

LAVINA®



LAVINA® 25LM-X User Manual



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



WARRANTY CARD

A warranty card must be submitted to Superabrasive within 30 days of purchase in order for the foregoing warranty to apply. See next page for more details on LAVINA warranty and return policies.

Print and mail this form. Or fill out and submit our **ONLINE WARRANTY FORM**

Customer Information

Customer Name

Business Name

Street Address

Street Address line 2

City

State

Zip Code

Phone Number

Email Address

Machine Information

Model

Serial Number

Purchased from / Distributor Name

Purchase date

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 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.

WARRANTY AND RETURNS.....	3
1. GENERAL INFORMATION	5
Manufacturer	5
General Description	5
Machine characteristics.....	5
Main design	5
Environmental Conditions	5
Electrical Connection	5
VACUUM CONNECTION.....	6
TECHNICAL DATA	6
VIBRATIONS	6
SONOROUS EMISSIONS	6
LABEL DATA.....	6
CUSTOMER SERVICE.....	6
2. SAFETY INSTRUCTIONS	6
Recommended Use	6
Prohibited Use	6
Preparation for work.....	6
PROTECTION DEVICES	7
Arrest Functions	7
Safe Use	7
Residual Risks	7
Before You Begin	7
Operating Machine	7
After Work is completed	7
The Work Area	7
Personal Protective	7
Equipment (PPE).....	7
Operator	7
3. HANDLING AND TRANSPORTATION	8
splitting the carriage from the mainhead.....	8
LIFT THE MACHINE from working to tool mounting position.....	8
Lifting	8
Adjusting the handle.....	8
Storage	9
4. OPERATION	9
Preliminary Controls	9
Water Flow Control Unit	9
Adjusting and Mounting Tools	9
The Control Board.....	10
Starting the Machine.....	10
Operating the Machine	10
Stopping the Machine	11
ALARM	11
5. TOOLS AND ACCESSORIES	12
Weights	12
Tool holder key.....	12
Foam Plate.....	12
Security plate for Quickchange pads.....	12
6. POPULAR TOOLS	13
RECOMMENDED TOOLS	13

Use Only Superabrasive's Recommended Tools. For More Tooling Options, Visit www.superabrasive.com	13
7. MAINTENANCE AND INSPECTION.....	14
Cleaning	14
CHECK DAILY	14
Check Every 200 Working Hours	14
Check Every 400 Working Hours	14
VACUUM	14
WATER LEAKS.....	14
MECHANICAL PARTS	14
ELECTRICAL SYSTEM	14
8. TROUBLESHOOTING.....	21
Index of Problems and Solutions.....	21
8.1 Replacing Power Cord and Plugs	21
8.2 DISMOUNTING AND MOUNTING TOOL HOLDER TO CHANGING V-RINGS AND FELT-RINGS	21
8.3 DISASSEMBLING AND MOUNTING TOOL HOLDER TO CHANGE BUFFERS AND ELASTIC ELEMENT.....	21
8.4 CORRECTING SAG OF THE USED PLANETARY CHAIN	23
8.5 Mounting new planetary CHAIN	23
8.6 Replacing the Planetary DRIVING Chain Wheel AND Planetary Tensioner.....	24
8.7 tensioning and replacing the belts.....	25
8.8 Replacing the Planetary driven Chain Wheel	27
8.9 replacing the pulley units.....	27
8.10 replacing the planetary unit	28
8.11 REPLACING PARTS FROM THE DRIVING OF THE CARRIAGE	28
8.12 Motor Connection.....	28
8.13 Fault diagnosis Inverter YASKAWA V1000	29
9. DISPOSAL	31
10. MANUFACTURER'S CONTACTS	31
11. SPARE PARTS	32
ASSEMBLY AND PARTS SPECIFICATIONS	32
1. LAVINA®25LM-X General parts.....	32
2. LAVINA® 25LM-X Top Cover 1 parts	32
3. LAVINA®25LM-X Top Cover parts 2.....	33
4. LAVINA®25LM-X Guard Parts	33
5. LAVINA® 25LM-X Bottom Cover 1 Parts	33
6. LAVINA® 25LM-X Planetary Drive Parts	34
6.1. LAVINA® 25LM-X Pulley Unit Assembly	35
7. LAVINA® 25LM-X Bottom Cover 2 Parts	35
8. LAVINA®25LM-X Water TANK Parts	36
9. LAVINA®25LM-X TOOL HOLDER PARTS/SEE ALSO FIG.8.7.13/	36
(POS.1 INCLUDE POS.1.1;1.2;1.3/POS.1.3 INCLUDE POS.1.3.1 and etc.)	36
10. LAVINA®25LM-X CARRIAGE PARTS	37
11. Lavina® 25LM-X Control Box Parts 200-240 Volt	38
12. Lavina® 25LMX-HV Control Box Parts 440-480 Volt ..	40

1. GENERAL INFORMATION

This owner's manual is intended for the operator of the Lavina® X 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® X 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® X machine is intended for grinding, polishing and buffing concrete, marble, granite, limestone, and terrazzo surfaces with diamond tools.

The Lavina® X machine is a three-disc machine, which can be used dry as well as wet.

For best results, use only tools manufactured or recommended by Superabrasive and its distributors. Additionally, the machine could be used for grinding wood floor surfaces.

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

MAIN DESIGN

The two main component sections of each machine are: carriage and main head.

The **handle** (Fig.1.2) on the frame is adjustable in height and allows the operator to work in a correct and safe working posture.

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 **controls** are positioned on top of the electrical box (fig.1.3)

The **electrical box** (fig.1.3) contains the electric switching devices and the inverter.

The **main feeding cable** is connected with a plug and socket on top. The motor feeding cable is plugged into the socket located on the bottom of the box.

The **tank** is on the opposite side of the frame, so that the weight of the water has no influence on the operation of the machine. The frame weight, on the other hand, is fully absorbed by the driving wheels. An electric pump sprays the water through a front sprayer or internal.

The **motor** is mounted on the base plate and is driving the three heads with a belt system.

The **planetary head** is driven by a simplex roller chain .

ENVIRONMENTAL CONDITIONS

The temperature range for operating the Lavina® X machine outdoors is between 41°F and 86°F or 5°C and 30°C. Never use the Lavina® X machine 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.



Figure 1.1



Figure 1.2



Figure 1.3

VACUUM CONNECTION

A connection for a vacuum dust extractor is located on the carriage. The Lavina® X machine 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 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 320m³/h with a negative vacuum of 21 kPa.

TECHNICAL DATA

	Lavina® 25LM-X		Lavina® 25LM-X-HV	
Voltage/Hz	3 ph x 200-240V/50-60Hz		3 ph x 440-480V/50-60Hz	
Amperage	Max 45 Amps		Max 30 Amps	
Power	11 kW	15 HP	11 kW	15 HP
Tool holder rpm	300-1100 rpm		300-1100 rpm	
Working width	655 mm	655 mm	655 mm	25.8"
Tool diameter (QC Plate)	3x 225 mm	3x 225 mm	3x 225 mm	3x 9"
Weight	349 kg	349 kg	349 kg	769lbs
Grinding pressure	180 kg	180 kg	180 kg	397 lbs
Additional weight	max 2x 29 kg	max 2x 29 kg	max 2x 29 kg	max 2x 64 lbs
Application	wet and dry		wet and dry	
Vacuum hose port	Yes		Yes	
Water tank capacity	20 l	20 l	20 l	5.2 gal
Water feed	with pump (peripheral and front)		with pump (peripheral and front)	
Cable length	17.4 m	17.4 m	17.4 m	57 ft
Machine LxWxH	1800x690x1265 mm	1800x690x1265 mm	1800x690x1265 mm	71x27.2x50"
Packing Crate LxWxH	1480x820x1560 mm	1480x820x1560 mm	1480x820x1560 mm	58.3x32.3x61.5"

VIBRATIONS

The vibrations of the machine are within the limits of directives and harmonized standards from the European Union when the Lavina® X 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® X 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 INSTRUCTIONS

RECOMMENDED USE



WARNING

The Lavina® X machine is designed and manufactured to grind and polish concrete, terrazzo, and natural stone floors. It can be used for renovation as well as for polishing. The machine is designed for dry or wet use. When using it dry, 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 non-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

Make sure that:



WARNING

- 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.

PROTECTION DEVICES



WARNING

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. Before using the machine, please ensure that all protection devices are mounted and function properly. The Security plate prevents the QuickChange pads to from loosening during work

ARREST FUNCTIONS



WARNING

Functions of arresting of the machine are following:

- Button to stop the motor (category 1)
- Emergency button (category 1)

SAFE USE



WARNING

The Lavina® X 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: Mount the Security plate for the QuickChange pads.
- 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.

- Before filling the water tank with water make sure the machine is not working and the main switch is turned off.
- Before turning on the machine make sure that the base is placed on the floor, the machine **MUST NOT** be in an upright position when turned on!

OPERATING MACHINE



WARNING

When operating the Lavina® X, 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.



WARNING

The water hose must move freely and must be damage-free. Check to make sure the floor, you are preparing to work on, is even. If the floor is uneven, it may damage the machine.

AFTER WORK IS COMPLETED

- Clean the machine and its surroundings properly
- Empty and clean the water tank
- 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® X 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. HANDLING AND TRANSPORTATION

SPLITTING THE CARRIAGE FROM THE MAINHEAD

Unplug the motor cable plug from the control box and disconnect the water hose from the main head by pulling it out (Fig.3.1) (Fig.3.2). Wind the electrical cable on the carriage (Fig.3.3). Release the pin sets which attach the head to the carriage (Fig.3.4). Pull out the vacuum hoses (Fig.3.3), and dismount the head from the carriage (Fig.3.5). The head of the LAVINA® X machine has one bar for support and is used as handles for easy moving and transportation.



Figure 3.1



Figure 3.2



Figure 3.3



Figure 3.4



Figure 3.5

LIFT THE MACHINE FROM WORKING TO TOOL MOUNTING POSITION

Push the lock the handle down and swivel it to the front (Fig.3.6.1). Pull the handle up and ensure the head is a stable upright position, for mounting/dismounting the tool. Ensure that the water tank is empty before flipping the machine. Pull the head in upright position (Fig.3.6.2).

LIFTING

Lifting the machine by crane is possible with the eye bolt, which is mounted on the carriage (see Fig. 3.7). The eye bolt and machine construction is rated only for the weight of the machine. Do not list any other leads on the machine. Always use hoisting equipment rated for 300 kg or 660 lbs.



Figure 3.7



Figure 3.6.1



Figure 3.6.2

ADJUSTING THE HANDLE

The Handle on the frame is adjustable in height and allows the operator to work in a correct and safe posture. **The unlocking is by pulling the handle (fig.3.8)The locking is automatically under action of the spring.** Choose the upright position to move easy the machine.



Figure 3.8

STORAGE

Always store and transport the Lavina® X machine in a dry place. Never transport the Lavina® X machine unprotected; it may be damaged if transported unprotected during rain or snow.



Figure 3.9



Figure 3.10



Figure 3.11

⚠ WARNING

When storing the machine the temperature may fall down to or to less than 32F (or 0° C) you should empty the water from the system using the following steps:

- Pull out the hose of the tank (Fig.3.9)
- Using compressed air blow out the water from the system for the two positions of the turn-cock (Fig. 3.10, Fig. 3.11).

4. OPERATION

PRELIMINARY CONTROLS

Inspect the working area as explained in the safety instructions. For wet use, fill the water tank when the electrical cable is disconnected. Connect the vacuum extractor and ensure that the vacuum hose is clear and that it will easily follow the machine. Plug in the machine and make sure that the power cord is free to follow the direction of the working Lavina® X machine.

WATER FLOW CONTROL UNIT



Figure 4.1



Figure 4.2



Figure 4.3

The operator can choose the water sprayer in the front when the tap is in the horizontal position (Fig.4.1), the water will spray under the cover of the machine when the level is in the vertical position (Fig.4.2). The flow regulating valve located on the tank (Fig.4.3) is increasing or reducing the water flow to the working area – in front of the machine or under the main head cover of the machine.

ADJUSTING AND MOUNTING TOOLS

The Holder A41 in LAVINA® X can work with either 3 or 6 buffers which will change its elasticity. You can make the change after dismantling the holder as per the instruction in TROUBLESHOOTING. **In Lavina 25L-X the holder is initially mounted with 6 buffers.**

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:** Always secure the “QuickChange” pads with the security plate (Fig.4.4), lock with the tool holder key (Fig.5.3). Diamond tools with Velcro are attached to three 9inch foam plates (Fig.4.5). The foam plates are mounted on the key lock (butterfly). Always use the tool holder key (Fig.5.3).

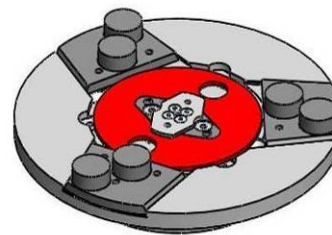


Figure 4.4

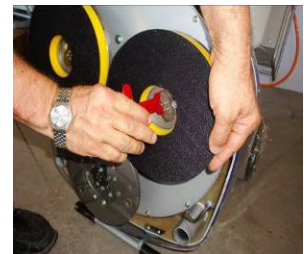


Figure 4.5

THE CONTROL BOARD

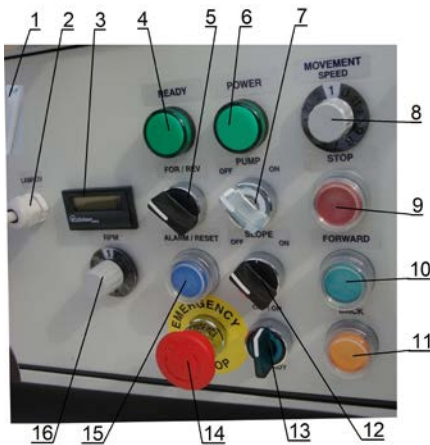



Figure 4.6

1. **Power cable plug**
2. **Lamp cable gland**
3. **Digital RPM indicator** Indicates the revolution per minute of the grinding plates (not the revolution per minute of the entire)
4. **READY led lights green when the power is on**
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. **Power led lights green when the power is on**
7. **Water pump switch** Lights orange when the water pump is working.
8. **Potentiometer** changes the speed of the movement forward or back.

9. **STOP button** stops the movement forward or back, by switching off the connection between gearmotor and wheels of the carriage. By activating it you can operate the machine in manual mode.
10. **FORWARD button** set direction forward. Lights green when is on.
11. **BACK button** set direction backward. Lights red when is on.
12. **ON/OFF switch SLOPE**  **WARNING** In position ON, does not allow to switch off the connection between the gearmotor and the wheels of the carriage, both from the STOP button /pos.9/, and from the Emergency stop button. It must be used when operating the machine on a slope for the security of the operator and the machine. Disconnecting the connection between the gearmotor and the carriage wheels is possible after switching the button in position OFF and activating the button STOP /pos9/.
13. **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.
14. **Emergency button** used in Emergency situations for stopping the motor.
15. **ALARM/Reset button** resets the alarm of the inverter. **Button** lights blue when the inverter goes into alarm mode
16. **Potentiometer** changes the RPM of the grinding plates from 300-1100 rpm

STARTING THE MACHINE

Follow strictly the instructions in chapter "SAFETY INSTRUCTIONS".

NEVER WORK WITH THE MACHINE WITHOUT VISUAL CONTACT WITH IT.

First, follow the directions in chapter Safety Devices and Safety Instructions. If working wet, add water to the floor surface. If working dry, omit this step, and instead, switch on the vacuum unit. Next, pull the emergency stop (Fig.4.6-14) to ensure that the machine is in working condition. Check the potentiometer (Fig.4.6-16) and ensure that it is set at the working speed. Check the potentiometer (Fig.4.6-8) for the required working speed.

Finally, hold the machine firmly and turn the start button (Fig.4.6-6) and set movement direction of the machine – forward or backward from the corresponding buttons (Fig.4.6-10 and Fig.4.6-11).

OPERATING THE MACHINE

Guide the machine in straight lines across the floor, and with each new line overlap a little bit of the previously completed surface.

At the end of each line you can reverse the direction of the machine by simply pressing the corresponding button **FORWARD** or **BACK** and through the handles to direct a new runway. If you get tight the handles and trigger the button **STOP** you will get to manual operated mode of the machine and can perform more complicated maneuvers. Once you direct the machine in the desired direction activate again the selfpropelled movement. Increase or decrease of the speed of the machine when operating can be made by the potentiometer (Fig.4.6-8)

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® 25LM-X-HV machine in one spot while the tools are still working because they will leave marks on the floor surface. When working wet, preliminary chose with the water tap (Fig.4.2) the position for water feed and periodically start the pump (Fig 4.6-7) to release water onto the floor surface. When working dry, check the floor surface periodically to ensure that dust is not accumulating on the surface, also check regularly if your vacuum works properly.

If you need to process on the floor with a slope that requires significant effort to work with machine with manual control, put the button **SLOPE** in position **ON**. In this position the activating the button **STOP** or **Emergency stop** will not **disconnect** wheels and motorgear connection and it will serve as a break on any movement of the machine on the slope. In that case the machine is operated by the buttons **FORWARD ; BACK and STOP**, but without possibility to go to manual control and at the end of the coarse. To switch to manual operation and control of the machine get the button **SLOPE** in position **OFF** and push the button **STOP**.

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 switch the off switch (Fig.4.6-15). Use the Emergency button (Fig.4.6-14) only in emergency or use it to switch the power totally off.

Remember not to hold the machine in one spot before turning off the motor.

The machine drive is stopped by the button **STOP** (Fig.4.6-9) or **Emergency button** (Fig.4.6-14)

ALARM

The Alarm light ((Fig.4.6-15) will light incase inverter goes in alarm mode. The most common failure is motor in overload. To reset the mode push reset button ((Fig.4.6-15).

5. TOOLS AND ACCESSORIES



Figure 5.1

WEIGHTS

Superabrasive offers additional weights for increasing the productivity of the machine (Fig.5.1). Each additional weight weighs about 64 lbs or 29kg. 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. The weight stacks onto three posts that are around the outer bowl (Fig.5.2). The additional weights depend on the tools; it is not always possible to ass weights. Some tools work too aggressively and the machine can stop. The weight can be ordered with item number A08.00.00.00



Figure 5.2

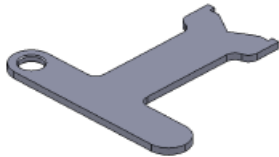


Figure 5.3

TOOL HOLDER KEY

The tool holder key (Fig.5.3) is used for adjusting, mounting and dismounting of the foam plates. Always use the key for mounting. Item number is A03.00.00.00

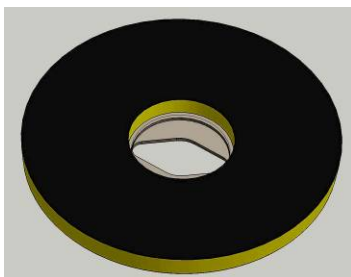


Figure 5.4

FOAM PLATE

Diamond tools with Velcro are mounted on the foam plate 9"(Fig.5.4). The foam plate is mounted on the "QuickChange" System. Item number is LV-9-FP-S

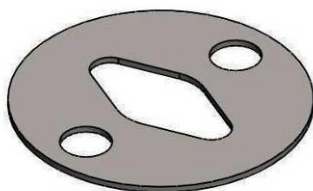


Figure 5.5

SECURITY PLATE FOR QUICKCHANGE PADS

Plate (Fig.5.5) used to ensure the "QuickChange" pads. Item number is A38.00.01

6. POPULAR TOOLS

RECOMMENDED TOOLS



QuickChange Metal Bond Tools 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 full range of grit sizes (from 6 to 120 grit). 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 included 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-impregnated pads for floor maintenance. Available in a variety of sizes, and are great for daily use. When used wet, they require only water (no wax or chemicals needed) and are a very environmentally friendly solution for maintaining floors.

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

7. MAINTENANCE AND INSPECTION

CLEANING

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

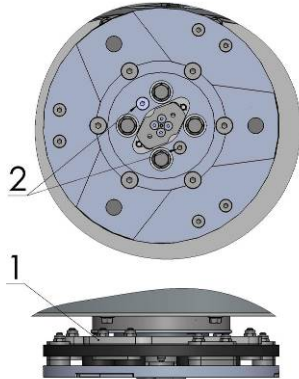


Figure 7.1

should be clean also.

CHECK DAILY

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

Tool holders: Buffers and elastic element are consumables and must be visually checked on a daily basis and replaced if necessary. Make sure the flanges or discs are securely locked in place. The key lock holders (butterflies) should also be checked.

Check the rubber buffers and make sure the holders are secure. The flange holding the buffers (Fig.7.1-1) has to be firmly secured to the unit. If there is a gap seen here, that means the screws securing the holder are loose. The screws have to be tightened immediately to safely operate the machine. Working with loose screws could cause serious damage to the machine. The tightening force of the screws has to be 22-25N.m (16-18ft/lbs).

It is very important to regularly check the screws that secure the “QuickChange” holder to the safety part (Fig.7.1- 2), so that the holder will not fly away if the buffers get damaged. The “QuickChange”



Figure 7.2



Figure 7.3

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 plugs, vacuum hoses and water tank and filter. Also, check the water flow of the pump. 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.

Open the service cover on the motor base (Fig 7.2) (Fig 7.3) to check of the planetary chain. Lubricate the chain with special lubricant for chains and correct the sag if needed. For sagging correction (See TROUBLESHOOTING 8.4).

Dismount the tool holders (See TROUBLESHOOTING) and replace all parts (elastic element, buffers, sealer caps, “O” rings) that have the slightest damage.

CHECK EVERY 400 WORKING HOURS

Besides the checks of 200 working hours, replace sealer and V-rings like described in chapter “TROUBLESHOOTING DISMOUNTING TOOL HOLDERS TO CHANGING V-RINGS AND FELT-RINGS.

VACUUM

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

WATER LEAKS

Leaking parts should be replaced immediately because the water could damage your machine.

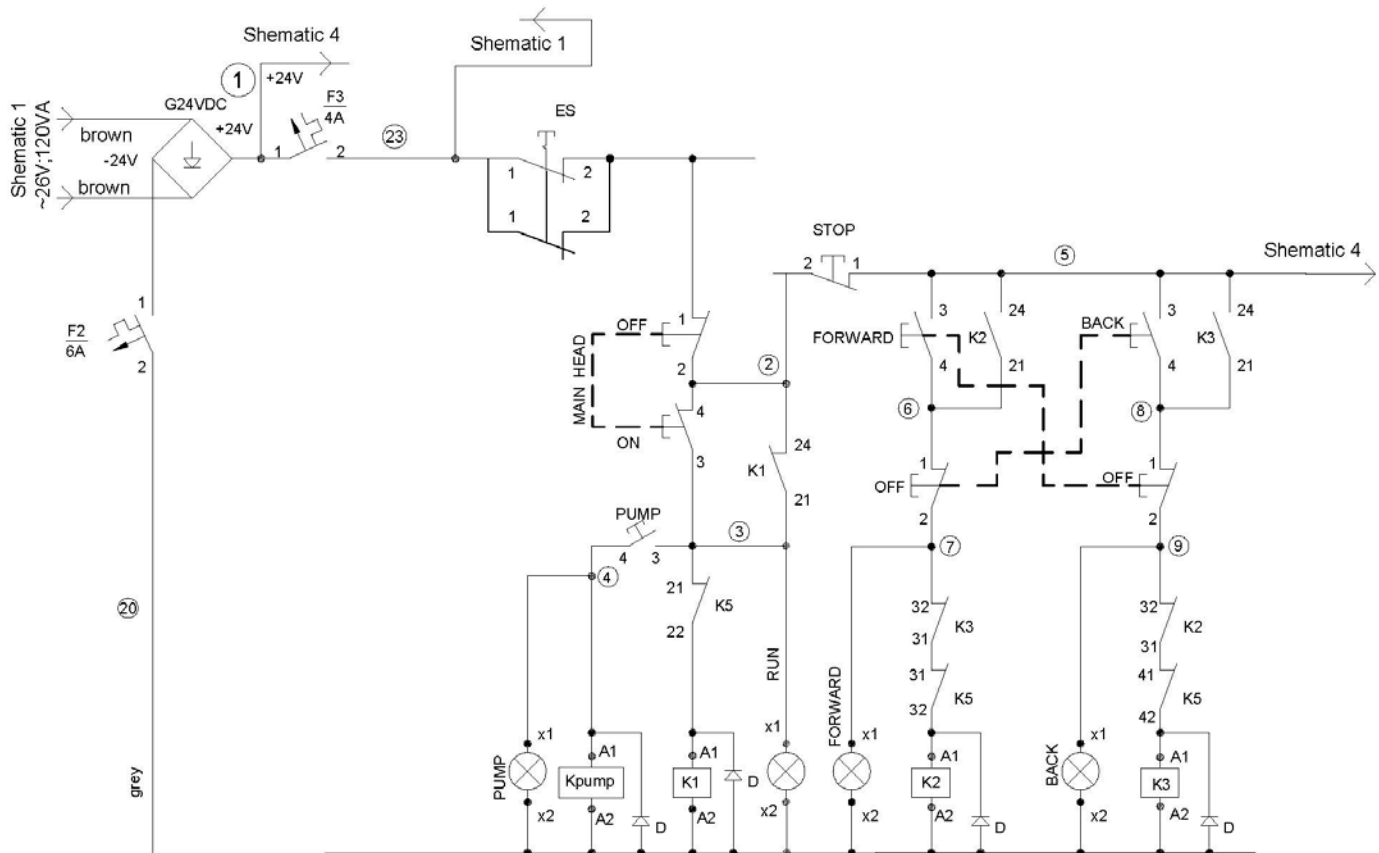
MECHANICAL PARTS

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

ELECTRICAL SYSTEM

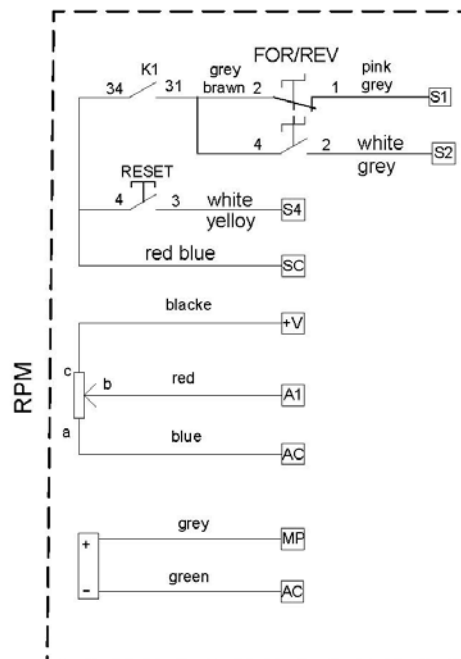
Dust should not enter the control box, as it will destroy the controls. Remove (blow out) any dust present

Schematic 2

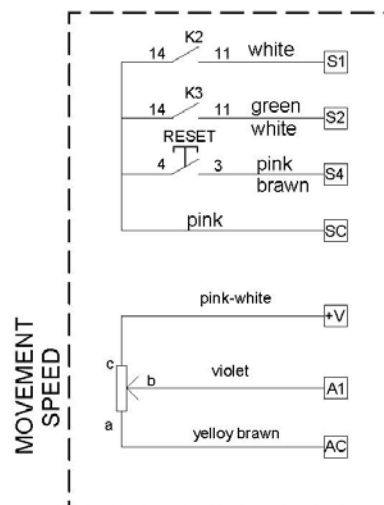


Schematic 3

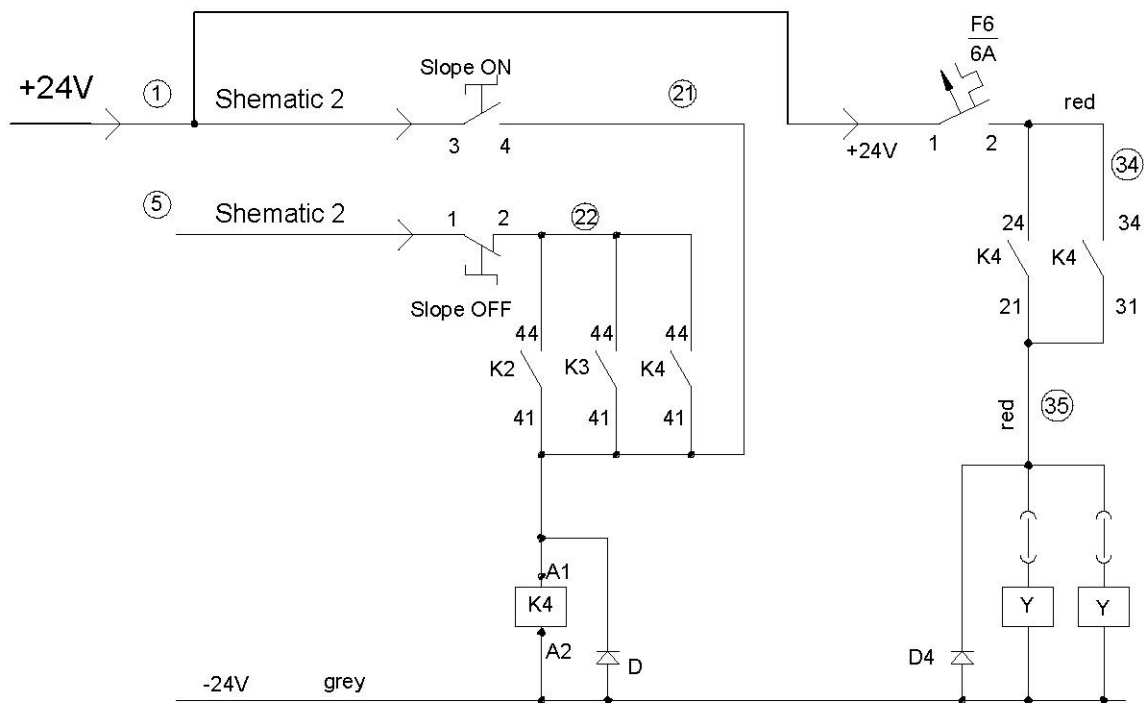
CIMR VU2A0056FAA



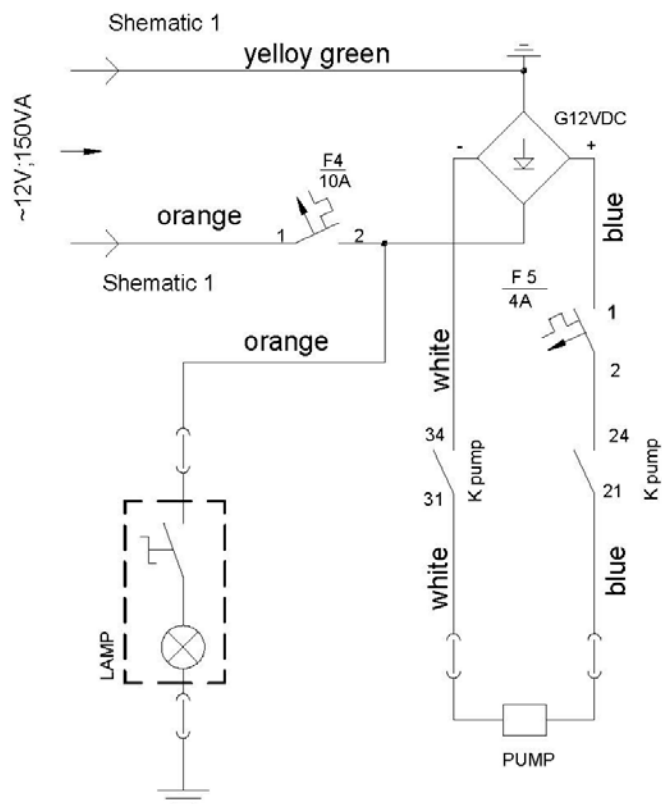
CIMR VUBA0003FAA



Schematic 4

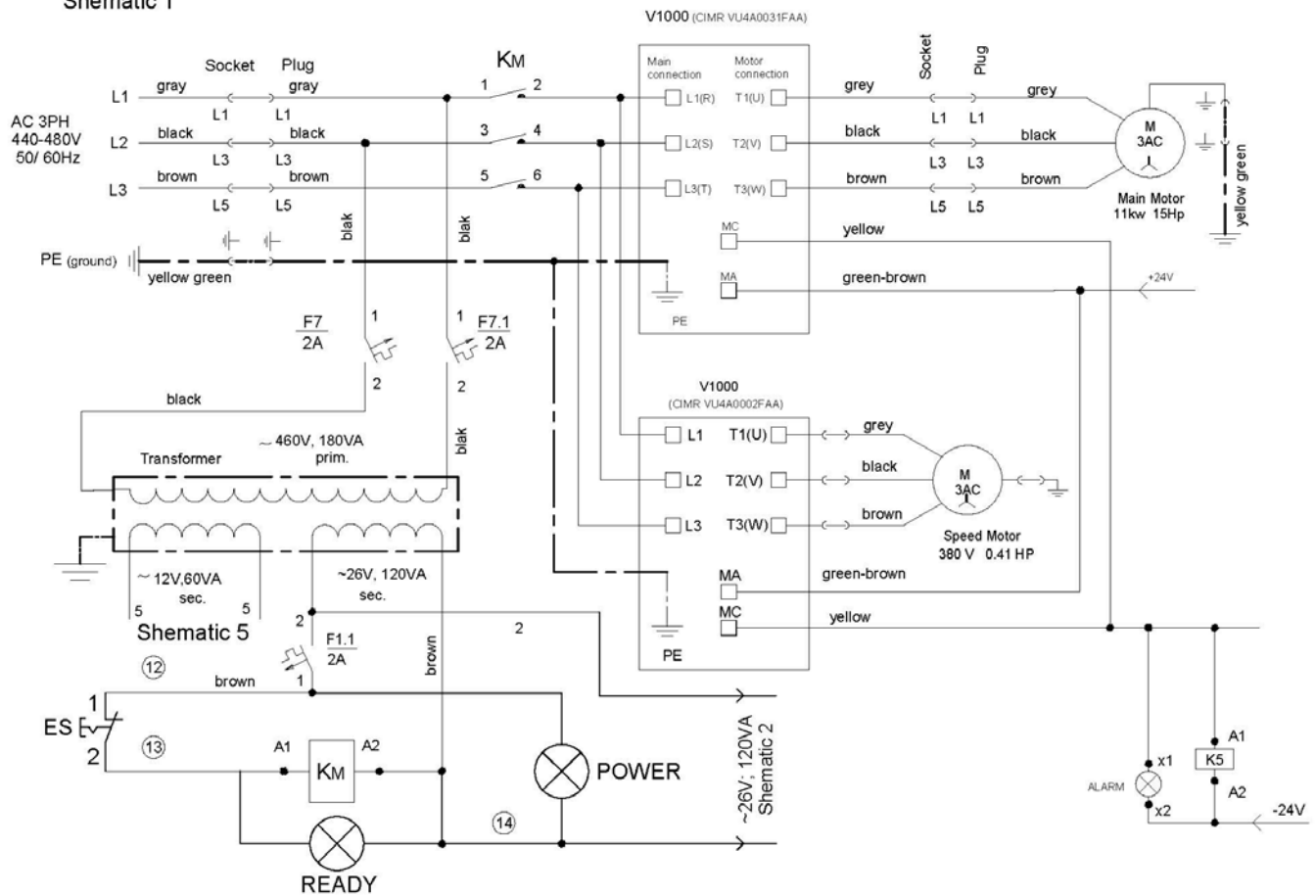


Schematic 5

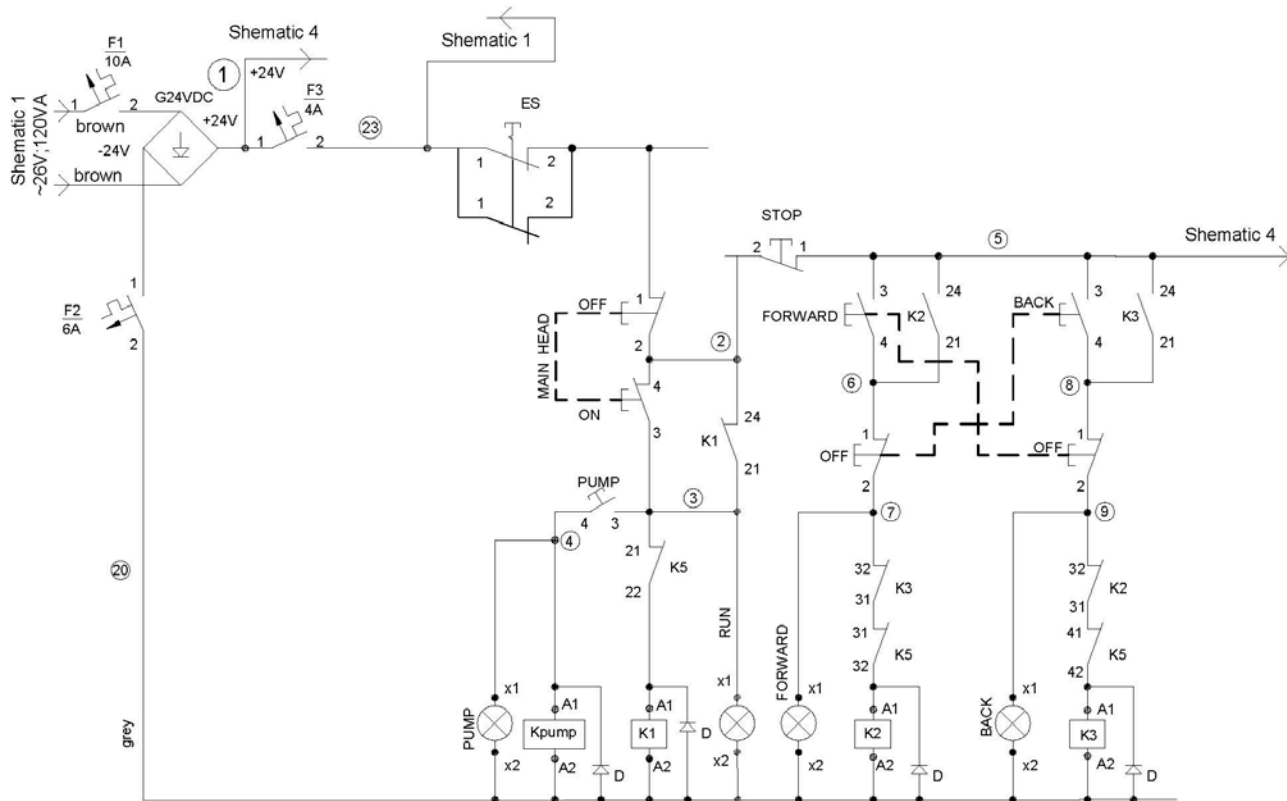


Lavina® 25LM-X-HV Electrical schemes with Yaskawa Inverter 440-480 VOLT

Schematic 1

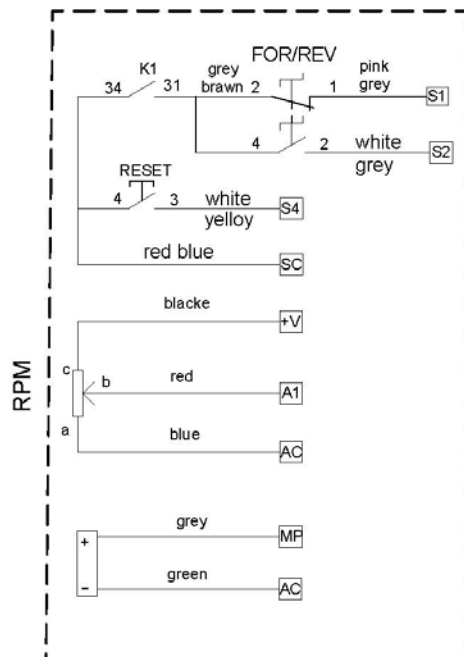


Schematic 2

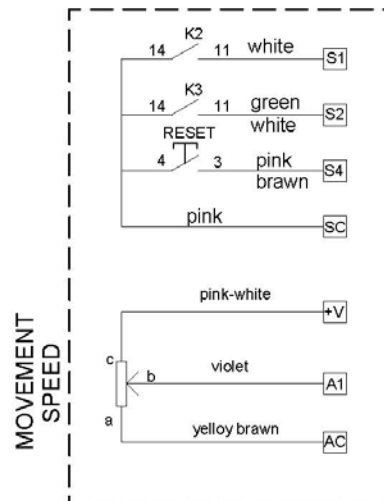


Schematic 3

CIMR VU2A0056FAA



CIMR VUBA0003FAA



8. TROUBLESHOOTING

INDEX OF PROBLEMS AND SOLUTIONS

8.1 REPLACING POWER CORD AND PLUGS

When replacing the power cord or plugs always use cords and plugs with the same specifications as the original ones. Never use lower quality or different types of cords and plugs.

In addition, take into consideration the distance between the appliance and 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 into alarm mode. This will 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 you need longer lengths then you must replace all the cables with cables of a bigger gauge rate for the length and amperage.

8.2 DISMOUNTING AND MOUNTING TOOL HOLDER TO CHANGING V-RINGS AND FELT-RINGS



Figure 8.2.1



Figure 8.2.2

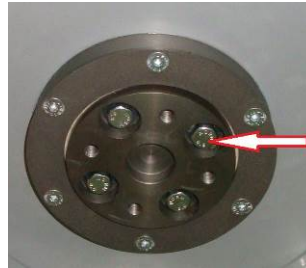


Figure 8.2.3



Figure 8.2.4



Figure 8.2.5



Figure 8.2.6

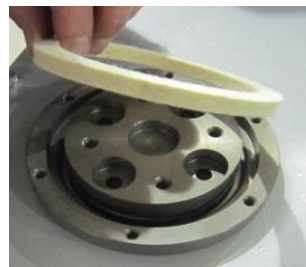


Figure 8.2.7

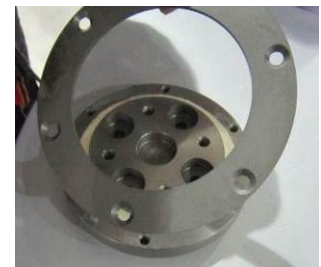


Figure 8.2.8

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

You will need deep metric socket 13mm with outside diameter not more than 3/4in to unscrew the four bolts (Fig.8.2.1) and remove the holder (Fig.8.2.2) When the tool holder is dismantled, you can change the sealers (V-Ring and Felt-Ring).

By loosening four Hex cap flange bolts (Fig.8.2.3) the adaptor comes loose. Unscrew the six screws of the cap (Fig.8.2.4) 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.8.2.5) just push the V-Ring so the top is on the same level as the pulley top (Fig.8.2.6). Then take the adaptor and push the V-Ring down with the adaptor (Fig.8.2.7). 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.8.2.7). Close the sealers with the cap (Fig.8.2.8) and screw the bolts. Always use the original bolts.

8.3 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.8.3.1) to dismantle the retaining washer (Fig.8.3.2). Take out the screws on the buffers and the nuts of the elastic element (Fig.8.3.3;Fig.8.3.4). Remove the elastic element from the QC plate (Fig.8.3.5). While the holder is dismantled (Fig.8.3.6;Fig.8.3.7) 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.8.3.8) and push the locking pin (Fig.8.3.9). This will prevent the fall of the washer when mounting the holder on the machine.



Figure 8.3.1



Figure 8.3.2

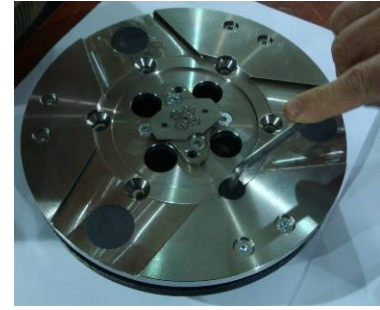


Figure 8.3.3

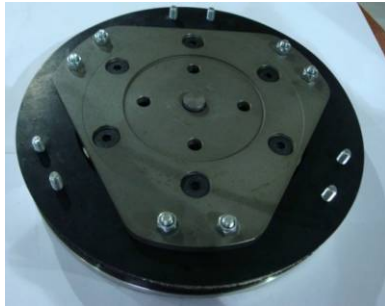


Figure 8.3.4



Figure 8.3.5



Figure 8.3.6



Figure 8.3.7



Figure 8.3.8

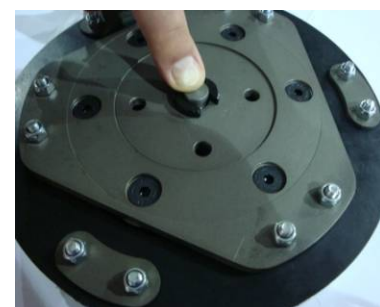


Figure 8.3.9

Make sure the four bolts holding the adaptor (Fig.8.3.12) are reliably tighten. Mount the holder on the machine using the same socket as mentioned in 8.2 (Fig.8.3.10; Fig.8.3.11). The retaining washer fits into the central hole C of adaptor and the four bolts into the thread holes T (Fig.8.3.12). 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.8.3.2) 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 8.3.10



Figure 8.3.11

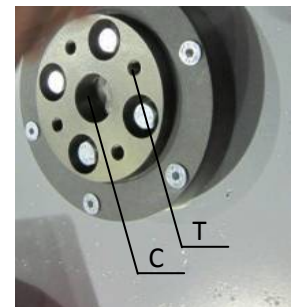


Figure 8.3.12

Fig.8.3.13 is 3-D section view of the holder, showing its parts. The numbering is the same as in Spare parts.

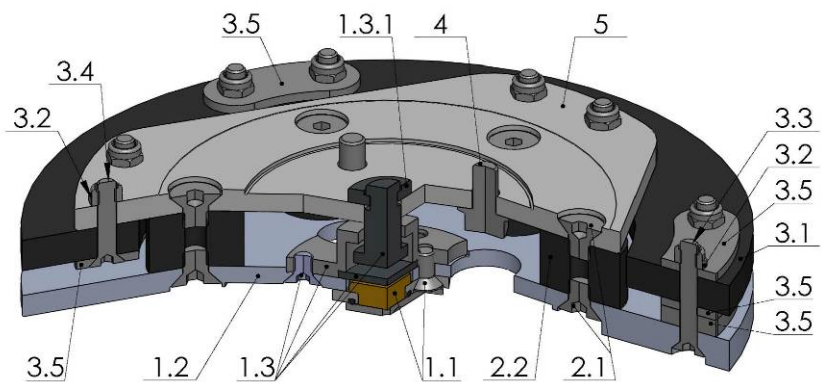


Figure 8.3.13

8.4 CORRECTING SAG OF THE USED PLANETARY CHAIN

Unscrew the eight bolts (Fig.8.4.1) and take out the cover (Fig.8.4.2) and pull out the hose of the water sprayer(Fig.8.4.3). Lift the machine in position to change the tools. Turn manually the holders in order to turn the main head, stop when you see through the window the chain tensioner (Fig.8.4.4).



Figure 8.4.1



Figure 8.4.2



Figure 8.4.3



Figure 8.4.4

Loosen a quarter to 1/2 rev the two bolts of the chain tensioner (Fig.8.4.5) the tensioner should turn with minimum clearance, without inclination, then unscrew the inner nut. To tension the chain screw the outer nut (Fig.8.4.6). The tensioner of the planetary chain should allow chain sagging 3...5mm/1/8...3/16 in/ controlled in span X (Fig.8.4.7). When ready screw the two nuts (Fig.8.4.6) and the screw(Fig.8.4.5).



Figure 8.4.5



Figure 8.4.6



Figure 8.4.7

ATTENTION: NEVER "OVER" TENSION THE CHAIN, THE CHAIN WILL BE DAMAGED

8.5 MOUNTING NEW PLANETARY CHAIN

The planetary chain is replaced with new one when the step/drive of the chain tensioner is finished or there is a break in the integrity of the chain.

Unscrew the eight bolts (Fig.8.4.1) and take out the cover (Fig.8.4.2) and pull out the hose of the water sprayer (Fig.8.4.3). Lift the machine in position to change the tools. Turn manually the holders in order to turn the main head, stop when you see through the window the chain tensioner (Fig.8.4.4). Separate the carriage from main head, pull out motor plug (Fig. 3.1), water tubes and vacuum tubes (Fig. 3.2) (Fig. 3.3). Take off handle (without water tubes) (Fig. 8.4.3). Release the pin sets (Fig. 3.4) which attach the head to the carriage. Take off the weight holders(Fig. 8.5.1), machine support(Fig. 8.5.2) and the service window



Figure 8.5.1



Figure 8.5.2



Figure 8.5.3

Loosen the two nuts(Fig.8.4.6) and unscrew the two screws of the tensioner (Fig.8.4.5)(Fig.8.5.4)(Fig.8.5.5). Take the chain tensioner(Fig.8.5.6). Pull out the split pin (Fig.8.5.7) and the chain link pin (Fig.8.5.8) (Fig.8.5.9). Take the chain, and put on the same way the new chain, get in the chain link pin and the split pin (Fig.8.5.9) (Fig.8.5.8) (Fig.8.5.7).



Figure 9.5.4



Figure 9.5.5



Figure 9.5.6



Figure 9.5.7



Figure 9.5.8



Figure 9.5.9

Mount the chain tensioner (Fig.8.4.6). Screw the two screws (Fig.8.5.4)(Fig.8.4.5). Loosen a quarter to 1/2 rev the bolt of the chain tensioner (Fig.8.4.5) the tensioner should turn with minimum clearance, without inclination, then unscrew the inner nut. To tension the chain screw the outer nut (Fig.8.4.6) . The tensioner of the planetary chain should allow chain sagging 3...5mm/1/8...3/16 in/ controlled in span X (Fig.8.4.7).

When ready screw the two nuts (Fig.8.4.6) and the screw(Fig.8.4.5).

ATTENTION: NEVER “OVER” TENSION THE CHAIN, THE CHAIN WILL BE DAMAGED

8.6 REPLACING THE PLANETARY DRIVING CHAIN WHEEL AND PLANETARY TENSIONER

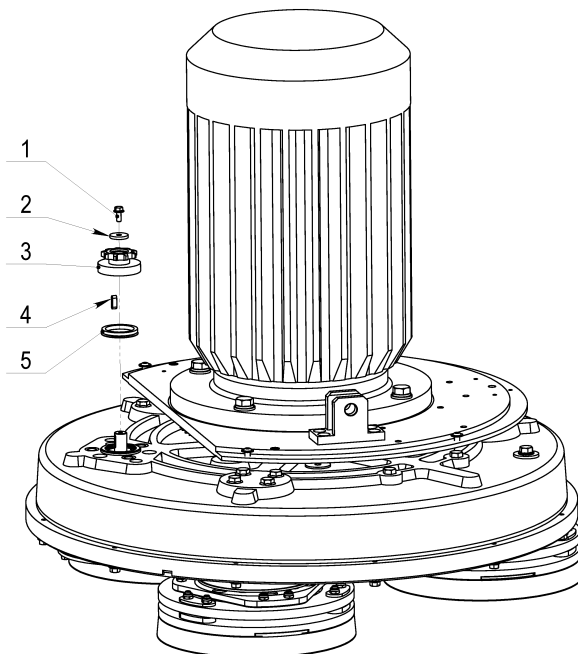


Figure 8.6.1

Check and repeat the instruction in 8.5 MONTING NEW PLANETARY CHAIN.

Unscrew bolt pos.1 take the chain pulley pos.3 together with the sealer pos.5. Change the sealer and mount it to the chain pulley pos.3. Apply lithium grease on the shaft and mount back the wheel and the front washer pos.2 as shown on (Fig.8.6.1). Screw the bolt by using always the “blue” thread locking adhesive. Tightening force of the bolts has to be 9...11N.m(6.6...8 ft/lbs).

8.7 TENSIONING AND REPLACING THE BELTS



Figure 8.7.1

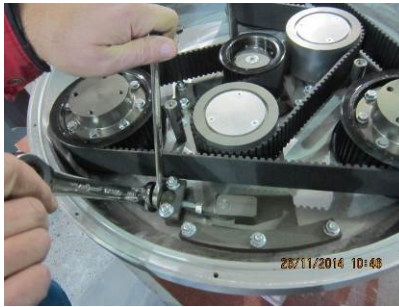


Figure 8.7.2



Figure 8.7.3

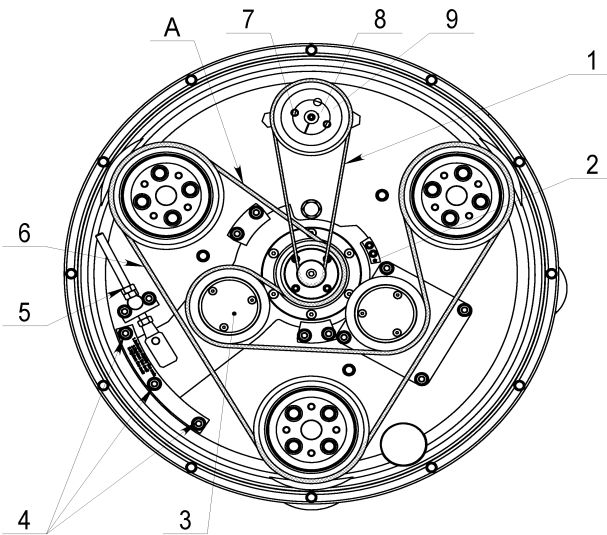


Figure 8.7.5

The transmission of the machine has two timing belts (main belt and planetary belt) of maintenance free type. To change the main belt you have to remove all holders and dismount their adaptors. Dismount the sealing. Carefully check the friction surface (flanges of the lower cover and the outside diameter of the adaptors). Decide if they are in good condition (wear out, smoothness of surface) and whether they can work until next inspection. Remove the bottom cover, unscrew the bolts on the outskirt and the three bolts of the spacers (Fig. 8.7.1). Under the cover on the outskirt there is a sealer, and the spacers have O-Rings. The change of all seals together with the belts is recommended.

Fig.8.7.5 shows the scheme of belts location. To dismount the old belts first dismount the planetary belt pos.1 and after that the main belt pos.6.

To dismount the main belt pos.6 unscrew nuts on pos.4 and pos.5 enough to be able to turn the tensioners pos.3 around the central axle. Clean the washers and space around, and check if all bearings of pulley units or tensioners are in good condition (check for too much clearance or rolling noise). Rotating the tensioner will allow the centre

distance to be reduced in such a way that the timing belt may be fitted without force. Installation with the use of force is NOT permissible at any time as this can damage the high quality, low stretch tension cord and other components. This damage is often not visible. Put the belts in pos.6 as per the scheme, and pay attention for their correct position in every pulley. Screw up until it stops and loosen on the half moons the nuts on pos.4, allowing the rotation of the tensioners at minimum inclination.

Using nuts on pos.5 tighten the belt, verifying again the correct position of the belt, and the correct gearing in every pulley.

Rotate the gear while tensioning to allow regular tension distribution on the belt. Control the tension using Frequency tension Tester (Optibelt 3 TT) (Fig. 8.7.3). Tension in span "A" of the belt should be 120-130Hz. It is possible for tensioning while changing the belt to use pre-installed support (Fig.8.7.5-2) (Fig.8.7.6) (only when its factory position is not changed), to limit the turn of the tensioner when the required belt tension is done.

ATTENTION: NEVER "OVER" TENSION THE BELT, THE BELT WILL BE DESTROYED AND IT WILL NEVER RECOVER ITS ORIGINAL TENSION



Figure 8.7.6

To dismount the planetary belt (Fig.8.7.5-1) unscrew the screw of the front washer (Fig.8.7.7) and the two screws of the conical sleeve (Fig.8.7.8). Screw one screw in the free thread (Fig.9.7.9), to push the washer down (Fig.8.7.10); take the conical sleeve and the belt (Fig.8.7.11). You can help with a flat screw driver if the sleeve is not going out easy. (Fig.8.7.12).



Figure 8.7.7



Figure 8.7.8



Figure 8.7.9



Figure 8.7.10



Figure 8.7.11



Figure 8.7.12

The assembly is on reverse order, and is important to match the threads of the conical sleeve and the belt washer(Fig.8.7.13). Put the front washer (Fig.8.7.14), on the screw use always the "blue" thread locking adhesive. Tightening force of the bolts has to be 4,5...6N.m(3,3...4,4 ft/lbs). Put carefully the two binder screws by leaving the central thread free.(Fig.8.7.14)(Fig.8.7.15). Insert the screws up to revolution and $\frac{1}{2}$ by alternating until the conical sleeve pull up the belt pulley. The conical sleeve must be aligned in height with the belt washer(Fig.8.7.16).



Figure 8.7.13



Figure 8.7.14

Dismounting the planetary belt is possible without removing of the Bottom cover assembly. Unscrew the eight bolts, take the service window cover and the sealing(Fig.8.7.17)(Fig.8.7.18). Dismount the planetary belt (see 8.7.)



Figure 8.7.15



Figure 8.7.16



Figure 8.7.17



Figure 8.7.18



Figure 8.7.19

8.8 REPLACING THE PLANETARY DRIVEN CHAIN WHEEL

Dismount the planetary chain and the tensioner and see Fig.8.5(MONTING NEW PLANETARY CHAIN).

Dismount the tool holders, sealers and bottom cover see Fig.8.7(TENSIONING AND REPLACING THE BELTS). Unscrew the cap that gives access to the fastening bolts of the driven chain wheel (Fig.8.8.1)(Fig.8.8.2). Roll the main head to the position when from the hole of the cap you see a fastening bolt of the driven chain wheel (Fig.8.8.3).

You will need magnetic deep metric socket 10mm with outside diameter not more than 11/16 in to unscrew the six bolts (Fig.8.8.3)(Fig.8.8.4) (Fig.8.8.5).

Driven Chain Wheel is composed by two symmetrical halves(Fig.8.8.6). Mount on the reverse order.

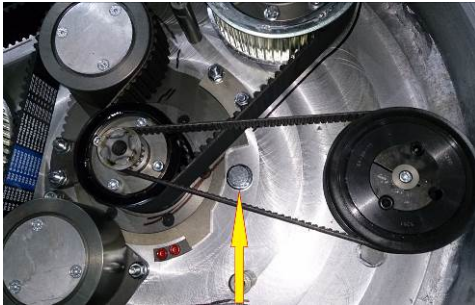


Figure 8.8.1

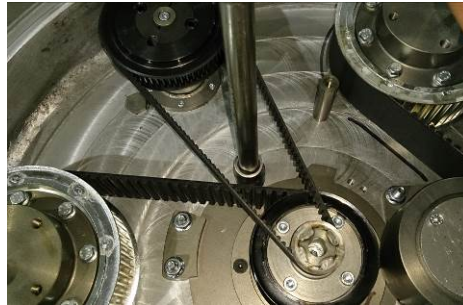


Figure 8.8.2

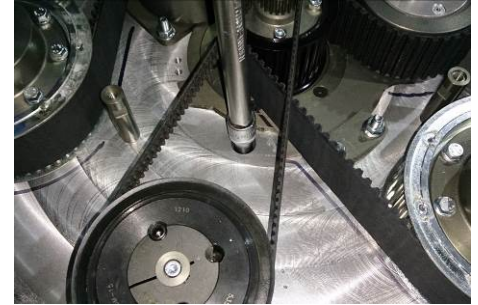


Figure 8.8.3



Figure 8.8.4



Figure 8.8.5



Figure 8.8.6

8.9 REPLACING THE PULLEY UNITS

Dismount guard, top cover, maintenance window chain tensioner, driven chain wheel, bottom cover and belts as previous described.



Figure 8.9.1



Figure 8.9.2



Figure 8.9.3

Unscrew the four bolts of each pulley between the base plate and the motor base disc (Fig.8.9.1)(Fig.8.9.2) and dismount the pulley (Fig.8.9.3).

A seal (Fig.8.9.4) should be placed on top of the pulley before mounting.



Figure 8.9.4

8.10 REPLACING THE PLANETARY UNIT



Figure 8.10.1



Figure 8.10.2

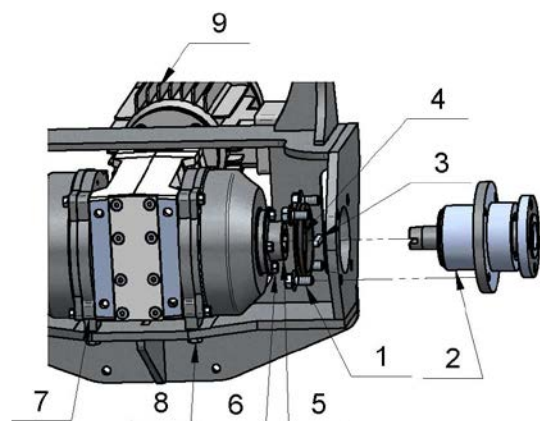


Figure 8.10.3

Unscrew the six bolts (Fig.8.10.1)(Fig.8.10.2) and press down the planetary unit. When mounting back secure with sealant (fig.8.10.3).

8.11 REPLACING PARTS FROM THE DRIVING OF THE CARRIAGE

Lift the lorry so both wheels are on the air. Unscrew the four bolts (Fig. 8.11-1) and take the bearing of the wheel (Fig.8.11-2).



From this position you can replace the loose key (Fig. 8.11-3) or the sealing V ring (Fig.8.11-4) without dismounting other parts. If a replacement of the half clutch is necessary (Fig. 8.10-5) unscrew the four bolts (Fig. 8.11- 6). During reassembly you have to assure the coaxiality of the wheel bearing against the hole of the half clutch (Fig. 8.11-5). Tighten the four bolts by hand (Fig. 8.11-1) and roll the bearing, so there is no increase or reduce of resistance on rolling. (Plug the lorry into the power supply, put **switch SLOPE** in pos. **ON** and tighten the four bolts (Fig. 8.11-1) tightening torque - 45N.m. (this way the parts of the electromagnetic clutch will take working position). After release of the electromagnetic clutches (put **switch SLOPE** in position **OFF** and activate the button **STOP** the bearing should scroll easy, without tangible resistance by hand. To replace the whole driving unit (Fig. 8.11- 7) or engine (Fig. 8.11- 9) unscrew the bolts (Fig. 8.11- 8). During reassembly you have to assure the coaxiality between the driving unit and the bearing of the two wheels.

8.12 MOTOR CONNECTION

In case the motor is being replaced, please follow the cable connections in the figures below (Fig.8.12.1 and Fig.8.12.2).

Lavina® 25LM- X

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

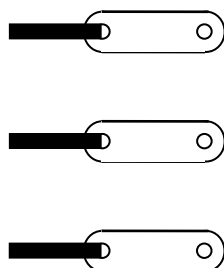


Figure 8.12.1

Lavina® 25LM-X-HV

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

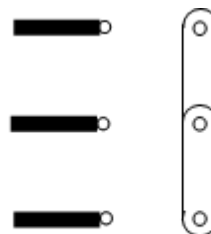


Figure 8.12.2

8.13 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	<p>When the drive detects a fault:</p> <ul style="list-style-type: none"> • 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	<p>When the drive detects an alarm or a minor fault:</p> <ul style="list-style-type: none"> • 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	<p>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.</p> <p>When the drive detects an operation error:</p> <ul style="list-style-type: none"> • 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	<p>Tuning errors occur while performing Auto-Tuning.</p> <p>When the drive detects a tuning error:</p> <ul style="list-style-type: none"> • 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	LED Operator Display	Name	Page
bUS	bUS Option Communication Error	242	CPF08	EEPROM Serial Communications Fault	243
CE	MEMOBUS/Modbus Communication Error	242	CPF11	RAM Fault	243
CF	Control Fault	242	CPF12	FLASH Memory Fault	243
CoF	Current Offset Fault	242	CPF13	Watchdog Circuit Exception	243
CPF02	A/D Conversion Error	242	CPF14	Control Circuit Fault	243
CPF03	PWM Data Fault	243	CPF16	Clock Fault	243
CPF06	Drive specification mismatch during Terminal Board or Control Board replacement	243	CPF17	Timing Fault	243
CPF07	Terminal Board Communication Fault	243	CPF18	Control Circuit Fault	243
			CPF19	Control Circuit Fault	244

LED Operator Display		Name	Page	LED Operator Display		Name	Page
CPF20 or CPF21	CPF20or CPF21	RAM Fault	244	GF	GF	Ground Fault	245
		FLASH Memory Fault	244	LF	LF	Output Phase Loss	245
		Watchdog Circuit Exception	244	LF2	LF2	Output Open Phase	246
		Clock Fault	244	oC	oC	Overcurrent	246
oH3	oH3	Motor Overheat 1 (PTC input)	247	oFA00	oFA00	Option Card Fault (port A)	246
oH4	oH4	Motor Overheat 2 (PTC input)	248	oH	oH	Heatsink Overheat	247
oL1	oL1	Motor Overload	248	oH1	oH1	Heatsink Overheat	247
oL2	oL2	Drive Overload	248	PGo	PGo	PG Disconnect (for Simple V/f with PG)	250
oL3	oL3	Overtorque Detection 1	249	rH	rH	Dynamic Braking Resistor	251
oL4	oL4	Overtorque Detection 2	249	rr	rr	Dynamic Braking Transistor	251
oL5	oL5	Mechanical Weakening Detection 1	249	SEr	SEr	Too Many Speed Search Restarts	251
oL7	oL7	High Slip Braking oL	249	STO	STO	Pull-Out Detection	251
oPr	oPr	Operator Connection Fault	249	UL3	UL3	Undertorque Detection 1	251
CPF22	CPF22	A/D Conversion Error	244	UL4	UL4	Undertorque Detection 2	251
CPF23	CPF23	PWM Feedback Data Fault	244	UL5	UL5	Mechanical Weakening Detection 2	251
CPF24	CPF24	Drive Capacity Signal Fault	244	Uv1	Uv1	Undervoltage	252
dEv	dEv	Excessive Speed Deviation (for Simple V/f with PG)	244	Uv2	Uv2	Control Power Supply Undervoltage	252
EF0	EF0	Option Card External Fault	244	Uv3	Uv3	Soft Charge Circuit Fault	252
EF1 to EF7	EF1 to EF7	External Fault (input terminal S1 to S7)	244	oS	oS	Overspeed (for Simple V/f with PG)	249
FbH	FbH	Excessive PID Feedback	245	ov	ov	Overvoltage	249
FbL	FbL	PID Feedback Loss	245	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
<i>oPE01</i>	oPE01	Drive Unit Setting Error	259
<i>oPE02</i>	oPE02	Parameter Setting Range Error	259
<i>oPE03</i>	oPE03	Multi-Function Input Setting Error	259
<i>oPE04</i>	oPE04	Terminal Board Mismatch Error	260
<i>oPE05</i>	oPE05	Run Command Selection Error	260
<i>oPE07</i>	oPE07	Multi-Function Analog Input Selection Error	260

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

9. 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.

10. MANUFACTURER'S CONTACTS

If you need to contact Superabrasive Inc. with technical support questions, below is the contact information. Address: 9411 Jackson Trail Road, Hoschton GA 30548, USA

Email: info@superabrasive.us

Tel.: 706 658 1122

Fax: 706 658 0357

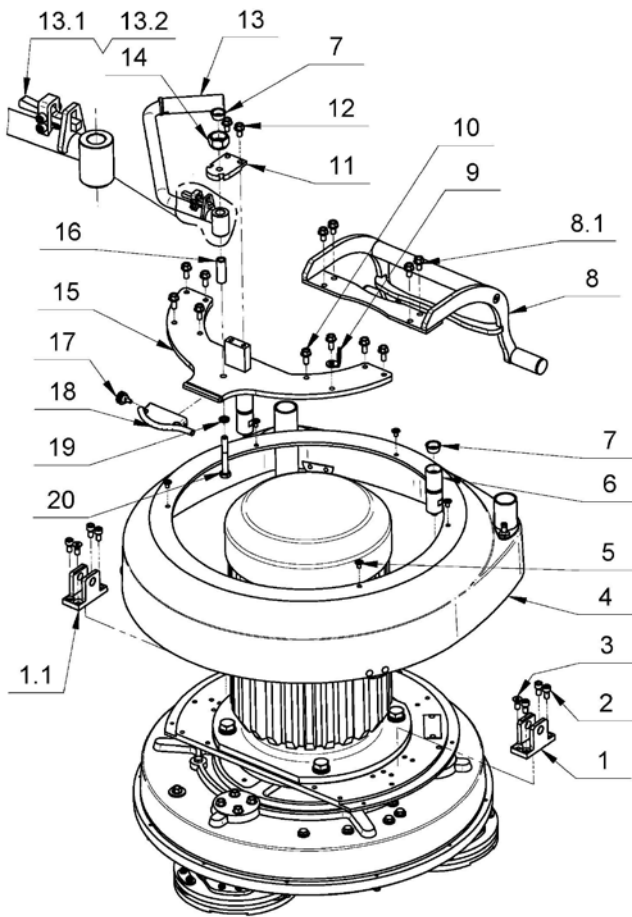
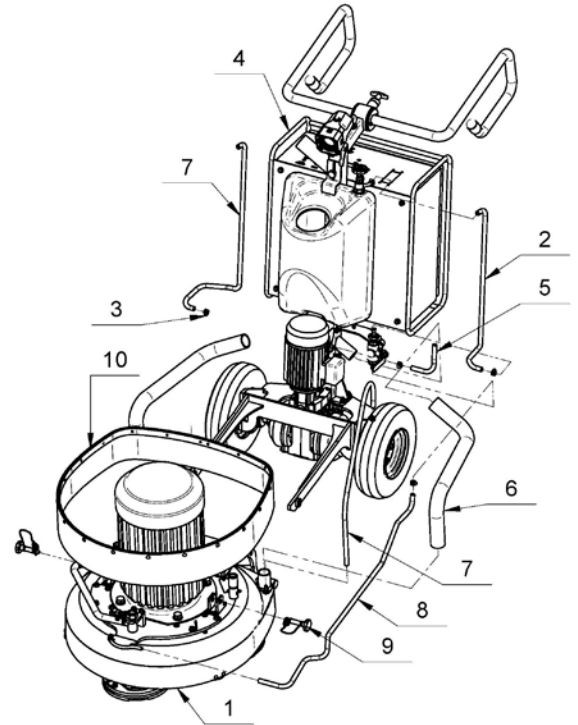
Website: www.superabrasive.com

11. SPARE PARTS

ASSEMBLY AND PARTS SPECIFICATIONS

1. LAVINA®25LM-X GENERAL PARTS

No.	Item No.	Description	Pcs.
1	L25LMX-10.00.00	Main Head	1
2	MAR8.71	Tube	1
3	10-16DIN3017	Clamp	2
4	L25LMX-20.00.00	Carriage	1
5	MAR8.25	Tube	1
6	D40L700	Vacuum Hose	2
7	MAR8.85	Tube	2
8	MAR8.110	Tube	1
9	L25SPS-07.03.00.00	Pin Assembly	2
10	L25SPS-05.00.00.00	Guard Assembly	1

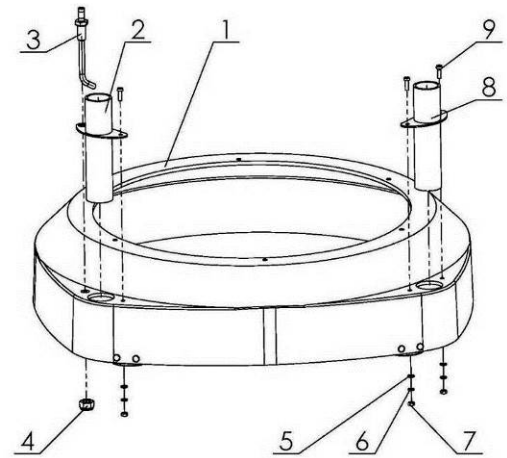


2. LAVINA® 25LM-X TOP COVER 1 PARTS

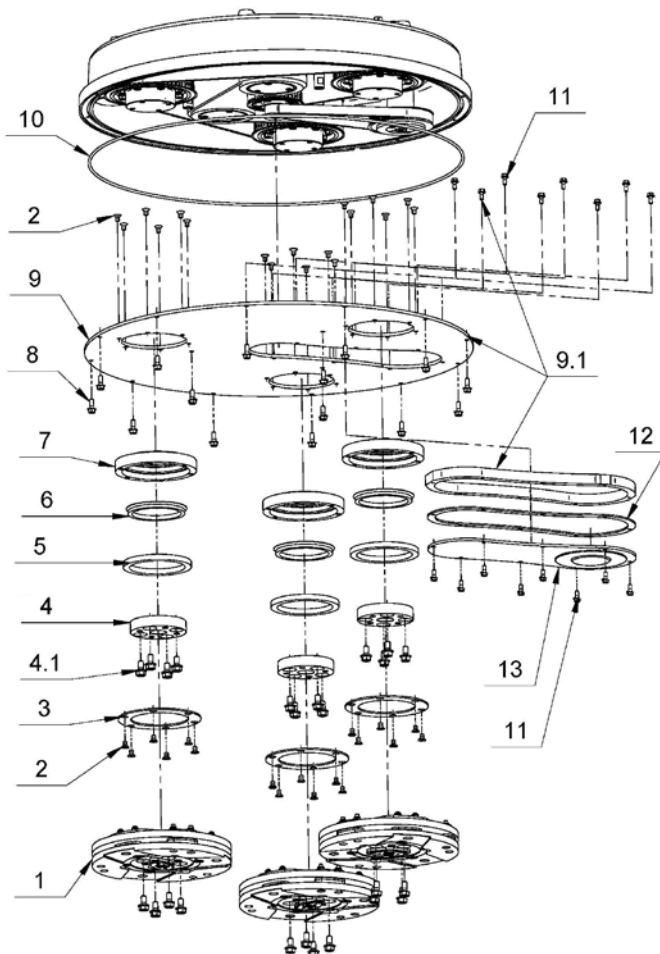
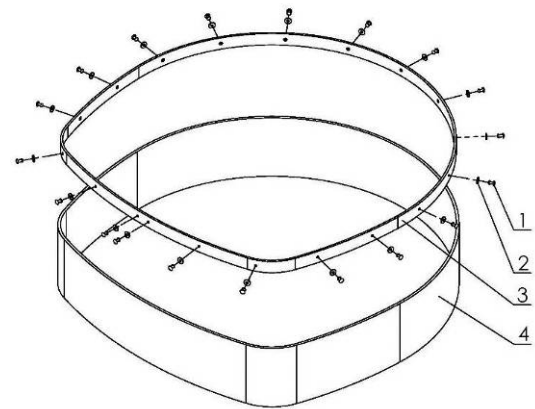
No.	Item No.	Description	Pcs.
1	L25SPS-07.00.00.02-L	Left Fork	1
	1.1 L25SPS-07.00.00.02-R	Right Fork	1
2	M8X16DIN912	Screw	6
3	M8X20DIN7991	Screw	2
4	L25X-19.00.00	Top Cover Assembly	1
5	M6X10ISO7380F	Screw	5
6	L25NSPS-07.00.00.05	Back Weight Holder	2
7	L25SPS-07.00.00.29	Rubber Buffer	3
8	L25LMX-18.00.00	Machine Support	1
	8.1 M8X16DIN6921	Bolt	4
9	L25X-15.00.02	Washer	1
10	M8X20DIN6921	Bolt	8
11	L25X-15.00.04	Support Top L25-X	1
12	M8X16DIN6921	Bolt	2
13	L25S-15.10.00	Bar Assembly L25-S	1
	13.1 L25S-15.10.02	Lever	1
	13.2 L25S-15.10.03	Spring L25-S	1
14	L25X-15.10.01	Nut	1
15	L25LX-15.11.00	Inspection Cover	1
16	L25SPS-07.00.00.26	Stud	1
17	H766-21	Knob bolt	1
18	A29.12.00	Spray Unit	1
19	M10DIN127B	Spring Washer	1
20	M10X75DIN931	Bolt	1

3. LAVINA®25LM-X TOP COVER PARTS 2

No.	Item No.	Description	Pcs.
1	L25X-19.00.01	Top Cover	1
2	L25GS-19.10.00	Vacuum Port	1
3	L25X-19.20.00	Water Fitting	1
4	M12DIN985	Nut	1
5	M5DIN125A	Washer	4
6	M5DIN127B	Spring Washer	4
7	M5DIN934	Nut	4
8	L25SPS-04.01.00.00	Vacuum Port	1
9	M5X16DIN84A	Screw	3

**4. LAVINA®25LM-X GUARD PARTS**

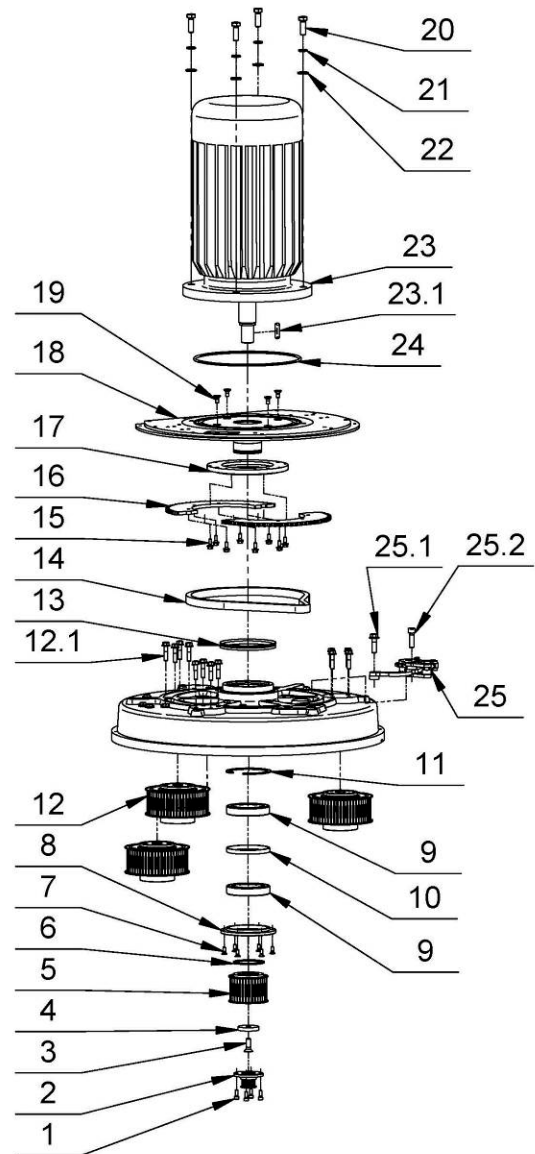
No.	Item No.	Description	Pcs.
1	D4X10DIN7337 LF12	Rivet	19
2	M4DIN9021A	Washer	19
3	L25SPS-05.00.00.01	Ring	1
4	L25SPS-05.00.00.02	Guard	1

**5. LAVINA® 25LM-X BOTTOM COVER 1 PARTS**

No.	Item No.	Description	Pcs.
1	A41.00.00	Tool Holder A41	3
2	M6X10DIN7991	Screw	36
3	L25LS-14.00.03	Outer Cover	3
4	A42.03.00	Adaptor	3
4.1	M8x16DIN6921	Bolt	4
5	110X90X8.5	Felt Ring	3
6	TWVA00800	V-Ring Type A	3
7	L25LS-14.00.02	Flange	3
8	M6x16DIN6921	Bolt	15
9	L25X-14.00.00	Bottom Cover Assembly	1
9.1	L25X-14.00.01-K	Bottom Cover with manhole	1
10	D4X2X1880	Seal	1
11	M5X12DIN6921	Bolt	16
12	L25X-14.00.04	Sealer Inspection Cover	1
13	L25X-14.10.00	Inspection Cover	1

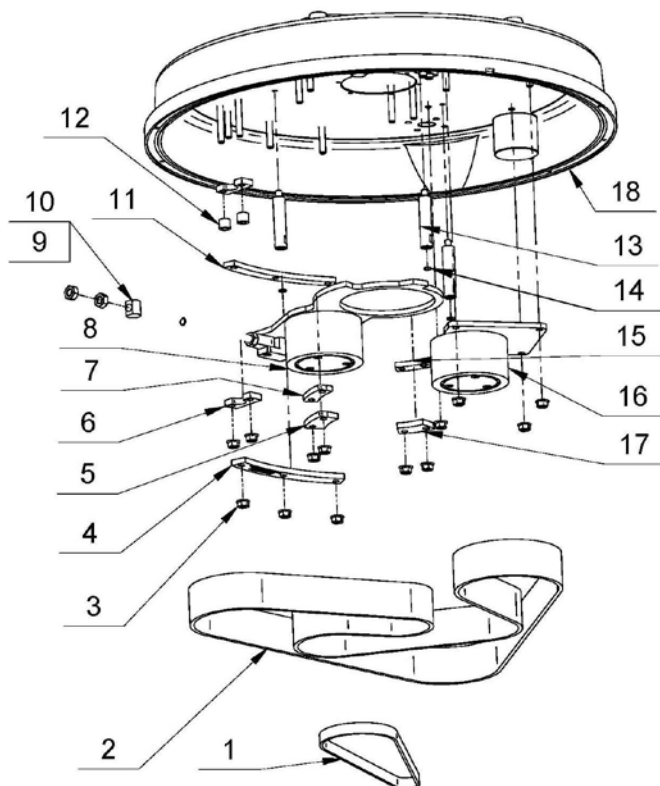
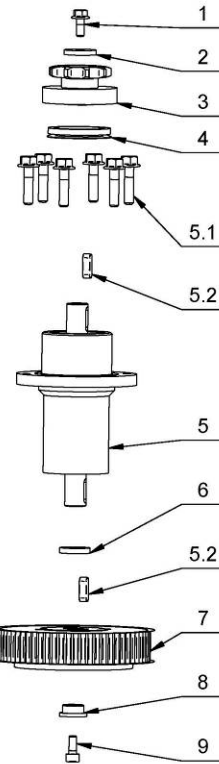
6. LAVINA® 25LM-X PLANETARY DRIVE PARTS

No.	Item No.	Description	Pcs.
1	M6X16DIN912	Screw	4
2	L25X-03.00.00	Pulley	1
3	M16X35DIN7991	Screw	1
4	L25LX-10.00.55	Front Washer	1
5	L25LX.10.10.00	Central Pulley	1
6	B65DIN471	Retaining Ring	1
7	M6x16DIN7991	Screw	6
8	L25X-10.00.17	Cap	1
9	6013	Roller Assembly	2
10	L25SPS-00.00.00.34	Distance Ring	1
11	A10013943	Retaining Ring	1
12	L25X-11.00.00	Pulley Unit Assembly	3
12.1	M8X35DIN6921	Bolt	4
13	TWVA01200	V-Ring Type A	1
14	08B-1-78	Chain	1
15	M6X16DIN6921	Bolt	8
16	L25X-15.00.12	Chain Pulley	2
17	L25X-15.00.03	Flange	1
18	L25LX-15.20.00	Base plate	1
19	M8X16DIN7991	Screw	4
20	M16X35DIN933	Bolt	4
21	M16DIN127B	Spring Washer	4
22	M16DIN125A	Washer	4
23	S255	Electro Motor	1
23.1	DIN6885A12X8X36	Key	1
24	D4X2X850	Seal	1
25	L25X-17.00.00	Chain Tensioner	1
25.1	M10X35DIN6921	Bolt	1
25.2	M10x35DIN912	Screw	1



6.1. LAVINA® 25LM-X PULLEY UNIT ASSEMBLY

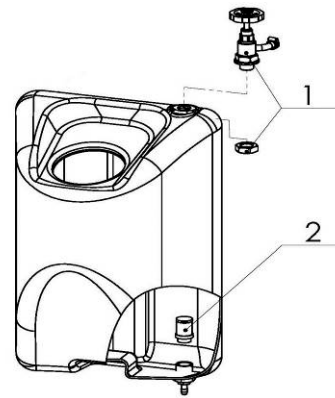
Model	No.	Item No.	Description	Pcs.
1	1	M5X12DIN6921	Bolt	1
2	2	L25X-10.00.46	Front Washer	1
3	3	L25X-16.20.00	Chain Pulley Assembly	1
4	4	TWVA00320	V-Ring Type A	1
5		L25X-16.00.00	Bearing Body	1
	5.1	M6X25DIN6921	Bolt	6
	5.2	DIN6885A5X5X16	Key	2
6	6	L25X-16.00.03	Distance Ring	1
7	7	TB 64_5M-15-1210-14	Pulley Unit Assembly	1
8	8	L25X-10.00.44	Front Washer	1
9	9	M5X12DIN912	Screw	1

**7. LAVINA® 25LM-X BOTTOM COVER 2 PARTS**

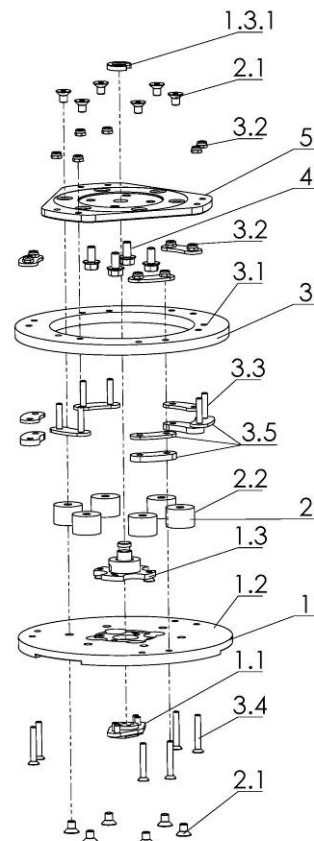
No.	Item No.	Description	Pcs.
1	HP645 5MHP15	Timing Belts	1
2	HL2400 8MHL50	Timing Belts	1
3	M8DIN6923	Nut	13
4	L25L-10.00.14	Sector	1
5	L25L-10.00.12	Sector	1
6	L25L-10.00.07	Support	2
7	L25L-10.00.11	Sector	1
8	L25X-12.00.00	Tensioning Support	1
9	L32C-14.20.04	Nut	1
10	M10DIN934	Nut	2
11	L25L-10.00.13	Sector	1
12	L25L-10.00.08	Washer	2
13	L25X-10.00.13	Distance Bolt	3
14	D6X2	O-Ring	3
15	L25X-10.00.34	Sector	1
16	L25X-13.00.00	Deflection Pulley	1
17	L25X-10.00.35	Sector	1
18	L25X-10.00.01	Disc	1

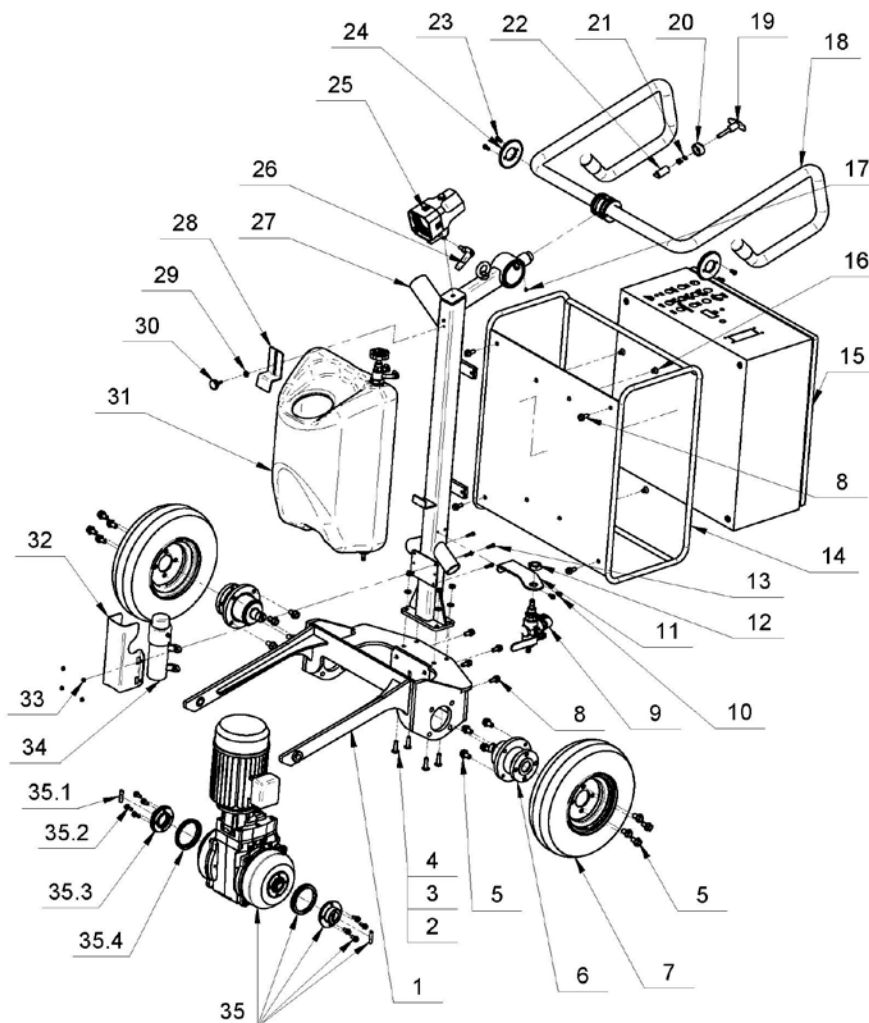
8. LAVINA®25LM-X WATER TANK PARTS

No.	Item No.	Description	Pcs.
1	A29.50.00	Regulator	1
2	1/2"	Filter	1

**9. LAVINA®25LM-X TOOL HOLDER PARTS/SEE ALSO FIG.8.7.13/ (POS.1 INCLUDE POS.1.1;1.2;1.3/POS.1.3 INCLUDE POS.1.3.1 and etc.)**

No.			Item No.	Description	Pcs.
1			A41.10.00	Quick Change Assembly	1
	1.1		A31.12.00	Keylock Set	1
	1.2		A41.11.00	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

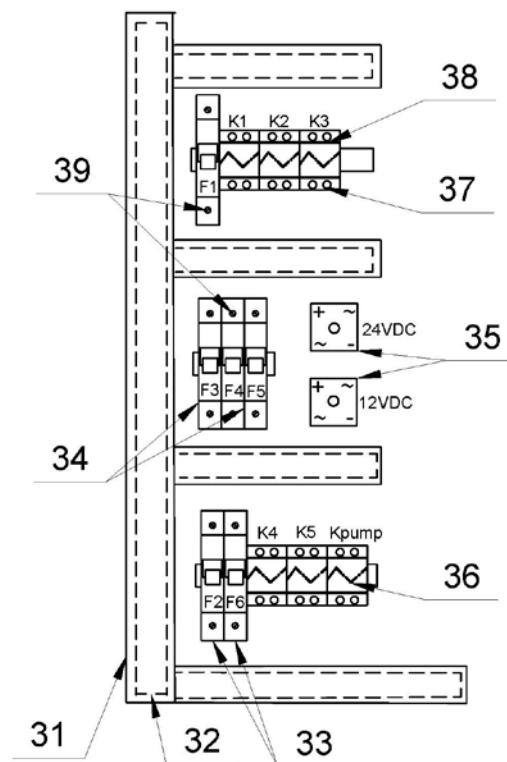




10. LAVINA®25LM-X CARRIAGE PARTS

No.	Item No.	Description	Pcs.	No.	Item No.	Description	Pcs.
1	L25LMX-21.10.00	Frame	1	21	L25S-23.00.07	Spring L25-S	1
2	M8DIN985	Nut	4	22	L25S-23.00.06	Locking bit	1
3	M8DIN125A	Washer	4	23	M6X12DIN912	Screw	4
4	M8X30ISO7380F	Screw	4	24	L25S-23.00.02	End Cover	2
5	M10X20DIN6921	Bolt	8	25	L20NS-30.30.00	Lamp Unit Incl. Cable	1
6	L25LMX-29.00.00	Wheel Bearing	2	26	A58165	Swivel Bolt	1
7	L32R-27.10.00	Wheel assembly	2	27	L25LMX-21.20.00	Column	1
8	M8X20DIN6921	Bolt	8	28	L25P-02.00.00.01	Top Bracket	1
9	A29.40.00	Water Flow Control Unit	1	29	M5UN732	Washer	1
10	M5X12DIN6921	Bolt	2	30	T34391	Knob Bolt	1
11	A29-20.01-01	Flow Unit Base	1	31	A33.10.00	Tank Assembly	1
12	M20X1.5DIN439B	Nut	1	32	L25S-20.00.26	Guard	1
13	M5X20DIN933	Bolt	4	33	M5DIN985	Nut	4
14	L25LMX-22.00.00	Guard	1	34	See table 11;pos.10	Water Pump	1
15	L25LMX-28.00.00	Control Box	1	35	L25LMX-27.00.00	Driving Unit	1
16	M8X12DIN7991	Screw	4	35.1	DIN6885A6x6x36	Key	2
17	M6X8DIN915	Screw	1	35.2	M6x16DIN6921	Bolt	8
18	L25S-23.10.00	Handle Assembly	1	35.3	L32MS-27.00.04	Coupling	2
19	L27160	Knob Bolt	1	35.4	TWVA00700	V-Seal	2
20	L25S-23.00.09	Nut	1				

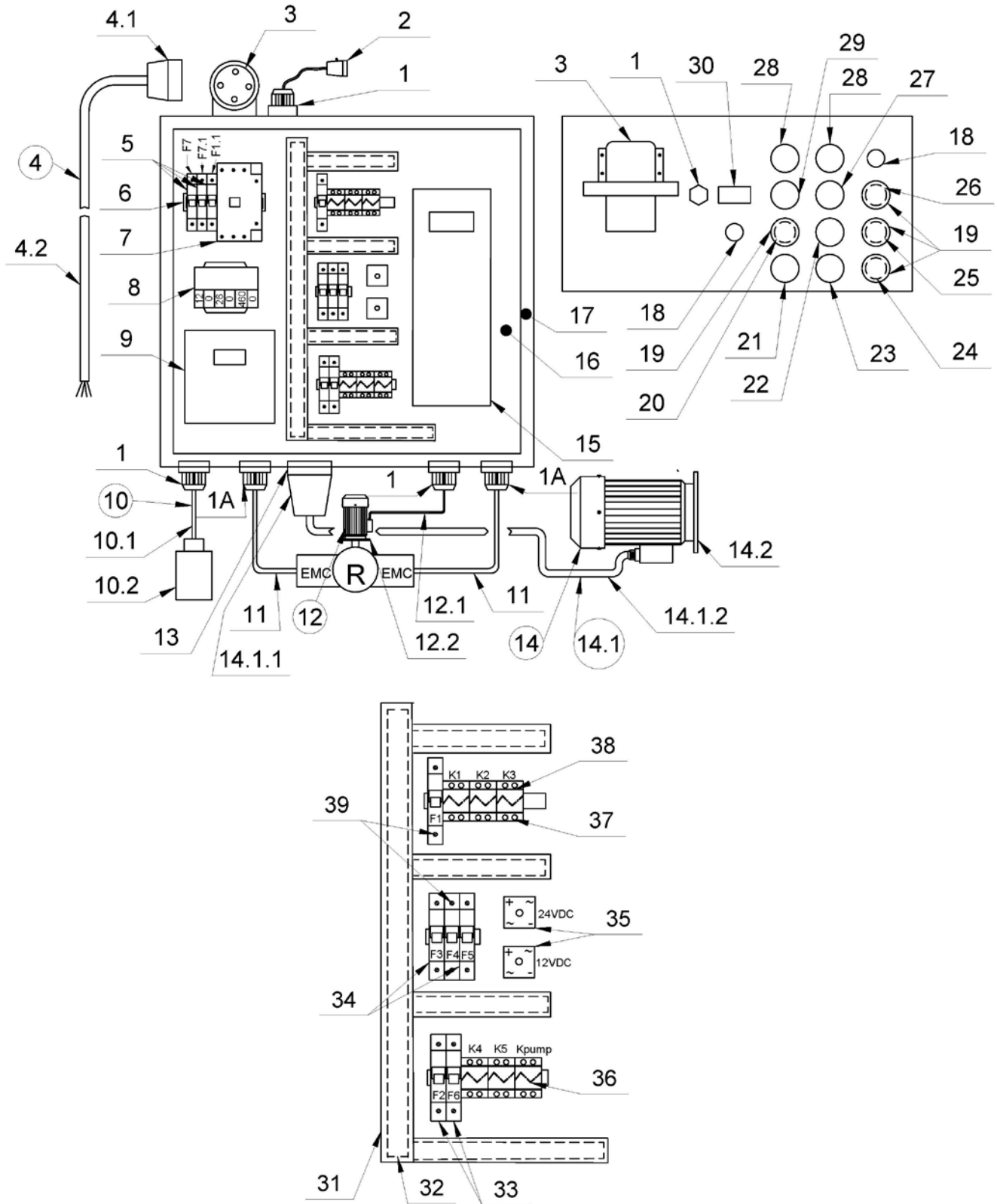
The diagram illustrates a water pump control system. On the left, a vertical pipe assembly (4) with a float valve (4.1) and a pump (4.2) is connected to a control cabinet (5). The cabinet contains a terminal block (6) with fuses (F7, F7.1), a relay (7), a contactor (8), and a thermal relay (9). A power supply (1) enters the cabinet. The pump (4.2) is connected to the terminal block (6). The control cabinet (5) is connected to a pump motor (14.1) via a contactor (11) and a thermal relay (12). The motor (14.1) is connected to a pump (14.2). The pump (14.2) is connected to a water supply system (15) via a pipe (16). The water supply system (15) includes a pump (17) and a tank (18). The tank (18) is connected to a water supply system (19) via a pipe (20). The water supply system (19) includes a pump (21) and a tank (22). The tank (22) is connected to a water supply system (23) via a pipe (24). The water supply system (23) includes a pump (25) and a tank (26). The tank (26) is connected to a water supply system (27) via a pipe (28). The water supply system (27) includes a pump (29) and a tank (30).



11.LAVINA® 25LM-X CONTROL BOX PARTS 200-240 VOLT

No.	Item No.	Description	Pcs.	No.	Item No.	Description	Pcs.
1	L20NS-30.10.01	Cable Gland	3	17	L25LMX -30.10.00	Metal box	1
1A	FXFPAL10M12B	Cable Gland	2	18	L20NS-30.10.04	Potentiometer	2
2	L20NS-30.30.00	Lamp Unit Incl. Cable	1	19	L20NS-30.10.06	Cap	4
3	L25LS-30.30.10	Plug on Control Board	1	20	L25LMXH-30.10.02	Alarm, Reset button	1
4	L25LS -30.02.00	Cable with Connector and Plug	1	21	L32MXHV-30.10.10	Emergency Stop Button	1
4.1	L25LS -30.02.10	Connector Ass	1	22	L32S-30.10.26	Switch Button SLOPE	1
4.2	L25S -30.02.02	Cable	1	23	L32S-30.10.25	Switch Button ON/OFF Led green	1
5	L32RSHV-30.00.11	Circuit Breaker	2	24	L32MSHV -30.10.02	BACK Button/red/	1
6	L20NS-30.11.02	Rail	1	25	L32MSHV -30.10.01	FOR Button/green/	1
7	L25LS-30.11.03	Circuit Breaker	1	26	L20NS-30.10.07	STOP Button	1
8	L25LMX-30.11.01	Transformer	1	27	L20NS-30.10.13	Water Pump Button	1
9	L25LM-S-30.00.02	Inverter	1	28	L20NS-30.10.12	Button	2
10	L20NS-30.40.00	Water Pump with Cable	1	29	L32S-30.10.26	Forward/Reverse switch	1
11	FXFPAL10B50M	Goffer tube	2	30	L20NS-30.10.15	Revolution counter	1
12	L32RSHV-30.13.00	Electro motor with cable	1	31	L32MSHV-30.11.38	Rail Cover	1
12.1	L32RSHV-30.13.10	Cable 4x1	1	32	L32MSHV-30.11.39	Rail Cable Guide	1
12.2	L32RSHV-30.13.20	Electro Motor	1	33	L32MSHV-30.11.34	Circuit Breaker	2
13	L25LS -30.50.00	Panel socket assembly	1	34	L20NS-30.11.01	Circuit Breaker	2
14	L25LS -30.20.00	Electro Motor Assembly	1	35	L20NS-30.11.08	Rectifier	2
14.1	L25LS -30.20.10	Plug with Cable assembly	1	36	L20NS-30.11.06	Rail Bracket	6
14.2	S255	Electro Motor	1	37	L20NS-30.11.04	Rail Base	6
15	L25S-30.11.09	Inverter Yaskawa (V1000)	1	38	L32RS-30.11.05	Rail	1
16	L25LMX-30.11.00	Metal box plate	1	39	L32SHV-30.11.01	Circuit Breaker	2

12. LAVINA® 25LMX-HV CONTROL BOX PARTS 440-480 VOLT



12.LAVINA® 25LMX-HV CONTROL BOX PARTS 440-480 VOLT

No.	Item No.	Description	Pcs.	No.	Item No.	Description	Pcs.
1	L20NS-30.10.01	Cable Gland	3	16	L25LMXHV-30.11.00	Metal box plate	1
1A	FXFPAL10M12B	Cable Gland	2	17	L25LMXHV -30.10.00	Metal box	1
2	L20NS-30.30.00	Lamp Unit Incl. Cable	1	18	L20NS-30.10.04	Potentiometer	2
3	L25LHVS-30.10.02	Plug on Control Board	1	19	L20NS-30.10.06	Cap	4
4	L25LHVS -30.02.00	Cable with Connector and Plug	1	20	L25LMXHV-30.10.02	Alarm, Reset button	1
4.1	L25LHVS -30.02.01	Connector	1	21	L32MXHV-30.10.10	Emergency Stop Button	1
4.2	L25LHVS -30.02.02	Cable	1	22	L32S-30.10.26	Switch Button SLOPE	1
5	L32RSHV-30.00.11	Circuit Breaker	3	23	L32S-30.10.25	Switch Button ON/OFF Led green	1
6	L20NS-30.11.02	Rail	1	24	L32MSHV -30.10.02	BACK Button/red/	1
7	L20NX-30.11.03	Circuit Closer	1	25	L32MSHV -30.10.01	FOR Button/green/	1
8	L25LMXHV-30.11.01	Transformer	1	26	L20NS-30.10.07	STOP Button	1
9	L25LMSHV-30.00.02	Inverter	1	27	L20NS-30.10.13	Water Pump Button	1
10	L20NS-30.40.00	Water Pump with Cable	1	28	L20NS-30.10.12	Button	2
11	FXFPAL10B50M	Goffer tube	2	29	L32S-30.10.26	Forward/Reverse switch	1
12	L32RSHV-30.13.00	Electro motor with cable	1	30	L20NS-30.10.15	Revolution counter	1
12.1	L32RSHV-30.13.10	Cable 4x1	1	31	L32MSHV-30.11.38	Rail Cover	1
12.2	L32RSHV-30.13.20	Electro Motor	1	32	L32MSHV-30.11.39	Rail Cable Guide	1
13	L25LHVS -30.10.03	Socket	1	33	L32MSHV-30.11.34	Circuit Breaker	2
14	L25LHVS -30.20.00	Electro Motor Assembly	1	34	L20NS-30.11.01	Circuit Breaker	2
14.1	L25LHVS -30.20.10	Plug with Cable	1	35	L20NS-30.11.08	Rectifier	2
14.1.1	L25LHVS -30.02.03	Connector	1	36	L20NS-30.11.06	Rail Bracket	6
14.1.2	L25LHVS -30.20.12	Cable for Electro Motor	1	37	L20NS-30.11.04	Rail Base	6
14.2	S255	Electro Motor	1	38	L32RS-30.11.05	Rail	1
15	L25LHVS-30.11.09	Inverter Yaskawa (V1000)	1	39	L32SHV-30.11.01	Circuit Breaker	2