unopex

# Operation & Maintenance Manual

## Unopex UHM 50

Vacuum Mixer


Document No: 520701

v1.2_en

# Table of Contents

# Foreword

Dear Customer,

Thank you for choosing Unopex UHM 50 Vacuum Mixer. You have made a good choice. Thank you for your trust.

Please read this manual carefully, note the safety precautions before installing and putting the Unopex UHM 50 Vacuum Mixer into operation. You will find all necessary information for the safe operation of the plant in this manual.

Follow this manual with regard to installation, start-up, operation, cleaning, maintenance, repair, storage and disposal of the plant.

Data in this manual are subject to change without notice.

# 1. Introduction

## 1.1 Details on the Declaration of Conformity

CE

The plant complies with the requirements of the European Directives: 2006/42/EC (Machinery Directive) and 2014/35/EU (Low Voltage Directive).

## 1.2 Safety

The safety information in this operation manual is designed to protect the responsible body, operator and the plant from damage.

### 1.2.1 Symbols Used for Safety Instructions

Safety instructions are marked by the below combinations of pictograms and signal words. The signal word describes the classification of the residual risk when disregarding this manual.

| | |
|---|---|
| ⚠ DANGER | **Denotes an immediate hazardous situation that will result in death or serious injuries.** |
| ⚠ WARNING | **Denotes a general hazardous situation that may result in death or serious injuries.** |
| ⚠ CAUTION | **Denotes a hazardous situation that can result in injuries.** |
| NOTE | **Denotes a situation that can result in property material damage.** |
| INFORMATION | **Denotes important notes and usable hints.** |

Below are the supplementary safety information symbols and meanings used in this manual.

General warning

Electrical hazard

Hot surfaces

Fragile components


Explosive gases

Explosive environments

Harmful to health and life

Risk of injuries of the limbs

Risk by chemicals

Wear protective goggles

Wear protective cloth

Wear protective gloves

Wear protective mask

Wash your hands

### 1.2.2 Proper Use

The technical specifications of the plant is given in Section-2.

Unopex UHM 50 Vacuum Mixer has been designed and manufactured for mixing of products that come up with various degree of viscosity under reduced atmospheric pressure.

It is appropriate for batch production of emulsions, syrups, lotion, skin care products, ointment, semisolids and creams in pharmaceutical, cosmetics, food and chemical industries.

Installation, operation, service and maintenance works must be performed according to the instructions in this manual. Failure to comply with the manual is deemed improper use and will result in loss of warranty.

**DANGER**

Using the plant in potentially explosive environments

DEATH OR SERIOUS INJURIES THROUGH EXPLOSION

- The plant is not explosion-proof. Never use it in areas which require ex-protected instruments or plants
- Do not install or start up the plant in explosive environments
- Do not operate the plant with explosive gas mixtures
- Ensure sufficient ventilation to directly withdraw released gases and gaseous substances

**WARNING**

Improper use

SERIOUS INJURY AND PROPERTY DAMAGE

- Store the operation manual where it is easy to access in close proximity to the plant
- Only adequately qualified operators may work with the plant
- Operators must be trained before handling the plant
- Check that the operators have read and understood the operation manual
- Define precise responsibilities of the operators
- Personal protective equipment must be provided to the operators
- Handle and dispose the substances used for operation and cleaning of the plant correctly
- Be sure to follow the responsible body's safety rules

**NOTE**

Modifications to the plant by third-parties

DAMAGE TO THE PLANT

- Do not allow third parties to make technical modifications to the plant
- Modifications to the plant are only permitted with the written approval of the manufacturer
- Modifications and upgrades shall only be carried out by an authorized Unopex specialist The manufacturer will decline any claim resulting from unauthorized modifications.
- In case of any modification of the plant not approved by the manufacturer, the CE declaration of conformity becomes invalid.
- Only specialists trained by the manufacturer may carry out start-up, service, repairs or maintenance work.
- Only use the plant in a fault-free conditions!
- Do not ignore, bypass, dismantle or disconnect any safety devices!

### 1.2.3 Improper Use

Unopex UHM 50 Vacuum Mixer is permitted only for the purposes for which it was manufactured. Risks to users, property and the environment can arise when the plant is damaged, used carelessly or improperly.

Use of the plant for purposes other than the ones mentioned or beyond specified use limits shall relieve the manufacturer of all responsibility in case of damage to persons or things and invalidate the warranty.

The manufacturer accepts no liability for damage caused by technical modifications to the plant, improper handling or use of if the operation manual is not observed.

Below uses are expressly forbidden:

- use of the plant by insufficiently trained personnel
- use of the plant for the applications not specified in Section 1.2.2
- use of substances with unknown chemical composition
- use of the plant in areas which require ex-protected instruments
- use of the plant without genuine parts and genuine consumables
- use of the plant with deactivated, modified or defect safety devices
- use of biohazardous materials or toxic substances
- use of substances which might explode or ignite
- use of substances which become solid in the plant due to the processing
- use of corrosives or substances which are not compatible with the plant materials
- unattended operation
- use of media containing chlorine

### 1.2.4 General Hazards and Safety Notices

DANGER

Risk by electrical voltage and current

DEATH OR SERIOUS INJURY OR PROPERTY DAMAGE

- External mains supply must always meet the plant specifications
- Check for sufficient grounding
- Check electrical equipment regularly
- Keep all parts of body and any hand-held tools or other conductive objects away from exposed live parts of electrical system
- Keep all electrical utilities and control cabinet always closed
- Do not clean electrical equipment with water or any unknown liquids
- Do not use the power cord if it is bundled or tangled
- Exchange defective or worn out wires or lines immediately

DANGER


Working with harmful or hazardous substances or with substances of unknown composition

DEATH OR SERIOUS INJURY THROUGH EXPLOSION

DEATH OR SERIOUS POISONING BY CONTACT OR INCORPORATION

- Certain gases in or in the vicinity of the plant are highly inflammable
- Always be aware of the poisoning and explosion risk for harmful or hazardous substances
- Never use explosive substances, flammable substances and substances that include explosive or flammable ingredients
- Never work with substances of unknown composition
- Before operation, check the plant for correct installation and assembling
- Before operation, inspect parts, components, sealings for good condition
- Exchange defective or worn out parts immediately
- Clean or exchange clogged parts immediately
- Directly withdraw released gases and gaseous substances by sufficient ventilation
- Check for leakages by performing an initial run without sample material
- Switch off main switch of the plant immediately in case of fire
- Only operate the plant in sufficiently ventilated environments

DANGER

Incorporation or inhalation of hazardous, gases, liquid, steam, vapors, fog and dust

DEATH OR SERIOUS POISONING BY INCORPORATION OR INHALATION

- Do not inhale hazardous substances
- Wear protective clothing
- Wear protective gloves
- Wear protective eye goggles
- Wear protective mask
- Wear non-slip shoes
- Check all parts for proper sealing before operation
- Always provide sufficiently ventilated environments to operate the plant
- Do not use compressed air to clean dusty parts
- Ensure an eye shower at the operating area
- All possibly hazardous substances and fumes have to be removed from the working area
- Exhausts leaving the plant have to be lead away instantly by a ventilation system which is equipped with safety devices and equipments to avoid health risk or contamination of the environment

**DANGER**

Internal overpressure

SERIOUS INJURY AND PROPERTY DAMAGE

- External pressure supply must always meet the plant specifications
- Check all parts, connections and sealings for proper sealing before operation
- Do not use clogged parts, clean or exchange them immediately
- Do not open any valve when there is a residual pressure inside the plant
- Close valves and clamp connections which are not necessary during operation with blind components.

**DANGER**

Inhalation of inert gases

DEATH BY SERIOUS POISONING OR SUFFOCATION

- Only operate the plant in sufficiently ventilated environments
- Do not inhale inert gases
- Ensure sufficient ventilation to directly withdraw released gases and gaseous substances
- Check all parts, connections and sealings for proper sealing before operation
- Exchange defective or worn out parts immediately

**WARNING**

Operation with bent hoses

SERIOUS INJURY AND PROPERTY DAMAGE

- Always inspect the plant for bends or kinks in hoses
- Eliminate them prior to operation

**CAUTION**

Handling hot surfaces

RISK OF BURNINGS WHEN HANDLING HOT SURFACES

- Do not touch hot surfaces
- Always wear proper personal protective equipments when working with the plant
- Allow all hot parts to cool down after operation

**CAUTION**

Always wear the following personal protective equipments when working with the plant

- protective clothing
- protective gloves
- protective eye goggles
- protective mask

Depending on operating conditions, noise levels might arise which can lead to deafness, loss of balance or reduced attention. Consider local noise regulations and use the proper personal protective equipment for ears.

**NOTE**

Liquid spill

PROPERTY DAMAGE

- Do not put any liquid sample vessel on any component of the plant
- Do not spill any liquids over the control cabinet, plant or any parts of it
- Do not allow any liquid to leak into the control cabinet
- Wipe off any liquids immediately
- Always be aware of the risk of plant short-circuits and damage by liquids
- Do not move the plant when it is loaded with liquid

### 1.2.5 Further Protective Safety Measures

**INFORMATION**

Emergency strategy
Disconnect the plant from the power supply!

Warnings/alarm messages on the touchscreen operating panel contain a message about the irregularity of the plant, the operator is also warned when defined limit values for defined parameters are exceeded. The operator evaluates the relevance of the message and takes action where necessary.

## 1.3 Staff Qualification

Risks to users, property, and the environment can arise when the plant is used carelessly or improperly.

### 1.3.1 Responsible Body

- The head of related department is the responsible body.
- This operation & maintenance manual is to be stored where it is easy to access in close proximity to the plant and must be made available at all times to the operating personnel.
- Operators must be trained before handling and operating the plant. The head of department is the responsible for training his personnel. Only adequately qualified operators must be permitted to work with the plant under the supervision of the responsible body.
- Check that the operators have read and understood the operation manual. Define precise responsibilities of the operators.
- System settings of the plant are protected via passwords on the touchscreen operating panel and are shared only with the responsible body by the manufacturer. The responsible body must not share those passwords with anyone.
- The plant meets the recognized safety standards. Integration into a system may give rise to hazards that are characteristic of the other system's design and beyond the control of Unopex. It is the responsibility of the responsible body to ensure that the overall system, into which this plant is integrated, is safe.
- The responsible body must check whether local, national and federal regulations require any mandatory installation of further pollution control equipment for the plant/the entire system.
- Personal protective equipment must be provided to the operators.

### 1.3.2 Operators

- Work on the plant is reserved for appropriately qualified specialists, who have been assigned and trained by the responsible body to do so.
- Operators have to confirm by signature that they have carefully read and understood the operation manual.
- Operators must be at least 18 years old. The operator is responsible vis-a-vis third-parties in the work area before operating the plant.
- Legal regulations, such as local, national and federal laws applying to the plant, installation and working area of the plant must be strictly followed.
- Ensure that the plant is operated in proper condition only.
- Observe all safety instructions and do not ignore, bypass, dismantle or disconnect any safety devices.
- When working with the plant, always wear appropriate personal protective equipments (e.g. protective clothing, protective gloves, protective eye goggles, protective mask, non-slip shoes). The personal protective equipment must meet all requirements of all data sheets for the materials used. Choose and use adequate measures according to the applications, since some additional protective measures might be necessary.
- Modifications to the plant and modifications to the spare parts used are only permitted with the prior written approval of the manufacturer. The manufacturer will decline any claim resulting from unauthorized modifications. Ensure that modifications and upgrades are carried out by authorized Unopex specialists only.
- Ensure that service, repairs or maintenance work are carried out with care and on schedule and by specialists trained by the manufacturer only.

# 2. Technical Details

## 2.1 Scope of Delivery

Unopex UHM 50 Vacuum Mixer is delivered with complete standard components.

The content of the delivery is listed in the packing list. The completeness of the consignment has to be checked upon receipt.

In case of any damage and/or missing parts, prepare a status report and send it to Unopex Customer Service immediately.


| INFORMATION | For detailed product information, visit www.unopex.com or contact Unopex. |
|---|---|

| INFORMATION | Scope of delivery might change according to specific offers/quotations. |
|---|---|

## 2.2 Technical Data

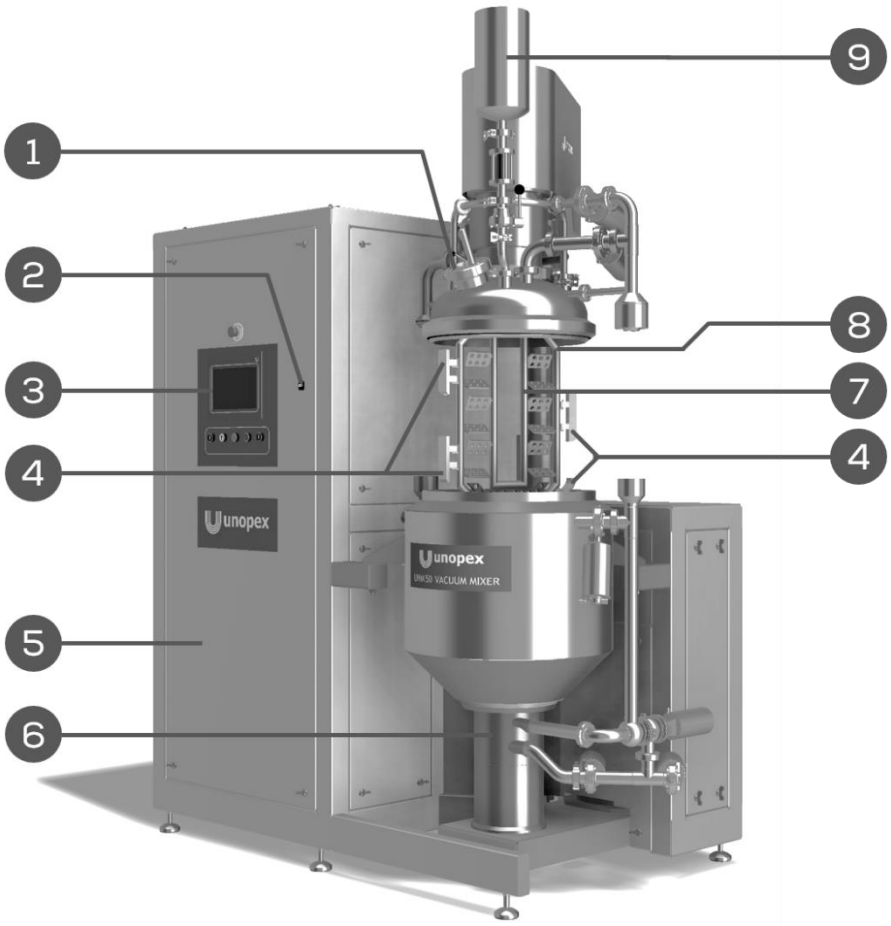
| | |
|---|---|
| model | Unopex UHM 50 Vacuum Mixer |
| serial number | 81670 |
| production year | 2021 |
| min. usable working volume | 20 L |
| max. usable working volume | 50 L |
| max. product temperature | 80 °C |
| ambient conditions | for indoor use only, temperature: 5–40 °C |
| design pressure of the mixing vessel | -1/+4 bar |
| operating pressure | -730 … 0 mmHg (-973 … 0 mbar), adjustable vacuum |
| heating | direct heating with electrical resistances<br>24 kW, PID controlled |
| cooling | indirect cooling with heat exchanger |
| external agitator | variable speed between 20 and 90 rpm,<br>with chemically coated polytetrafluoroetilen (PTFE) scrappers |
| Internal agitator | variable speed between 20 and 80 rpm |
| homogenizing turbine | variable speed between 600 and 3500 rpm |
| lid lifting system | hydraulic |
| feed hopper | for feeding raw materials, volume 1 L |
| thermal insulation | rockwool |
| compressed air requirement | 5 … 7 bar |
| surface quality of the vessel | mirror polished inner and outer surfaces |
| connection voltage, frequency | 380 V AC, 50 Hz |
| operating panel | 10.1" touchscreen |
| computer connection | data transfer with USB flash drive |
| Dimensions, lid closed (LxWxH) | 1830x1100x2100 mm |
| Dimensions, lid open (LxWxH) | 1830x1100x2750 mm |

## 2.3 Material of Construction

| | |
|---|---|
| product contact parts | stainless steel, AISI 316L |
| product non-contact parts | stainless steel, AISI 304 |
| scrappers | chemically coated polytetrafluoroetilen (PTFE) |

# 3. Plant Description

## 3.1 Overview




| | | | |
|---|---|---|---|
| 1 | inspection glass with illumination | 6 | homogenizer |
| 2 | connection for usb flash drive | 7 | internal agitator |
| 3 | touchscreen | 8 | external agitator |
| 4 | scrappers | 9 | feed hopper |
| 5 | control cabinet | | |

| | |
|---|---|
| **INFORMATION** | Components and parts might change according to specific offers/quotations. |

## 3.2 External Connections

(supply and return line connections)

- Compressed air supply
- Mechanical seal cooling supply/return
- Chiller cooling supply
- Chiller cooling return
- Heating/cooling circuit water supply
- Vacuum line exhaust
- Vacuum line drain
- Vacuum tank water supply line

## 3.3 Control Cabinet

On the front surface of the control cabinet;

- 10.1" touchscreen operating panel
- buttons for lifting and lowering the lid,
- signal indicators for control voltage and alarm,
- emergency stop are placed.

# 4. Preparations Before Operation


MORTAL DANGER

- Do not operate a damaged plant
- Do not operate the plant with unsuitable installation
- Please contact the Unopex Customer Support when needed


Death or serious injuries by use in explosive environments

- Do not install or operate the plant in explosive environments
- Do not install or operate the plant with explosive mixtures
- Check all connections for correct installation before operation
- Directly withdraw released gases and gaseous substances
- Only operate the plant in sufficiently ventilated environments


SERIOUS INJURY

- Place the plant on stable, horizontal and vibration-free surface in an adequately dimensioned area
- Get help from others where you need for heavy parts/components of the plant
- Take special care when loading, transporting and unloading to avoid damages
- Do not move the plant while assembled
- Keep limbs out of moving parts/crushing zones
- Check for damages to glass parts
- Do not touch thin/sharp edges of the parts/components

## 4.1 Un-packing

- Check for damage to the packaging. Damage can indicate property damage to the plant or parts/components.
- Check for any transport damage when unpacking the plant or parts/components.
- If necessary, prepare a status report immediately and always contact your forwarding agent regarding the settlement of claims.
- Follow the instructions under "Chapter 8.2" for the disposal of packaging material.
- Keep the original packaging for future transportation.
- If the plant is not assembled immediately after delivery, store it with all electrical components in a vibration-free, frost-free area; place on a foundation (do not place directly on the ground) and cover to protect against penetration of dust and humidity.

## 4.2 Ambient & Installation Conditions

Consider the ambient conditions under "Chapter 2.2".

Take into consideration of the dimensions and weight of the plant. Be sure that the floor can withstand the weight of the plant with full product.

Install the plant upright on a stable, horizontal, anti-slippery and vibration-free surface where you can easily reach.

Maintain wall and ceiling clearance for adequate air exchange (dissipation of waste heat, supply of fresh air for the plant and work area). Do not operate the plant in an inadequately dimensioned area.

**INFORMATION**

Use required sealing rings and gaskets for each connection and consider the correct mounting directions.

Screw all threaded connections tightly.

## 4.3 Connecting to the Power Supply

**NOTE**

Risk of plant damage by wrong mains supply

- External mains supply must meet the voltage and the current specified on the name plate
- Check for sufficient grounding.

**INFORMATION**

Additional electrical safety measures might be necessary to meet local laws and regulation!

External power or emergency stop switches must meet the requirements of the related standards, be accessible at any time and clearly labeled.

External connections and extension lines must be provided with a grounded conductor lead and power cords must meet the input power requirements.

Mains plug must be accessible at any time to cut the power in case of emergency by unplugging,

Unopex UHM 50 Vacuum Mixer is equipped with flexible power cords. Connect the power cords to the mains supply meeting the proper voltage and current specified on the name plate. The mains circuit must handle the electrical load of the plant and must be equipped with all electrical safety measures including proper grounding. After the installation, electrical safety tests are recommended to verify safe system condition such as sufficient grounding. All electrical works may only be carried out by qualified personnel.

# 5. Operation

## 5.1 Final Check Before Operation

Carry out the following checks and safety warnings prior to each operation.

- Only adequately qualified personnel who have been adequately must be trained may work with the plant.
- Each person working on the plant for assembly, commissioning, operation or maintenance has to have read and understood the complete operation manual and has to be familiar with all devices, operating elements and their functions
- Legal regulations, such as local, national and federal laws and responsible body's safety rules applying to the plant, installation or working area must be strictly followed
- All measures must be taken to ensure safe and functional operation of the plant
- Personal protective equipment must be provided to the operators
- Operators must wear non-slip shoes and protective clothing, gloves, eye goggles and mask during operation
- Store this manual where it is easy to access in close proximity to the plant
- Initial checks and periodical inspections must be performed properly
- External pressure supply must always meet the plant specifications
- Check the plant for correct installation and assembling
- Check all parts, connections, hoses tubes and sealings for good condition and tight connection
- Check the lid for correct seat and tight connection
- Inspect all glass parts visually for possible damage
- Exchange worn out or defective parts or components immediately
- Close valves and clamp connections which are not necessary during operation with blind components
- Ensure that no uncontrolled pressure may be released from the plant which would endanger life and limb of users or third persons
- Do not open any valve when there is a residual pressure inside the plant
- Check the electrical connections
- Check for leakages by performing an initial run without sample material
- Check for connections for disposing the substances used for operation and cleaning of the plant
- Do not use compressed air to clean dusty parts
- All possibly hazardous substances and fumes have to be removed from the working area
- Exhausts leaving the plant have to be lead away instantly by a ventilation system which is equipped with safety devices and equipments to avoid health risk or contamination of the environment
- The plant must be supervised during operation to prevent any unauthorized person to cause any possible damage
- Inspect and report any changes to the plant concerning safety immediately
- Operate the plant only in perfect working conditions.

## 5.2 Introducing Operating Elements

### 5.2.1 Homogenizer

The homogenizer consist of a fast-spinning inner rotor with a stationary outer stator to homogenize samples through mechanical tearing and shear fluid forces. The product in the vessel can be homogenized and/or recirculated during operation.

### 5.2.2 Agitators

Unopex UHM 50 Vacuum Mixer has been designed and manufactured for mixing of products that come up with various degree of viscosity under reduced atmospheric pressure. It is appropriate for batch production of emulsions, syrups, lotion, skin care products, ointment, semisolids and creams in pharmaceutical, cosmetics, food and chemical industries.

An external agitator with PTFE scrappers and an internal agitator enables mixing with bottom-up/top-down recirculation while a bottom mounted homogenizer enhances the shearing and mixing effect as well as giving homogeneous stability to the mixing components.

Rotation direction, rpm and the runtime for both external and internal agitators can be set separately on the touchscreen operating panel.

### 5.2.3 Heating and Cooling System

The integrated heating/cooling system of the Unopex UHM 50 Vacuum Mixer ensures a PLC controlled indirect heating and cooling of the product in the vessel to be processed. Water is the heating and cooling media. When the heater is activated on the touchscreen and the set temperature is higher than the product temperature, heating is carried out by electrical heating rods. When the cooler is activated on the touchscreen and the product temperature is lower than the set temperature, cooling is carried out indirectly by a heat exchanger and a regulating valve. Required safety devices are installed in the heating/cooling circuit.

**NOTE**

Always run homogenizer before activating heater or cooler in order not to allow the product to be damaged as a result of an excessively high temperature.

**INFORMATION**

Heating or cooling can not be activated without running water pump.

### 5.2.4 Vacuum System

When desired vacuum value is set on the touchscreen and the vacuum pump is activated, plant works in reduced atmospheres. Vacuum rate is PLC controlled with a regulating valve.

**NOTE**

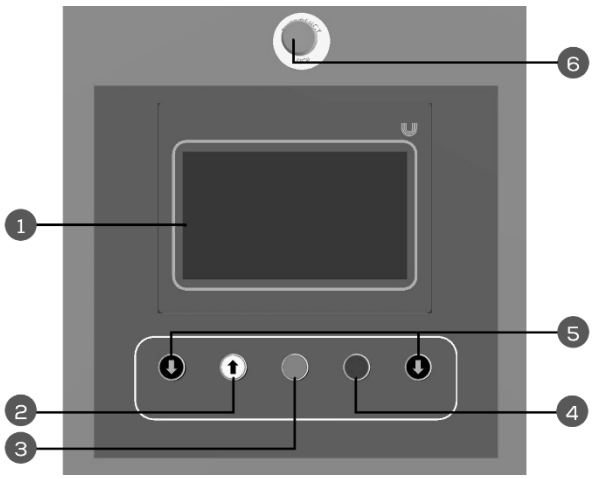
The constant availability of water supply has to be ensured manually for the vacuum tank. Otherwise, dry-run of the pump may lead to its destruction.

## 5.3 Introducing Operating Panel

**CAUTION**

SERIOUS INJURY

- Keep limbs out of moving parts/crushing zones
- Before pressing the buttons to lower the lid, make sure that there is nothing between lid and vessel




(1) touchscreen operating panel
(2) button to lift the lid
(3) signal indicator for control voltage
(4) signal indicator for alarm
(5) buttons to lower the lid
(6) emergency stop

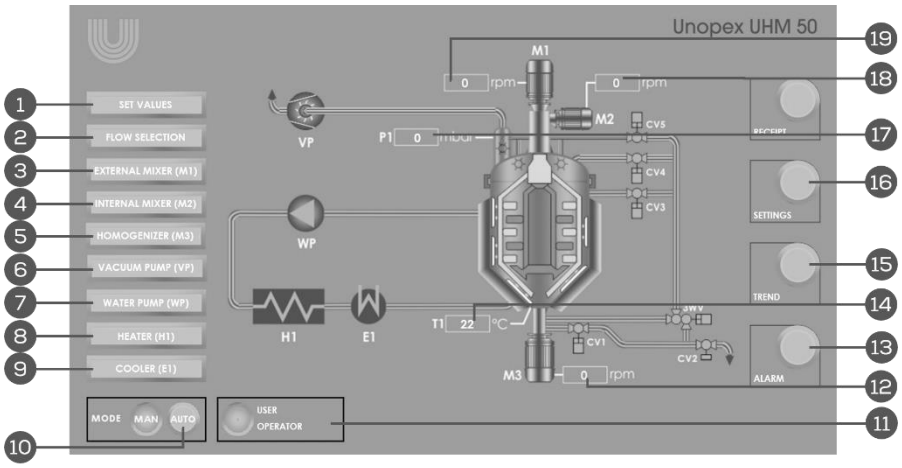
**INFORMATION**

For safety reasons, both buttons (5) at once should be pressed to lower the lid.

## 5.4 Introducing Touchscreen Operation

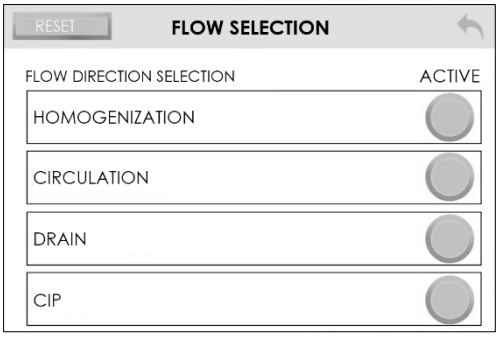
Touchscreen panel allows the user to operate the Unopex UHM 50 Vacuum Mixer in manual or auto mode. The receipt manager in the auto mode allows the user to achieve repeatability.
All parameters for one step can be set and then be stored in total as a receipt which can always be repeated while operating the plant. It is possible to make 10 receipts with max. 30 steps each.

**Manual mode**

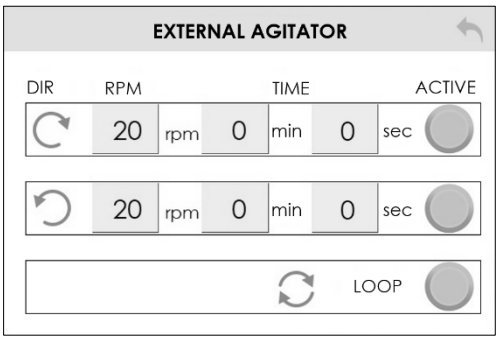



(1) to make set values visible on the touchscreen for M1, M2, M3, T1 and P1.

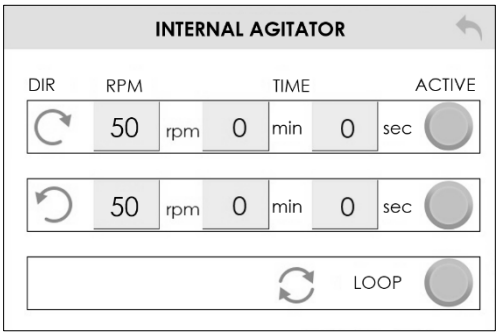
(2) to select the valve flow directions according to the desired operation



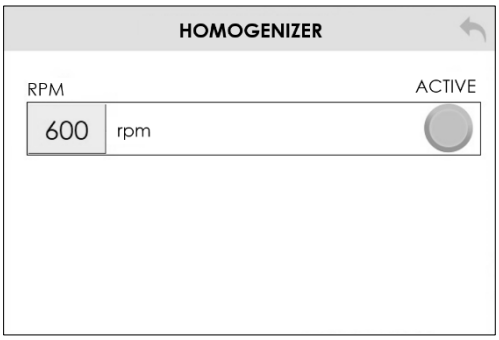

(3) to start/stop and set the rotation time, direction and rpm for external agitator



(4) to start/stop and set the rotation time, direction and rpm for internal agitator

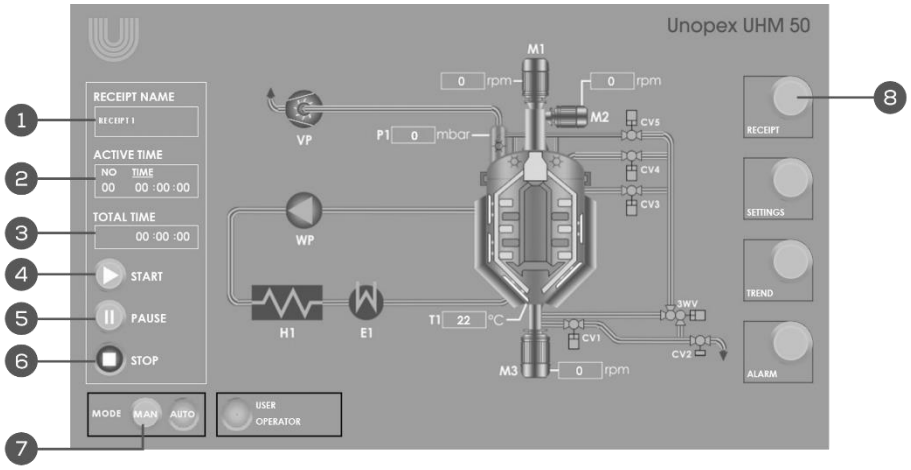



(5) to start/stop and set the rpm for homogenizer

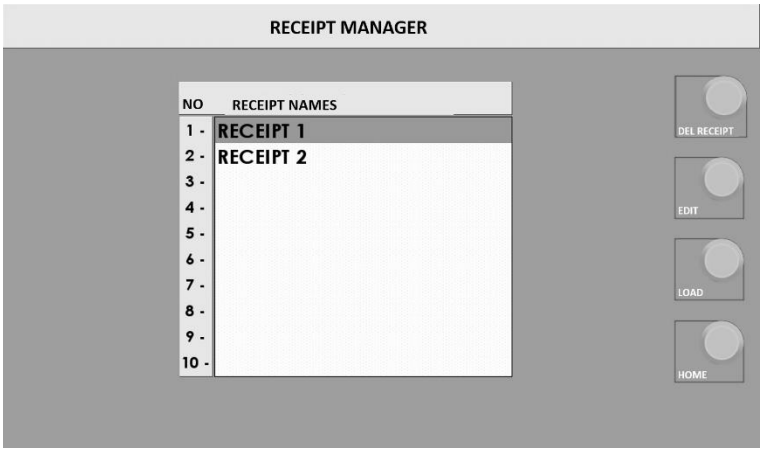



(6) to start/stop the vacuum pump (VP)
(7) to start/stop the water pump (WP)
(8) to start/stop the heater (H1)
(9) to start/stop the cooler (E1)
(10) to change the operating mode from manual to auto
(11) to go to user log in/log out page
(12) rpm value for homogenizer (M3)
(13) to go to alarm page
(14) temperature of the product in °C (T1)
(15) to go to trend page (it is possible to see the process parameters during operation on the trend menu and to save the data to a usb flash drive)
(16) to go to settings page
(17) system pressure in mbar (P1).
(18) rpm value for internal agitator (M2)
(19) rpm value for external agitator (M1)

## Auto mode




(1) the name of receipt loaded
(2) the number and remaining time of the running step
(3) the current total time of the running receipt
(4) to start the loaded receipt
(5) to pause a running receipt (press again to allow the the receipt to continue)
(6) to stop a running receipt
(7) to change the operating mode from automatic to manual
(8) to go to receipt manager page



## 5.5 Starting a Vacuum Mixing Operation

**WARNING**


MORTAL DANGER

When the plant is running, do not open or demount any clamps, pipelines, sensors etc.
Open or close valves only according to the operating instructions.

1. Turn on the chiller unit.

**INFORMATION**

Chiller unit circulates a cooling medium and allows the heating/cooling circuit of the plant to be cooled indirectly to the desired temperature. Turn on the chiller at the beginning of each operation to allow itself to cool down.

2. Turn on the main switch. The control voltage signal indicator will be green and the welcome screen will appear on the touchscreen.

**INFORMATION**

Make sure that compressed air and chiller cooling medium supply lines are properly connected to the plant and the CV2 manual valve is closed.

Close valves and clamp connections which are not necessary during operation with blind components.

3. Open the manual valves for compressed air supply and chiller cooling lines.
4. Open the valve for vacuum tank water supply to feed sufficient water to the vacuum pump during operation.
5. Select user and log in to the system on the touchscreen.
6. Check system status by pressing the "SETTINGS" on the touchscreen and make sure that all variables are normal.

**NOTE**

If any of the variables is not normal, fix it before operating the plant.
Operate the plant only in perfect working conditions.

7. Open the manual V2 valve slowly and carefully to deaerate the plant.
8. Fill in the vessel with the raw materials to be processed.
   Raw materials should be dosed into the vessel slowly via manual valve V1 connected to the feed hopper.

**INFORMATION**

Always fill in the vessel with raw materials while the plant is NOT in operation.

Minimum working volume of the vessel is 20 liters, maximum is 50 liters.

**NOTE**

Always fill in powder when there is liquid in the vessel. Dry powder will lead to damages to the homogenizer.

Always fill in powder from a well dried feed hopper by opening the manual valve V1 slowly.

Pre-melt hardened raw materials to liquids in melting tanks before feeding into the vessel. Solid or hardened materials damages the plant.

9. Close the manual V2 valve.
10. Select the operating mode (manual or automatic) on the touchscreen.

**NOTE**

For safety reasons, during operation of the plant either in manual or automatic mode, the operator should not leave the working area.

**INFORMATION**

The process parameters (temperature, vacuum, homogenizer rpm, rotation directions and rpm of agitators , valve flow directions etc.) should be adjusted and optimized by the operator according to the requirements of the raw materials and product.

**INFORMATION**

Operating the plant in manual or automatic mode are described under "Chapter 5.3".

## 5.6 Finishing a Vacuum Mixing Operation and Draining the Product

**CAUTION**

RISK OF BURNINGS WHEN HANDLING HOT PRODUCT OR SURFACES

- Do not allow hot raw materials or products to spurt out and cause severe burnings
- Do not touch hot surfaces
- Always wear proper personal protective equipments when working with the plant
- Allow all hot parts to cool down after operation

1. Switch off heater and cooler on the touchscreen operating panel.
2. Switch off vacuum pump.
3. Select the valve flow direction DRAIN on the touchscreen.
4. Activate any of the first two (5 or 6) selections for draining in the flow direction selection menu. (If you need to drain with pressurization of the vessel, activate any of the last two (7 or 8) in the same menu. Make sure that the manual valve V2 is closed, supply air according to the requirements of the raw materials and product to the system slowly and carefully via manual valve V3. Do not allow the system to be pressurized more than 300 mbar.)

**INFORMATION**

Vacuum pump cannot be turned on if the drain is active in the flow direction selection menu.

5. Run the homogenizer at the minimum rpm.
6. Open the manual valve CV2 slowly and carefully to drain the product into a collection tank.
7. Repeat step 4 if needed to complete full drain.
8. Close CV2.

**INFORMATION**

It is possible for the operator to make product drain via receipt manager.

**INFORMATION**

Carry out cleaning of the plant immediately after each operation.

## 5.7 Cleaning

**CAUTION**

RISK OF BURNINGS WHEN HANDLING HOT LIQUID OR SURFACES

- Do not allow cleaning liquid to spurt out and cause severe burnings
- Do not touch hot surfaces
- Always wear proper personal protective equipments when cleaning with the plant
- Allow all hot parts to cool down after operation

**NOTE**

- Use soapy water as detergent only
- Acid or chlorine solutions must never be used

1. Fill in the vessel with water approx. 20...30 liters.
2. Heat the vessel to approx. 50...80 °C.
3. Activate CIP SHORT LINE (9) in the flow direction selection menu on the touchscreen.
4. Run the homogenizer (1000...3000 rpm), external agitator (20...50 rpm) and internal agitator (20...50 rpm) for 5-10 minutes.
5. Activate CIP LONG LINE (10) in the flow direction selection menu.
6. Repeat step 4.
7. Activate DRAIN WITH HOMOGENIZATION (5) in the flow direction selection menu.
8. Open the manual valve CV2 slowly and carefully to drain the cleaning liquid into a waste collection tank.
9. Close the manual valve CV2.
10. Repeat step 1 and 2 respectively.
11. Activate CIP FULL (11) in the flow direction selection menu.
12. Repeat step 4.
13. Activate FULL DRAIN WITHOUT PRESSURE (6) in the flow direction selection menu.
14. Repeat step 8.
15. Close CV2.

**INFORMATION**

It is possible for the operator to make cip cleaning of the vessel via receipt manager.

**INFORMATION**

Heater cannot be turned on if the water pump is turned off.

# 6. Maintenance and Repairs

**WARNING**

DEATH OR SERIOUS INJURIES

- Depressurize the system before maintenance and repairs
- Wear proper protective equipments

**WARNING**

DEATH OR SERIOUS BURNING

- Switch off the plant, disconnect the power cord and prevent unintentional restart before maintenance and repairs
- Do not spill any liquids over any electronic parts or components
- Do not touch parts inside the plant with wet hands
- Do not squeeze cables, hoses or other items at reassembling
- Exchange defective cabling or hoses before reassembling

**CAUTION**

Always wear the following personal protective equipments when working with the plant

- protective clothing
- protective gloves
- protective eye goggles
- protective mask

Depending on operating conditions, noise levels might arise which can lead to deafness, loss of balance or reduced attention. Consider local noise regulations and use the proper personal protective equipment for ears.

**CAUTION**

Risk of minor or moderate burnings

- Some components can get hot during operation. Do not touch hot surfaces.
- Allow all hot parts to cool down before maintenance and repairs.

Ensure that the following check and maintenance works are carried out with care and on schedule and by specialists trained by the manufacturer only.

- Check cleanliness of the plant after each operation.
- Check the level of mechanical seal water tank for leakages; check scrappers for removing any unintended particles daily.
- Check safety devices (safety valves, switches etc.) monthly.
- Check all screw connections manually for tightness; check all cables, flexible pipes and hoses on damage and ageing; check scrappers on wear every three months.

- Calibrate measuring instruments every year.
- Check all gaskets of screwed connections for leakages and change every two years or earlier if necessary.
- Replace all pneumatic/hydraulic hoses and hydraulic oil in approximately five years.

Modifications to the plant and modifications to the spare parts used are only permitted with the prior written approval of the manufacturer. The manufacturer will decline any claim resulting from unauthorized modifications. Ensure that modifications and upgrades (including software modifications) are carried out by authorized Unopex specialists only.

Only use original spare parts which correspond to the technical requirements defined by the manufacturer.

## 6.1 Customer Service

Service and repair or maintenance work on the plant must be performed with care by authorized personnel only. These authorized personnel have a comprehensive technical training and knowledge of possible dangers which might arise from the plant and components.

Contact Unopex customer service for spare parts delivery, repairs or technical advice. Contact information is given on the website www.unopex.com.

# 7. Troubleshooting

## 7.1 Alarm Messages and Remedy

| Alarm Number | Alarm Description | Possible cause | Remedy |
|---|---|---|---|
| ARM 101 | Water Pump (WP) failure ! | Blockage in the heating/cooling circuit | Localize blockage and clean it |
| | | Dry run protection is active | See remedy for ARM 113 |
| | | Defective wiring | Check wiring of flow switch and pump |
| | | Defective switch or pump | Contact Unopex customer service |
| ARM 102.1 | P1 pressure is high ! | Manual valve V3 is open | Close the valve |
| | | T1 product temperature is too high | Cool the product |
| | | | Modify receipt |
| | | Medium in the vessel is too much | Check the substances |
| | | | Modify receipt |
| | | Pressure rise due to chemical reactions | Check the substances |
| | | | Modify receipt |
| | | Defective wiring | Check wiring of pressure sensor (P1) |
| | | | Contact Unopex customer service |
| | | Defective sensor or control valve | |
| ARM 102.2 | P2 pressure is high ! | Over pressurized flow in the heating/cooling circuit | Check the pressure, if it is more than 1 barg drain water from the line |
| | | Insufficient flow in the heating/cooling circuit | Check the water level in the expansion tank |
| | | | Check leakage, localize and fix it |
| | | Defective wiring | Check wiring of pressure sensor (P2) |
| | | Defective pressure sensor | Contact Unopex customer service |
| ARM 103.1 | T1 temperature is high ! | Temperature rise due to chemical reactions | Cool the product |
| | | | Modify receipt |
| | | Defective temperature sensor | Contact Unopex customer service |

| Alarm Number | Alarm Description | Possible cause | Remedy |
|---|---|---|---|
| ARM 103.2 | T2 temperature is high ! | High temperature in the heating/cooling circuit | Start cooling to lower the temperature |
| | | Defective temperature sensor | Contact Unopex customer service |
| ARM 103.3 | T3 temperature is high ! | No cooling water supply to mechanical seal water tank | Make sure that the cooling water is supplied |
| | | Defective temperature sensor | Contact Unopex customer service |
| ARM 103.4 | T4 temperature is high ! | No water/cooling water supply to the vacuum tank | Make sure that the water/cooling water is supplied |
| | | Defective temperature sensor | Contact Unopex customer service |
| ARM 103.5 | T5 temperature is high ! | Defective temperature sensor | Contact Unopex customer service |
| ARM 104.1 | T1 temperature is too high ! | Temperature rise due to chemical reactions | Cool the product<br>Modify receipt |
| | | Defective temperature sensor | Contact Unopex customer service |
| ARM 104.2 | T2 temperature is too high ! | High temperature in the heating/cooling circuit | Start cooling to lower the temperature |
| | | Defective temperature sensor | Contact Unopex customer service |
| ARM 105 | 3WV valve failure ! | No compressed air supply | Make sure that the compressed air is supplied to the valve |
| | | Compressed air connection configuration is incorrect | Make the hose-valve connections in correct configuration |
| | | Air leakage | Check compressed air line through control valve connection, detect leakage and remove it |
| | | Valve cannot reach its final position | Check valve seal, replace if necessary |
| | | Defective wiring | Check wiring of the selenoid valve and valve sensors |
| | | Defective control valve, selenoid valve or valve sensors | Contact Unopex customer service |

| Alarm Number | Alarm Description | Possible cause | Remedy |
|---|---|---|---|
| ARM 106.# | CV# Control Valve failure ! | No compressed air supply | Make sure that the compressed air is supplied to the valve |
| | | Compressed air connection configuration is incorrect | Make the hose-valve connections in correct configuration |
| | | Air leakage | Check compressed air line through control valve connection and check valve seal, detect leakage and remove it |
| | | Valve cannot reach its final position | Check valve seal, replace if swollen |
| | | Defective wiring | Check wiring of the control valve, selenoid valve and valve sensor |
| | | Defective control valve, selenoid valve or valve sensor | Contact Unopex customer service |
| ARM 107.# | T# temperature sensor failure ! | Defective wiring | Check wiring of the sensor |
| | | | Switch off the plant and try again |
| | | Defective sensor | Contact Unopex customer service |
| ARM 108.# | P# pressure sensor failure ! | Defective wiring | Check wiring of the sensor |
| | | | Switch off the plant and try again |
| | | Defective sensor | Contact Unopex customer service |
| ARM 109.1 | M1 motor failure ! | Safety protection while vessel lid open is active | Check the vessel lid, close it before starting agitation |
| | | Overload of motor drive due to not pre-melted raw materials or hardened products | Clean plant & unblock the agitators immediately |
| | | Defective wiring | Check wiring of motor and vessel lid sensors |
| | | Defective motor or vessel lid sensors | Contact Unopex customer service |

| Alarm Number | Alarm Description | Possible cause | Remedy |
|---|---|---|---|
| ARM 109.2 | M2 motor failure ! | Safety protection while vessel lid open is active | Check the vessel lid, close it before starting agitation |
| | | | Check sensors for vessel lid |
| | | Overload of motor drive due to not pre-melted raw materials or hardened products | Clean plant & unblock the agitators immediately |
| | | Defective wiring | Check wiring of motor and inductive sensors |
| | | Defective motor | Contact Unopex customer service |
| ARM 109.3 | M3 motor failure ! | Safety protection while vessel lid open is active | Check the vessel lid, close it before starting homogenization |
| | | | Check sensors for vessel lid |
| | | Dry run protection is active | See remedy for ARM 112 |
| | | Overload of motor drive due to not pre-melted raw materials or hardened products | Clean plant & unblock the homogenizer immediately |
| | | Defective wiring | Check wiring of motor and inductive sensors |
| | | Defective motor | Contact Unopex customer service |
| ARM 110 | Hydraulic lift failure ! | Defective wiring, switch or pump | Contact the Unopex customer service |
| ARM 111 | VCV/CCV failure ! | Defective valve controller | Contact the Unopex customer service |
| ARM 112 | Level in mechhanical sealing water tank is low ! | Water leakage | Check leakage, localize and fix it |
| | | Defective wiring or switch | Check wiring of the level switch |
| | | | Switch off the plant and try again |
| | | | Contact Unopex customer service |
| ARM 113 | Level in expansion tank is low ! | Water leakage | Check leakage, localize and fix it |
| | | Defective wiring or switch | Check wiring of the level switch |
| | | | Switch off the plant and try again |
| | | | Contact Unopex customer service |

| Alarm Number | Alarm Description | Possible cause | Remedy |
|---|---|---|---|
| ARM 114 | VP Vacuum Pump failure ! | Defective wiring or pump | Contact Unopex customer service |
| ARM 115 | Heating controller failure ! | Defective heating controller | Contact Unopex customer service |
| ARM 116 | P2 pressure is too low ! | Water leakage in the heating/cooling line | Check leakage, localize and fix it<br>Contact Unopex customer service |
| ARM 117 | No Flow! Water Pump is stopped ! | No flow in heating/cooling circuit | See remedy for ARM 101 |
| ARM 118 | Emergency Stop is active ! | Activated emergency stop push button<br>Defective switch | Release the button<br>Contact Unopex customer service |

## 7.2 Malfunctions and Remedy

| Malfunction | Possible cause | Remedy |
|---|---|---|
| Plant cannot be switched on | No voltage | Insert mains plug |
| | | Turn on the main switch |
| Plant does not heat up | Heating is not turned on | Turn on the heater |
| | T1 set point is below the product temperature | Set a new temperature above product temperature |
| | Homogenizer (M3) is not turned on | Run homogenizer when the heater is active |
| | Defective wiring of heating elements | Check wiring of heating elements |
| | Polluted heating/cooling circuit | Contact Unopex customer service |
| | Heater defective | Contact Unopex customer service |
| Plant does not cool down | Cooling is not turned on | Turn on the cooler |
| | T1 set point is above the product temperature | Set a new temperature below product temperature |
| | Homogenizer (M3) is not turned on | Run homogenizer when the heater is active |
| | Cooling water is warm | Reduce cooling water temperature |
| | Cooling water supply is not sufficient | Open cooling water supply valve |
| | Polluted heating/cooling circuit | Contact Unopex customer service |
| Plant does not achieve the set vacuum values | Incorrect seat of lid | Check the lid for correct seat and tight connection |
| | Open valve or clamp connection | Close valves and clamp connections which are not necessary during operation with blind components |
| | "Drain" is active in flow direction selection menu | Activate another selection in the flow direction menu on the touchscreen (vacuum pump does not run if "drain" flow direction is activated) |
| | Leakage | Check all parts, connections, hoses tubes and sealings for good condition and tight connection, exchange worn out or defective parts or components |
| | Sealing material incompatibility | Check compatibility/corrosion resistance of sealing material |
| Raw material cannot be fed into the vessel | Manual valve V1 is blocked | Clean the possible powder block at feed valve |
| | | If the valve is moist, dry the valve and sealing well, feed powder more slowly |
| | Leakage at manual valve V1 | Check the sealing of feed valve, replace if defective |
| | | Contact Unopex customer service |

# 8. Taking Out of Operation

**WARNING**

Death or serious poisoning by contact or incorporation of harmful substances

- Wear appropriate personal protective equipments (e.g. protective clothing, protective gloves, protective eye goggles, etc).
- Remove all liquids and dusty residues from the plant to remove possibly dangerous substances
- Do not use compressed air for removing dusty residues

## 8.1 Storage, Packing and Transport

Switch off the plant, remove the power cord, clean the plant thoroughly.

Store the plant and its components in a dry location.

**INFORMATION**

When returning a component of the plant to the manufacturer for repair work, visit www.unopex.com and download the safety clearance form, then complete and send it with the component.

## 8.2 Disposal

For environmentally friendly disposal of the plant, do comply with all regional and local disposal regulations applicable for you.

**INFORMATION**

Contact your local authorities for any questions concerning disposal.

# 9. Declaration of Conformity

unopex

## Declaration of Conformity

| | |
|---|---|
| Directives | 2006/42/EC (machinery directive)<br>2014/35/EU (low voltage directive) |
| Manufacturer | BAK-ON Makina Muhendislik Ltd. Sti.<br>1429 Sk. No:9 Doğanlar<br>Izmir / Turkiye |
| Certification | FQC Standard Sertifikasyon Muayene<br>Laboratuvar Egitim Hizmetleri A.S.<br>Manisa / Turkiye |
| Equipment | Vacuum Mixer - Unopex UHM 50<br>Unopex UHM 2, Unopex UHM 5, Unopex UHM 10,<br>Unopex UHM 20, Unopex UHM 100, Unopex UHM 500 |
| Standards | EN 60204-1:2018, Safety of machinery- Electrical equipment of machines- Part 1: General requirements |

We hereby certify under our sole responsibility that the equipment described herein has been manufactured and tested in accordance with the above directives and standards.

Izmir, November 26th, 2021

Elif Görgün
Quality Management

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