

Dewatering Unit

OPS 010



Safety and operating instructions

Read safety and operating instructions before use.

Note: The indicated data only serve to describe the product. Specifications regarding the use of this product are only examples and suggestions. Catalog specifications are no guaranteed features. The information given does not release the user from his / her own assessments and inspection.

Our products are subject to a process of natural wear and aging.

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The picture on the title page shows a configuration example. The delivered product may thus differ from the illustration.

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1. About this documentation

1.1 Applicability of this documentation

This documentation is applicable for the following product:

- › Oil Dewatering Unit OPS 010-41110

This documentation is written for technicians, operators, service engineers and system operators.

This document contains important information for safe and appropriate assembly, transport, activation, operation, usage, servicing, dismantling and simple troubleshooting.

- › Read this document completely and in particular chapter 2, "Safety Instructions", before you work with the product.

1.2 Required and supplementary documentation

Do not commission the product until you have received the documentation marked with the book icon and before you have understood and complied with the information therein.


	Title	Number of document	Document type
	OPS010	80.81	Data sheet

Table 1: Required and supplementary documentation


1.3 Presentation of information

So that this document can help you to work quickly and safely with your product, we use standardized safety instructions, symbols, terms and abbreviations. For better understanding, these are explained in the following sections.

1.3.1 Safety instructions

In this documentation, safety instructions are faced with a sequence of actions which would result in the danger of personal injury or damage to equipment. The measures described to avoid these hazards must be observed.

Safety instructions are structured as follows:

 SIGNAL WORD
Type and source of danger Consequences in case of non-compliance <ul style="list-style-type: none">› Escaping or averting the danger› <List>

- › Warning signal: draws attention to the danger
- › Signal word: indicates the severity of the danger
- › Type and source of danger: specifies the type and source of danger
- › Consequences: describes the consequences in the event of non-compliance
- › Defense: indicates how to deal with the danger




Warning sign, signal word	Meaning
 DANGER	Indicates a dangerous situation which results in death or serious injury if not avoided.
 WARNING	Indicates a dangerous situation which may result in death or serious bodily injury if not avoided.
 CAUTION	Indicates a dangerous situation which may result in light to moderate injury if not avoided.
NOTE	Indicates property damage: The product or surrounding could be damaged.

Table 2: Danger classes according to ANSI Z536.6-2006

1.3.2 Symbols

The following symbols indicate notes which are not safety-relevant but increase the intelligibility of the documentation.











Symbol	Meaning
	If this information is not observed, the product cannot optimally be used or operated.
>	Singular, independent action step / instruction.
	This symbol indicates danger to equipment, material and environment.
	This symbol indicates the risk of personal injury (death, serious bodily injury).
	This symbol indicates the risk of personal injury (minor injury).
	This symbol indicates the risk of personal injury (death, serious bodily injury).
	This symbol specifies that protective gloves should be worn.
	This symbol specifies that safety shoes should be worn.
	This symbol specifies that protective goggles should be worn.
	This symbol specifies that the unit should be disconnected from the power supply.
	This symbol indicates possible hazards to the environment.

Table 3: Meaning of symbols

1.3.3 Terms

In this documentation the following terms are used:

Term	Meaning
OPS 010	Dewatering Unit

Table 4: Terms

1.3.4 Abbreviations

In this documentation the following abbreviations are used:

Term	Meaning

Table 5: Abbreviations

2.1 About this chapter

This product was manufactured according to the generally recognized standards of engineering. Nevertheless, there is a danger of injury or damage if you do not observe this chapter and the safety instructions in this documentation.

- › Read this document thoroughly and completely before working with the product.
- › Retain this document and ensure that it is available for all users at all times.
- › Always include the necessary documentation when passing the equipment along to a third party.

2.2 Intended use

This product is a hydraulic component.

You may use the product for the following:

- › Processing hydraulic fluids on mineral oil and synthetic basis in the bypass flow

This product is intended for professional use only, and not for private use.

"Intended use" also includes that you have completely read and understood this documentation, in particular chapter 2 "Safety Instructions".

2.3 Improper use

Any other use than the intended use described, is improper and inadmissible.

If unsuitable products are installed or used in safety-related applications, unintended operating states may occur in the application, which may cause personal injury and / or property damage.

Therefore only use this product in safety-related applications if this use is explicitly specified and permitted in the product documentation, e.g. in explosion protection areas or in safety-related parts of a control system (functional safety).

ARGO-HYTOS GMBH assumes no liability for damages resulting from improper use. The risks associated with improper use are solely with the user.

2.4 Reasonably foreseeable misuse

The delivery of the following media is forbidden:

- › others than listed in chapter 5 "Technical data"

In particular:

- › flammable liquids such as petrol or thinner (explosion hazard)
- › foodstuffs
- › oil sludge and residues

The operator alone is liable for damages resulting from improper use.

2.5 Qualification of personnel

The operations described in this document require fundamental knowledge of mechanics and hydraulics as well as knowledge of the appropriate technical terms. In order to ensure safe use, these operations may therefore only be carried out by a correspondingly skilled worker or an instructed person under the guidance of a skilled worker.





A skilled worker is someone who can - based on his / her technical education, knowledge and experience as well as knowledge of the respective regulations of the jobs assigned to him / her - recognize possible dangers and ensure appropriate safety measures.

A skilled worker must observe the relevant technical regulations.

2.6 General safety instructions

- › Observe the valid regulations for accident prevention and environmental protection.
- › Observe the safety regulations and requirements of the country in which the product is used / applied.
- › Only use ARGO-HYTOS products that are in technically perfect condition.
- › Observe all instructions on the product.
- › People who assemble, operate, disassemble or maintain ARGO-HYTOS products may not do so under the influence of alcohol, other drugs or medications that affect the responsiveness.
- › Only use manufacturer-approved accessories and spare parts, in order to prevent personal danger due to unsuitable spare parts.
- › Observe the technical data and ambient specifications specified in the product documentation.
- › If unsuitable products are used or installed in safety-relevant applications, unintended operating states may occur in the application, which can cause personal injury and / or material damage. Therefore only use the product in safety-relevant applications if this use is explicitly specified and permitted in the product documentation.
- › You may only put the product into operation, when it has been established that the final product (e.g. a machine or system), into which the ARGO-HYTOS products have been installed, complies with the country-specific regulations, safety regulations and standards of the application.

2.7 Product and technology related safety instructions

 CAUTION	
	<p>Leaked hydraulic oil Environmental hazard / risk of slipping.</p> <ul style="list-style-type: none">› In case of spills, cover the oil-covered surface immediately with an oil-binding medium.› Then immediately dispose of the oil-binding medium according to the national environmental regulations.
	<p>Ignition hazard Risk of electrostatic charge by poorly conducting hydraulic fluid.</p> <ul style="list-style-type: none">› If the electrical conductivity of the hydraulic fluid is not known, please contact the manufacturer of the hydraulic fluid.
	<p>Risk of burns Contact temperatures according to DIN EN563 (3) and DIN EN13202 (4) may be exceeded during operation.</p> <ul style="list-style-type: none">› Allow the filter unit to cool down before touching it.

For prevention of material damage and product damage



Danger due to improper handling

Property damage

- › The oil dewatering unit may only be used in accordance with section 2.2, "Intended use".

Leakage or spillage of hydraulic fluid

Environmental pollution and ground water contamination.

- › Use oil binding agents in order to bind leaked hydraulic oil.

Contamination due to fluids and foreign bodies

Premature wear - malfunction - risk of damage - property damage

- › Ensure cleanliness during installation in order to prevent foreign bodies, such as welding beads or metal chips, from entering the hydraulic lines, leading to premature wear or malfunction.
- › Make sure that connections, hydraulic lines and attachment parts (e.g. gauges) are free of dirt and chips.
- › Prior to commissioning, check that all hydraulic and mechanical connections are connected and tight, and that all gaskets and seals of the plug connectors are correctly assembled and undamaged.
- › For removal of lubricants and other contaminants, use residue-free industrial wipes.
- › Make sure that all connections, hydraulic lines and attachment parts are clean.
- › Ensure that no contaminants enter when closing the connections.
- › Make sure that no detergents enter the hydraulic system.
- › Do not use cotton waste or faying cleaning rags for cleaning.
- › Do not use hemp as sealing agent.

4. Scope of delivery

The package includes:

- › 1 Oil Dewatering Unit OPS 010
- › 1 Operating manual
- › 1 Supplier documentation, see chapter 12

5. Technical data

This chapter provides information on the device data, approved operating materials, ambient conditions and connecting values.

5.1 Approved oils

Oil type	Synthetic and mineral oil based lubrication and hydraulic oils
Viscosity range	10 - 700 mm ² /s

5.2 Temperature ranges

Max. operating temperature	max. 80 °C
Recommended operating temperature	50 °C - 60 °C
Oil temperature in the reactor	approx. 60 °C
Gas temperature in the reactor	> 50 °C - < 65 °C

5.3 Dimensions and weight

Basic unit without attachments	600 x 565 x 1200 mm (L x W x H)
Weight basis unit	approx. 161 kg

5.4 Connection, electrical

Voltage	3~380 - 440 V
Frequency	50/60 Hz
Rated current	16 A
Max. power	7.4 kW
Mains fuse	16 A

5.5 Connection, hydraulic

Oil inlet	3/4" BSP - hose diameter min. 3/4"
Oil outlet	1" BSP - hose diameter min. 3/4"

5.6 Sound pressure level

Device in operation	< 72 dB (A)
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6. About this product

The oil dewatering unit OPS 010 is a complete system for the cleaning and treatment of synthetic and mineral oil based lubrication and hydraulic oils with an oil viscosity of 10 - 700 mm²/s.

6.1 Performance specification

The oil dewatering unit OPS 010 separates free and dissolved water from hydraulic and lubricating oils. With a vacuum pump, a vacuum is generated in the reactor and oil is sucked in via the oil inlet. A heater heats the oil to the previously set temperature. Inside the reactor, the water evaporates to well below the saturation limit. The water vapor is cooled and condensed. The condensed water collects in a collecting container.

When the collecting container is full, the process is switched off by a float switch and the collecting container has to be emptied.

The dehydrated oil collects in the reactor. There are level switches for switching the drain pump on and off.

When the maximum filling level is reached, the drain pump switches on and feeds the dehydrated oil via a fine filter to the oil outlet.

6.2 Type plate

NOTE



Type plates are documents which must not be changed or removed.

› Damaged or lost type plates have to be replaced true to the original.

Kompaktes Öl-Reinigungssystem Compact Oil Purification System	ARGO HYTOS
ARGO-HYTOS GMBH Fluid Management D-76703 Kraichtal-Menzingen	CE
Type / type Serien Nr. / series No. Herstelldatum / manufacturing date	OPS 010-41110 XXXXXXXX-XX XX XX XX
Netzanschluss / power supply	U 3~380 - 440 V I 16 A P _{max.} 7,3 kW
Filterelement / filter element	V7.1230-53 Q _{Nenn} 8 l/min P _{max.} 9 bar

6.3 Component overview



Fig.1: Component overview

7. Accessories

7.1 Hitch

The device is available ex factory with a hitch for suspended transport.
The crossbar of the towing device can be dismantled and is secured on both sides by pins.

NOTE



- › The hitch is an option and can only be ordered together with the unit.
- › Due to special reinforcements in the housing, the towbar can only be installed directly at the manufacturer.

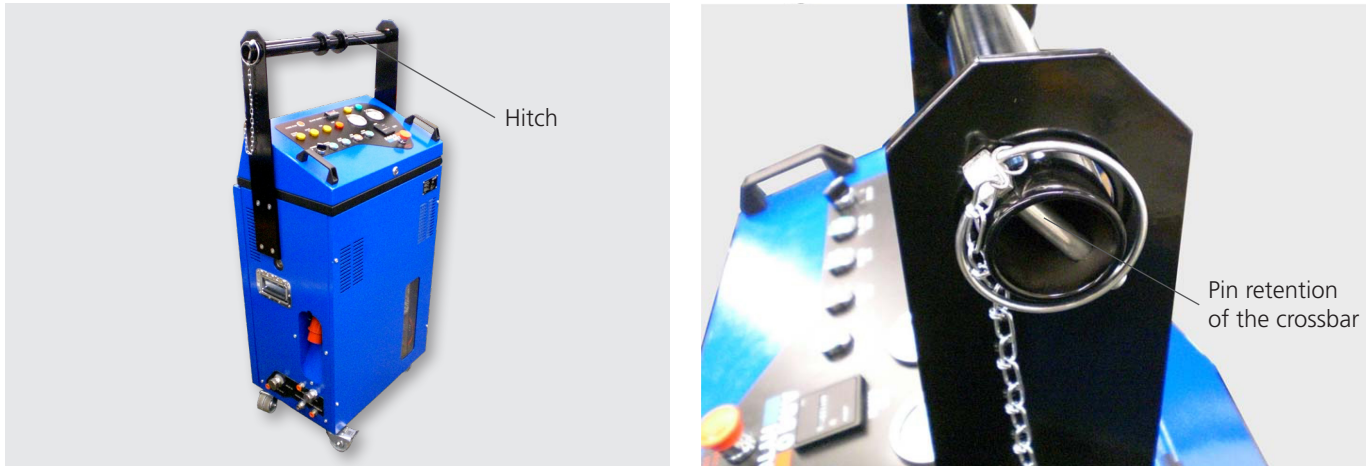


Fig. 2: Hitch and pin retention of the crossbar

DANGER



Danger to life due to falling loads

- › The device may only be lifted with a secured crossbar.
- › The pin retention must be fully inserted on both sides and secured against slipping out by turning down the ring.
- › Immediately replace lost or damaged parts.

7.2 Hose package

A hose package consisting of a suction and filling hose can be ordered as a useful accessory.

Pressure lance	OPS010.1850
Pressure hose 3 m	OPS010-1830
Pressure hose 5 m	OPS010.1840
Suction lance	OPS010.1820
Suction hose 3 m	OPS010.1800
Suction hose 5 m	OPS010.1810

The hoses are equipped with the necessary screw connections and suction and filling lances.

7.3 Power supply cable

A suitable power supply cable with phase inverter is available as an accessory.

Electric cable	OPS010-1703 - 16 A, 4 m long, with phase converter
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8. Transport, storage, installation, disposal

This chapter contains information on the transport, installation, connection and commissioning as well as the storage of the device.

NOTE



Please note:

- › The safety instructions in chapter "Safety" and in particular the operating conditions in section "Intended use".
- › Dimensions and weight of the device in chapter "Technical data".

8.1 Safety instructions



Danger to life due to falling loads

- › Do not stand under suspended loads
- › Move loads as close to the ground as possible

Transport work may only be carried out by qualified and authorized persons.
Industrial trucks must comply with the provisions of the accident prevention regulations.
When selecting the truck, pay attention to the weight of the device (see chapter "Technical data").

8.2 Transporting the device

8.2.1 Preparation for transport

When the unit has been put into operation:

- › Switch off the device.
- › Depressurize all lines.
- › Disconnect all supply and connecting lines and secure them to the device.
- › Mount transportation locks. To do this, secure all moving parts with adhesive tape or tensioning belt.
- › Remove any components (e.g. hoses) that are not firmly connected to the machine and package and transport them separately.
- › Close connections for oil with a plug.
- › The device has a high center of gravity - install tilt protection.
- › Fasten or lift the device only at the provided lifting device.
- › Transport may only be carried out in a standing position.
- › When transporting outdoors, protect the device from moisture and humidity.



8.2.2 Transportation



Danger to life due to falling loads

- › A falling device or assembly can result in life-threatening injuries or severe damage to the device.
- › Secure the device and accessories on the truck against tipping over or falling.
- › When transporting with a crane, lift the device only at the towing beam using suitable lifting devices. The lifting beam must be secured with spring plugs.

- › When transporting with a forklift or pallet truck, tie the device down on a pallet.
- › Observe the maximum lifting capacity of the lifting device.
- › Carefully lift the machine and check the center of gravity of the appliance on the fork.
- › In addition, secure the device with a tensioning belt to prevent it from tilting or falling.
- › Lift the device only slightly and transport it to the installation site as close as possible above the ground.
- › Gently lower the device to avoid vibrations.

 CAUTION	
	<p>Danger of property damage</p> <ul style="list-style-type: none"> › When positioning the fork, make sure that no parts are damaged and no lines are torn off. › Do not lift the unit at the mounted handles. The handles only serve for pulling the unit.

8.3 Storing the device

8.3.1 Preparation for storage

- › Reactor, collecting tank for condensation and heating element must be completely emptied (see chapter "Operation").
- › Treat all bare parts with preservatives.

8.3.2 Storage

- › Store the unit in a dry, well-ventilated room, protected from dirt.
- › Temperature range + 5 °C to + 35 °C.
- › Humidity 30 to 95 %, non-condensing.
- › Store protected against ozone, UV radiation, vibration and shock.

During transport and storage, care must be taken to ensure that dewpoint shortfalls are reliably avoided when the equipment is not or is no longer packed, and that condensation does not take place.

9. Setting up the device

9.1 Requirements to the installation site

The floor surface must be level and horizontal so as to ensure a safe stability of the device.

No separate foundations are required for the unit.

The load capacity of the floor must be suitable for the weight of the unit.

This is especially true when the device is used on work platforms.

The openings and connections on the device must be accessible.

The distance to walls or objects should be min. 30 cm in order to ensure free air intake and air discharge.

There must be sufficient freedom of movement for the staff.

The light conditions must comply with the applicable accident prevention regulations.

When installing the unit outdoors, protect the unit from rain and snow.

The appliance must not be operated outdoors in the event of a thunderstorm.

NOTE



For fixed installation in a system:

- › If the device is permanently installed in a system, install the device in such a way that all maintenance and inspection openings can be opened properly.
- › There must be sufficient space for maintenance and repair work around the unit.

9.1.1 Delivery status of a new device

Connection openings are provided with plugs.

Emergency stop switch in OFF position.

Fuses under the control panel are in OFF position.

9.1.2 Setting up



- › Install the device and secure it against rolling away with the brakes on the rollers.
- › Connect separately transported connecting parts (hoses).
- › Lay hoses in such a way that no tripping occurs.
- › When laying the hoses in travel paths, use hose bridges.
- › Remove transport safety devices, such as adhesive tape or tensioning straps.

Fig. 3: Brake on the transport rollers

9.2 Disposal

NOTE



Danger of environmental damage

- › Observe the applicable national and regional regulations and instructions of the manufacturer when disposing of the product.
- › Operating and auxiliary materials should be separated and disposed of in a proper manner.

This chapter contains information on the design, function and operation of the device, as well as any faults that may occur.

NOTE



Note:

- › The safety instructions in chapter "Safety".
- › The "supplier documentation" in the device documentation.

10.1 Design

The device consists of:

- › Housing upper part with control panel
- › Cover for the electro components
- › Housing base

The reactor, the collection tank, the heating element, the pumps and the filter are installed separately from the electrical components in the housing base. All connections are easily accessible on one side of the housing.

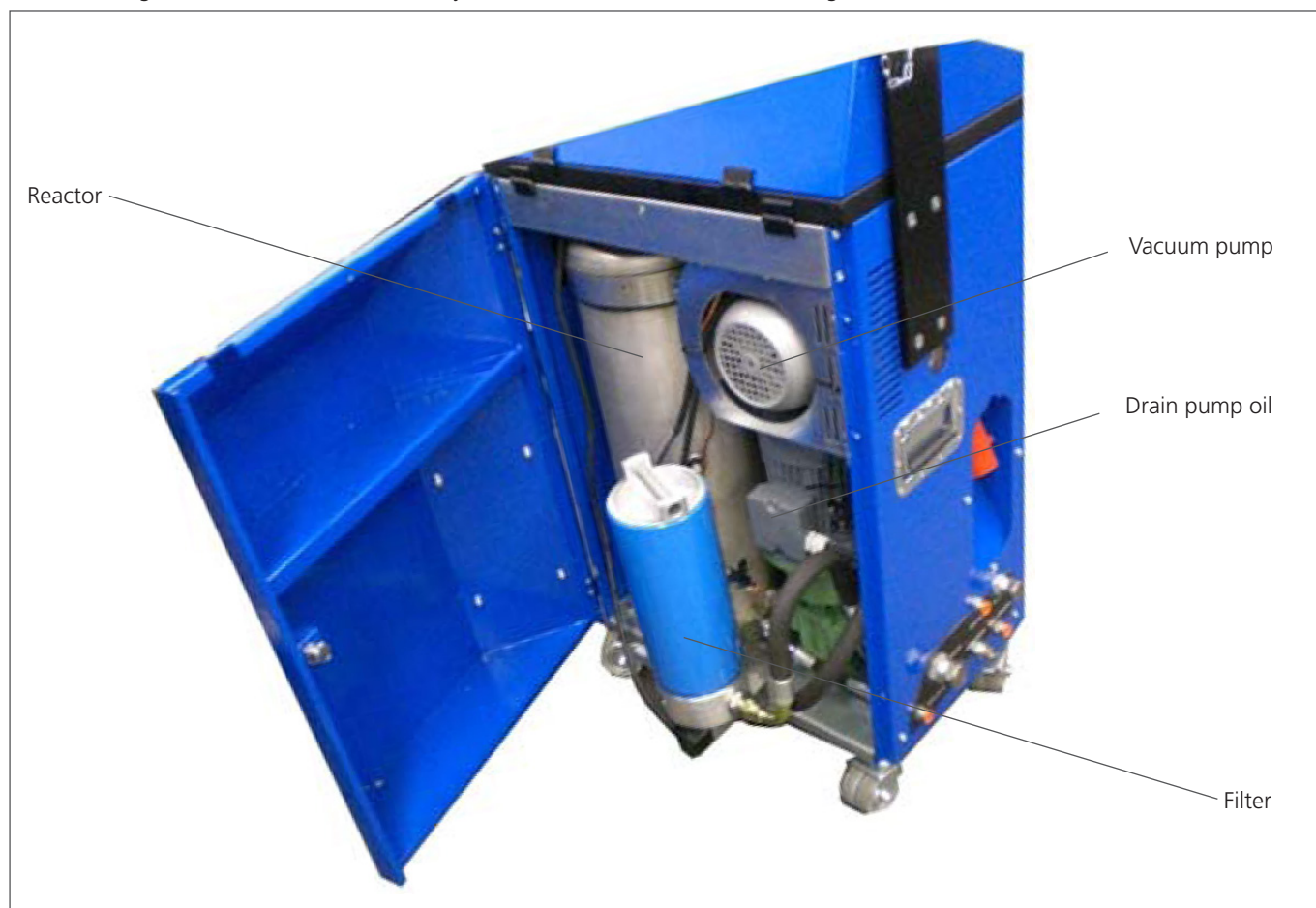


Fig. 4: Components inside

10.2 Function

The device separates free and dissolved water from hydraulic and lubricating oils. A vacuum is generated in the reactor with a vacuum pump and oil is sucked in via the oil inlet. A heater heats the oil to the previously set temperature. Inside the reactor, the water evaporates to well below the saturation limit. The water vapor is cooled and condensed. The condensed water collects in a collecting container.

When the collecting container is full, the process is switched off by a float switch and the collecting container has to be emptied. The dehydrated oil collects in the reactor. There are level switches for switching the drain pump on and off.

As soon as the maximum filling level has been reached, the emptying pump is switched on and the dehydrated oil is fed to the oil outlet via a fine filter.

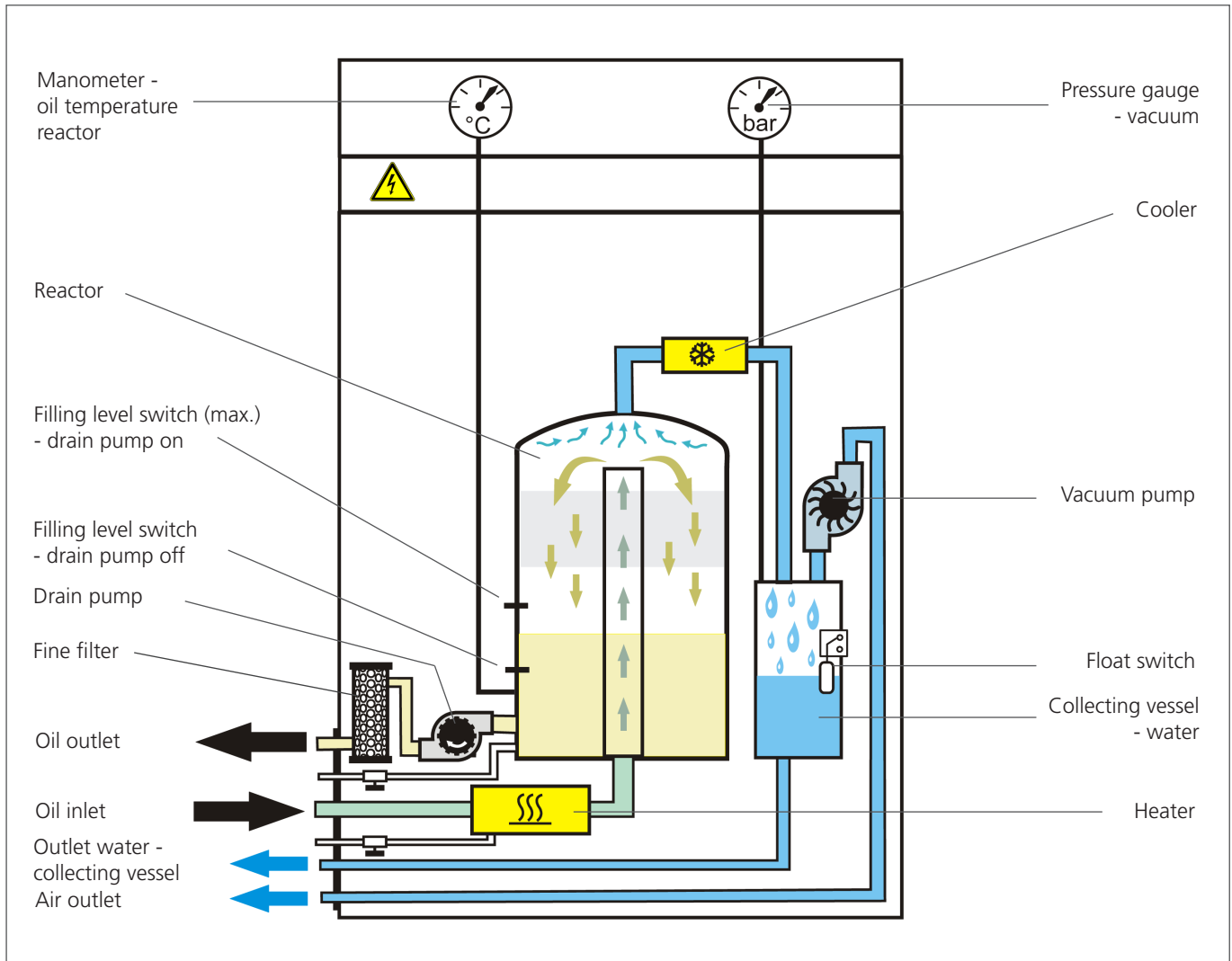


Fig. 5: Function - schematic

10.3. Operating facilities

10.3.1 Indications and buttons at the control panel



Fig. 6: Control panel

Operating element	Functional description
EMERGENCY STOP	EMERGENCY STOP push button. When activated, all processes are immediately stopped.
RELATIVE HUMIDITY	Relative humidity display. "HH" in the display indicates that there is still free water in the oil. A value in the display of 100 % or less means that water is still present in dissolved form (relative humidity) in the oil. The value is displayed in the appropriate % values.
OIL STATUS - yellow	Lights up with relative humidity < 75%
OIL STATUS - green	Lights up with relative humidity < 50%
HOUR COUNTER	Operating hours counter. Counts the operating hours in automatic operation.
START PROCESS	Button for starting the automatic sequence
RUN - yellow	Lights up while the process is running - after pressing START PROCESS
STOP PROCESS	Button for stopping the automatic sequence
STOP - red	Lights when the process is off
HEATING	Switch for switching on the heating element
HEATING ELEMENT yellow	Lights when the heater is on
OUTLET OIL - yellow	Lights up when the max. filling level in the reactor is reached and the drain pump pumps off the oil from the reactor.
MANUAL OUTLET OIL	Button for manual emptying of the reactor (For complete emptying of the reactor before transport or storage of the device)
DRAIN CONDENSER	Button for opening the drain valve for the water collecting vessel
CHANGE FILTER - red	Lights up when the filter element is dirty. (Only lights up when the reactor is automatically emptied)
VACUUM	Manometer for indicating the vacuum in the reactor
OIL TEMP	Thermometer for indicating the temperature in the reactor

10.3.2 Manual controls at the unit

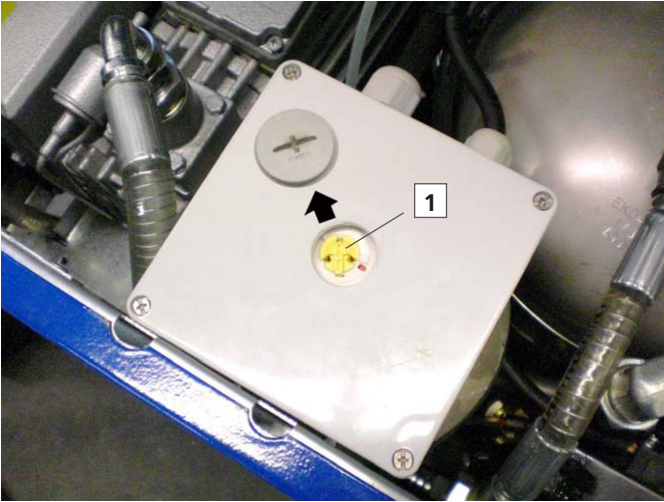


Fig. 7: Controller for heating element

- 1 Controller for heating element - adjustable from stage 1 to 4.
The heating is preset to level 4 in the delivery state.
This corresponds to an oil temperature in the reactor of about 65 °C.
For settings see "Technical data" and "Operation".

- › To adjust the heater, remove the cap on the regulator.
- › After adjustment, screw the cap back on.

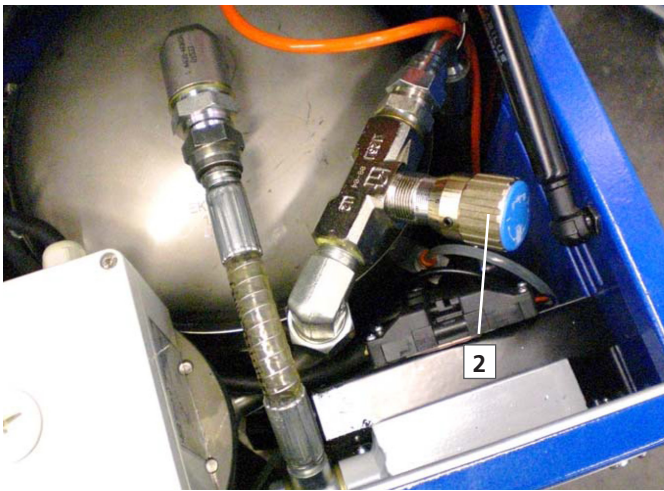


Fig. 8: Throttle valve

- 2 Throttle valve for regulating the flow from the heater to the reactor.
The adjustment of the volumetric flow depends on the viscosity.
Basic setting approx. 7 l/min. The scale on the throttle valve is ascending.
The highest value means the maximum adjustable flow rate.

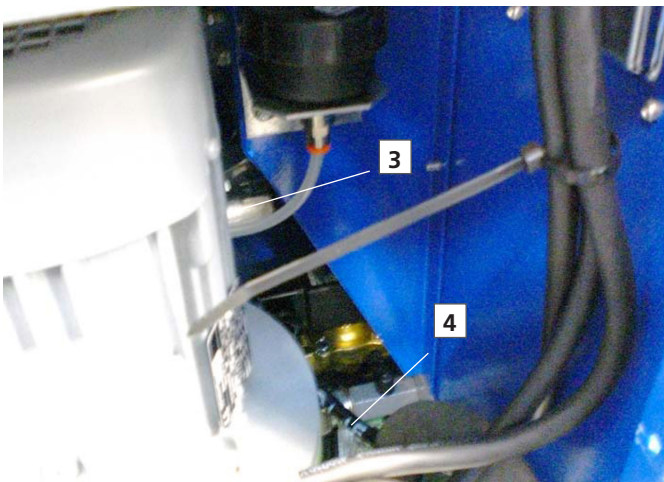


Fig. 9: Ball valves

- 3 Ball valve for emptying the residual oil in the heater.
Ball valve is closed during operation.
- 4 Ball valve for the complete emptying of the reactor interior.
Ball valve is closed during operation.

10.4. Operation

10.4.1 Before commissioning

CAUTION



Danger of malfunctions

- › If the oil cleanliness is inferior to cleanliness class 22/20/19 ISO 4406 or if the oil is visibly contaminated, only operate the unit with an additional suction strainer.

NOTE



- › Unlock the emergency stop button before commissioning and turn the fuses under the control panel to "ON".

DANGER



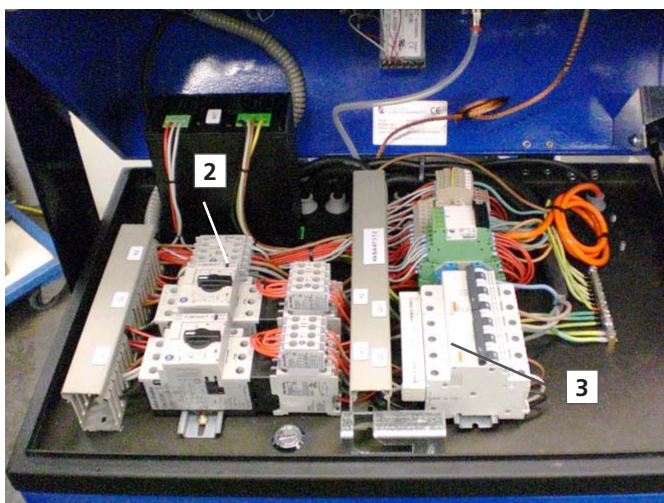
Life-threatening voltage

- › Open the control panel door only when the mains plug is disconnected.
- › Connect the device to the power supply only when the fuses under the control panel are set to "ON".



1 Emergency stop button

- › Release the emergency stop button and switch the fuses to "ON".
- › Connect the mains.
- › Close the ball valves for emptying the reactor and emptying the heater.
- › Remove the plugs from the oil inlet and oil outlet.



2 Fuses under control pane

3 Motor protection switch

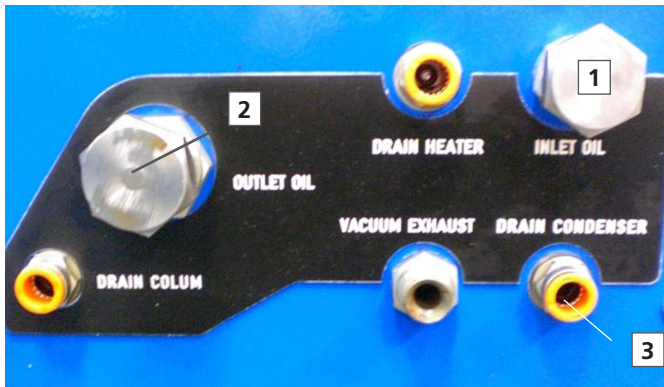
Fig.10: Emergency stop button and fuses

NOTE



- › Keep the plugs.
- › The connections must be closed again to transport or to store the device.

- › Connect hoses or pipes to the oil inlet and outlet.
Oil inlet min. 3/4"
Oil outlet min. 3/4"



- 1 Oil inlet with plug
- 2 Oil outlet with plug
- 3 Connection drain condenser

When installing hoses and connecting cables, avoid tripping. Do not bend hoses or lead them over sharp edges.

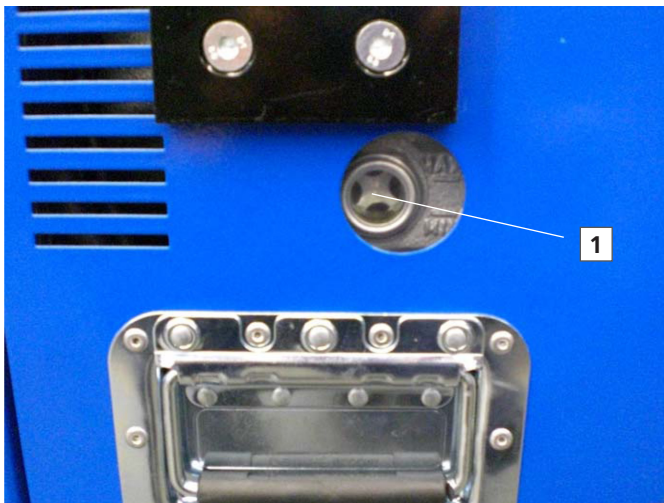
- › Connect the hose at the outlet of the drain condenser and lead the hose into a suitable collecting vessel.

Fig. 11: Emergency stop button and fuses

NOTE



- › The collecting vessel must be located below the liquid level of the collecting vessel in the unit.
- › Separated water must be able to drain unimpeded when the valve is opened.



- 1 Oil sight glass vacuum pump

- › Check the oil level and the condition of the oil at the oil sight glass of the vacuum pump.
(also see separate operating manual vacuum pump)

Fig. 12: Oil sight glass



Fig. 13: Control panel

- 2 Start button
 - 3 Stop button
- › Switch on the device with the start button (start process) and check the direction of rotation of the motors (also see arrow on the motor housing).
 - › Switch off the device with the stop button (stop process).

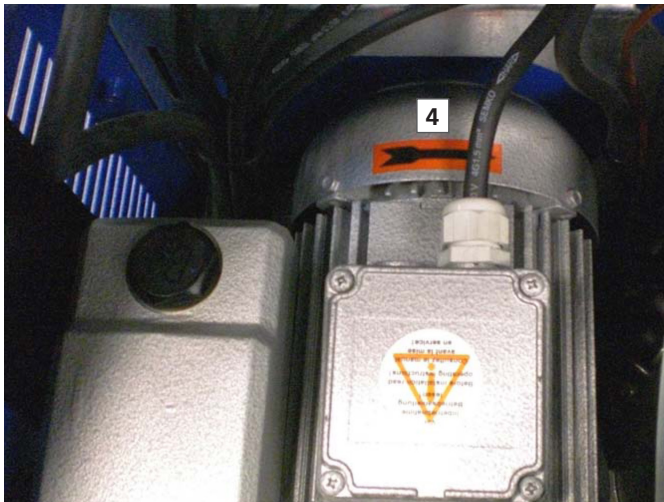


Fig. 14: Motor vacuum pump

- 4 Rotation direction sign vacuum pump

! CAUTION	
	<p>Danger of malfunctions</p> <ul style="list-style-type: none"> › If the direction of rotation is incorrect, the vacuum pump cannot generate a vacuum in the reactor. The device is not working. › The phase in the mains plug may have to be replaced. › Tip: Use a power plug with a phase inverter

- › Insert the suction hose and the return hose into the oil to be dewatered and secure it against slipping out.
- › Make sure that the suction line is clean.

NOTE	
	<ul style="list-style-type: none"> › Keep the distance between suction and return hoses in the oil tank as large as possible to prevent the dehydrated oil from being sucked in again.

CAUTION



Danger of malfunctions

- › If the oil cleanliness is inferior to cleanliness class 22/20/19 ISO 4406 or if the oil is visibly contaminated, only operate the unit with additional suction strainer.

- › Switch on the device at the start button (Start Process) and check the tightness of the connections and hoses.

CAUTION



Danger of environmental damage

- › In the case of leaks in the device or at the connections, switch off the device immediately and eliminate leaks.
- › Any oil that has leaked out should immediately be covered with oil binder.
- › Dispose of contaminated oil binders according to regulations.



Fig. 15: Pressure gauge vacuum

1 Pressure gauge vacuum

- › Check the vacuum gauge to see if a vacuum builds up in the reactor. Negative pressure target value: approx. 0.8 bar.
- › Check the viewing window to see if the collecting vessel for condensation is empty. The container must be emptied manually.



Fig. 16: Viewing window collecting vessel for condensation

2 Viewing window

NOTE



- › When the maximum filling level has been reached, the device switches off automatically and the container has to be emptied by pressing the button "Drain Condenser".

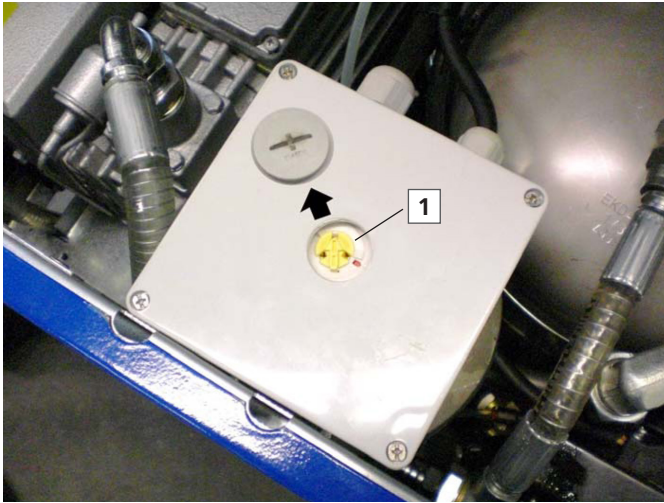


Fig. 17: Setting heating element

1 Controller for heating element - adjustable from stage 1 to 4

- › Check the cooler function.
An air flow must be detectable from the outlet openings at the housing.
- › Determine the temperature of the medium to be drained.
If the inlet temperature > 60 °C: Set heating element on the scale to level 1.
Otherwise:
Mineral oils: recommended setting level 4 (approx. 65 °C)
Synthetic Esthers: recommended setting level 2 – 3

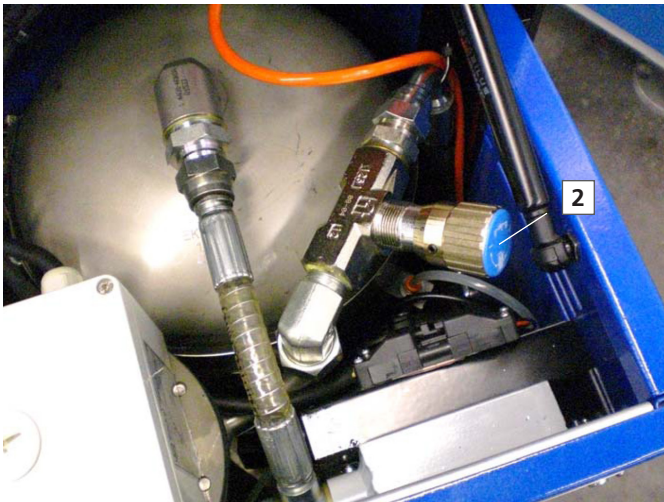




Fig. 18: Throttle valve

2 Adjusting screw throttle valve



- › Check in the window of the collecting container for condensing water, whether oil droplets are introduced into the separated water.
- › If so: reduce the flow at the throttle valve by turning the adjusting screw until clean water is drained off.

10.4.2 Commissioning

Prerequisites: Checks and settings are carried out before commissioning.

 CAUTION	
	<p>Danger of environmental damage</p> <ul style="list-style-type: none"> › Before each start-up, ensure that suction and return hoses are prevented from slipping out. › Check for leaks.



- › Switch on the device at the "Start Process" button.
Yellow control lamp "Run" glows.
- › Wait until a vacuum builds up in the reactor.
Display on the manometer should constantly display a vacuum of approx. 0.8 bar.

 CAUTION	
	<p>Danger of property damage</p> <ul style="list-style-type: none"> › If no vacuum is generated, switch off the device immediately. › Check for leaks.


- › At the inlet temperature < 60 °C, switch the heating switch to "1"
Yellow control lamp "Heating Element" glows.
At an inlet temperature > 60 °C, the inlet temperature is sufficient and the heating does not need to be switched on.
When the preset temperature in the reactor has been reached, the "Heating Element" indicator light turns off.
- › Indication at the thermometer "Oil Temp" should be about 65 °C.
- › Check at the viewing window that pure water is separated without containing any oil.
If an oil inlet is visible, reduce the flow at the throttle valve.
- › Check indication of "Relative Humidity".
Indication „HH“ = relative humidity > 100 % = free water is in the oil.
If the relative humidity is less than 100 %, the current value is displayed in %.
Yellow control lamp "Oil Status" lights up with a relative humidity < 75 %.
Green control lamp "Oil Status" lights up with a relative humidity < 50 %.



10.4.3 Operation

The operation of the device is mostly automatic. However, the unit should be constantly checked for normal function or leaks during operation.

 CAUTION	
	<p>Danger of damage to equipment and environment</p> <ul style="list-style-type: none"> › Do not leave the device unattended during operation. › In case of leaks, unusual noises and odors, smoke development, etc. switch off the appliance immediately at the emergency stop button and pull the mains plug. › The device must not be put into operation again until the faults have been eliminated.

- › Regularly check the filling level in the collecting container.
- › To empty the collecting container before the maximum filling level has been reached, the device must be switched off at the "Stop Process" button. (Red "Stop" indicator glows).
- › Do not press the "Drain Condenser" button until the negative pressure in the reactor has been released, then drain the condensation water into a suitable container.

NOTE	
	<ul style="list-style-type: none"> › When the maximum filling level in the collecting container has been reached, the device switches off automatically and the container has to be emptied by pressing the button "Drain Condenser".

 CAUTION	
	<p>Danger of damage to equipment</p> <ul style="list-style-type: none"> › The device must be switched off for emptying the collecting container and the vacuum in the reactor must have been reduced. › Before switching off, switch the heating "Heating" to "0". › Do not use the emergency stop button to turn off the unit. › Only use the emergency stop button in an emergency.

- › After emptying the collecting container, switch on the device again at the "Start Process" button (yellow control lamp "Run" is lit).
- › Constantly check the "Oil Status" and the "Relative Humidity" indicators.

Recommendation:

Mineral oils: Complete drying at relative humidity < 50 % (green light)
Synthetic Esthers: Complete drying at relative humidity < 25 % (green light)

- › Periodically check whether the drain pump automatically drains the dehydrated oil from the reactor.

NOTE



- › Drain pump only switches on when the maximum filling level in the reactor has been reached.
- › After pumping out, the pump switches off automatically.

› Control lamp "Change Filter"

If the red control light "Change filter" lights up during the pumping down of the oil from the reactor, the fine filter must be changed. For replacing the filter, see chapter "Maintenance"

NOTE



- › The "Change Filter" indicator only lights during the pumping out of the oil from the reactor. If the drain pump is switched off, the control lamp also turns off.

10.4.4 Taking an oil sample

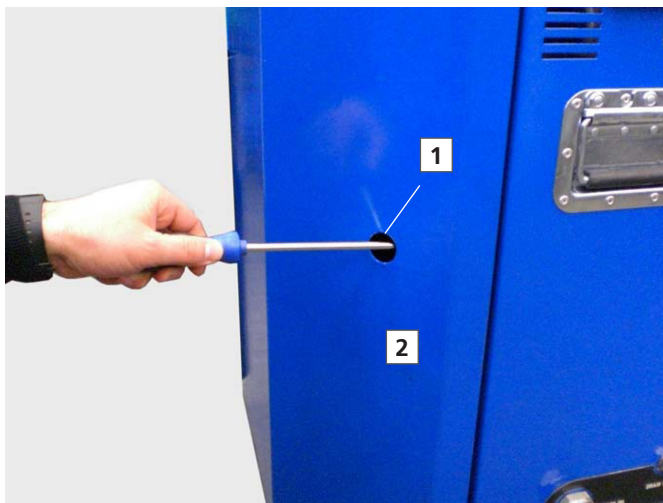
CAUTION



Risk of personal injury and equipment damage

- › Before taking an oil sample, the device must be switched off and must not be pressurized.

- › To take an oil sample, first switch on the heating at the "Heating" switch to "0".
- › Switch off the device at the "Stop Process" button (red control lamp "Stop" glows).
- › Wait until the pressure in the device has decreased.
- › Open the service door on the rotary lock with a screwdriver.



- 1 Rotary locking
 - 2 Service door
- › Hold an appropriate vessel under the sampling point and briefly open the stopcock to flush the sampling point.

Fig. 19: Taking an oil sample

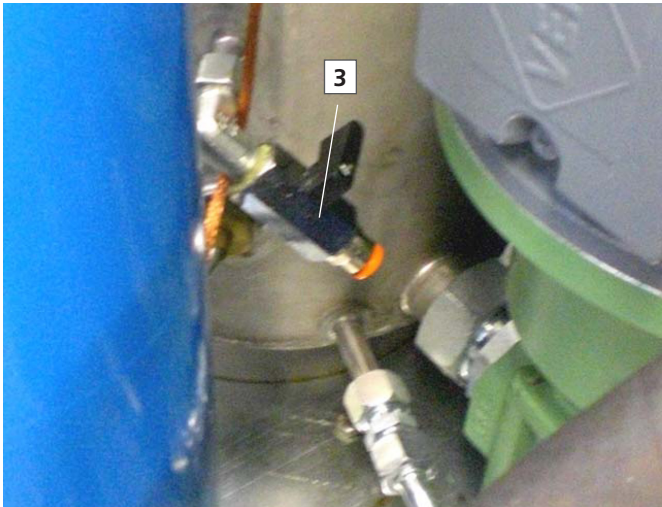




Fig. 20: Stopcock oil sample

3 Sampling point for oil sample



- › After taking the oil sample, close the stopcock and the service door.
- › Switch on the device again and continue the process.

10.4.5 Shutting down and draining the device

- › When the desired relative humidity has been reached, first switch the heating at the "Heating" switch to "0".
- › Then switch off the device at the "Stop Process" button (red control lamp "Stop" glows).

 CAUTION	
	<p>Danger of environmental damage</p> <ul style="list-style-type: none"> › After switching off, there is still residual oil and condensation in the unit. › Do not pull or disassemble the hoses until the device has been emptied.

- › To drain the reactor, press and hold the "Manual Outlet Oil" button (yellow control lamp "Outlet Oil" is lit). The pumping-out of the drain pump is acoustically audible. As soon as the reactor is empty, the noise of the drain pump changes significantly.
- › Release the "Manual Outlet Oil" button.
- › To drain the collecting container for condensed water, press the button "Drain Condenser".
- › Collect the condensation water in a suitable container and dispose of according to regulations.
- › Pull the suction and filling hose out of the tank and pay attention to dripping oil.

 CAUTION	
	<p>Danger of environmental damage</p> <ul style="list-style-type: none"> › Collect draining oil. Immediately cover the oil, which has dripped onto the floor, with oil binders and properly dispose of the contaminated oil binder.

The oil residues remaining at the bottom in the reactor and in the heater must be drained manually.

- › For this purpose, connect short hose pieces to the outlet for the reactor "Drain Column" and to the outlet for the heater "Drain Heater" .



Fig. 21: Connection plate

- 1 Outlet residual oil heater (Drain Heater)
- 2 Outlet residual oil reactor (Drain Column)

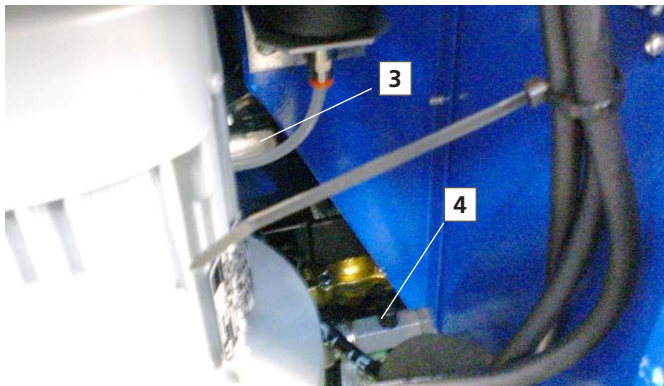


Fig. 22: Stopcocks

- 3 Stopcock for draining the residual oil in the heater
- 4 Stopcock for draining the interior of the reactor

- › Route the hoses into a suitable collecting vessel.
- › Open the service door at the rotary lock with a screwdriver.
- › Open the shut-off valves for the reactor and the heater and let the residual oil drain into the collecting vessel.
- › After the residual oil has drained, close the shut-off valves.
- › If the suction and filling hose are dismantled, pay attention to leaking oil residues.
- › Close the connections with the supplied sealing plugs.
- › Check the oil level at the vacuum pump (see operating manual vacuum pump).
- › Check for leaks.
- › Clean the unit and hoses.
- › Store the device, see chapter "Transport, storage".

 CAUTION



Risk of personal injury and equipment damage

- › Troubleshooting must only be carried out by qualified persons.
- › The authorized persons must be instructed by the operator and be familiar with the operating instructions of the device as well as the applicable occupational safety and accident prevention regulations.
- › Check the safety devices for existence and operability after completion of the work and before each restart.

 CAUTION



Risk of burns

- › The surface of the vacuum pump can become hot during operation.
- › Allow the device to cool down.
- › Use personal protective equipment.
- › Wear safety gloves.

Pos.	Failure	Possible Cause	Remedy
1	Device does not start	<ul style="list-style-type: none"> › Emergency stop button is pressed › Fuses under control panel are not switched to "ON" › Collecting vessel for condensation water is full and the float switch has turned off the device › Reactor is filled to maximum 	<ul style="list-style-type: none"> › Release emergency stop button › Switch the fuses under the control panel to "ON" › Empty the collecting vessel by pressing the "Drain Condenser" button › Operate the drain pump manually by pressing the "Manual Outlet Oil" key
2	Vacuum pump does not start	<ul style="list-style-type: none"> › Motor protection switch Q1 is tripped › Oil level of the vacuum pump is too low › Collecting vessel for condensation water is full and the float switch has turned off the device › Reactor is filled to maximum › Pump defective 	<ul style="list-style-type: none"> › Press the motor protection switch Q1 › See operating manual for vacuum pump › Empty the collecting vessel by pressing the "Drain Condenser" button › Operate the drain pump manually by pressing the "Manual Outlet Oil" key › Replace the pump
3	Vacuum is not achieved	<ul style="list-style-type: none"> › Leakage in the system › Check the filter in the vacuum pump › Manometer defective › Oil level of the vacuum pump too low › Incorrect rotation direction of the motor of the vacuum pump 	<ul style="list-style-type: none"> › Check for leaks › Clean the filter - see operating manual for the vacuum pump › Check the function of the manometer › See operating manual for vacuum pump › Interchange the phases in the mains connection cable or use a mains connection cable with phase inverter
4	Drain pump "Manual Outlet Oil" does not start	<ul style="list-style-type: none"> › Emergency stop button is pressed › Fuses Q0 and Q1 under the control panel are not switched to "ON" › Motor protection switch K2 is tripped › Collecting vessel for condensation water is full and the float switch has turned off the device › No oil was sucked into the reactor 	<ul style="list-style-type: none"> › Release emergency stop button › Switch the fuses under the control panel to "ON" › Check the motor protection switch K2 › Empty the drain container by pressing the "Drain Condenser" button › Check the suction area for free passage
5	Oil is not heated	<ul style="list-style-type: none"> › Heating not switched on › Fuse Q2 is not switched to "ON" › Switch contactor K3 is tripped › Volume flow at the throttle valve is too high › Heating defective › Temperature display in the control panel is defective › No oil was sucked into the reactor 	<ul style="list-style-type: none"> › Switch on heating "Heating". "Heating On" is lit. › Switch on the fuse under the control panel › Check the switch contactor with switched on heater › Reduce the flow at the throttle valve › Check if the heating element gets warm Possibly replace the heater › Check if the heating element gets warm - possibly replace the temperature display › Check the suction area for free passage
6	Oil gets too hot / boils	<ul style="list-style-type: none"> › Supply temperature too high › Thermostat of the heating is defective › Temperature display in the control panel is defective › Vacuum is too high 	<ul style="list-style-type: none"> › Switch off the heating › Check the thermostat, see documentation heating › Check temperature display, if necessary replace it › Check the negative pressure in the reactor

Table 1: Error messages

This chapter provides information on the inspection, maintenance and repair of the device.

NOTE



On performing any work please observe:

- › The safety instructions in chapter 2
- › The component documentation

12.1 Safety instructions

The general instructions in the operating instructions for inspection, maintenance and repair must be complied with. Please also pay attention to the "supplier's documentation" for purchased parts such as motors, pumps, etc. Maintenance work may only be carried out by qualified persons.

The authorized persons must be instructed by the operator and be familiar with the operating instructions of the device as well as the applicable occupational safety and accident prevention regulations.

After completion of the maintenance work and before each restart, check the safety devices for presence and functionality.



WARNING



Risk of personal injury and equipment damage

- › Disconnect all supply lines during all maintenance work on the device.
- › Protect against reconnection, disconnect the mains connection cable.
- › Check that no voltages are present.
- › Depressurize all lines.

12.2 Cleaning

- › Clean the device regularly with fiber-free cleaning cloths.
- › Do not use aggressive cleaning agents.
- › Observe the manufacturer's instructions when using cleaning agents. Improper detergents can damage or destroy components. They can also be the cause of disturbances.
- › When cleaning and removing dirt, do not blast components with compressed air, but vacuum the dirt, wipe with a hand brush or wipe with fiber-free cleaning cloths.
- › After cleaning, inspect all cables for leaks, loosened connections and scrubbers.
- › Fix any defects immediately.

NOTE



Risk of damage to the control panel

- › Clean the operating panel only with a damp cloth.
- › Do not use aggressive or abrasive cleaning agents.

12.3 Maintenance

Maintenance includes cleaning, retightening of loose parts, replacing operating and auxiliary materials.

12.3.1 Cables and hoses

Regularly inspect all pipes, hoses and fittings for leaks and visible signs of damage. Eliminate any damage immediately.



Make sure that the pressure lines are properly laid and installed. Do not mix up the connections.

Fittings, length and quality of the hose lines must meet the requirements.

Disconnect all pipes and hoses before any maintenance work on the unit.


12.3.2 Disposal of operating and auxiliary materials

All substances, e.g. waste oil (including biodegradable oil), filters, auxiliaries, etc., must be carefully separated from other waste. To keep waste disposal costs as low as possible, waste oils from the various categories should be collected separately.

 CAUTION	
	<p>Danger of environmental damage</p> <ul style="list-style-type: none">› In case of improper disposal, operating and auxiliary materials can lead to environmental damage.› Ensure safe and environmentally safe disposal of operating and auxiliary materials as well as exchange parts.› Observe the applicable national and regional regulations.

12.3.3 Maintenance

Maintenance includes the replacement of wear parts and the replacement of defective components.

NOTE	
	<p>Danger of damage to equipment</p> <ul style="list-style-type: none">› Defective components may only be replaced by original spare parts.› ARGO-HYTOS GMBH will void the guarantee if other spare parts are installed which are not approved.

To be exchanged:

- › Any worn, bent or broken parts.
- › Wear parts, whose stated lifetime is exceeded or whose functionality is no longer guaranteed.

12.4 Maintenance and repair of individual components

12.4.1 Vacuum pump



 CAUTION	
	<p>Risk of burns</p> <ul style="list-style-type: none">› The surface of the vacuum pump can become hot during operation.› Allow the device to cool down.› Use personal protective equipment.› Wear safety gloves.



Fig. 23: Vacuum pump

Inspection

- › Before commissioning, check the oil level and the oil condition.

Maintenance

- › Change the oil after 1,000 operating hours or when the oil is dirty.
- › Drain the used oil in a suitable container and dispose of it in accordance with the regulations.
- › Replace the filter in the exhaust gas chamber after 1,000 operating hours.
- › See also documentation Busch vacuum pump.

12.4.2 Drain pump



Fig. 24: Drain pump

Inspection

- › Before commissioning, check that the access to the pump is free of dirt.

Maintenance

- › The drain pump does not require any maintenance. If the pump is defective, it must be replaced (see data sheet company Rickmeier).
- › Engine for drain pump (see data sheet VEM Motors).

12.4.3 Cooler with fan

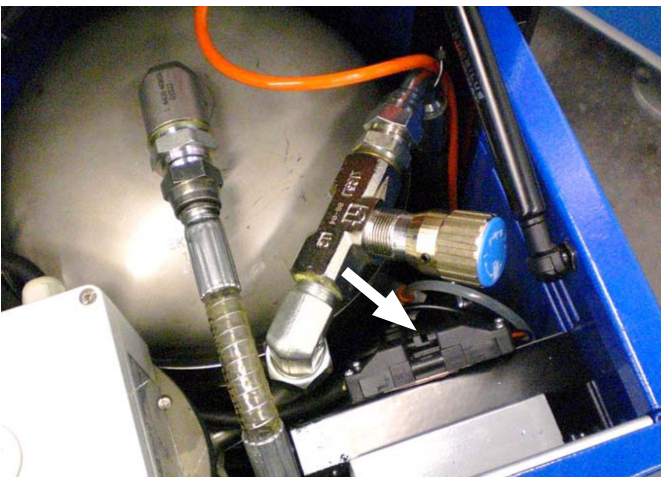


Abb.25: Kühler mit Lüfter

Inspection

- › Before commissioning, check whether the cooling ribs are free from contamination.

Maintenance

- › Rinse and clean cooler once a year (see data sheet company Sesino).

12.4.4 Reactor

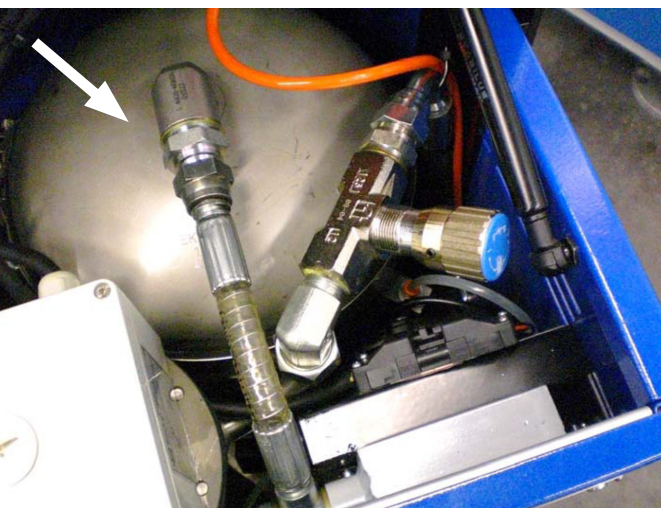


Fig. 26: Reactor

Inspection

- › Before commissioning check for leakage.

Maintenance

- › Depending on the duration of the operation, at least once a year, the reactor must be removed and cleaned. Ask for service at ARGO-HYTOS GMBH or instructions from ARGO-HYTOS GMBH for disassembly and cleaning.

12.4.5 Emergency stop button



Fig. 27: Emergency stop button

Inspection

- › Before commissioning, check the function of the emergency stop button.

Maintenance

- › If the emergency stop button is defective, replace the component immediately.
- › The device must not be operated with defective safety devices.

12.4.6 Hose for air supply



Fig. 28: Hose for air supply

Inspection

- › Periodically check for contamination.

Maintenance

- › Remove and clean the hose when dirty.
- › After cleaning, screw the hose back to the coupling.

12.4.7 Throttle valve



Fig. 29: Throttle valve

Inspection

- › Regularly check for contamination and flow.

Maintenance

- › Remove the throttle valve and clean it.
- › After cleaning, reinstall the throttle valve and check for leaks.

12.4.8 Filter change

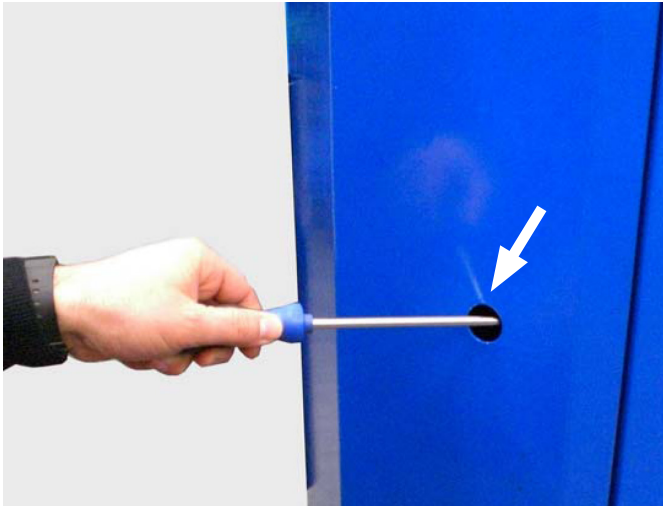


Fig. 30: Filter change, service door

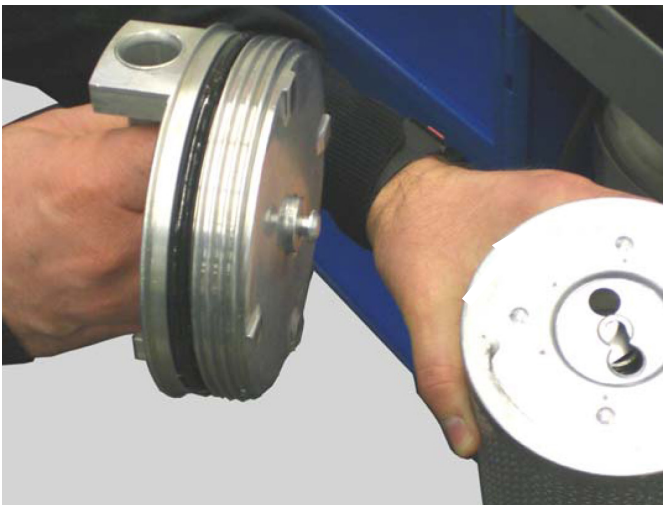


Fig. 31: Filter change, filter element

Inspection

- › Periodically check for contamination.

Filter change

- › If the control lamp "Change Filter" lights up, switch off the unit and wait until the pressure has relieved.
- › Open the service door with a screwdriver.

- › Unscrew the filter element from the filter housing.
- › When removing, pay attention to dripping oil.
- › Remove the filter element from the cover.
- › Properly dispose of the used filter element.
- › Insert the new filter element at the cover and screw the filter into the housing.
- › Close the service door.

This chapter provides information about the documents associated with the device. The documents of the purchased parts or the individual components are part of the device documentation and contain information about the safety, operation, maintenance and repair of the installed components.

NOTE

**On performing any work please observe:**

- › The safety instructions in chapter 2.
- › The construction documentation of the installed components.

13.1 Related documents

- › The EC Declaration of Conformity can be found in the folder of the device documentation in "EC Declaration of Conformity".
- › The associated component documents are located in the folder of the device documentation in tab "Documentation components".
- › Drawings and parts lists are located in the folder of the device documentation in register "Drawings and Parts Lists".
- › Documents for the electrical system are located in the folder of the device documentation in register "Electrics".

13.2 Related documents components

No.	Manufacturer / component	Documents
	Electrics see data sheet LubCos H2O ; 100.00 Humidity sensor see data sheet FN_060 ; 8010 Filter FN 060/ FN 300	Circuit diagrams on request Description / data sheet Description / data sheet
	Busch Vacuum pump R5 KB 0010/0016 E	Documentation on the manufacturer's website
	Rickmeier Gear pump / drain pump Type R25/20	Documentation on the manufacturer's website
	VEM-Motors Drive drain pump K21 R80G6	Documentation on the manufacturer's website
	Sesino Cooler Type APL 170	Documentation on the manufacturer's website
	NOR-Instruments Heating element Type 70010 Level gauge collecting vessel Type NVF-5 Level gauge reactor Type 845-976	Documentation on the manufacturer's website
	Fly-Industri Instrumenter AIS Thermometer Type L31 063KBVG1 M1	Data sheet
	Nuova Fima Manometer Type N21 03D0632B093	Data sheet
	ASCO Joucomatic Solenoid valve – collecting vessel Type AJSCG262C090 Solenoid valve – oil inlet Type AJSCE21 OD095 Solenoid valve – Emptying collecting vessel Type AJSCE21 OD094	Documentation on the manufacturer's website

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Czech Republic	ARGO-HYTOS s.r.o	info.cz@argo-hytos.com
	ARGO-HYTOS Protech s.r.o	info.protech@argo-hytos.com
France	ARGO-HYTOS SAS	info.fr@argo-hytos.com
Germany	ARGO-HYTOS GMBH	info.de@argo-hytos.com
Great Britain	ARGO-HYTOS Ltd.	info.uk@argo-hytos.com
Hong Kong	ARGO-HYTOS Hong Kong Ltd.	info.hk@argo-hytos.com
India	ARGO-HYTOS PVT. LTD.	info.in@argo-hytos.com
Italy	ARGO-HYTOS S.r.l.	info.it@argo-hytos.com
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