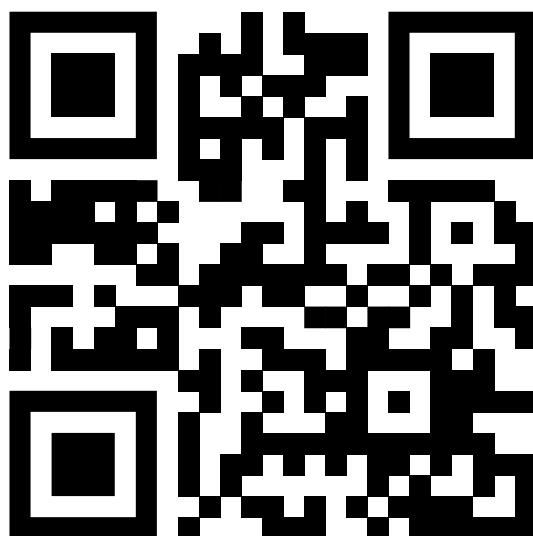




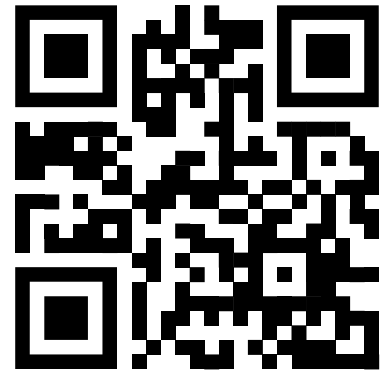
**Original
Operation manual**
www.hengst.com/multicnc

MultiCNC

DELBAG GmbH
Shamrockring 1
44623 Herne



For questions about spare parts and further technical information visit www.hengst.com/multicnc



Identification data

Tool/Machine/System

Model name: Cooling lubricant separator MultiCNC

Customer data:

Company name:

Order no.:

Location:

Manufacturer address:

Company name: Hengst Group / DELBAG GmbH

Street: Shamrockring 1

Location: 44623 Herne

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Homepage: www.hengst.com/multicnc

Operation manual:

Version: END

Creation date: 30.05.2023

You will also find new link to our video instruction on filter change at www.hengst.com/multicnc!



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1 Introduction

1.1 Introduction

This Operation Manual contains important information on how to safely, properly and economically operate the Cooling Lubricant Separator MultiCNC. Observing this document shall support you to avoid hazards, reduce repair costs and downtime, and increase the reliability and service life of Cooling Lubricant Separator.

Keep this Operation Manual available at all times, refer and apply instructions when working on or with the separator.

This Operation Manual contains the following sections:

- operation and elimination of errors during operation,
- regular maintenance (care, maintenance, repair),
- transport

1.2 Copyrights and property rights

- Only make these Operation Manual accessible to authorized persons.

This Operation Manual is protected by the copyright law.

Reproducing and duplicating documents, also in extracts, as well as using and communicating content without express written authorization are not permitted.

Violations entail liability for damage. All rights for industrial patents or property rights are the DELBAG GmbH reserved.

1.3 Information for operator

This Operation Manual is an integral part of the separator.

- Ensure that all persons working with the separator observe this Operation Manual.
- Spare parts shall comply with the technical requirements specified by the DELBAG GmbH. This compliance is always guaranteed if original spare parts are used.



2 Safety

The separator is developed and produced in accordance with the state of the art and recognized safety regulations.

When operating the separator, hazards may arise for persons working with the separator or damage the separator and other property if the system is:

- operated by personnel without training or instruction,
- used for other than intended purposes,
- improperly maintained.

2.1 Notes on signs and symbols

The following signs and symbols are used in this Operation Manual to designate particularly important information:

- The eye-catching point is used to identify work and/or operating steps. Perform the steps in the specified order.
- The indent is used to mark enumerations.



DANGER

This is a warning of an imminently hazardous situation leading to a serious injury or death, if the designated instruction is not followed exactly.



WARNING

Draws attention to a potentially hazardous situation that could lead to a serious personal injury or death, if the designated instruction is not followed exactly.



CAUTION

This is a warning of a possible hazardous situation leading to a moderate or minor injury, if the designated instruction is not followed exactly.

NOTICE

This is a warning of a possible hazardous situation leading to property damage, if the designated instruction is not followed exactly.



This is a notice to useful information for safe and proper handling.

- Observe the warning signs, operating signs or component labels attached to the separator. Do not remove signs or notices.
- Always keep these notes and symbols in a clean and legible condition.

2.2 Proper use

The separator is exclusively intended for extracting and filtering air contaminated with cooling lubricant aerosols from machine processing centers and similar machines.



- Observe the information in Chapter 3, section Technical data. Ensure to adhere to these specifications.

Intended use also includes compliance with the following instructions on

- safety,
- operation and control,
- maintenance and servicing,

described in this Operation Manual.

Generally the system is also suitable for various applications other than those mentioned above, where non-critical aerosols are extracted through a filter. Such applications are considered to comply with proper use, if qualified personnel evaluates the specific application to "comply with proper use" before commissioning and based on sufficient information.

Any other application or using the system outside the specified range shall be considered as **im**proper use. The operator alone is liable for any damage resulting from such use. This also applies to unauthorized modifications of the separator.

2.3 Reasonably foreseeable misuse

The following sample processing methods are considered as improper:

- Using and/or processing of explosive substances.
- Processing of materials other than those specified for proper use.
- Operating the separator in an explosive atmosphere.
- Operating the separator without fully installed safety devices.
- Using by private users or users without relevant instructions and proper training.
- Storing explosive or highly flammable substances in the vicinity of the separator.
- Installation of the separator in unprotected, rooms or halls accessible to weather effects.



2.4 Residual risk

Even if all safety regulations are observed, a residual risk remains during operation of the separator as described below.

- The contractor/operator shall ensure that all persons working on and with the separator are aware of the residual risks.
- Follow the instructions that prevent residual risks from causing accidents or damage.

It may be necessary to dismantle on-site safety devices during commissioning and setup steps. As a result various residual risks and potential dangers arise. The operator shall be aware of the following:



DANGER

Danger to life due to electric shock

An electric shock will result in fatal injuries.

- Before carrying out any repair, setup or maintenance work, switch off the power supply to the separator via the mains switch.
- Secure the separator against unintentional activation.
- Close the mains switch and put up warning signs.
- In addition, activate an emergency stop button.



CAUTION

Health hazard!

Temporary or permanent damage to health can occur when handling cooling lubricants.

- Always wear personal protective equipment when handling cooling lubricants, e.g. protective clothing, eye protection, respiratory protection, protective gloves.
- Immediately collect and dispose leaked cooling lubricants.
- Clean surfaces contaminated with cooling lubricant.

2.5 Description of safety devices



- Also consider
 - Safety instructions in Operation Manuals of suppliers



- Risk assessments or declarations of incorporation from suppliers

2.5.1 Location of the emergency stop devices

The separator is equipped with a mains switch with an emergency stop function.

2.5.2 Safety concept

The safety concept provides for mobile or fixed isolating protective devices for which the following applies:

- Isolating safety and protective devices can only be removed with tools.
- If mobile isolating devices are not secured, they do not remain in a protective position.
- Fastening means are firmly connected to protective devices.

2.5.3 Safety devices

The separator is completely enclosed. Thanks to the slots in the grille above the fan of 9 mm wide and distance to the fan of 120 - 160 mm, access to moving parts is not possible.

Access to moving parts through the intake and discharge fittings is prevented by sufficient clearance.

A grille between the filter chamber and the fan prevents access to moving parts when the maintenance door is open.

Fan

The fan is an additional purchase CE-certified item, the manufacturer certifies compliance with the applicable directives. A visual inspection did not reveal any objections.

2.5.4 Safety functions

The separator is integrated into the safety concept of the higher-level system. Safety functions are implemented by the main engineer of the complete system.

2.5.5 Safety functions

Safety function		has an effect on	Plr
SF 01	Emergency stop function	Fan	c



2.6 Identifications and labels for separator

Label	Meaning	Fixation location
	Identification type plate with all relevant data	Well readable on the separator
	Observe Operation Manual	On the maintenance door of the separator
	Warning of dangerous electrical voltage	labels on all terminal boxes, switch boxes and switch cabinets for low voltage.
	Marking of connection point for external protective conductor	Protective conductor terminal
	Protective conductor connection	next to the grounding screws

2.7 Operating personnel / users

Persons working with the separator shall meet the following requirements:

Personnel	Activity	Required qualification
Shipper	Transporting from site to site	Qualification of a specialized shipper/forwarding agent for machinery
Transport operator	Transporting within site	Trained for transporting with lifting equipment (crane, forklift, automated guided vehicles, etc.)
Mechanical assembler	Mechanical installation	Qualified specialist for mechanics
Electrician	Electrical installation	Qualified electrician*
Commissioning engineer	Initial commissioning Recommissioning	Qualified specialist* with understanding of process related engineering systems
Operator	Operation	Trained personnel

Maintenance personnel for mechanical components



Personnel	Activity	Required qualification
Maintenance personnel for mechanical components	On mechanical parts: Troubleshooting Repairs Maintenance Decommissioning Storage Dismantling	Qualified specialist for mechanics
Maintenance personnel for electrical components	On electrical parts: Troubleshooting Repairs Maintenance Decommissioning Storage Dismantling	Qualified electrician*
Disposer	Disposal of machine	Qualified disposal specialist*

* A qualified specialist is someone with a completed technical qualification, knowledge and experience in relevant regulations, is able to evaluate assigned work and recognize possible hazards.



2.8 Safety instructions for operating personnel

Every person working with the separator shall read and understand the entire operation manual.

- Only use the separator in perfect working order and for intended purpose and proper use, in a safe and hazard-conscious manner in compliance with this Operation Manual.

No liability is accepted for damage and accidents caused by failure to observe this Operation Manual.

- Eliminate all malfunctions immediately.
- Always keep this Operation Manual available at the separator.
- Wear personal protective equipment. This includes safety shoes, safety goggles and protective gloves.
- Do not wear open long hair, loose clothing or jewelry. There is a risk of snagging, drawing in or capturing on moving parts.
- Only reliable, trained and certified personnel of the legally permissible minimum age according to the Youth Employment Protection Act shall be admitted to work with the separator.
- Personnel to be trained, instructed or undergoing general training shall only be admitted to work under constant supervision of an experienced person.

Ensure the following safety-relevant changes on the cooling lubricant separator:

- Immediately shut down the separator.
- Secure the separator.
- Report the incident to the responsible department/person.

2.9 Safety instructions for maintenance personnel

- Observe the obligatory intervals or those specified in this Operation Manual for recurring and repetitive tests/inspections.

2.9.1 Preparation of maintenance

Appropriate workshop equipment is required to perform maintenance.

- Perform setup, maintenance and repair work as well as troubleshooting only when the separator is switched off.
- If necessary, secure the maintenance area with a red and white safety chain and a warning label.
- First remove dirt or care products from connections and screw fittings. Then complete maintenance/repair steps.



2.9.2 Completing maintenance

- Never stand beneath suspended loads.
- When replacing components and to minimize danger, carefully attach and secure individual parts and larger assemblies to lifting equipment. Only use suitable and technically fault-free lifting gear and load-handling equipment with sufficient load-bearing capacity.
- During maintenance and repair always tighten loosened screw connections with a torque wrench with specified force.
- Ensure safe and environmentally friendly disposal of operating and auxiliary materials as well as spare parts as described in chapter 0.

2.10 Notes on special risks

2.10.1 Electric system

Working on electrical equipment shall only be performed by a qualified electrician or by instructed personnel under the supervision of a qualified electrician in accordance with the electrotechnical regulations.

- First use the main switch to electrically isolate the separator. Then open the switch cabinet.
- Secure the separator with a safety lock to prevent it from being energized.
- Disconnect components from the power supply on which inspection, maintenance and repair steps are performed.
- Only use original circuit breakers with specified current ratings.
- Secure the equipment used to disconnect against unintentional or automatic reconnection (lock out circuit breakers, close off switches, etc.).
- First check the de-energized state for exposed electrical components, then isolate nearby live components.
- When carrying out repairs, make sure that design features are not changed in a way that reduces safety (e.g. do not reduce creepage/leakage paths and clearances by using insulation).

If work is required on live components (only in exceptional situations!):

- Ask an additional person to activate the emergency stop button or the mains switch in case of an emergency.
- Only use voltage-insulated tools.

Ensure proper grounding of the electrical system by using protective conductor systems. If the leakage current to ground (PE) is >3.5 mA, a permanent installation is required.

- Regularly check cables for damage.



- Replace defective cables immediately.

For further details, also see chapter 6.2.3 Safe maintenance of electrical equipment.

2.10.2 Cooling lubricants

Due to chemical composition, water-mixed cooling lubricants are always subjected to contamination through microbial growth. This is a mixed flora of different types of bacteria and/or fungi (filamentous and yeast fungi), which can also grow as so-called biofilms on and on surfaces. This can result not only in technical problems during industrial separating and forming processes, but also in possible health risks. Temporary or permanent damage to health can occur when handling cooling lubricants, such as

- especially skin diseases due to direct contact of the skin with cooling lubricants,
- occasional eye irritation due to direct eye contact with cooling lubricants or their degrading products or
- isolated irritations and diseases of the respiratory tract, such as allergic bronchial asthma due to inhalation of cooling lubricant vapor and aerosols.

Cooling lubricant circuits, processing points and ventilation systems in machines using cooling lubricants for machining and forming of materials or contacting cooling lubricants shall comply with the basic health and safety requirements of the Equipment and Product Safety Act.

- When handling cooling lubricants, observe the safety regulations of the Hazardous Substances Ordinance, the Biological Substances Ordinance and the relevant Technical Rules for Hazardous Substances.



2.10.3 Noise

The A-weighted equivalent continuous sound pressure level at operator workstations during normal operation of cooling lubricant separator is below 80 dB(A).

- The plant operator shall equip operating personnel with appropriate protective equipment if due to local conditions a higher sound pressure level occurs at the operating site of the separator.

2.10.4 Vibration

The total vibration value to which the upper body limbs are subjected does not exceed 2.5 m/s².



3 Product description

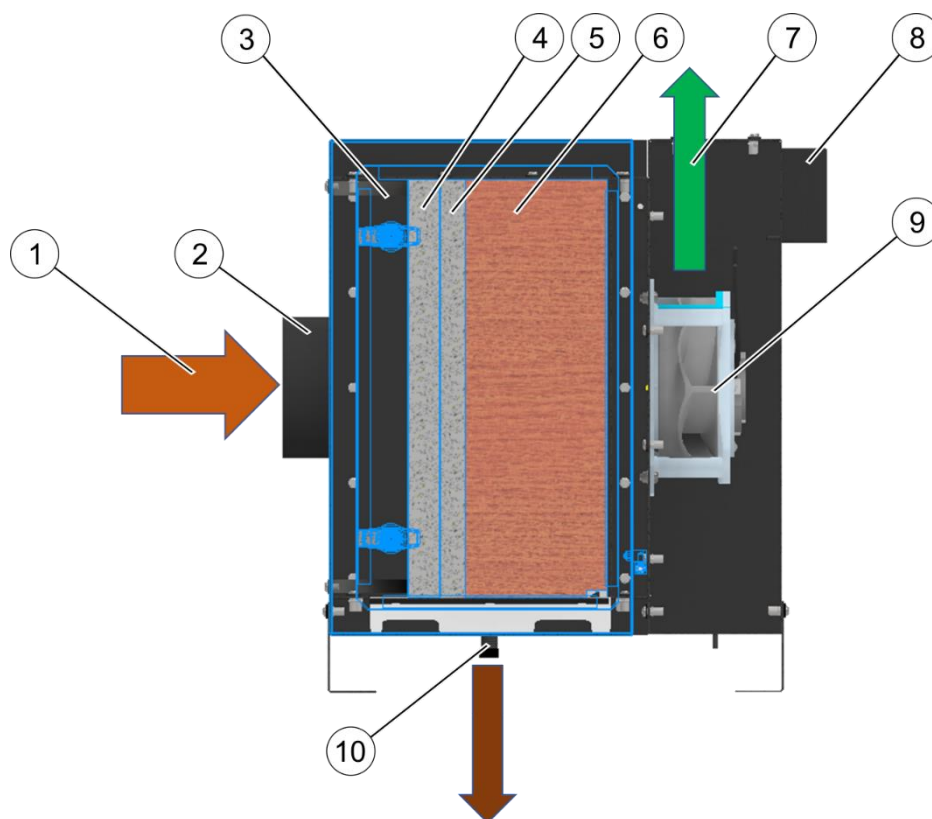


Figure 1 Coolant lubricant separator

Pos.	Designation
1	Aspirated polluted air
2	Connection fitting for suction on separator housing
3	Door filter area
4	1st Pre-filter metal wire-mesh filter
5	2nd Pre-filter filter mat in metal frame
6	Main filter
7	Clean air outlet
8	Box with electrical connections for fan
9	Fan
10	Drain liquid filtrate
11	Mains switch with emergency stop function (not shown)



3.1 General

The cooling lubricant separator is used for filtration of aerosols from liquid cooling lubricants as they are generated during mechanical machining processes such as turning, milling, grinding, drilling in the enclosed machining area. Air for cleaning is sucked into the unit through a pipe connection. A flexible hose or a pipeline can be connected to the spigot. Spigit connection to unit shall be located at the highest point of the line. Pressure drop of hose or pipe shall not exceed 100 Pa.

Suction of aerosols shall correspond to the state of the art. The location of suction shall not be in the immediate vicinity to machining and cooling. Suction of chips, cutting shavings and large drops of liquid and splashes shall be avoided as far as possible. In applications with high aerosol loads, pre-separation may be required at the suction to prevent excessive load on air filters (e.g. baffle plate, metal wire mesh, expanded metal).

3.2 Component assemblies Fehler! Verweisquelle konnte nicht gefunden werden. Fehler! Verweisquelle konnte nicht gefunden werden.

Assembly	Manufacturer
MultiCNC cooling lubricant separator	DELBAG
Fan	ebm Pabst

3.3 Electric system

Cooling lubricant separator is permanently connected to the electrical power supply. The mains switch is used to isolate the cooling lubricant separator from the electrical power supply.

3.4 Technical data

Unit type:	Fehler! Verweisquelle konnte nicht gefunden werden.	
Unit size:	600	1200
Supply voltage:	200 V...240 V	200 V...277 V
Mains frequency	50 Hz/60 Hz	50 Hz/60 Hz
Rated current:	1.35 A	2.2 A
Rated capacity:	169 W	500 W
Nominal volume flow:	600 m ³ /h	1200 m ³ /h



Ambient temperature:	5 °C - 50 °C	
Air quality:	No condensation	
Dimensions (H/W/D):	580x470x570 mm	580x470x670 mm
Weight:	28 kg	33 kg



4 Shipping and installation

4.1 Shipping

The cooling lubricant separator was manufactured, tested and handed over to the operator by the DELBAG GmbH.

If shipping of separator is required, observe the following instructions.



WARNING

Lifting and shipping of separator can cause life-threatening crushing and damage to health.

Improper lifting and shipping can cause the separator to tip and fall.

- Close the separator completely.
- Lift and transport the separator only with two persons or use a suitable industrial truck or crane!
- Never stand beneath suspended loads.
- Only use technically fault-free slings and lifting gear.



4.1.1 Transporting by crane

- The cooling lubricant separator has no crane attachment points. If the crane operator considers that safe lifting is possible, transporting by crane is permitted. The load should then be transferred to the base platform via straps.
- Observe the following safety instructions when transporting the separator by crane:



DANGER

Life-threatening crushing injuries during lifting and transporting of separator

Improper lifting and shipping can cause the separator to tip and fall.

- Lift and transport the separator only with suitable slings and lifting gear.
 - Only use fault-free slings.
 - Never stand beneath suspended loads.
- Observe the applicable accident prevention and occupational safety regulations.
 - Follow the instructions and regulations of the carrier/shipper.
 - Check the tight fit of slings on the crane hook.
 - Use a loading harness if necessary.
 - Adjust the lengths of four suspension ropes so that the separator is suspended horizontally. Insert the suspension ropes with shackles to the suspension lugs.
 - When selecting shackles, ensure that each individual shackle has sufficient load capacity.



4.1.2 Transporting with industrial truck



DANGER

Life-threatening crushing during transportation of separator

Improper lifting and shipping can cause the separator to tip and fall.

- Close the separator completely.
- Lash the separator to the industrial truck to avoid risk of tipping over.
- Never stand beneath suspended loads.

The following industrial trucks are permitted for transporting the separator:

- Rolling pallets for transport vehicle,
- Forklift and
- Pallet truck.



- Prevent contact of separator with the lifting frame of the industrial truck.
- For this purpose place timber spacer between the components and the lifting frame.
- Avoid hard impacts when setting separator down.



4.2 Installation



DANGER

Possible life-threatening injuries.

Improper installation can, for example, cause an electric shock, burns or scalding, leaking chemicals and bursting hoses.

- The plant operator shall allow installation to be carried out only by qualified and trained personnel.
- Avoid reflections on the visual displays at the installation site.
- Observe the floor condition in the working and traffic area.
- Floor level to walk on, ducts laid recessed and covered, trip hazards marked in black and yellow.



- Observe the following access distances when setting up the separator:
 - at least 600 mm, better 800 mm
 - for passages with people traffic with more than one person at least 1000 mm
 - Exception for short distance at least 500 mm
- Observe the minimum passage height for sufficient headroom
 - ≥ 2100 mm
 - Exceptions on fixed beams in the building ≤ 1900 mm
- pad and mark the head impact hazard area
- The plant operator shall provide ascending aids, if necessary
- Insulate steam and condensate lines

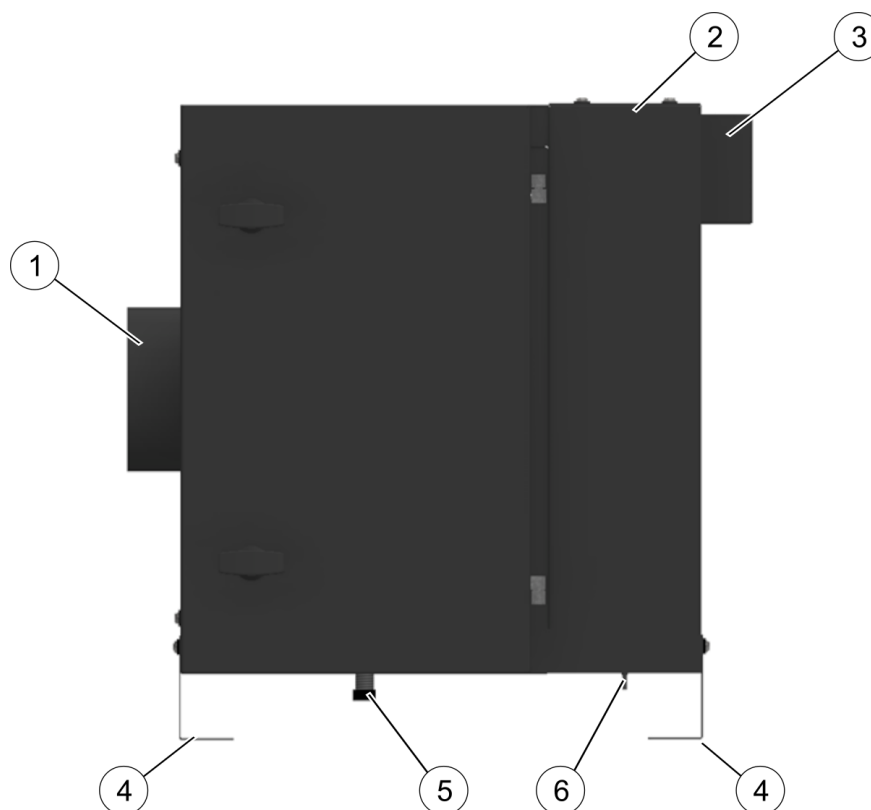


Figure 2 Connections

Pos.	Designation
1	Suction connection; connection for flexible hose DN150
2	Air discharge grille for filtered air
3	Box with electrical connections for fan
4	Unit feet with mounting option
5	Connection for drain of liquid cooling lubricant filtrate Must be connected for filtration of liquid aerosols
6	Connection possibility potential equalization/external grounding (thread M5)

The plant operator shall ensure the mains supply.

- Check the scope of delivery for completeness using the packaging lists enclosed with the separator.
- Complain about any missing parts with exact details according to the packaging list.
- Vertically position the separator.
- Fix the separator to the floor or a suitable base platform.



Connect to supply and drain lines according to the connection diagram enclosed with the separator.

- Connect to supply and drain lines according to the connection diagram enclosed with the separator.
- Check all pipe connections for tightness.
- Consider the operating voltage.



The operating voltage and rating for circuit breakers of the supply line are presented in the electrical drawing and on the type plate of the switch cabinet.

For the cross-section of required electrical lines, refer to the diagram and the electrical drawings.

- Complete the electrical installation in accordance with the locally applicable regulations.

4.2.1 Safety devices

- Design the drain/discharge lines for safety devices (safety valves, bursting discs, etc.) in such a way that backpressure-free, hazard-free discharge of the media is ensured.
- Lay the piping to exclude formation of water pockets.
- Secure the outlet openings of the discharge lines in such a way that no danger to persons or goods can arise.
- Comply with the applicable and official safety guidelines.

4.2.2 Electrical connection

The electrical connection is made directly on the mains switch. The cable ends of the communication connections for fan are placed in the connection box for filter, where connection can optionally be made using supplied through connectors (type: Wago 221).

- Complete the wiring for the separator in accordance with regulations for setting up power installations with rated voltages up to 1000 V and in accordance with the regulations of the power supply company.
- Check that the nominal values of the controller match the values of the mains.
- Check connected loads of all motors. (power, current, voltage)
- Check all drives for the correct direction of rotation.



5 Operation

Every person operating, maintaining and repairing the separator shall read and understand the chapter "Operation".

5.1 Safe operation

Work on the separator shall only be carried out by trained and/or instructed personnel. Danger to life and limb may result from improper use.

The separator shall only be operated by authorized and qualified persons.

A technically suitable person can evaluate, carry out assigned work steps and recognize possible hazards based on relevant technical training, certified qualification, professional experience and knowledge of accident prevention and occupational safety regulations. Such personnel shall fulfill all requirements for relevant activities and work independently.

- Use the separator only according to the proper use or for purposes approved by the manufacturer.
- To avoid accidents, always operate the separator in a fault-free condition.
- Do not use any third-party components for separator, otherwise compliance with the required safety cannot be ensured.
- Refrain from any working method that compromises safety of the separator.
- Immediately report any safety-relevant changes that have occurred to the separator to the supervisor in charge.
- Immediately shut down the separator in the event of a malfunction affecting safety. First fix the error or malfunction, then put the separator back into operation.
- Do not dismantle or tamper with any safety devices. Do not deactivate safety devices.
- Do not remove any covers from drive parts while dangerous drives are ongoing. First install covers properly, then put the unit into operation.



5.1.1 Notes for plant operator

- Before the first or repeated start-up of the separator, the plant operator shall ensure that trained personnel carries out the function test of safety devices.
- The plant operator shall provide and ensure use of required personal protective equipment (PPE) to the operating personnel.

5.1.2 Electrotechnical instructions



Danger to life due to electric shock

An electric shock will result in fatal injuries.

- Connect the separator according to regulations. Ensure to comply with the regulations.
- Repairs and maintenance of the separator shall only be performed in the de-energized state and only by a qualified electrician.

A qualified electrician is someone with a completed technical qualification, knowledge and experience in relevant regulations, is able to evaluate assigned work and recognize possible hazards.

5.2 Commissioning

Before commissioning the system check all components and important functions as follows:

Type of test	Action
Preserved surfaces	• Depreserve and clean preserved surfaces.
Transportation locks	• Loosen and properly remove all transportation locks.
Visual inspection	• Check the separator for correct assembly. • Check all parts of the separator for damage and remove foreign objects.
Connections	• Check all connections for proper condition.
Power supply (electrical)	• Check all connections for proper condition.
Screw connections	• Check and inspect all screw connections.



5.3 SWITCHING ON and OFF

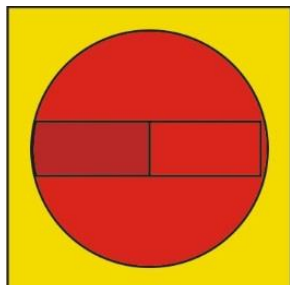


Figure 3 Mains switch

5.3.1 Switching on

- Switch on the separator using the mains switch.

5.3.2 Switching off

- Switch off the separator using the mains switch.

5.4 Operation

During operation, the separator is supervised.

5.5 Errors and malfunctions

Some of the operating errors listed here can be fixed using this Operation Manual.

First take the unit out of operation. Then open the unit housing to fix a possible malfunction.

Contact the manufacturer in case that malfunctions cannot be fixed with the help of the following instructions.

Working on electrical components shall only be carried out by qualified electricians.

Description	Cause	Measures
Strange sounds	Foreign objects in separator	Switch off separator and remove foreign objects
	Loose bearing casing	Replace bearings
Motor too hot	Overload	Check fan run and airflow
Error in electrical / control system	Connected incorrectly	Check cable connections, engage an electrician
Power failure	Faulty circuit breaker	Replace circuit breaker
	Cable failure	Renew cable



6 Maintenance

The chapter *Maintenance* is divided into the areas of care, maintenance and repairs. This should make it easier to plan the maintenance work required in each case.

The instructions described in this chapter shall be understood as minimum requirements. Depending on operating conditions, further instructions may be required to uphold the separator in optimal condition. The specified time intervals refer to a single-shift operation. For maintenance instructions on specific assemblies, refer to the corresponding supplier documentation in chapter 8.

Maintenance and repair described in this chapter shall only be carried out by specially trained maintenance personnel of the plant operator.

For maintenance and repairs in special areas, e.g. electrical installations, only qualified specialists trained in the respective field are admitted to perform work steps.

For repairs and spare parts orders, please refer to the drawings and part lists in chapter 8 *Appendix*. This also applies to parts purchased from the DELBAG GmbH.

Liability shall not apply to defects caused by poor maintenance, use of non-original spare parts, modification without the written consent of the manufacturer, poorly performed repairs on customer side or normal wear and tear.

Spare parts shall comply with the technical requirements specified by the DELBAG GmbH. This compliance is always guaranteed if original spare parts are used.

- With regard to the storage, handling, use and disposal of gases, greases, oils and other chemical substances, read the applicable regulations and safety data sheets of the manufacturer as well as internal instructions provided by the operator. Ensure to comply with these regulations and instructions.
- Ensure the safe and environmentally friendly disposal of operating materials and replacement parts.
- Observe the safety instructions on the following pages.



6.1 Care/Cleaning

Maintenance of separator is essentially limited to cleaning all surfaces of dust and other debris.

- Sweep or wipe the separator. It is not recommended for sensitive surfaces.

NOTICE

Material damage due to improper cleaning

Improper cleaning of separator can lead to malfunctions and damage.

- Do not use any aggressive cleaning agents that are not gentle on metal and plastic surfaces and hose connections.
- Never clean sensitive components with coarse brushes and do not apply mechanical pressure. Use non-linting cleaning cloths.
- Never clean the separator with a water jet or high-pressure cleaner.
- All water-soluble industrial cleaners can be used without restriction.

Appropriate care helps to keep the separator in a long-term trouble-free condition.

- Thoroughly clean separator at least once a week.
- Do not use any metallic objects such as scrapers or screwdrivers for cleaning bare machine parts, such as piston rods or guiding rails.
- Do not use aggressive cleaning agents or solvents (damage seals), or sandpaper for cleaning.

NOTICE

- Do not clean the separator with compressed air. This can cause dust and/or dirt particles to settle on and damage seals and sealing surfaces.

- Observe the information from the safety data sheets of the respective hazardous substances.

6.2 Maintenance

6.2.1 General maintenance instructions

High availability of the separator depends on completing suggested care and maintenance intervals.



Check the separator regularly and inform the responsible person, when repair and maintenance is necessary.

- Check the separator regularly and inform the responsible person, when repair and maintenance is necessary.



WARNING

Warning of serious injury

In case of improper use, there is a risk of serious injury, such as danger of crushing or tearing off limbs due to uncontrolled movements of individual machine parts.

- For repair and maintenance engage only trained and authorized personnel in compliance with the safety instructions and applicable accident prevention regulations.
- Perform setup, maintenance, repair and troubleshooting with the separator switched off.



CAUTION

Health hazard!

Temporary or permanent damage to health can occur when handling cooling lubricants.

- Always wear personal protective equipment when handling cooling lubricants, e.g. protective clothing, eye protection, respiratory protection, protective gloves.
- Immediately collect and dispose leaked cooling lubricants.
- Clean surfaces contaminated with cooling lubricant.

6.2.2 Preparing repair and maintenance

- When working, use only proper tools and replace worn parts, such as screws or nuts, only with original spare parts.
- Carefully label components and piping before disassembly.



WARNING



Possible injuries due to insufficient visibility

With low visibility, you can only insufficiently recognize possible danger spots.

- Ensure sufficient lighting when carrying out repair and maintenance on the separator.

6.2.3 Safe maintenance of electrical equipment

Working on electrical components shall only be carried out by qualified electricians.



DANGER

Danger to life due to electric shock

An electric shock will result in fatal injuries.

- Before carrying out any repair, setup or maintenance, use the mains switch to switch off the power supply to the separator.
 - Secure the separator against unintentional activation.
 - Close the mains switch and put up a warning sign.
- The plant operator shall determine the type and scope of required tests.
 - Set the intervals for periodic inspections so that the separator can be used safely until the next specified inspection.



Generally, proven inspection intervals for recurring inspections make up 4 years for stationary electrical equipment. The test shall be performed in accordance with the applicable electrotechnical rules. Furthermore, a reduction of the inspection period to once a year is required for all mobile electrical devices.

- Eliminate loose connections and damaged cables immediately.



- Never work on components in energized state. This is only allowed in exceptional cases, if there are compelling reasons.
- The plant operator shall present these compelling reasons in writing before starting work on live equipment.
- Carry out work on live parts in accordance with national requirements and procedures.

Work shall only be carried out by qualified electricians or persons instructed in electrical engineering who have received appropriate special training.



6.3 Maintenance plan

- Carry out maintenance at the intervals specified below. Intervals correspond to a single-shift operation. Adjust the intervals for multi-shift operation accordingly. Maintenance ensures consistent, trouble-free operation of separator.

The maintenance plan shows what steps are required on specific points on a weekly, monthly or semi-annual basis.

Interval	Work step	Responsible personnel
daily	• Check that the air flow rate is sufficient. If necessary, change the filter. • Ensure free drainage through the drain connection. • Ensure that no foreign air is aspirated through the drain socket. • Ensure that the on-site air supply line is in trouble-free condition. • Check tight closure of the maintenance door.	Operating personnel
every 6 months	• Check the door seal: some cooling lubricants attack material of the door seal or can lead to strong adhesion to the sealing surface. In both cases, damage to the seal may occur so that it must be replaced.	Maintenance personnel
every 6 months	• Check the tightness of the unit. Some cooling lubricants attack the sealing material. Leaks can be sealed with Teroson MS939 or equivalent sealant.	Maintenance personnel
every 6 months	• Check the fan according to ebm-Papst maintenance plan.	Maintenance personnel
every 12 months	• Replacement of filters • Check the fan for damage and contamination and clean if necessary. This may require dismounting of the fan.	Service personnel / Maintenance personnel



6.3.1 Replacement of filters

As filters become increasingly dirty, air flow rate is reduced. In case of very heavily contaminated and aged filters, there is a risk of a significant drop in filtration performance. The DELBAG GmbH recommends changing the filters when the air flow rate is noticeably reduced, but at least once a year. If an optional differential pressure monitoring device is installed, perform a filter change when the recommended final differential pressure is reached (but at least once a year). The first pre-filter, designed as a metal wire mesh, can be cleaned and reused several times.



CAUTION

Health hazard!

Temporary or permanent damage to health can occur when handling cooling lubricants.

- Always wear personal protective equipment when handling cooling lubricants, e.g. protective clothing, eye protection, respiratory protection, protective gloves.
- Immediately collect and dispose leaked cooling lubricants.
- Clean surfaces contaminated with cooling lubricant.

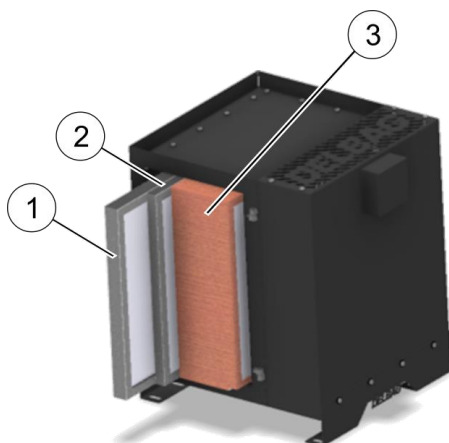


Figure 4 Filter

- Unlock the door with T-handles.
- Open the door.



Filters shall be installed and removed in the specified order.



Demounting:

- Pull out the 1st pre-filter (1) by the handle.
- Pull out the metal frame of the 2nd prefilter (2).
- Remove the mat from the metal frame.
- Pull out the main filter (3).



To protect the seal from shear forces, the main filter has a guide that prevents direct, straight pull-out. The filter moves backwards only for a few cm.

Installation:

- Push in the main filter - seal in the fan direction.



During installation as well, the guide protects the seal and prevents a direct straight insertion along the sealing surface.

- Insert the filter a few cm from the sealing surface.

- Push the main filter against the opposite wall to the end stop. The seal in the direction of the sealing surface!
- Insert a new filter mat into the metal frame.
- The grille in the metal frame must be on the downstream side of the filter mat. Pay attention to the correct arrangement.
- Slide in the metal frame along the main filter until it stops against the opposite wall.
- Carefully push the metal frame and main filter together against the sealing surface. Press only against the surrounding frame.
- Slide in the metal wire-mesh filter (1st pre-filter). Overcome the pressure of the tension springs. Pressure is applied to sealing surfaces of filter elements to minimize leakage.
- Close the door.
- Lock the door with T-handles.

Video on how to change the filter on: <https://www.youtube.com/@HengstFiltration>



6.4 Repair

Repair the separator shall only be carried out by trained and authorized specialists of the plant operator. The instructions in this chapter are limited to important general information and notices to follow during repairs.



The following applies to all installation and dismantling steps:

- Identify parts as to how they fit together.
- Mark the point of installation and record this data.
- After assembly, tighten all mechanical connections.

6.5 Spare part list

MCNC600 filter set	1163682A
Filter set MCNC1200	
Metal filter MCNC600	1162875A
Metal filter MCNC1200	1163638A
Interchangeable frame MCNC600/1200	1162876A
Door seal replacement MultiCNC 600S/1200S	1163673A



6.6 Accessories

Differential pressure gauge set	1163671A
Potentiometer for volume flow setting	1163672A
Suction hose set DN150 3m	1163669A
Transformer 400V/230V	1163670A



7 Disposal

7.1 Environmental protection

NOTICE

Environmental pollution due to substances hazardous to water

Such substances can pollute the soil and groundwater or enter the sewage system.

- Observe all legal obligations for waste prevention and proper recycling/disposal when handling the separator.
- Follow all applicable legal regulations when disposing of consumables or replacement materials during maintenance or decommissioning of the separator.
- Ensure that during installation, repair and maintenance, water-endangering substances such as lubricating greases and oil, emulsion and liquids containing gasoline shall not pollute the soil or enter the sewerage system.
- Ensure these substances shall be stored, transported, collected and disposed of in suitable containers.

7.2 Oil and oily waste, greases

Oil and oily waste as well as lubricating greases pose a high potential hazard to the environment. Therefore, their disposal is carried out by specialized companies.

- Take this waste to the internal waste disposal department, which shall forward it to specialized companies.

7.3 Plastics

- Sort the used/processed plastics as much as possible.
- Dispose of plastics in compliance with legal requirements.

7.4 Metals

- Separate the used/processed metals as much as possible.
- Engage an authorized company to dispose of metals.

7.5 Scrapping

- Check which materials can be recycled and make relevant arrangements.



Detailed descriptions of the individual system components can be found in the respective Operation Manuals in the appendix.



8 Annex

- Declaration of Conformity
- Electrical diagram + Parts list



8.1 Declaration of Conformity

Copy of the signed declaration of conformity



EG-Konformitätserklärung nach Maschinenrichtlinie 2006/42/EG, Anhang II 1A

Bauart: Luftfilter
Typ: MultiCNC (Standard)
Maschinen-Nr.: MCNC-...S-10001 bis MCNC-...S-99999

ist entwickelt, konstruiert und gefertigt in Übereinstimmung mit den EG-Richtlinien

2006/42/EG Maschinen
2014/30/EU Elektromagnet. Verträglichkeit

- die Schutzziele der **2014/35/EU Niederspannungsrichtlinie** wurden gemäß Anhang I,
Nr. 1.5.1 der Maschinenrichtlinie eingehalten -

in alleiniger Verantwortung von

Firma: DELBAG GmbH
Shamrockring 1
44623 Herne

Folgende harmonisierte Normen sind angewandt:

EN ISO 12100:2010-11	Sicherheit von Maschinen - Allgemeine Gestaltungsleitsätze, Risikobeurteilung und Risikominderung
EN ISO 20607:2019-07	Sicherheit von Maschinen - Betriebsanleitung - Allgemeine Gestaltungsgrundsätze
EN ISO 13857:2019-10	Sicherheit von Maschinen - Sicherheitsabstände gegen das Erreichen von Gefährdungsbereichen mit den oberen und unteren Gliedmaßen
EN 60204-1:2018-09	Sicherheit von Maschinen - Elektrische Ausrüstung von Maschinen - Teil 1: Allgemeine Anforderungen

Folgende nicht harmonisierte Normen sind angewandt:

EN IEC 61000-6-2:2019-02	Elektromagnetische Verträglichkeit (EMV) - Teil 6-2: Fachgrundnormen - Störfestigkeit für Industriebereiche
EN IEC 61000-6-4:2019-09	Elektromagnetische Verträglichkeit (EMV) - Teil 6-4: Fachgrundnormen - Störaussendung für Industriebereiche

Wir erklären weiterhin, dass die technischen Unterlagen gem. Anhang VII Teil A der Richtlinie 2006/42/EG von uns erstellt wurden.

Auf Verlangen der Marktaufsichtsbehörden werden diese Unterlagen nach Absprache auf Papier u/o elektronisch übermittelt.

Dokumentationsbevollmächtigter: DELBAG GmbH

Herne, 30.05.2022

Unterschrift

Bernstorff

Technischer Leiter



8.2 Electrical diagram + Parts list

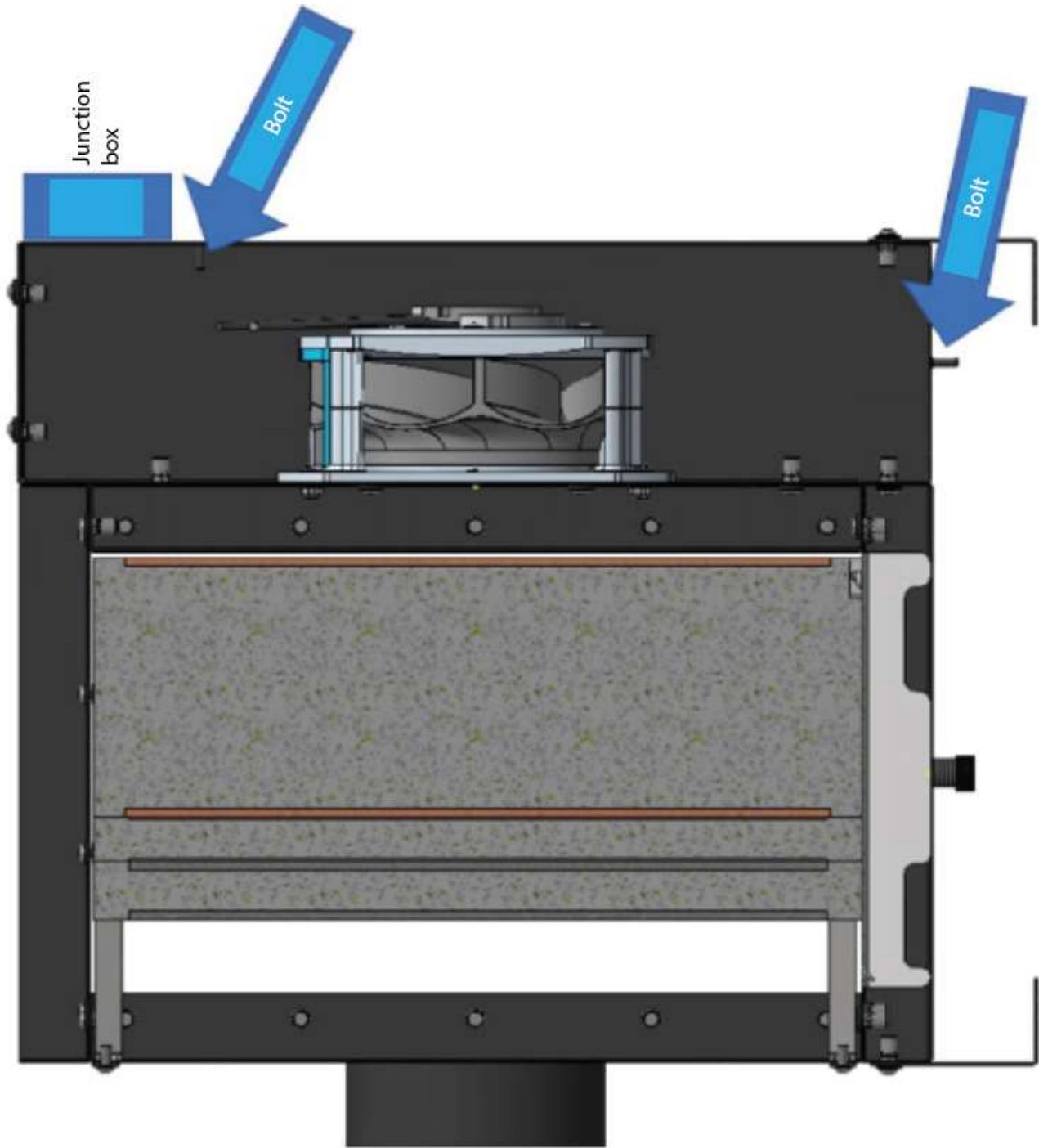


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	- 4K8 Current circuit Nr. Identification letter Sheet Nr.
Plant designation	
Project : Standard	
Order number : Standard	
Drawing number : 225141-2	
Customer : Delbag GmbH Shamrockring 1 D-44623 Herne	
Notice This equipment is designed and built according to the following regulations: EN60204-1. Our company prepared this hardware documentation with the utmost care, but cannot accept any responsibility in the legal sense or any liability for possible incorrect or inaccurate information. We do not accept any liability or warranty for commissioning and adjustment carried out by the customer. Furthermore, we are not liable for damages that occur when equipment or parts of equipment are switched on by third parties without prior commissioning by us. These plans were created with the CAD system EPLAN P8. Changes should only be made with this CAD system using the original parameters. Observe local regulations of the power supply companies! Tighten all terminals before commissioning! Set motor protection switch and bi-relay! Insulation monitoring is required for unearthed auxiliary circuits!	Switch cabinet type Switch cabinet dimensions Switch cabinet paint finish Switch cabinet protection type
	Wiring colors
	Terminal strip X1 Mains current X2 Controls

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