OPERATION AND MAINTENANCE INSTRUCTIONS

AERZEN TURBO MULTICORE BLOWER

AT600-0.6DT, AT600-0.8DT, AT600-1.0DT
AT800-0.8DT, AT800-1.0DT

Read the instructions prior to performing any task!
Keep for future reference.

Original Document
06.01.2020
Initial Release
0573-T-4
EN

Phone +1 610 380 0244
Fax +1 610 380 0278
Email service-usa@aerzen.com
Web www.aerzen.com/en-us

These instructions are published by:
Aerzen Turbo Americas, Aerzen USA Corp.

Technical editing and illustration by:
haneol.park@aerzen.com

Table of contents

1 General Information

1.1 Information about these instructions

These instructions allow for the safe and efficient handling of this machine. These instructions are an integral part of the machine and must be kept in the immediate vicinity of the machine so that they are accessible to personnel at all times. Keep these instructions in a safe place for future reference.

Personnel must have read these instructions carefully and have understood them before beginning work. A fundamental requirement for working safely is compliance with all specified safety notes and guidelines in these instructions.

In addition, the local occupational health and general safety regulations apply to the machine's field of application.

The illustrations included show Aerzen MultiCore turbo blower AT600-0.6DT by way of an example. They serve to provide the user with a basic understanding and may deviate somewhat from the actual design and dimensions.

The following is a list of additional, supplementary documents:

Declaration of Conformity pursuant to the Machinery Directive (Only for EU models)	
Installation drawing	
Further project-related documentation	
Further documentation as per the order confirmation	

1.2 Explanation of symbols

Safety instructions

Safety instructions in this manual are illustrated using symbols. The safety instructions are organized into signaling words which designate the level of danger posed.

DANGER!

This combination of symbol and signaling word points to an imminently dangerous situation that could be fatal or lead to serious injury if it is not avoided.

WARNING!
This combination of symbol and signaling word points to a potentially dangerous situation that could be fatal or lead to serious injury if it is not avoided.

CAUTION!
This combination of symbol and signaling word points to a potentially dangerous situation that could lead to minor injuries if it is not avoided.

NOTICE!
This combination of symbol and signaling word points to a potentially dangerous situation that could lead to material damage if it is not avoided.

ENVIRONMENT!
This combination of symbol and signaling word points to a potential risk for the environment.

Safety instructions as part of operating guidelines

Safety instructions may relate to certain individual operating guidelines. These safety instructions are integrated into the operating guidelines themselves so as to simplify the task of reading while carrying out work. The signaling words mentioned above are used.

For example:

1. Loosen screw.
2. 

   CAUTION!
   Pinch hazard on the cover!

   Close cover carefully.
3. Tighten screw.

Tips and recommendations

This symbol draws attention to useful tips and recommendations as well as information about efficient and trouble-free operation.

Special safety instructions

To draw attention to exceptional hazards, the following symbols can be used as part of the safety instructions:

Warning signs	Type of danger
	Warning – automatic start-up.
	Warning – high-voltage.
	Warning – flammable substances.
	Warning – hot surface.
	Warning – danger zone.

Additional designations

To draw attention to operating guidelines, events, listings, references and other elements in this manual, the following designations are used:

Designation	Explanation
1., 2., 3. ...	Step-by-step operating guidelines
	References to sections of this manual and to relevant documentation
■	Lists without a designated sequence
[push-button]	Control elements (e.g. push-buttons, switches), display elements (e.g. signal lamps)
„Display“	Screen elements (e.g. buttons, allocation of function keys)

1.3 Copyright protection

The contents of this manual is protected by copyright. The use of this manual is permitted within the framework of machine use. Any other use is excluded unless there is written approval by the manufacturer.

1.4 Addresses

1.4.1 Manufacturer

Tab. 1: Manufacturer

Address	Aerzen USA Corporation 108 Independence Way Coatesville, PA 19320 USA USA
Telephone	+1 610 380 0244
Fax	+1 610 380 0278
E-mail	sales-usa@aerze.com
Internet	www.aerzen.com/en-us

1.4.2 Customer service

Our customer service staff are on hand to provide you with technical information:

Tab. 2: After sales service/service contact

Address	Aerzen USA Corporation 108 Independence Way Coatesville, PA 19320 USA
Service hotline	+1 484 784 6768
E-mail	service-usa@aerzen.com
Internet	www.aerzen.com/en-us

In addition, we are always interested in receiving information and feedback pertaining to machine use that could be useful in helping us improve our products.

2 Safety

This section gives an overview of all important safety aspects relevant to the protection of persons and to safe and trouble-free operation. Further task-based safety instructions are contained in the section on the individual phases of the machine's service life.

Non-compliance with the handling and safety instructions provided in this manual can lead to serious hazards.

The following section outlines the residual risks and hazards during the service life of the product that may arise as a result of non-compliance with safety instructions or the disabling of safety devices.

In order to reduce health and safety risks and to avoid dangerous situations, observe the safety and warning notes in this manual.

2.1 Residual risks and fundamental risks

The following chapter states the general residual risks that have been established on the basis of a risk analysis.

- Compliance with these safety instructions and the safety instructions in the main chapters reduces the risk of personal injury, property damage and environmental harm and prevents dangerous situations.

2.1.1 Electrical hazards

Electric current

DANGER!

Risk of fatal injury from electric current!

Coming into contact with live parts poses an immediate and potentially fatal risk of an electric shock. Damage to insulation or individual components can prove fatal.

- Work on the electrical system should only be carried out by qualified electrical personnel.
- If the power supply's insulation is damaged, switch off the machine immediately and have the damage repaired.
- Before starting to work on active parts of the electrical systems and operating equipment, ensure that the machine is completely disconnected from any power source and remains so for the for the duration of the work.

  When doing this observe the following 5 safety rules:
  - Disconnect the machine completely.
  - Secure the machine against restarting.
  - Confirm that the machine is completely disconnected from any power source.
  - Earth and short-circuit the device.
  - Cover or shut off adjacent live parts.
- Never bypass or deactivate fuses.
- When changing fuses, comply with the correct specified amperage.
- Keep moisture away from live parts. Moisture can cause the machine to short-circuit.

Stored charges

DANGER!

There is a risk of fatal injury from stored charges!

Electrical charges can be stored in electronic components and maintained even after the deactivation and separation of the electric power supply. Coming into contact with these components can lead to fatal injuries.

- Observe all applicable safety rules.
- Bleed off stored charges correctly.

Operating faults caused by short-circuiting

WARNING!

Risk of injury from operating faults!

If the electrical system short circuits this can render the entire system inoperable. Operating faults can lead to serious injuries.

- Connect the machine's earthing connections and acoustic hood to the local equipotential bonding rail.
- Install a fault-current circuit breaker in order to prevent sparks and contact voltage in the event of a fault.
- After all work on the machine has been carried out, ensure that the earthing connection and equipotential bonding are connected correctly.

2.1.2 Risks through radiation

Strong magnetic fields

WARNING!

Risk of fatal injury from strong magnetic fields!

Strong magnetic fields in the vicinity of the turbo blower can result in serious or fatal injury or considerable material damage.

- Persons with pacemakers are prohibited from approaching the machine. The pacemaker's operation may otherwise be impaired.
- Persons with metal implants are prohibited from approaching the machine. The implants could heat up or be attracted.
- Keep ferromagnetic materials and electric magnets away from the magnetic source. Such materials may be attracted and flung around, thus causing serious or fatal injury. Minimum distance 3 m.
- Remove all metal objects (jewelry, watches, writing utensils etc.) prior to performing any maintenance work.
- Keep electronic devices away from the magnetic source. These could otherwise be damaged.
- Keep storage devices, credit cards etc. away from the magnetic source. Data may otherwise be lost.

2.1.3 Hazards associated with the acoustic hood

Inside the acoustic hood

DANGER!

Risk of injury if the acoustic hood is open during operation!

By opening the acoustic hood while the machine is in operation there is a risk of direct contact with hazardous zones, e.g. hot surfaces or rotating or moving components.

- Never open the acoustic hood while the machine is in operation or in stand-by mode.
- Never stand on or reach into the acoustic hood while the machine is in operation.
- Always lock the acoustic hood with the key provided and keep it locked.
- Only allow authorised personnel access to the key.

Falling parts

CAUTION!

Risk of injury from falling parts!

Acoustic hood elements are very heavy and may drop after unlocking, causing serious injury. Covers set to one side may topple over.

- Never run the machine with unlocked acoustic hood elements.
- Before unlocking the acoustic hood elements, switch off the machine and secure it against restarting.
- Handle acoustic hood elements with care.
- After disassembly, carefully set acoustic hood elements to one side and secure them.

Air flow at the air outlet

CAUTION!

Risk of injury from the strong air flow at the air outlet of the acoustic hood!

Strong air flows at the air outlet on the acoustic hood can suck in dirt particles from the environment and disperse them.

- Avoid standing in the direct vicinity of the air flow.
- Wear safety goggles and a safety mask.

Noise

WARNING!

Risk of injury from noise!

The noise level present at the installation area can cause hearing damage. The magnitude of the noise level is dependent on operational data, among other factors.

- Never undertake measures to bypass or deactivate sound insulation.
- Wear hearing protection while working.
- Only stand in the high-noise-level area if it is absolutely necessary.

Risk of falling

CAUTION!

Risk of injury from standing on the acoustic hood!

Standing on the acoustic hood carries with it a risk of injury from the potential collapse of the roof elements. Persons could fall into the internal area of the machine.

- Never stand on the acoustic hood.
- Never exert pressure on roof elements.

Easily-flammable materials

WARNING!

Risk of fire from easily-flammable materials that are sucked into the machine!

Easily-flammable material, fluids or gases can be sucked into the machine and cause it to catch fire. This can lead to serious or fatal injuries.

- Never allow flammable materials to be sucked into the machine.
- In case of emergencies, have extinguishing agents (fire blanket, fire extinguisher, fire-extinguishing powder for fire class A, B, C) at hand.
- Immediately report suspicious materials, liquids or gases to the responsible persons.
- In case of fire, stop your work immediately and make an emergency call.

2.1.4 Hazards at the installation site and operating site

Securing the machine against restarting

DANGER!

An unauthorized or unregulated restart can have fatal consequences.

An unauthorized or unregulated restart of the machine can lead to serious or fatal injuries. There may be people in the hazard area. Activating the energy supply and starting the machine could result in those people being fatally injured.

- Prevent the machine from restarting by:
  - disconnecting the electrical power supply
  - operating the main circuit breaker
  - attaching a padlock to the main circuit breaker
  - checking and ensuring that the machine is completely disconnected from the power source
  - displaying a sign on the machine that prohibits a machine start
  - displaying a sign on the control system that prohibits a machine start
- Before restarting, ensure that safety devices are installed and functioning correctly and that there are no potential hazards to the safety of any persons.

Mains cables or power lines

WARNING!

Risk of injury from incorrectly laid voltage-conducting mains cables or power lines!

Voltage-conducting mains cables or power lines that have been laid incorrectly within the machine or work area pose a risk of injury from tripping and falling.

- All voltage-conducting mains cables or power lines within the machine or work area must be laid safely and correctly.

Water contact with live components

DANGER!

Risk of fatal injury from water contact with live components!

Risk of fatal injury from cleaning work with water in areas with live components. Water spray may enter electrical and electronic components.

- Do not use water.
- When performing cleaning operations, proceed with care and make sure that no water comes into contact with live components.
- Make sure that spray water is prevented from entering electrical and electronic components.
- Never clean components designed to conduct electricity using a high-pressure jet cleaner.

Unexpected machine start

WARNING!

Risk of injury or personal shock if the machine starts suddenly!

For example, a superordinate control system could send a start command to the machine so that it starts operating.

- Shut down the machine for all work and secure it against restarting.
- When operating via a control center, also take suitable measures at that location to prevent restarting.
- You must be prepared for the machine to start at any time.

Intake openings

WARNING!

Risk of injury from intake openings!

Intake openings can suck objects or body parts into the machine with severe force.

- Never remove acoustic hood elements in operating position.
- Never stand in the immediate vicinity of intake openings.

Vacuum pressure or intake pressure

WARNING!

Risk of injury from vacuum pressure or intake pressure generated in the vicinity of the acoustic hood and intake openings!

During or after special operations (troubleshooting, maintenance, repair), failure to observe key items can result in injury caused by the vacuum pressure or intake pressure generated in the vicinity of the acoustic hood and intake openings.

- Never stand directly in front of the acoustic hood's intake openings or reach into the acoustic hood's intake openings while the machine is running.
- Prior to removing the acoustic hood elements, safely deactivate the entire machine or work area.
- Never remove or assemble the acoustic hood elements while the machine is running. Due to the intake pressure generated at the acoustic hood elements and the vacuum pressure generated by the machine, the elements are difficult to remove or assemble. This can cause injury.
- Never attempt to change the filter mat inside the filter housing/filter cage behind the cover while the machine is running.
- Work may only be performed by qualified personnel.
- Always wear the prescribed protective equipment when performing work.
- Train personnel regularly.

Sharp edges and corners

CAUTION!

Risk of injury from sharp edges and corners!

Sharp edges and corners can cause excoriations and cuts on the skin.

- If working in the vicinity of sharp edges and corners, proceed with caution.
- If in doubt, wear protective gloves.

Lighting in the machine and controls area

WARNING!

Risk of injury through insufficient lighting in the machine and controls area!

Insufficient or lack of lighting in the machine and controls area poses a risk of injury. In addition, it makes operation of the machine difficult, which can result in damage to the machine.

- The operator must ensure adequate lighting in the machine area.
- Faulty illuminants must be replaced immediately.
- Never run the machine with faulty or missing lighting.

Sudden air emission

CAUTION!

Risk of injury from sudden air emission!

Components such as intake pressure valves and start unloading devices may open suddenly during operation and emit hot compressed air. Dust particles may be blown around.

- Never attempt to look inside the blow-off opening.
- Wear safety goggles when in the immediate vicinity of these components.
- Never close the blow-off opening.
- Always keep the blow-off opening clean.

Improper handling

WARNING!

Risk of injury and material damage from improper handling of the electric extender system!

Mechanical overloading and disassembly of the electric extender system's supporting elements poses risk of the electric extender system fracturing and dropping. A dropping electric extender system can cause serious crushing injuries. Handling without due care entails a risk of injury from catching and impacts.

- Prior to extending the electric extender system, ensure that there are no persons in the hazard area.
- Always move the electric extender system carefully and hold it using both hands. Keep your limbs out from between moving and rigid parts.
- Fully retract the electric extender system and secure it using the locking bar after maintenance work has been completed.
- Never use the electric extender system as a climbing aid.
- Never lay heavy objects on the electric extender system.

High weight

WARNING!

Risk of injury from weight when assembling/ removing components!

Components may be very heavy. When assembling/removing components, these may drop or topple over, thus causing serious injury.

- Wear personal protective equipment when assembling/removing components!
- Always enlist at least one more person to assist when removing heavy components.
- Support heavy components or secure them using suitable lifting gear designed to take the components' weight.
- Disconnect all necessary feed lines before disassembly.
- Set removed components to one side and make sure that they cannot topple over.

2.1.5 Mechanical hazards

Rotating components

WARNING!

Risk of injury from rotating components!

The machine's rotating rotors can cause very serious injuries.

- Do not remove acoustic hood elements while the machine is running.
- Prior to any work, switch off the machine and secure it against restarting.
- Observe the lag time: before opening the acoustic hood elements for maintenance purposes, make sure that no components are still moving.
- Never reach into the machine's intake openings.

2.1.6 Thermal hazards

Hot surfaces

WARNING!

Risk of injury from hot surfaces!

Component surfaces may become very hot during operation. Skin contact with hot surfaces causes serious burns.

- For all work performed in the vicinity of hot surfaces, always wear protective work clothing and protective gloves.
- Before beginning any work, ensure that all surfaces have cooled down to ambient temperature.

Hot air flow

WARNING!

Risk of injury from hot air emission!

Air outlets (pressure line pipe flange, cooling air system outlet, start unloading device (BOV) outlet) may emit hot air at high flow speeds, which can cause serious injury through skin contact. The hot air flow may drag along dirt particles, which may cause eye injuries.

- Never operate the machine with open pressure connections.
- Do not stand near open air outlets when the machine is running.
- Prior to any maintenance work, switch off the machine and secure it against restarting.

Hot media

WARNING!

Risk of injury from sudden emission of hot media!

The emission of hot media may lead to scalding.

- Never stand in the immediate vicinity of the outlet vent.
- Never attempt to look inside the outlet vent.
- Never close or cover the outlet vent.

2.1.7 Risks from pressurized components

Pressurized components

WARNING!

Risk of injury from compressed conveyed materials!

When disassembling pressurized components, or in the case of a fault in a pressurized component such as pipes, containers, hoses or valves, hot conveying material can escape with a strong air flow. This can result in serious injury.

- Before beginning work, fully relieve pressurized components of pressure.
- Check that components are not pressurized.
- Replace malfunctioning components immediately.
- Only disassemble pressurized components when they are not under pressure.

Noise during disassembly

CAUTION!

Risk of injury from noise during the disassembly of pressurized components!

When disassembling pressurized components, or in the case of a fault in a pressurized component such as pipes, containers, hoses or valves, hot conveying material escapes. This causes noise. This can cause hearing damage.

– Before beginning work, fully relieve pressurized components of pressure.
– Check that components are not pressurized.
– Replace malfunctioning components immediately.
– Only disassemble pressurized components when they are not under pressure.

2.1.8 Risks from hazardous substances

Hazardous dust

WARNING!

Risk of injury from rising dust!

Dust deposits may rise during machine operation.

Inhaling this dust may, in the long term, lead to lung damage or other health problems.

– Avoid the relevant hazardous area.
– For all work in the hazard zone wear light respiratory protection.

2.1.9 Risks from flammable substances

Fire hazard

WARNING!

Risk of fire from spark-generating work and ignition sources in the immediate vicinity of the machine!

Easily-flammable substances, fluids or gases may catch fire and cause serious or fatal injury.

- Take measures to protect against the build-up of steam in deep-lying or closed areas.
- Take measures to protect against electro-static pressure charging.
- Do not smoke in the hazard zone or in the direct vicinity of the machine.
  Do not use naked lights, fire or ignition sources of any kind.
- Immediately report suspicious materials, liquids or gases to the responsible persons.
- Have extinguishing agents (fire-extinguishing powder) for fire class A, B, and C at hand.
- In case of fire, stop your work immediately. Leave the hazard zone until it is safe to return and notify the fire brigade.

Improper fire protection

WARNING!

There is a risk of injury and material damage from limited or improper fire protection!

If, in the event of fire, the fire extinguisher is not operational or not suited to the specific class of fire, there is a risk of serious or fatal injury and considerable material damage.

- Ensure that only suitable fire extinguishers (fire-extinguishing powder for fire classes A, B and C) are at hand.
- Inspect fire extinguishers every 2 years to ensure they are functioning correctly.
- Refill fire extinguishers after each use.
- Only use extinguishing agents and replacement parts that correspond to the recognised model specified on the fire extinguisher.
- In case of use, observe the safety and operating instructions on the fire extinguisher.

2.1.10 Risk of material damage

Foreign bodies

NOTICE!

Damage to the machine from foreign bodies!

Foreign bodies may enter the machine via the pressure line's pipe flange and damage the primary turbine.

– Do not remove the flange cap until shortly before assembly.
– Never operate the machine with an open pressure connection.

2.2 Intended use

Fig. 1: Correct use

The turbo blower is intended solely for conveying and compression of naturally aspirated ambient air for the purposes of aerating sewage/activated sludge in aeration tanks.

It may be operated only in dry indoor areas that meet the assembly location requirements and the operating requirements specified in the technical details.

The **turbo blower** machine has been designed and constructed solely for its "intended use" in the industrial field, as described here.

Observe and comply with the order-related operational data and operational limits!

This intended use also includes compliance with all information in this instruction manual.

Any application that deviates from the intended use, or any other type of non-standard application, is considered misuse.

2.3 Foreseeable misuse

Misuse

Any use beyond the intended use or any other type of application of the machine is considered misuse.

WARNING!

Danger in the case of misuse!

Misuse of the machine can lead to dangerous situations. Never

- run the machine with open pressure connections or without pipes.
- run the machine with gas.
- use the machine to pump particles or bulk materials.
- run the machine with both sides of the start unloading device closed.
- run the machine outdoors.
- use the machine in explosion hazard areas.

Further misuse

NOTICE!

Risk of damage from misuse!

Misuse of the machine can lead to malfunction and destruction. Never

- run the turbo blower with closed pressure line.
- reduce the machine performance via a pressure regulator valve.

Misuse

Fig. 2: Prohibited use

The machine is not intended for:

- Conveying media in solid, liquid or powder form.
- Conveying caustic media.
- Conveying corrosive media.
- Conveying flammable or poisonous gases, vapors or mists.
- Alteration, retrofitting or modification of the overall design or of individual equipment parts, with the aim of altering the field of application or scope of use.

Further examples of misuse

The following operating modes/applications and uses are considered improper and must be avoided!

Operation:

- outside the scope of intended use.
- outside the scope of the intended operating data.
- using gases other than those originally intended.
- with the machine operating in the incorrect direction of rotation.
- in a potentially-explosive atmosphere.
- with closed flange connections.
- with missing or damaged components.
- without any or with damaged protective equipment.
- with contaminated intake filter/starting strainer.
- without sufficient ventilation of the room.
- activation while the machine is coming to a stop or when it is rotating backwards.
- non-compliance with maintenance intervals.

Applications:

- using the machine to “purge” blockages in the conveying pipes. exceeding the maximum permissible discharge pressure.
- using the pressure valve to regulate the operating data.

Installation:

- installation on inclined, sloped or strip-type surfaces.
- installation outdoors.
- attachment of transportation equipment to the acoustic hood.
- open flames or spark formation in the immediate vicinity of the machine.

2.4 Responsibility of the operator

Operator

The operator is the person who operates the machine himself, for commercial or business purposes, or who assigns the use/application of the machine to a third party. During operation, the operator holds legal responsibility pertaining to the product, for the protection of the user, personnel or third party.

Operator’s obligations

The machine will be employed for commercial purposes. The machine’s operator is thus subject to the applicable legal obligations regarding occupational safety.

Alongside the safety instructions in this manual, the safety, occupational and environmental regulations relevant to the field of application for the machine must also be complied with.

The operator is obligated to:

- Inform themselves about the applicable occupational protection regulations. As part of a hazard assessment, the operator must also establish the hazards that could result from special working conditions at the machine location. He must implement these for the operation of the machine in the form of operating instructions. The necessary safety data sheets can be obtained from the relevant manufacturer.
- During the entire service life of the machine, check that the operating instructions created by the manufacturer correspond to the current status of the applicable regulations. If necessary, adjust the operating instructions accordingly.
- Clearly structure and specify the responsibilities for installation, operation, fault rectification, maintenance and cleaning.
- Ensure that all persons who come into contact with the machine have read and understood these instructions. in addition, the operator must regularly provide personnel training as pertains to machine use and inform personnel of the related hazards.
- Provide personnel with the necessary protective equipment and communicate to them that wearing this protective equipment is compulsory.
- In addition, the operator is responsible for ensuring that the machine is always in perfect technical condition.
- For this reason, the following applies:
- Observe the maintenance intervals described in this instruction manual.
- All safety devices must be regularly inspected to ensure they are in good working order.

Additional obligations

The operator is obligated to

- apply the required safety notices in the hazard area and to ensure that these remain in impeccable condition throughout.
- install the safety devices to be retrofitted and to establish a building-side facility for disconnecting the machine from the power supply and securing it against restart.
- ensure that protective equipment is not dismantled or bypassed.

Operator's obligations at the installation site

The operator must ensure that the following requirements are complied with and put into practice:

- Machine use only in a stable three-phase power supply. Voltage fluctuations / drops beyond the tolerance level may cause serious damage to the drive system.
- It must be ensured that a powered-down machine cannot start automatically.

- For the purposes of operation, the machine must be equipped with a command device that shuts down the machine in dangerous situations.
- The circuit breaker must cut off power supply to the motor.
  If this is not possible, the “standstill” operating condition must be monitored and maintained.
- Avoid electrostatic charges. Connect an equipotential bonding.
- For accidents and emergencies, integrate emergency measures for the machine into the emergency operational measures. Make particular efforts to integrate these measures into the evacuation and rescue plan and the fire warning plan.

2.5 Replacement parts

Use of incorrect replacement parts

CAUTION!

Safety risk from using incorrect replacement parts!

Incorrect, defective or unsuitable replacement parts or copies of original components may endanger personal safety and lead to damage, faults or the total failure of the machine.

– Only use the manufacturer’s original replacement parts or parts approved by the manufacturer.
– If in doubt, always contact the manufacturer.

Purchase replacement parts from an authorized dealer or from the manufacturer directly. For contact information see Customer service *on page 10*.

Replacement parts

Replacement parts that have not been provided by AERZEN have not been tested or approved. They do not correspond to the original components. The use of such products can potentially have an effect on the default design characteristics of the system. The manufacturer assumes no liability for damage resulting from the use of non-original components.

2.6 Requirements for personnel

2.6.1 Qualifications

The various tasks described in this instruction manual represent a variety of requirements in terms of the qualifications of the persons responsible for carrying out these tasks.

Insufficient qualifications

WARNING!

Risk if persons are not sufficiently qualified!

Insufficiently trained/skilled persons are unable to gauge the risks presented by the use of the machine and put themselves, and others, at risk of serious or fatal injury.

- Only allow work to be carried out by suitably qualified persons.
- Observe the information on qualifications in this manual.
- Keep insufficiently qualified persons away from the operating range of the machine.

For the purposes of all work with this machine, only allow persons who are expected to carry out their work reliably to do so. Persons whose reaction times have been impaired, e.g. through drug or alcohol consumption or medication, must not be permitted to work.

This instruction manual contains the following qualification requirements for the various tasks:

Authorized electricians
Authorized electricians, on the basis of their field-specific training, expertise, experience and knowledge of the relevant standards and requirements, are able to carry out their work on electrical systems safely while independently recognizing and avoiding hazards.

Authorized electricians are specially trained for the environment in which they work and are familiar with the relevant standards and requirements.

Authorized person
The authorized person is reliable, familiar with the work and has power of authority. This person supervises and monitors the correct and safe performance of work. He/she must be sufficiently qualified. This person has been authorized, through instruction by the manufacturer, to make necessary adjustments to the operating setup and operating mode.

Manufacturer’s customer service division
Certain work may only be performed by the customer service division of the manufacturer. On the basis of its special, field-specific training, expertise and experience, the customer service division is up to the task of performing highly-skilled work.

The customer service division is a competent point of contact for all stages of the machine’s service life. It is able to perform all work on the machine with the highest efficiency.

Service personnel
Service personnel are able to carry out their work on the basis of their field-specific training, expertise, experience and knowledge of the relevant standards and requirements. Personnel recognize hazards independently and avoid risks.

Service personnel in particular possess practical experience and extensive field-specific expertise for the variety of tasks.

- Transport
- Set-up / installation
- Commissioning
- Maintenance
- Fault rectification
- Disassembly

Depending on the designated job, the person must have additional qualifications:

- Operation and handling of compressors.
- Parameterization of compressors.
- Optimization work within the permissible operating data range.

Skilled staff for industrial waste
Skilled staff for industrial waste possess comprehensive, field-specific expertise relating to the disposal and recycling of industrial waste. Skilled staff transports the industrial waste to the waste disposal company and holds responsibility for proper sorting of waste. The staff incorporates this sorting into the recycling and disposal processes.

Trained persons
A trained person has been expressly instructed and, if necessary, trained on site by the responsible management about the tasks delegated to him or her and the risks that are posed by improper behavior. A trained person has been instructed regarding the nec- essary protective equipment and protective measures. He or she is in a position to work cautiously and to recognize hazards and react accordingly. The trained person may not interfere with the handling and operation of the machine.

Depending on the designated job, the person must have the following expertise:

- Transport and handling of packaged units.
- Ability to perform visual inspections of the machine.

User
The machine user is trained by the system operator in terms of operation, maintenance work and basic fault rectification. He or she is informed of possible operational hazards and improper behavior. Tasks that go beyond those for which the machine user is trained or instructed may only be carried out if these tasks are listed in this instruction manual and the operator has expressly designated these tasks to the user.

2.6.2 Unauthorized personnel

Unauthorized personnel in the installation area

WARNING!

Risk of fatal injury for unauthorized persons in the installation area!

Unauthorized persons who do not fulfil the requirements described here, are not familiar with the hazards in the installation area. Therefore, unauthorized persons are at risk of serious or fatal injury.

- Keep unauthorized persons away from the installation area.
- If in doubt, instruct such persons to leave the installation area.
- Stop all work as long as unauthorized persons are in the installation area.

2.6.3 Training

The operator must regularly provide safety training for personnel. For tracking purposes, a training report must be drafted with the following mandatory content:

- Date of training
- Name of the training participant
- Content of the training
- Name of the training instructor
- Signatures of the participant and instructor

Date	Name	Type of training	Training requirements are:	Signature

2.7 Personal protective equipment

Personal protective equipment serves to protect persons from breaches of safety and health hazards when working.

Personnel, when working near or with the machine, must wear the personal protective equipment described separately in the various sections of this instruction manual.

Description of personal protective equipment

The following is a description of the personal protective equipment:

Hearing protection
Hearing protection serves to protect against hearing damage from noise generation.

Industrial hard hat
Industrial hard hats protect the head against falling or stray objects and loads and from collisions against stationary objects.

Protective gloves
Protective gloves protect hands from friction, abrasion, puncture hazards or more serious injuries and from contact with hot surfaces.

They are oil-resistant and protect hands from coming into contact with lubricants.

Protective work clothing
Protective work clothing is tight-fitting work clothing with minimal tensile strength, tight sleeves and without protruding parts.

Safety goggles
Safety goggles serve to protect the eyes against flying particles and splashing liquids.

Safety shoes
Safety shoes protect feet from being crushed, from falling objects and from slipping on slippery surfaces.

2.8 Safety devices

Inoperative safety devices

WARNING!

Risk of fatal injury from non-functioning safety devices!

Non-functioning or deactivated safety devices may cause serious or fatal injury.

- Before beginning work, check that all safety devices are functioning correctly and are correctly installed.
- Never deactivate or bypass safety devices.
- Ensure that all safety devices are accessible at all times.

2.8.1 Description of the installed safety devices

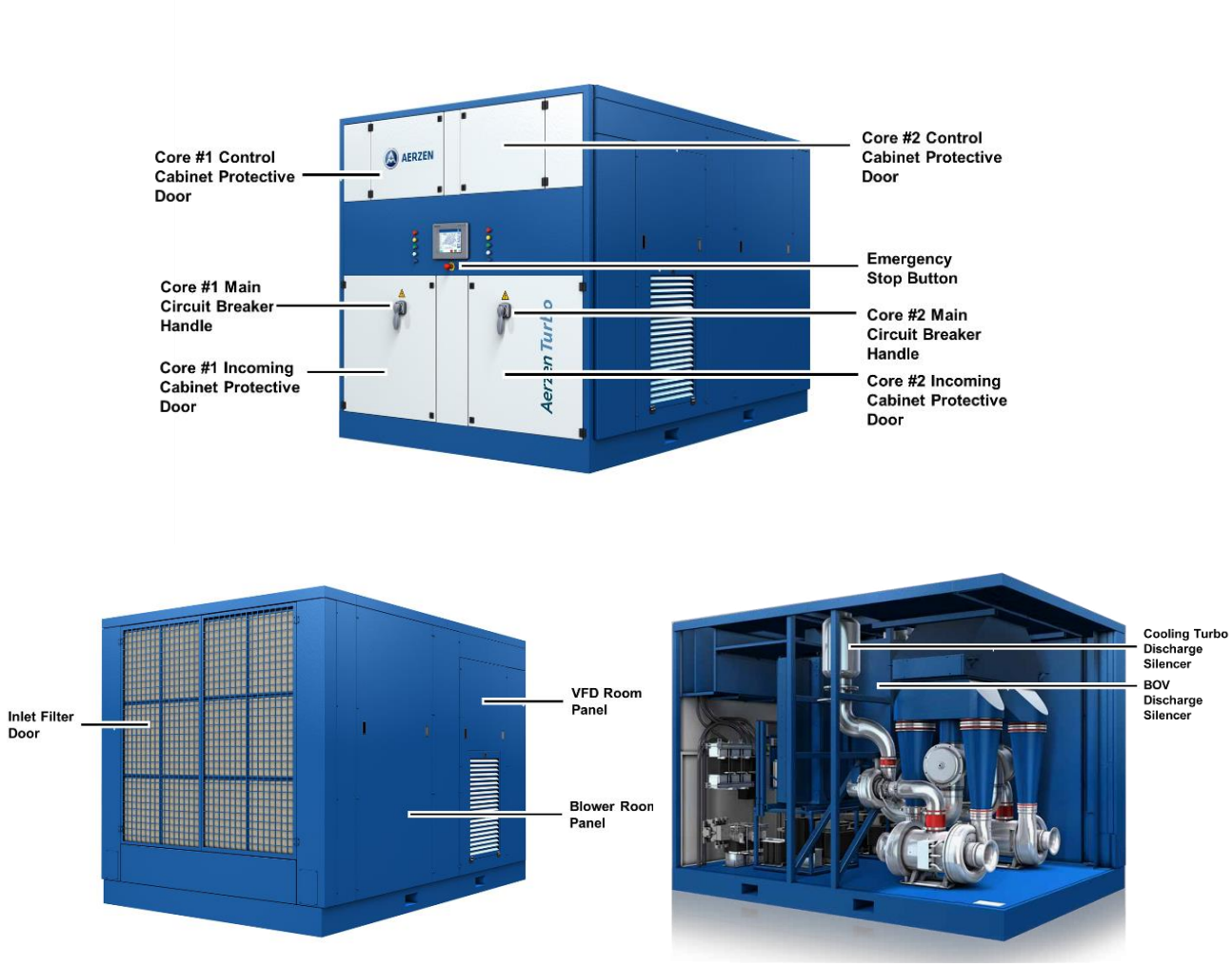


Fig. 3: Safety devices

Acoustic hood elements, covers, protective doors

Acoustic hood elements, covers and protective doors are used to close off the machine's acoustic hood and the switch cabinet. They provide acoustic protection and protect against reaching into the hazard area. They feature switch cabinet locks.

Acoustic hood elements, covers and protective doors, can be removed/opened for maintenance purposes once the machine has come to a standstill. All of the elements must be returned to their places and locked in position as soon as the work has been completed.

Start unloading device (BOV)

The start unloading device consists of a controlled blow-off valve (BOV) which opens the discharge side to the atmosphere during start-up and in the event of overpressure caused by incorrect operation, component failure or other irregular occurrences, thus dissipating overpressure harmlessly.

The ex-works default for the start unloading device is to blow pressure upwards from the machine's acoustic hood via discharge outlets. Alternatively, pressure can also be blown off to the outside via a flanged pipe system at the customer's location.

Pressure and temperature sensors

Pressure and temperature sensors in the conveying system duct and on the machine measure parameters critical to operation and transmit them to the control unit. In the event that a limit value is exceeded, the control unit can thus trigger a corresponding error.

Main circuit breaker handle

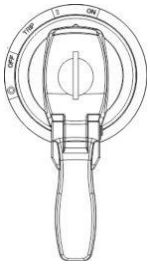


Fig. 4: Main circuit breaker

Turning the main circuit breaker to position “0/OFF” immediately cuts the power supply. This does not necessarily trigger an EMERGENCY STOP. The main circuit breaker handle is connected to and operates the circuit breaker in the incoming cabinet via a shaft.

The circuit breaker disconnects the machine from the building-side power supply. In the event of overheating (due to short-circuiting) or overloading, the circuit breaker automatically disconnects the machine from the building-side power supply. The main circuit breakers can be locked to secure it against restarting.

WARNING!

Risk of fatal injury from partial disconnection from the building-side power supply!

Turning off the circuit breaker of one core does NOT mean the circuit breaker of the other core gets OFF as well.

Decoupling and removing both the main circuit breakers for core #1 and core #2 allows the incoming cabinet’s doors to be opened for maintenance purposes. When doing so, the circuit breakers remain in the “0/ OFF” position. The main circuit breakers must be reassembled after completion of the maintenance work.

The main circuit breakers can be locked to secure it against restarting.

DANGER!

Risk of fatal injury from unregulated restart!

An unregulated restart can lead to serious or fatal injuries.

– Before restarting, ensure that there are no potential hazards to the safety of any persons and that all safety devices are installed and functioning correctly.

EMERGENCY STOP button

Fig. 5: EMERGENCY STOP button

Pressing the EMERGENCY STOP button shuts down the machine by immediately cutting the power supply to all drives. When an EMERGENCY STOP button has been pressed, it must be released by pulling it back out before a restart is possible

WARNING!

Risk of fatal injury from unauthorized or unregulated restart!

An unauthorized or unregulated restart of the machine can lead to serious or fatal injuries.

- Before restarting, make sure that the reason for the EMERGENCY STOP has been eliminated.
- Ensure that all safety devices are installed and functioning correctly.
- Only release the EMERGENCY STOP button once the danger has been eliminated.

Discharge silencer

Discharge silencers are fitted to various exhaust lines in order to minimize the flow noise emissions.

Acoustic hood

The acoustic hood encloses the machine's entire housing. It is lined with noise-damping foamboard, in addition to mineral fiber with perforated sheet coverings. The acoustic hood elements are sealed with rubber seals.

The acoustic hood elements can be removed for maintenance purposes. All of the acoustic hood elements must be returned to their places as soon as the work has been completed to ensure that the acoustic hood can perform its function.

Protective covers

Various protective covers (plexiglass, PVC, guard plates) are employed as barriers on components that carry dangerous voltage.

Protective insulation

Protective insulation is featured on certain components and flange connections to prevent contact with hot surfaces.

Thermal switches

Thermal switches protect the drives from overloading and switch off in the event of overheating.

2.8.2 Description of the safety devices to be retrofitted

The following safety precautions and safety devices must be retrofitted.

Equipotential bonding rail

To protect against electric shocks, the unit must be connected to the building-side equipotential bonding rail via the specified grounding point (ground busbar).

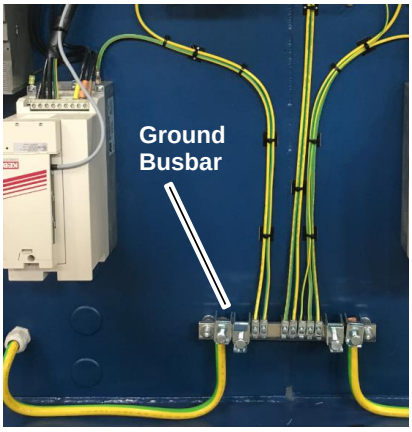


Fig. 6: Earth connection

Overcurrent protection

Overcurrent protection corresponding to the machine type that securely cuts all connected phase lines in the event of short-circuiting must be incorporated into the power supply.

Discharge silencer (optional)

A discharge silencer can be employed in the pressure line to reduce the noise emissions.

2.9 Safety classification

The following symbols and notices are displayed in the work area. They relate to the immediate vicinity in which they are located.

Unreadable signage

WARNING!

There is a risk from unreadable signage!

Over time, stickers and signs can become soiled or otherwise illegible, preventing risks from being recognized and necessary operating instructions from being observed. This poses a risk of injury.

– Keep all safety, warning and operating information in a thoroughly readable condition.
– Replace damaged signs or stickers immediately.

Safety and warning signs

The layout of warning signs affixed to the machine. These constitute warning, instruction and prohibition signs.

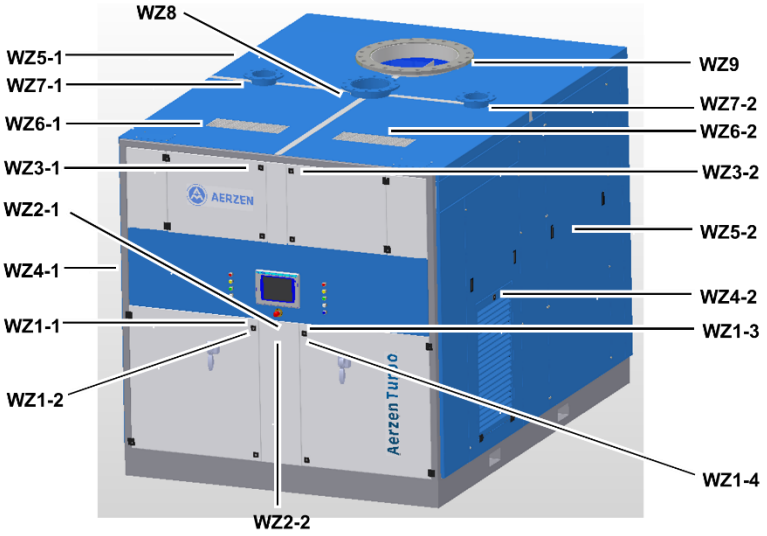


Fig. 7: Sticker set

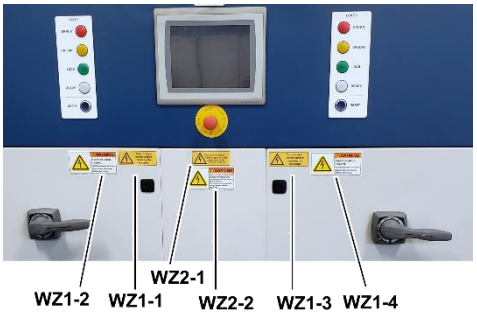


Fig. 8: Warning signs on lower front panel

Position on the front panel (the incoming cabinet doors)

WZ1-1	Turn off main switch before opening the housing!
WZ1-2	WARNING! Electrocution hazard. Multiple power sources. Disconnect all power before servicing!
WZ1-3	Turn off main switch before opening the housing!
WZ1-4	WARNING! Electrocution hazard. Multiple power sources. Disconnect all power before servicing!
WZ2-1	Caution voltage. Power supply line under voltage even if main switch is turned off
WZ2-2	WARNING! UPS voltage present when power is off. Contact may cause electric shock or burn. Turn off and lock out UPS output power before servicing.

Positions viewed from front

Fig. 9: Warning signs on upper front panel

WZ3-1 Electrical voltage!
WZ3-2 Electrical voltage!

Positions on the control cabinet

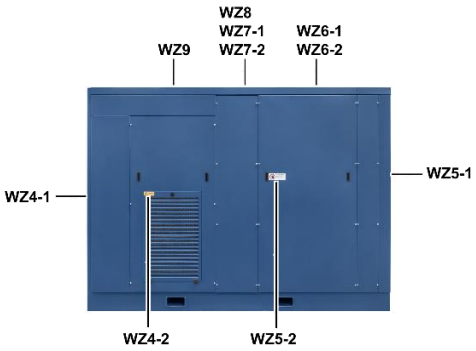


Fig. 10: Warning, instruction and prohibition signs

WZ4-1 Caution! Residual voltage
WZ4-2 Caution! Residual voltage
WZ5-1 ATTENTION! Qualified personnel only may remove acoustic hood elements
WZ5-2 ATTENTION! Qualified personnel only may remove acoustic hood elements
WZ6-1 Hot surface!
WZ6-2 Hot surface!
WZ7-1 Hot surface!
WZ7-2 Hot surface!
WZ8 Hot surface!
WZ9 Hot surface!

Positions viewed from left side

Access for unauthorized persons forbidden

Only persons given authorization by the operator may enter the hazard area.

Do not reach in

Risk of crushing, shearing, catching or snaring, dragging or trapping. Danger points may not be visible.

Electrical voltage

Only qualified electrical personnel may perform work in areas marked with this symbol.

Unauthorized persons are prohibited from performing work on the electrical system and electrical components.

Hot surface

There is a risk from hot surfaces in areas marked with this symbol. Wear protective gloves or allow components to cool down sufficiently when working on components or in areas marked with this symbol.

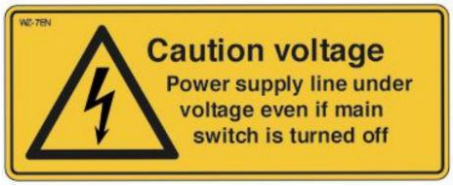
Electric current

Prior to opening any covers, the main circuit breaker must be switched off and secured against restarting.

Electric current

Warning of residual voltage charges on the frequency converter.

Electric current



Warning of components permanently live even with main circuit breaker switched off

2.10 Instruction signs

Wear hearing protection

In areas where this symbol is displayed there is a risk of hearing damage. Therefore, wear hearing protection when in these areas.

Information on wearing hearing protection	
< 80 dBA	Hearing protection is not prescribed as mandatory but should be worn as a matter of personal responsibility.
80 to 85 dBA	Hearing protection is recommended
> 85 dBA	**Hearing protection must be worn**

Observe the instruction manual

Only use the labelled machine once you have read the instruction manual.

2.11 Work and hazard areas

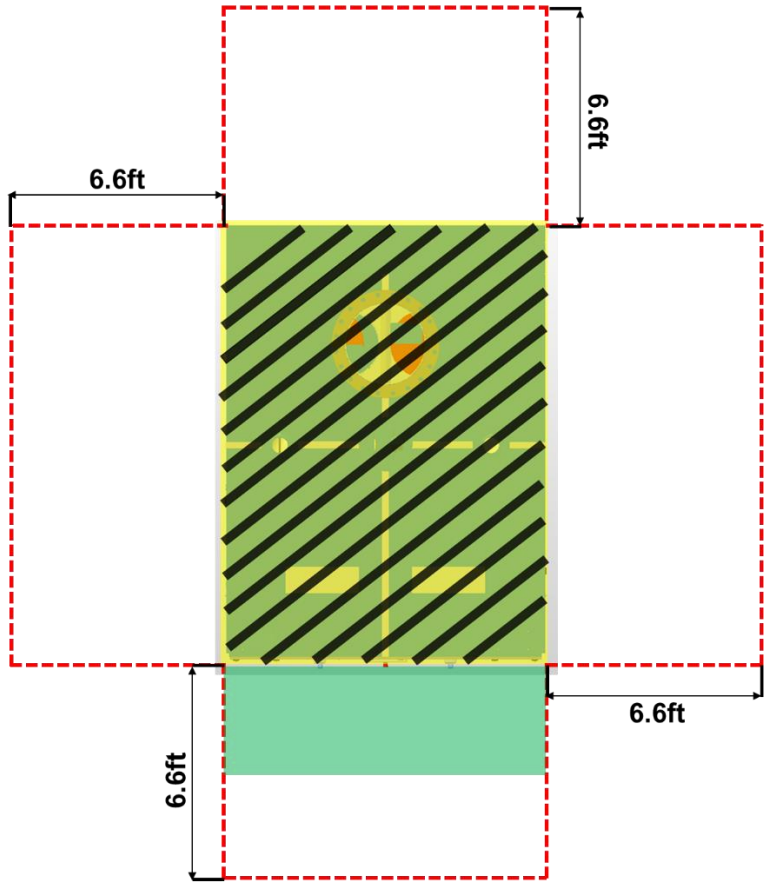


Fig. 11: Work and hazard area

Hazardous area
Operating area
Maintenance area

The hazardous area is located on the upper side of the acoustic hood and in the machine interior. It is prohibited to open acoustic hood elements, panels, covers and protective doors as well as access the upper side while the machine is running.

The operating area encompasses the LCD control panel (HMI) on the control cabinet, the main circuit breaker and the EMERGENCY STOP button.

In the maintenance area, maintenance work is performed on the machine by persons qualified to perform the relevant maintenance tasks.

2.12 Securing the machine against restarting

Sudden restart

DANGER!

An unauthorized or unregulated restart can have fatal consequences.

An unauthorized or unregulated restart of the machine can lead to serious or fatal injuries. There may be people in the hazardous area. Activating the energy supply and starting the machine could result in those people being fatally injured.

- Prevent the machine from restarting by:
  - disconnecting the electrical power supply
  - operating the main circuit breaker and disconnecting the machine from the power source.
  - lock out and tag out the main circuit breaker.
  - ensuring the machine is completely disconnected from the power source.
  - displaying a sign on the machine that prohibits a machine start
  - displaying a sign on the control system that prohibits a machine start
- Before restarting, ensure that safety devices are installed and functioning correctly and that there are no potential hazards to the safety of any persons.
- Always observe the procedure described below to secure against restarting.

Disconnecting the machine from the power source

1. Switch the main circuit breaker to position “0”.
   ► The machine is free of current.
2. Attach a padlock to the main circuit breaker.
3. Ensure the machine is completely disconnected from the power source.
4. Inform supervisory personnel of work in the hazardous area.

5. Place a sign on the machine and (where applicable) customer control system that notifies persons of the work being carried out in the hazard area and forbids activation of the machine. The sign must contain the following information:
   - Shut-down on:
   - Shut-down at:
   - Shut-down by:
   - Important: Do not switch on!
   - Important: Only switch on the machine once it has been ensured that there is no risk to personal safety.

Where the operator maintains additional EMERGENCY STOP features

The particular approach to preventing a restart is dependent on the operator-installed EMERGENCY STOP feature.

Secure the machine against restarting in accordance with the operator's instructions.

Follow the instructions of the responsible supervisory personnel.

Once all work has been completed, ensure that there is no risk to personal safety.

Ensure that all safety and protective equipment is installed and operational.

2.13 Environmental protection

Environmentally hazardous materials

ENVIRONMENT!

Improper handling of environmentally hazardous materials presents a threat to the environment!

Incorrect handling of environmentally hazardous materials, particularly in the case of improper disposal, can cause considerable damage to the environment.

– Always observe the information below on the handling of environmentally hazardous materials and their disposal.
– If environmentally hazardous materials are inadvertently released into the environment, take appropriate action immediately. If in doubt, inform the responsible local authority about the damage and seek advice on taking appropriate measures.

The following environmentally hazardous materials are used:

Insulation fibers

Released insulation fibers can pose a substantial environmental hazard. Avoid inhaling such fibers to prevent damage to health. Deposit at local collection points or commission disposal by specialist companies.

Electronics

Electrical and electronic components may contain poisonous material. These components must be collected separately and deposited at local collection points or disposed of by specialist companies.

3 Design and operation

3.1 Overview

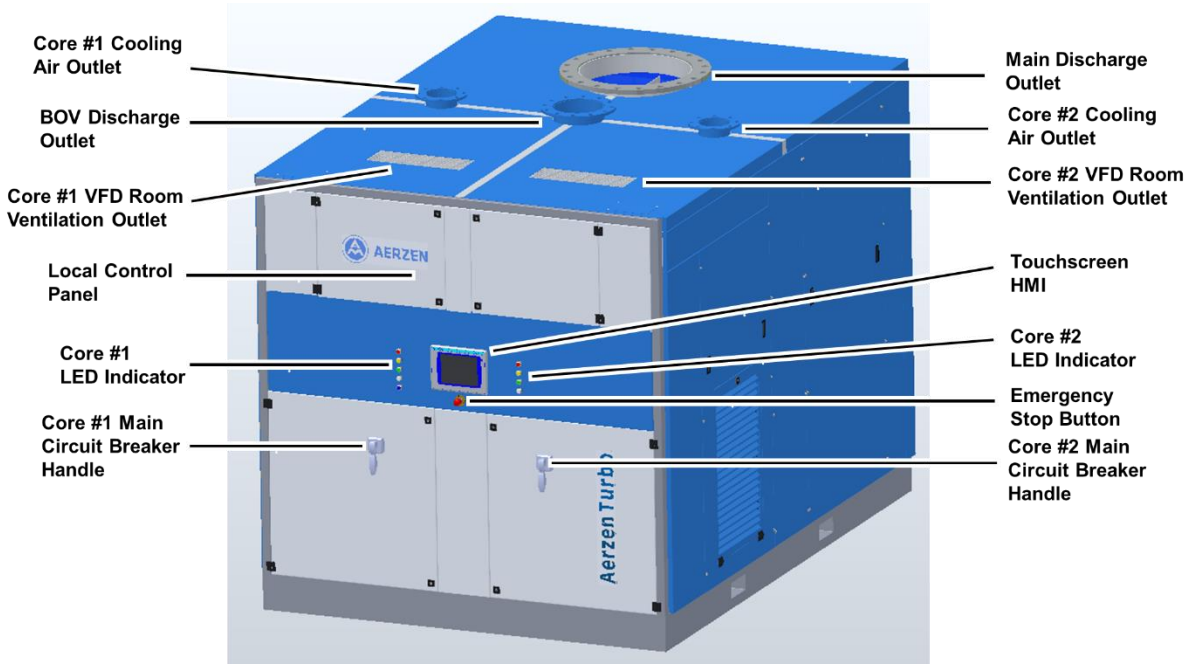
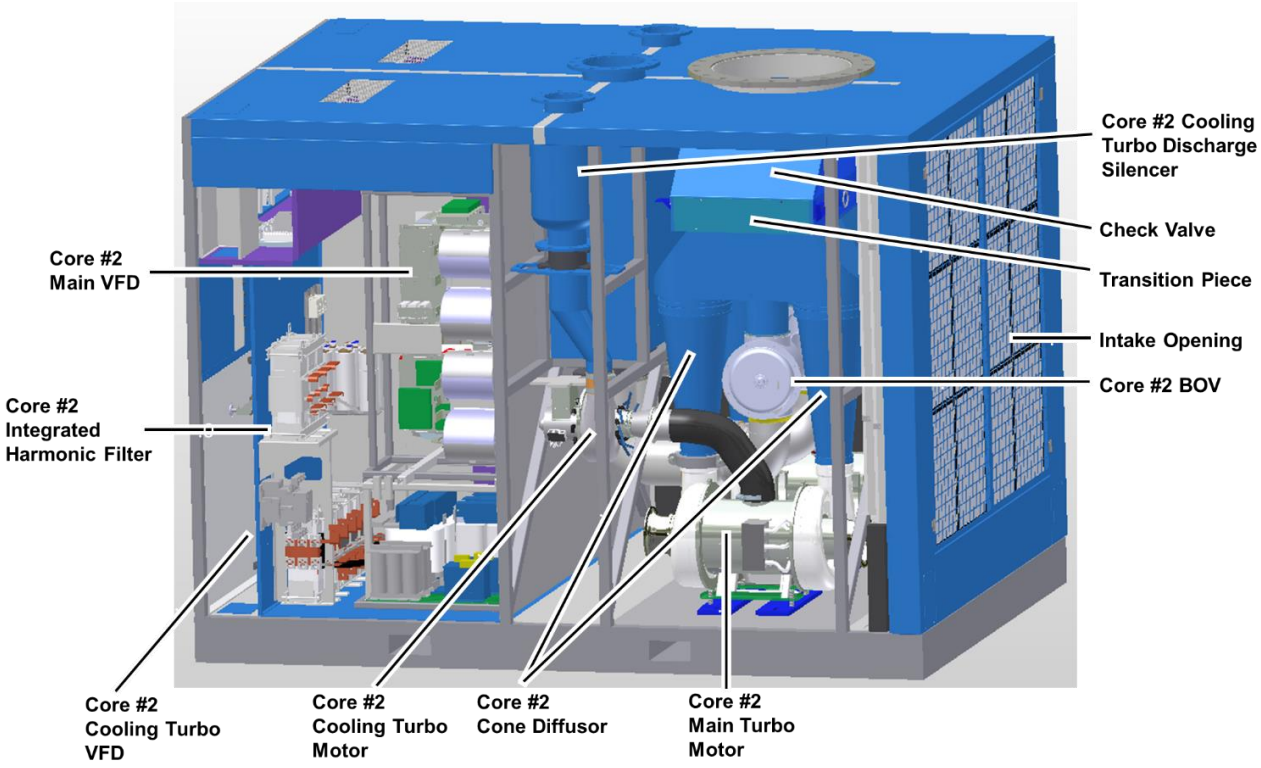


Fig. 12: Front view



Remark: core #1 and core #2 are symmetrical

Fig. 13: Transparent view

3.1.1 Functionality

The radial-fan type machine (turbo blower) compresses ambient air. It consists of the actual conveying air flow part and the circuitry and control components in the incoming and the control cabinets.

The ambient air aspirated through the intake opening is filtered out and routed into the two main turbo motors where it is compressed when both cores are in process. The volume flow required is controlled by adjusting speed of the impeller driven by the main motor via the main VFD. If the required volume flow is low enough to be provided by single core, automatically one motor takes the load and the other motor will be released. The compressed air is routed through the cone diffusors and the transition piece to the pressure line's pipe connection. The heat generated by machine operation is sucked off by the motor cooling turbo system and expelled into the room through the cooling turbo outlet or routed to a customer-installed pipe system. The motor cooling turbo system's speed is controlled using a separate cooling turbo VFD.

The start unloading device's (BOV) exhaust air is discharged upwards and outwards from the machine through the BOV discharge outlet via a discharge silencer. Optionally, the exhaust air can be guided via a customer-side pipe connection, into a pipe system, for further use.

Process control of both cores is performed by the local turbo control panel, which can be operated using the LCD touchscreen (HMI). The machine can be switched on/off using the main circuit breakers and stopped in an emergency using the EMERGENCY STOP button.

3.1.2 Operating modes

The machine can be run in two operating modes.

Load operation

Load operation is the default operating mode in which the machine runs at the set operating speed and optimum operating point. In load operation, the machine conveys the given volume into the process chain.

Idle operation

In idle operation mode, the machine runs at a reduced speed. Idle operation is used as an intermediate mode between load operation and full machine stop. In idle operation, the machine does not convey the given volume into the process chain, but rather releases the volume via the start unloading device (BOV).

In cases where it is necessary to switch operating modes frequently, switching between load and no-load operation produces considerably less material strain and takes less time than switching between load operation and a full machine stop.

Observe permissible switch-on frequencies! *„Permissible starting frequency“ on page 120.*

3.1.3 Extent of supply

The machine is delivered fully assembled together with the ordered accessories and a filter set.

The filter set includes:

- Intake pre-filter
- Intake medium filter

According to the order, the following pressure line accessories are included in addition to the extent of supply:

- Expansion joint
- Check valve
- Butterfly valve
- Discharge silencer

3.2 Description of assemblies

3.2.1 Conveying system assembly

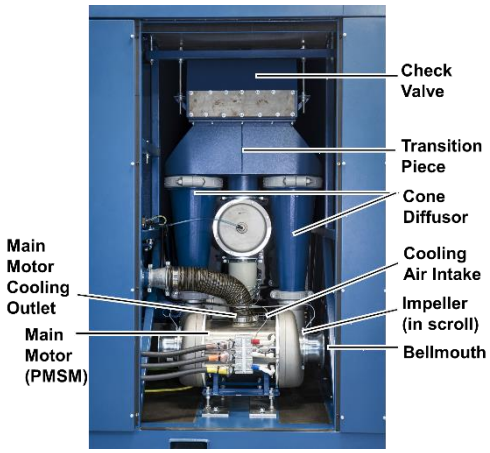


Fig. 14: Conveying flow

The conveying flow assembly is the machine's power element. It produces the conveying air flow.

It consists of an air-cooled permanent magnet synchronous motor (PMSM), to which two impellers are flanged directly. The drive shaft is borne on a non- contact, lubricant-free airfoil bearing. The ambient air is aspirated via the cooling air intake to act as motor cooling air and delivered to the cooling air system assembly via the pipe bend. The conveying air is aspirated via the bellmouth components and routed as compressed air through two cone diffusors and a transition piece to collect compressed air from two cores. Structure of both cores is symmetrical. The compressed air from two cores is conveyed to the pressure line's pipe connection on the upper side of the acoustic hood through the check valves.

3.2.2 Cooling air system assembly

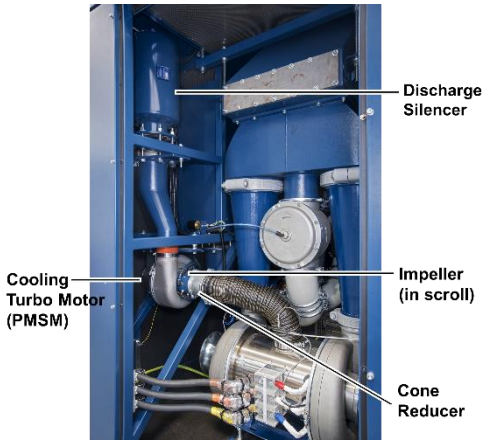


Fig. 15: Cooling air system

The cooling air system assembly dissipates the heat generated by the conveying flow assembly.

The assembly consists of an air-cooled permanent magnet synchronous motor (PMSM), to which an impeller is flanged directly. The drive shaft is borne on a non-contact, lubricant-free airfoil bearing. The hot air from the conveying flow assembly's motor is aspirated via the cooling air pipes and routed to the cooling air system's outlet on the upper side of the acoustic hood. A discharge silencer reduces the noise emissions produced.

Structure of both cores is symmetrical

3.2.3 Conveying flow frequency converter assembly

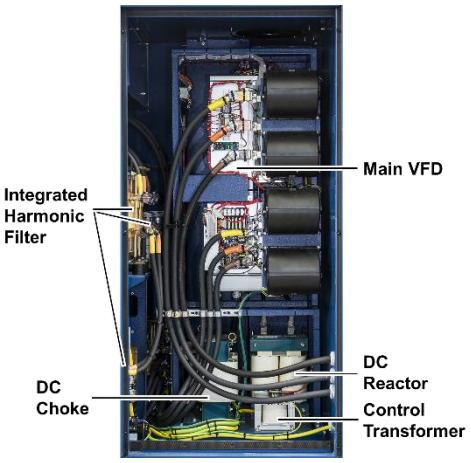


Fig. 16: Main VFD

The conveying flow frequency converter assembly steplessly regulates the motor speed and performance of the conveying flow assembly according to the set values and any occurring pressure fluctuations.

The main VFD is installed on the VFD rack. Structure of both cores is symmetrical.

Due to the high currents, the capacitors retain residual charges for up to 20 minutes even after the power supply has been switched off.

WARNING!
Risk of injury from hot surfaces!

3.2.4 Frequency converter for cooling air system assembly

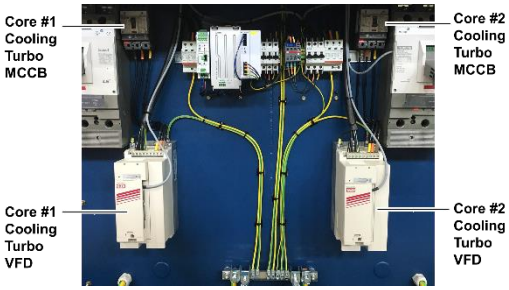


Fig. 17: Frequency converter for cooling air system

The cooling air system frequency converter assembly steplessly regulates the motor speed and performance of the cooling air system assembly according to the set values.

The cooling turbo VFDs are installed in the incoming cabinet.

Due to the high currents, the capacitors retain residual charges for up to 10 minutes even after the power supply has been switched off.

WARNING!
Risk of injury from hot surfaces!

3.2.5 Start unloading device (BOV) assembly

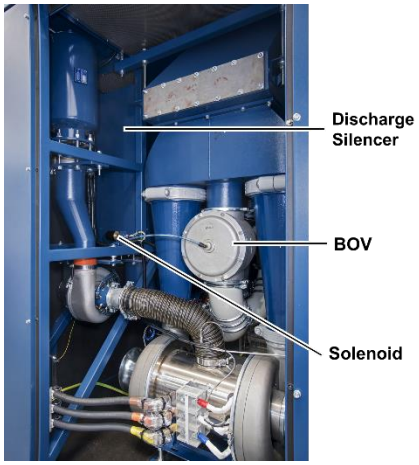


Fig. 18: Start unloading device (BOV)

The start unloading device opens the pressurized side to the atmosphere during start-up and in the event of overpressure caused by incorrect operation, component failure or other irregular occurrences. The start unloading device harmlessly dissipates overpressure.

It consists of a blow-off valve (BOV) which is opened by the controller via a solenoid. The start unloading device routes the air flow upwards and outwards from the machine's housing via its outlet. Alternatively, the air flow can be routed to the customer-side pipe connection on the acoustic hood's upper side. A discharge silencer reduces the noise emissions produced. Structure of both cores is symmetrical and air flow from both cores is combined in the discharge silencer.

3.2.6 Acoustic hood assembly

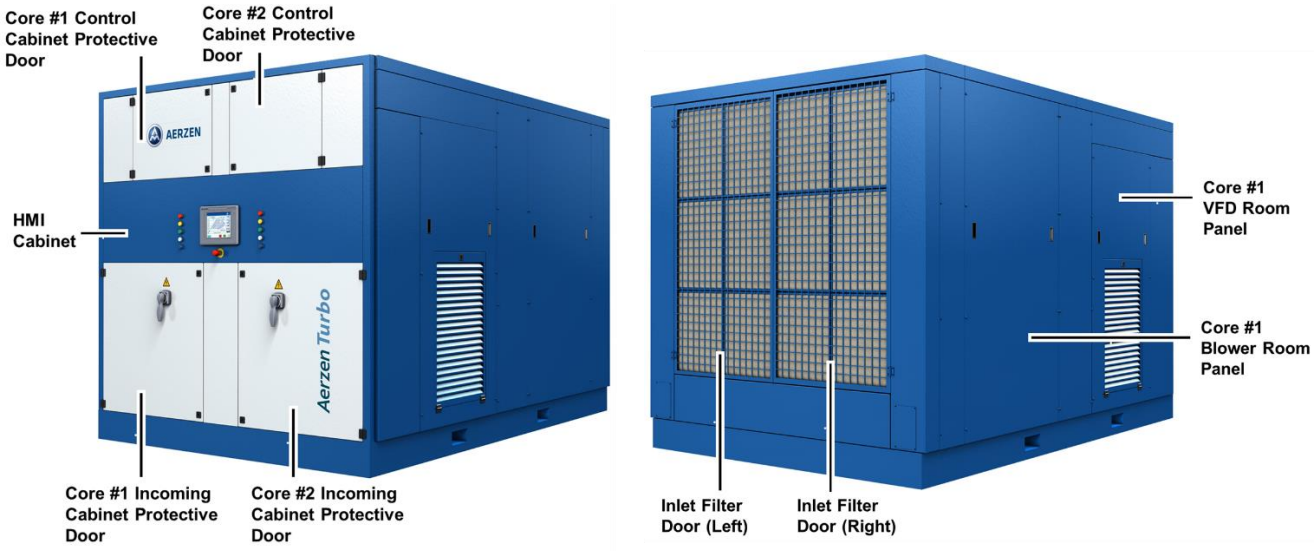


Fig. 19: Acoustic hood

The acoustic hood encloses the machine's entire housing. It reduces the noise emissions. For maintenance purposes, the front and rear acoustic hood elements can be individually removed once they have been unlocked using a locking key.

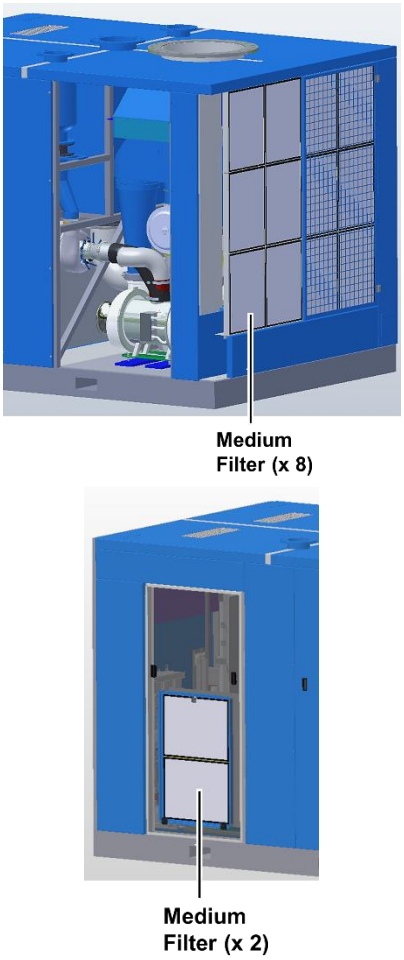


Fig. 20: Filter elements

The intake filters are installed behind the intake opening in frame structures. They filter out the particles contained in the aspirated ambient air. The filters can be accessed after the inlet filter doors.

The filter elements for filtering the cooling air aspirated to VFD rooms are located behind the VFD room panels' inlet louver.

3.2.7 Control unit

Fig. 21: Connections for process control systems

The local control panel (LCP) in the control cabinet controls both cores of the machine processes in accordance with the set operating parameters and the process parameters reported by the sensors. The operating parameters can be reviewed and set using the LCD control panel (HMI).

The local control panel can also be integrated into a process control system (master control panel; MCP) using various communication protocols.

Connection via terminal block

The following analogue/binary data signals are supplied to a control system of the customer (MCP) via a terminal block:

Signal	Communication direction	Type
Load	Output	Switching Signal
Unload	Output	Switching Signal
Remote Operation Ready	Output	Switching Signal
Error Signal	Output	Switching Signal
Set Value	Input	Analogue Value
Start / Stop *	Input	Switching Signal
Load / Unload *	Input	Switching Signal

* potential-free connection via relay

The terminal allocation is described in the chapter "Integration in a process control system".

Connection via Fieldbus

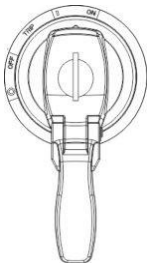
The control unit supports different type of Fieldbus communication protocol and can be connected to a control system of the customer (MCP). The default setting is EtherNet/IP and other communication protocol may require a factory setup or an onsite technical support.

Contact the manufacturer for an appropriate connection.

If a connection has been established to a control system of the customer or a process control system, the operating parameters are also displayed on the respective visualization system provided by the customer.

3.3 Control elements and displays

3.3.1 Main circuit breaker



The main circuit breaker is part of the installed safety devices. For details, see the chapter *„Main circuit breaker“ on page 38*.

Fig. 22: Main circuit breaker

3.3.2 EMERGENCY STOP button

The EMERGENCY STOP button is part of the installed safety devices. For details, see the chapter *„EMERGENCY STOP button“ on page 39*.

Fig. 23: EMERGENCY STOP button

3.3.3 Indicator lights and push-buttons

The indicator lights light up to indicate various operating states.

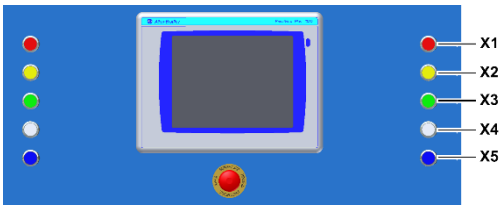


Fig. 24: Indicator lights and push-buttons

Item	Designation	Function
X1 (Red)	*[ERROR]*	Malfunction. Machine is not running.
X2 (Yellow)	*[UNLOAD]*	Machine idling at reduced speed.
X3 (Green)	*[LOAD]*	Machine is in load operation mode.

Item	Designation	Function
X4 (White)	*[READY-TO- OPER-ATE]*	Machine is ready for operation.
X5 (Blue)	*[RESET]*	Pushbutton for resetting EMERGENCY STOP.

The indicator lights feature the language of the applicable country, in accordance with EC Machinery Directive 2006/42/EC.

3.3.4 LCD control panel

The machine is operated using the touch-sensitive LCD control panel (HMI) on the front of the control cabinet.

The main screen shows the most important operating parameters and through them provides access to submenus and operating menus. It is the default display shown for parameter monitoring when the machine is running.

Pressing the displayed buttons accesses further screens and allows input of values.

If a connection to a customer control system or a process control system has been established, the operating parameters are also displayed by the respective systems.

The LCD control panel depicted and described in this and all subsequent chapters is that of the machine AT600-0.6DT. It serves as an example for Aerzen Turbo MultiCore series.

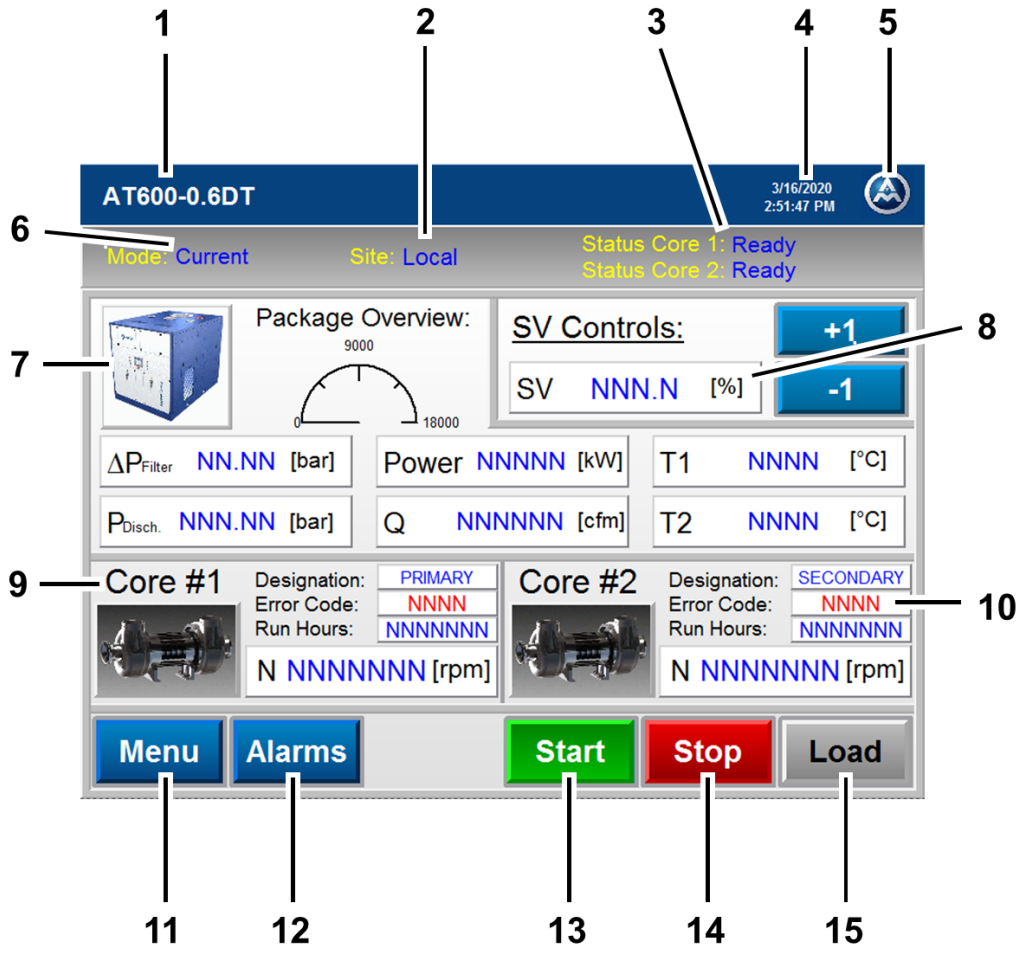


Fig. 25: LCD control panel main screen

Fig. 26: Individual core information

Item	Designation	Explanation
1	*„ATxxx-x.xDT“*	Displays the machine type used.
2	*„Control“*	Displays the selected operating setup. ■ Local: on-site operation using the LCD control panel ■ LAN: control via EtherNet/IP ■ Remote I/O: remote control via the hardwire I/O terminal block This button can be used to select the operating mode.
3	*„Status“*	Displays the current operating status. ■ Wait: system preparing ■ Load: load operation ■ Unload: in no-load operation ■ Error: fault state ■ Ready: machine ready for operation
4	*„Date/time“*	Shows the current date and time (MM/DD/YYYY).
5	*„Information screen button“*	This button can be used to go to information screen
6	*„Mode“*	Displays the operating mode, i.e. the criterion used as a basis for controlling machine performance: ■ Current: constant current draw ■ Flow: constant volume flow ■ Service: operating mode for service and maintenance purposes The button allows selection of the operating mode.
8	*„Set value“*	This button is used to set the operating target value. The type of set value depends on the selected operating mode.
7	*„Diagnostic screen button“*	This button can be used to go to information screen.
9	*„Individual core readouts“*	Displays each core’s ■ Primary/Secondary designation ■ Error code ■ Run hours ■ Speed
	„ΔP filter“	Displays the pressure differential at the intake filters.
	„P_{disch}“	Displays the air flow’s discharge pressure on the discharge side.
	„Power“	Displays the current power consumption.
	„Q“	Displays the air flow’s flow rate.
	„T1“	Displays the temperature of the air flow on the intake side.
	„T2“	Displays the temperature of the air flow on the discharge side.

Item	Designation	Explanation
10	*„ERROR CODE“*	Displays an error code if there has been a malfunction (*9.2 „Fault displays“ on page 146*).
11	*„MENU“*	This button accesses the submenus for setting and displaying the operating parameters (*on page 121*).
12	*„ALARM“*	This button can be used to display detailed alarm information.
13	*„START“*	This button is used to switch the machine to idle mode during breaks in operation.
14	*„STOP“*	This button is used to stop the machine. The start unloading device opens and the machine enters no-load operation initially for a certain time. After cooling down sufficiently, the machine is stopped.
15	*„LOAD“*	This button is used to switch the machine to load operation mode.

3.4 Connections

Electrical power connections

Circuit breaker connection

Fig. 27: Circuit breaker

The connections for the power cable set (L1/L2/L3) of the building's power supply are located on the two circuit breakers in the incoming cabinet which are accessible via cable entry. The power cables can be routed either along the top or along the base (*Chapter 5.5 „Establishing the electrical connection“ on page 90*). If required, cable insertion plates can be removed from the top or from the floor of the machine for routing the power cables.

The ground connection for the protective conductor of the building's equipotential bonding rail is located on the middle of the incoming cabinet floor.

Circuit breaker - connection dimensions

Observe the circuit breaker supplier’s connection dimensions!

Item	AT600	AT800
Circuit Breaker	TS800NU	TS800NU
Terminal	2-pole	3-pole
Conductor Size	250 – 500 [kcmil]	300 – 400 kcmil
Tightening Torque	375 [ln-in]	375 [ln-in]

Observe a maximum tightening torque.

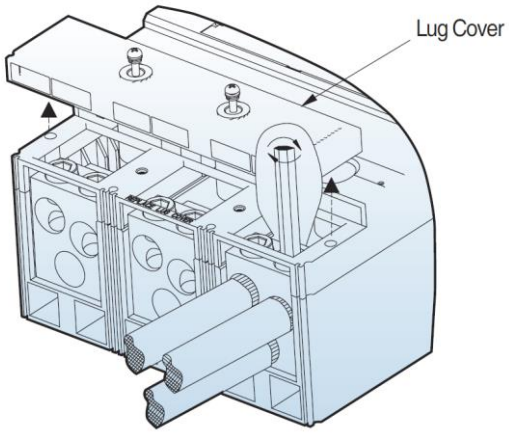


Fig. 28: Wire Installation

General requirements for power cables

- Only authorized electricians may perform the connection.
- Fine-core cable is recommended for the connecting leads.
- The connecting hardware must be suitable for the cross-section and type of the connecting leads.
- Cables, leads and connections must not be subjected to excessive bending and tensile forces. Install the connecting cable via a stayed cable bridge to prevent the terminal box being subjected to forces or stress.
- Install cables and leads in such a way that they cannot sustain any external damage.
- Observe the tightening torques of the terminal screws.
- Secure all connections against inadvertent release or loosening.
- Ensure that the nominal electrical data is complied with during operation.
- Avoid contact with the machine, excessive friction and excessive radiant heat.

Requirements for the electricity network

NOTICE!

There is a risk of material damage from voltage fluctuations / drops!

Voltage fluctuations / drops beyond the tolerance interval may lead to serious damage to the drive system.

Pressure connections

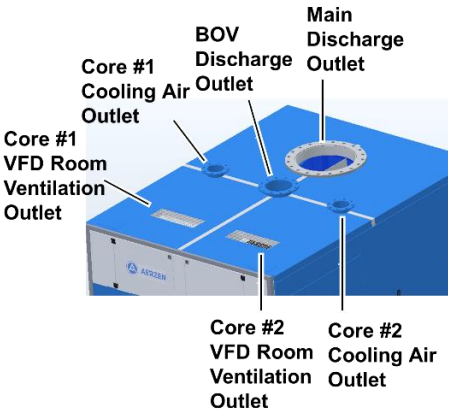


Fig. 29: Pressure connections

The pressure line's pipe connection is located on the upper side of the acoustic hood.

The cooling air systems' outlets are also located on the upper side of the acoustic hood. To utilize the waste heat further, the waste heat can be discharged through a pipe system.

The start unloading device's (BOV's) outlet is located on the acoustic hood's upper side as well. The excess pressure can be discharged to an outdoor area via a customer-side pipe system.

The VFD room ventilation outlets are sealed as standard by an exhaust air grid.

Intake openings

The machine aspirates the ambient air through the intake opening.

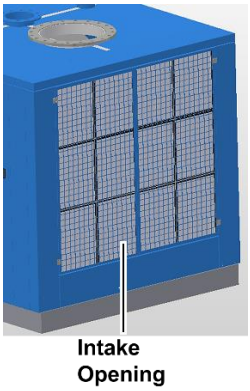


Fig. 30: Intake openings

Connections for process control systems

The machine can be connected to a process control system via the following connections:

- The standard connection is established via an I/O terminal block by means of analogue and binary signals.
- Fieldbus connection via various protocols.
  For information about the configuration (data structure), contact AERZEN.

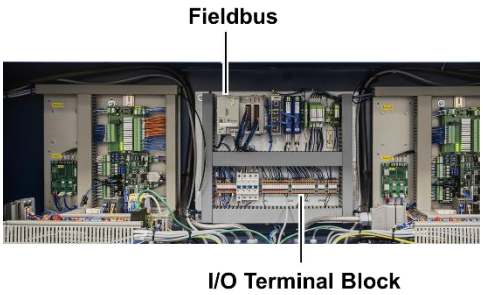


Fig. 31: Connections for process control systems

3.5 Accessories - optional

The following options are available for the machine.

Outlet and butterfly valve

An outlet and a butterfly valve need to be installed downstream of the check valve in the pressure line when performing maintenance work.

Discharge silencer

A discharge silencer should be installed in the pressure line's pipe downstream of the check vavle to further reduce the noise emis- si-ons.

Expansion joint

An expansion joint should be used to reduce vibrations in the pressure line and to prevent damage caused by motion. It is installed between the pressure line's connection flange and the pressure line.

Check valve

To prevent counterpressure on the machine when running it in parallel operation, a check valve needs to be installed in the pressure line between the expansion joint and the discharge silencer.

3.6 Required tools

The following tools are required in addition to standard tools:

Auxiliary materials, aids
including collection containers for oil, drain hose, cleaning rags.

Conveyor rails
The conveyor rails must be made of steel. They act as slide-in modules in the forklift tunnel of the acoustic hood. The cables are pulled by the conveyor rails and joined above the machine using the lifting beams.

Crane
For transporting the machine. The crane must have sufficient load-bearing capacity.

Drills
Drills for making fastening holes.

Electric drill
Electric drills, e.g. for drilling fixing holes.

Forklift/industrial truck
For transporting the machine. The forklift/industrial truck must have sufficient load-bearing capacity.

General measurement tools and equipment
For example, a steel ruler, plumb line, folding yardstick, spirit level.

General tool kit
including various screwdrivers, combination wrenches, set of socket spanners, set of Allen wrenches, hammers.

Lifting beams
Transverse truss required for crane transport for absorbing cable force.

Lifting equipment
For lifting loads, e.g. ropes, belt anchorages, shackles, eyebolts with nuts.

Locking key
The locking key is a component of the overall safety concept. This must be stored safely and should only be made accessible to trained personnel. It is intended for the proper opening and closing of the acoustic hood elements.

Tools for authorized electricians
Basic electrical engineering equipment, e.g. multimeter, voltage detector, insulated tools.

Transport equipment
for transporting packaged units and the machine, e.g. with lift trucks, forklifts.

4 Transport, packaging, and storage

4.1 Safety instructions

Improper transport

WARNING!

Risk of injury and damage from improper transport!

Improper transport may result in personal injury.

- Proceed with caution upon delivery and unloading of the machine and during in-house transport.
- Observe the symbols and information on the packaging.
- Only use the intended anchorage points.
- Observe the machine's center of gravity.
- Attach lifting equipment accordingly and hang the load so that it is balanced.
- Remove the packaging shortly before setting up the machine.

Industrial trucks

WARNING!

There is a risk of fatal injury from industrial trucks!

Transport with industrial trucks can result in objects and other loads falling accidentally and causing serious or fatal injury. There is also the risk of the driver failing to see persons and running them over.

- Industrial trucks should only be operated by trained drivers (e.g. forklift drivers).
- Only walk past an industrial truck if the driver has signaled that he has recognized the person in his path.
- Only use approved industrial vehicles with sufficient load carrying capacity.
- Never transport materials over persons or the areas in which persons are located.

Suspended loads

WARNING!

There is a risk of fatal injury from suspended loads!

During lifting work, loads may come loose and fall. This can result in serious or fatal injury.

- Never walk under or into the range of a suspended load.
- Move loads under supervision only.
- Observe lashing points.
- Ensure that the lashing equipment is fitted securely.
- Do not hang lashing equipment on protruding machine parts or on the lugs of attached components.
- Only use approved hoists and lashing equipment with sufficient load carrying capacity.
- Do not use torn or scoured hoists such as ropes or pulleys.
- Do not attach hoists such as ropes or belts to sharp edges and corners and do not tie or twist them.
- Set down the load when leaving the work area.

Off-center of gravity

WARNING!

There is a risk of the unit toppling and falling over if there is disregard for the machine's center of gravity!

If the machine's center of gravity is disregarded the packaged unit may topple and cause life-threatening injury.

- Take into account the machine's center of gravity.
- Observe the packaging information on the machine's center of gravity.
- Attach lashing equipment in such a way that it is located above the center of gravity.
- Raise the load carefully and ensure that it does not topple. If necessary, change the position of the lashing equipment.

Risk of slipping

CAUTION!

There is a risk of injury from slipping on the packaging foil!

The packaging foil features a slippery surface that can cause persons to slip if they stand on it. Moisture, creases, edges and tension straps on the packaging foil carry the risk of slipping or stumbling. The packaging foil is not suitable for supporting weight. A fall may result in injury.

– Never stand on the packaging foil.
– Never lean on the packaging foil or use it for support.

Requirements for personnel

Requirements for transport:

Transport of packaged units

Personnel:
- Trained persons

Transport of unpacked machines

Personnel:
- Service personnel

Protective equipment

Requirements for transport:

Protective equipment:
- Protective work clothing
- Safety shoes
- Protective gloves

Special tools

Requirements for transport:

NOTICE!

Risk of damage to the machine! Chains, steel cables and similar equipment are not suitable lifting equipment.

Special tool:
- Lifting equipment
- Transport equipment
- Lifting beams
- Locking key
- Conveyor rails
- Forklift/industrial truck
- Crane

Dimensions of the conveyor rails

Nominal diameter of discharge nozzles	Rail dimensions (mm)
Consult manufacturer	Consult manufacturer

Span width at least 150 mm longer than the dimensions of the acoustic hood.

4.2 Delivery of the machine

4.2.1 Delivery method

The machine is shipped using a freight forwarder. In accordance with the given requirements the machine is sealed in foil and may be additionally packed in wood.

The machine is delivered fully assembled on a forklift-suited transport pallet. Accessories are delivered separately in sealed packaging foil.

Transport on a truck

Fig. 32: Transport with straps

1. Strap the packaged unit to the truck in accordance with the diagram.
2. Always use appropriate edge protection to avoid damage to the packaged unit.

4.2.2 Packaging

4.2.2.1 Center of gravity Symbols on the packaging

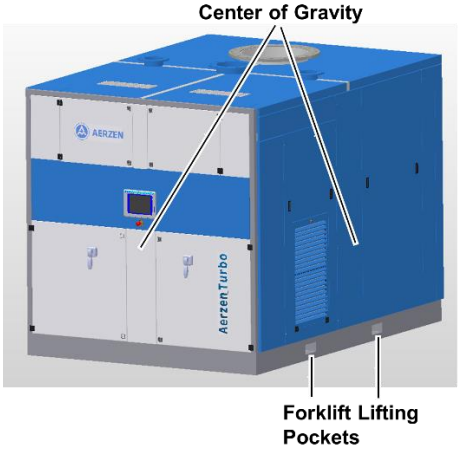


Fig. 33: Center of gravity

Always observe center of gravity during transport.

1. Displays the center of gravity and weight of the machine.

   Observe the location of the center of gravity for lifting work and transport.
2. Strap the packaged unit onto the truck.

   Always use appropriate edge protection to avoid damage to the package.
3. Lift the transport items with a forklift only at the lifting points

Transport without a pallet

Comply with the order of the work stages.

1. **CAUTION!**
   Risk of injury from high weight!

2. Separate the machine from the transport pallet by removing the fastening screws.
3. Drive the forklift's forks under the machine's indicated forklift lifting points.

   WARNING!
   Risk of injury if the machine topples or falls!
   Observe the machine's center of gravity.

4. Determine the machine's center of gravity by raising it carefully.
5. Transport the machine so that it is balanced. The machine must not lean to one side.
6. Remove the lifting equipment from the installation site.

4.2.2.2 Handling packaging

Handling packaging

The various packaged items are packed in accordance with the anticipated transport conditions. In as far as it is possible, environmentally-friendly materials are used for the packaging.

The packaging is intended to protect individual components from transport damage, corrosion and other forms of damage. For this reason, do not destroy the packaging and only remove it shortly before assembly.

Only remove packaging for transport to the installation area if it has been expressly permitted.

Removing packaging

Packaging materials made of solid wood (e.g. wooden pallets, wooden crates) comply with the IPPC standard. This material is re-usable. When disposing of the material, national and local requirements must be complied with.

1. **CAUTION!**
   Risk of injury from raw packaging material and protruding nails!

   Remove packaging material.
2. First detach the packaging and then remove it.
3. Separate the machine from the transport pallet by removing the holding screws.
4. **ENVIRONMENT!**
   Packaging material is valuable. It can be used several times or processed and then re-used. The improper disposal of packaging material can present a risk to the environment.
5. Sort packaging according to the material used and dispose of it properly. *Chapter 10.3 „Disposal“ on page 155*

4.2.3 Transport inspection

Transport damage

Transport damage
Register transport damage claims as soon as damage is discovered. Compensation claims for damage are only valid within the applicable claim periods.

Inspect the delivery immediately for transport damage.

In case of perceptible external damage, proceed as follows:

- Do not accept the delivery or only accept it under certain conditions.
- Note the scope of the damage in the transport documents or on the delivery docket provided by the carrier.
- Register the claim.
- Inspect the delivery for completeness on the basis of the packing slip.
- The packing slip is located on the packaged unit.

4.2.4 Transport of packaged units

4.2.4.1 Transport using industrial vehicles

Transport using industrial trucks

Fig. 34: Transport with acoustic hood

Fig. 35: Indicated forklift lifting points

1.

NOTICE!
Risk of toppling loads! The transport of packaged units may only be carried out using lifting equipment that reaches under the machine and fits into the forklift pockets fully.

2. Drive the forks to the folklift pockets in the positions indicated as forklift lifting points.

See the labelling on the packaging.

- The center of gravity is located in the center between the two forks.

3.

DANGER!
Risk of fatal injury from toppling components!

Transport the machine so that it is balanced. The packaged unit must not lean to one side.

4.2.4.2 Transport using a crane

Transport using a crane

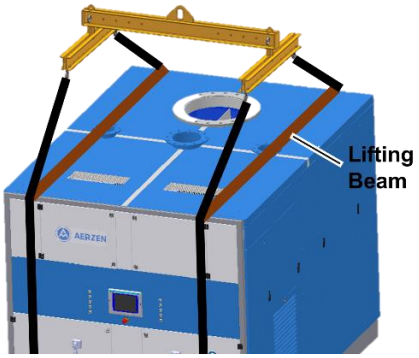


Fig. 36: Transport of packaged units

1. Drive the conveyor rails under the pallet's beams.
2. Place the lifting beams onto the acoustic hood. Length at least 150 mm longer than the dimensions of the acoustic hood.
3. Guide lifting equipment, such as cables or straps, through the conveyor rails and join them above the machine using the lifting beams.
4. Take into account the center of gravity
5. **DANGER!**
   Risk of fatal injury from toppling components!

   Determine the packaged unit's center of gravity by raising it carefully.
6. Transport the machine so that it is balanced. The packaged unit must not lean to one side.

4.2.5 Transport to the installation site

4.2.5.1 Transport using industrial vehicles

Transport using a forklift truck

Fig. 37: Transport using fork-lift truck

Conditions for transport using forklift truck

- The forklift truck must have sufficient load-bearing capacity.

Transporting the machine

1. Drive the forks into the forklift pockets.
2. Drive the forks in far enough for them to protrude on the far side.

WARNING!
Risk of injury if the machine topples or falls! Observe the machine's center of gravity.

3. Determine the machine's center of gravity by raising it carefully
4. Transport the machine so that it is balanced. The machine must not lean to one side.
5. Remove the lifting equipment at the installation site.
6. Install the machine. *Chapter 5.3 „Installing the machine“ on page 86*

4.2.5.2 Transport using a crane

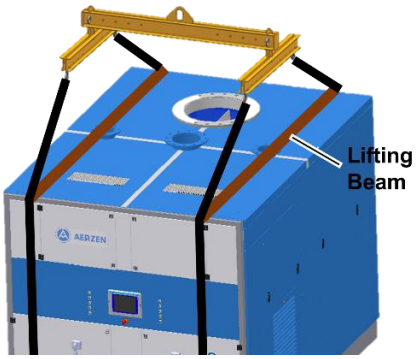


Fig. 38: Transport with acoustic hood

1. Align the conveyor rails with the designated forklifting lifting points.
2. Place the lifting beams onto the acoustic hood. Length at least 150mm longer than the dimensions of the acoustic hood.
3. Guide lifting equipment, such as cables or straps, through the conveyors rails and join them above the machine using the lifting beams.
4. Take into account the center of gravity!
5. **CAUTION!**
   Risk of injury from high weight!

   Determine the machine's center of gravity by raising it carefully
6. Transport the machine so that it is balanced. The machine must not lean to one side.
7. Remove the lifting equipment at the installation site.
8. Install the machine. ↳ *Chapter 5.3 „Installing the machine“ on page 86*

4.2.6 Storing the packaged units

The packaged units are delivered in sealed packaging foil.

There may be information on the packaged unit regarding storage that goes beyond the requirements listed here. Comply with this information.

Store the packaged unit under the following conditions:

- Keep Store in a dry and dust-free place.
- Do not store outdoors.
- Store in a dry and dust-free place.
- Do not expose it to any aggressive media.
- Protect the packaged unit from exposure to the sun.
- Avoid mechanical vibrations.
- Avoid extreme temperature fluctuations.
- Avoid adverse water effects.
- Storage temperature: 39 to +100°F.
- Relative humidity: maximum 60%.

NOTICE!

Risk of corrosion! To avoid potential damage to the machine, an inspection of the overall scope of supply should be undertaken by the manufacturer every 2 years.

Storage information for periods of over 12 months

Additional measures:

- Packaging with VPI paper.
- Sealed in PVC foil.

Packaging during storage

Inspect the general condition of the packaging regularly. Immediately rectify damage to the packaging.

- After opening the packaging:
  - Protect against humidity and damaging environmental influences.
  - Sealing flaps from the connection openings must not be removed.
- Replace the drying agent regularly in accordance with climate conditions.

NOTICE!

Risk of corrosion! Customized packaging is required for tropical climate zones and in the case of special customer requirements.

Damaged packaging

NOTICE!

Risk of corrosion! As a result of damaged packaging, moisture and damaging environmental influences could directly affect the product.

Measures in the case of damaged packaging

- Immediately rectifier damage to the packaging.

Cover the packaged units.

- Store in a dust-free place.
- Do not expose it to any aggressive media.
- Keep storage temperature constant.
- Dry the machine, if necessary.
- Relative humidity: maximum 60%. If necessary, ensure ventilation and use suitable drying agents (e.g. silica gel).
- Inspect the drying agent, replace if necessary.
- Repair or replace the packaging.
- If stored for more than 3 months, regularly check the general condition of all parts.

5 Set-up and installation

5.1 Safety instructions

Improper set-up / installation

WARNING!

Risk of injury from improper set-up / installation!

Improper set-up / installation may lead to serious personal or material damage.

- Before beginning work ensure there is sufficient space for installation.
- Check the tidiness and cleanliness of the working site.
- Only use commercially-available tools or, if necessary, special tools.
  Unsuitable or damaged tools may cause injury!
- Secure parts against falling during installation.
- Mount parts correctly.
  Comply with the specified screw-tightening torques.

Electrical system

DANGER!

Risk of fatal injury from electrical current!

There is a risk of fatal injury from touching live components. Live electrical components may make uncontrolled movements and cause extremely serious, or even fatal injury.

- Before beginning work, switch off the electric power supply and secure it against restarting.

Improper connection of power cables

DANGER!

Risk of fatal injury from improper connection of power cables!

Improper connection presents a risk of fatal injury from electric shock. Swapped phase lines can cause damage to the machine.

- Only allow qualified electrical personnel to establish the electrical connections.
- Switch off the building-side power supply and secure it against reactivation.
- Make sure that the building-side power supply matches the electrical specifications of the machine and that the machine is separately protected by overcurrent protection.
- Only use power cables with a capacity sufficient for the current load. Observe the locally applicable regulations and standards on power cable design.
- The machine's ground connections must be connected to the local equipotential bonding rail.
- Route power cables safely so that mechanical damage through catching, running over etc. is prevented.

Hot air emission

WARNING!

Risk of injury from hot air emission!

Air outlets may emit hot air at high flow speeds, which can cause serious injury through skin contact.

- Never operate the machine with open pressure connections.

High weight

WARNING!

Risk of injury from weight when assembling components!

The exhaust lines' components may be very heavy. When assembling components, these may drop or topple over, thus causing serious injury.

– Wear personal protective equipment when assembling components!
– Always enlist at least one more person to assist when assembling heavy components.
– Support heavy components sufficiently or secure them using lifting gear designed to take the components' weight.

Incorrect parallel operation

NOTICE!

Risk of machine damage from incorrect parallel operation!

If the machine is to be operated in parallel with other machines, check valve must be installed between the machines' pressure lines. This protects machines that are not running from the counterpressure applied through the collective lines.

Assembling the pressure line

NOTICE!

Risk of damage to the machine from incorrect assembly of the pressure line!

There is a risk of damage to the machine if the pressure line and accessories are assembled incorrectly.

– The pipes and the discharge silencer must be assembled to bear their own weight in order to prevent the machine's connection flange from taking any weight.
– The check valve must be installed so that it opens in the direction of flow.

Requirements for personnel

Requirements for set-up and installation:

Set-up and installation of electrical components

Personnel: ■ Authorized electricians

Set-up and installation of the mechanical components

Personnel: ■ Service personnel

Personal protective equipment

Requirements for set-up and installation:

Protective equipment:
- Protective work clothing
- Safety shoes
- Protective gloves
- Safety goggles
- Industrial hard hat

Special-purpose tools

Requirements for set-up and installation:

Special tool:
- Tools for authorized electricians
- Electric drill
- Drills
- General tool kit
- General measurement tools and equipment
- Locking key

5.2 Requirements for the installation site

Prior to beginning assembly, it must be ensured that the assembly location/installation site meets the following conditions.

Establish these conditions at the assembly location/installation site through construction measures if necessary or find another, suitable assembly location/installation site. Observe the order drawing. If in doubt, contact AERZEN.

Space requirements

- The assembly location/installation site must meet the requirements for the permissible operating conditions). It should be possible to rule out major climate fluctuations.
- The assembly location/installation site must be suitable for the machine's dimensions ↳ *Chapter 11.1 „Dimensions and weights“ on page 158*.
- There must be sufficient clearance to allow assembly. The minimum distances apply equally to maintenance work and later operation. The respective minimum distances must be observed ↳ *„Minimum distances“ on page on 84*.
- The assembly location/installation site must have a means of continuously supplying fresh air in order to guarantee heat dissipation for the machine.

- The assembly location/installation site must allow the pipe system and the power cables to be routed safely to the assembly position.
- The assembly location/installation site must offer sufficient access for moving even larger and heavy spare parts up to the machine.

Air supply required for the machine interior

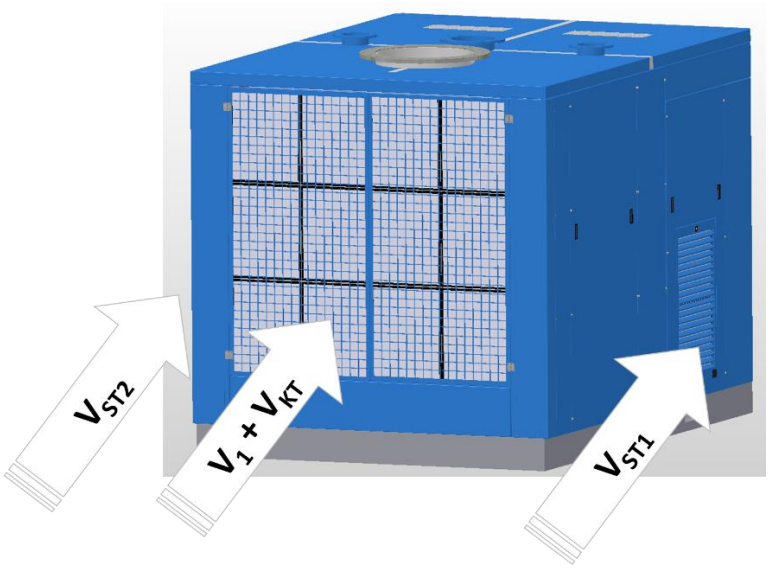


Fig. 39: Ventilation

Size	Symbol (unit)	AT600-0.6DT	AT600-0.8DT	AT600-1.0DT	AT800-0.8DT
Max. Intake Volume Flow	V_1 [ft³/min]	14,832	11,371	9,747	15,538
	V_1 [ft³/h]	889,930	682,279	584,811	932,307
Max. Motor Cooling Air	V_{KT} [ft³/min]	423.8	423.8	423.8	494.4
	V_{KT} [ft³/h]	25,427	25,427	25,427	29,664
Max. VFD Room Cooling Air	$V_{ST1} + V_{ST2}$ [ft³/min]	3,461	3,461	3,461	3,461
	$V_{ST1} + V_{ST2}$ [ft³/h]	207,650	207,650	207,650	207,650
Total Required Inlet Air Volume	V_{GES} [ft³/min]	18,717	15,256	13,631	19,494
	V_{GES}[ft³/h]	1,123,006	915,356	817,888	1,169,622

Minimum distances

The following minimum distances between the machine and walls or other system components must be observed at the assembly location/installation site.

CAUTION!
There must be no persons in the area above the machine so as to avoid the risk posed by sudden sound output and the rapid escape of hot air when the start unloading device blows out.

Size	Front	Rear	Top
AT600	6.6ft	6.6ft	6.6ft
AT800	6.6ft	6.6ft	6.6ft

Ambient air

- For aspiration of ambient air during normal operation, the following must be observed in addition:
  - The assembly location/installation site must be sufficiently far away from any possible ignition sources.
  - The assembly location/installation site must feature normal ambient air, without increased pollution levels such as might be produced by the emission of exhaust gases, vapour, dust or suchlike.

Outdoor installation

- Outdoor installation of the machine is not permitted!

Foundations

- The foundations must display the following properties:
  - The foundations must possess sufficient load-bearing capacity to support the weight and to facilitate secure bolting down of the machine.
  - The foundation surface must be level and smooth.
  - The foundations must be sufficiently protected against induced vibrations.
  - The foundations must feature prepared bore holes for the machine’s fastening bolts.

Ground properties

Inspect the ground properties. These should be as follows:

- Stable
- Even
- Free of vibrations
- Without any incline
- Without holes

NOTICE!
Do not install or mount the machine on “hollow” or lamellar foundations. Risk of deformation of the acoustic hood substructure!

Foundation requirements for the cement floor.
The cement floor should have a recommended surface pressure resistance of 30 - 40 [N/mm²].

Flatness tolerance according to DIN 18202						
	Distance between measuring points in (m)					
	0.1	1	4	10	>15	/
Dimension tolerance in (mm)	2	4	10	12	15	/

Angular tolerance according to DIN 18202						
	Distance between measuring points in (m)					
	up to 1	over 1 up to 3	over 3 up to 6	over 6 up to 15	over 15 up to 30	over 30
Dimension tolerance in (mm)	±6	±8	±12	±16	±20	±30

5.3 Installing the machine

Installation

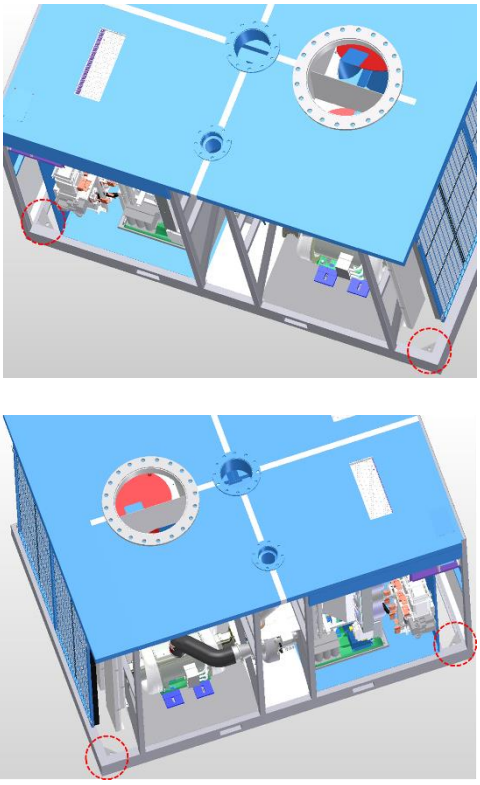


Fig. 40: Boreholes for bolting to foundations

1. Carefully set down the machine at the assembly location. Fasten the machine to the foundations using its six provided fastening boreholes (Fig. 71).
2. **NOTICE!**
   Risk of damage to the machine through aspirated secondary air!
3. Seal the boreholes for bolting to the foundation by replacing the previously removed covers.
4. Install the panels back.
5. Lock the panels.

5.4 Connecting the exhaust lines

5.4.1 Connecting the conveying flow's pressure line

Normal operation Connecting the pressure line

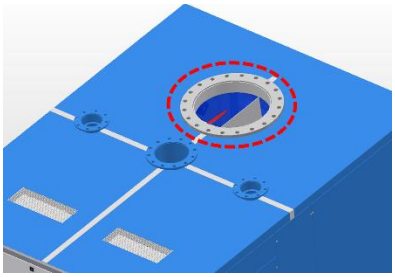


Fig. 41: Pipe connection for the pressure line

1. Remove the flange cover of the pressure line's pipe connection on the top of the acoustic hood.
2. Install the expansion joint on the pressure line's pipe connection on the top of the acoustic hood.

If the pressure line is routed to the machine horizontally, a 90° pipe bend must be installed upstream of the expansion joint. Add supports if necessary.

3. Install the check valve downstream of the expansion joint so that it opens in flow direction.

WARNING!
Risk of injury from high weight!

4. Install the discharge silencer downstream of check valve.
5. Guide the building-side pressure line to the connection flange without applying stress, seal it and bolt it tight.

Provide an outlet and butterfly valve in the pressure line for maintenance purposes!

Parallel operation

NOTICE!

Risk of machine damage from incorrect parallel operation!

In addition to the installation of check valve in the pressure lines, butterfly valves must be installed on the individual machines for maintenance purposes.

The following diagram shows an example application.

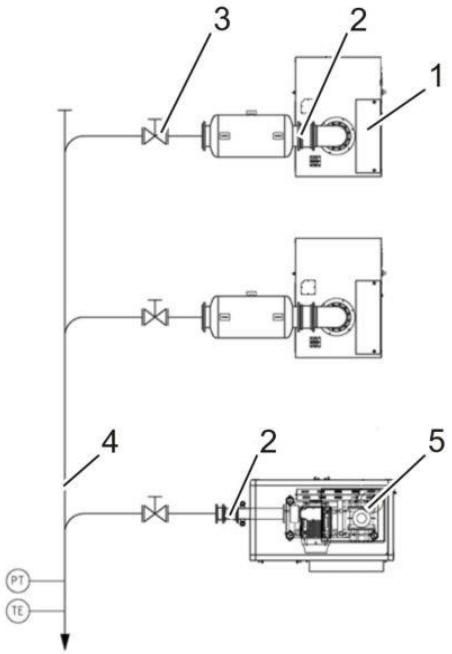


Fig. 42: Parallel operation diagram

1 Machine (turbo blower)
2 Check valve
3 Butterfly valve
4 Collective line
5 Machine (positive displacement blower)

5.4.2 Connecting exhaust line for the cooling air system (optional)

The cooling air system's waste heat can be provided for utilization via a pipe system. Connect the outlet on the acoustic hood's top with a pipe system.

Connecting exhaust line

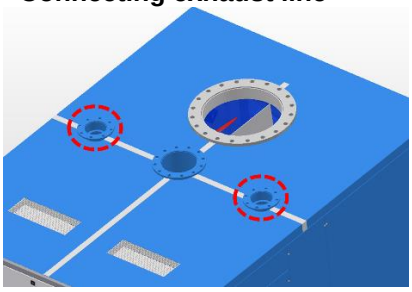


Fig. 43: Waste heat discharge

→ Flange-mount the pipe system.

Consult the manufacturer to determine the connection dimensions required for the on-site exhaust line.

5.4.3 Connecting an exhaust line for the start unloading device (BOV) (optional)

Connecting exhaust line

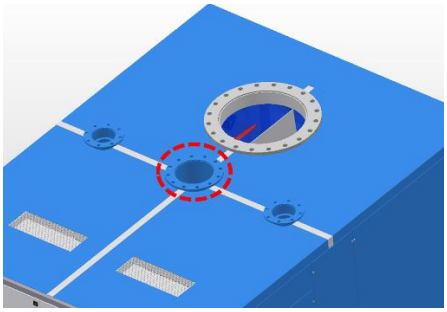


Fig. 44: Outlet of the exhaust air BOV

The default for the start unloading device is to blow off pressure outwards through the top of the machine housing. Alternatively, pressure can also be blown off to the outside via a pipe system. To do so, the outlet must be connected to a customer-side pipe system.

WARNING!

Air outlets may emit hot air at high flow speeds, which can cause serious injury through skin contact.

→ Flange-mount the exhaust pipe system to the start unloading device's outlet on the top of the acoustic hood.

Consult the manufacturer to determine the connection dimensions required for the on-site exhaust line.

5.5 Establishing the electrical connection

Connecting the power cables

DANGER!

Risk of fatal injury from electric shock due to improper connection of the power cables!

Power cables and grounding

The table presents (as a reference) an example of cable cross-sections for grid-side power connections and grounding for each core. The cable cross-section to be used depends on the power generated, the strength of the current and the routing method.

The supply leads used must be designed for the maximum current load applied; the lead's permissible current load must therefore be observed. Selection of the correct cable cross-section depends decisively on a correct assessment of the ambient conditions, e.g. temperature, routing method "individual routing with good cooling or multi-core routing with poor cooling" and the type of the cables to be laid.

Notes for the operator:

Apply the relevant standards (e.g. 2020 National Electric Code, 2018 NFPA 79).

Size	Max. Power Requirement [kW] of Each Core	Mains Voltage 460 [V]			
		Rated. Input Current [A] of Each Core	Power Cable Cross-Section [kcmil] of Each Phase	Ground Cross-section [AWG/kcmil]	Machine's Main Circuit Breaker [A] of Each Core
AT600-0.6DT	260	370	2 x 300	2 x 4/0	500
AT600-0.8DT	250	370	2 x 300	2 x 4/0	500
AT600-1.0DT	270	370	2 x 300	2 x 4/0	500
AT800-0.8DT	340	476	2 x 350	2 x 300	700

When connecting to the mains, observe the correct phase sequence L1-L2-L3 or U-V-W (clockwise phase rotation). The ground conductor's color should be Green/Yellow; this color should not be used for anything else.

Connecting the building-side power supply

There are two alternatives for power cable routing

- Top cable routing
- Foundation cable routing

Top cable routing

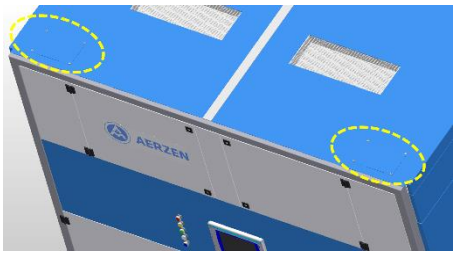


Fig. 45: Top cable entry

1. Release both the main circuit breakers in the incoming cabinet by forcefully pressing down the fastening bar (Pos. OFF).
2. Remove the top cable entry plate on both sides. (Fig. 81)
3. Drill boreholes required for attaching customer's cable glands into the cable entry plate. Attach the cable gland.

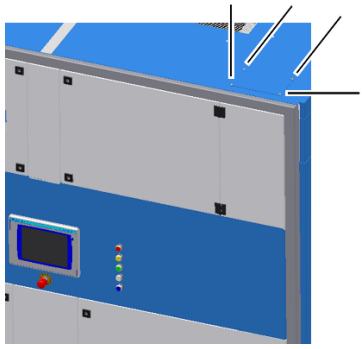


Fig. 46: Cable entry plate

4. Remove the middle cable entry plate in control cabinet. (Fig. 82) The plate can be reached out from the incoming cabinet.
5. Route the power cables from the top through the control cabinet. (through the cable glands and the cable duct)

Aerzen Turbo MultiCore blower requires two three-phase power feeds. Top cable routing for core #1 and core #2 is symmetrical.

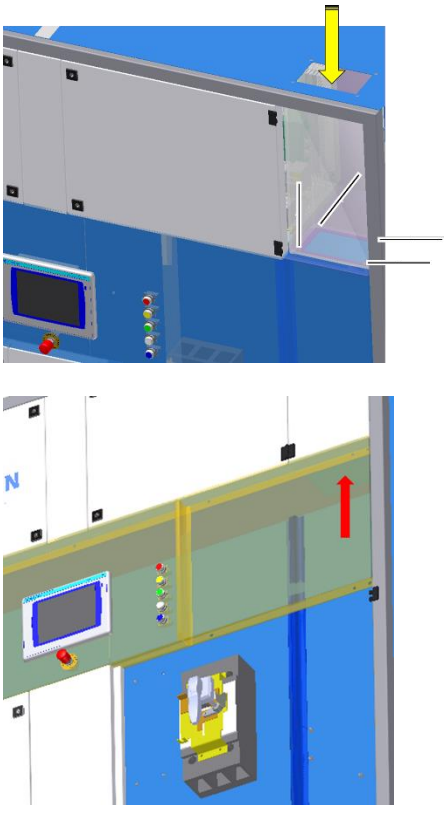


Fig. 47: Direction of cable routing

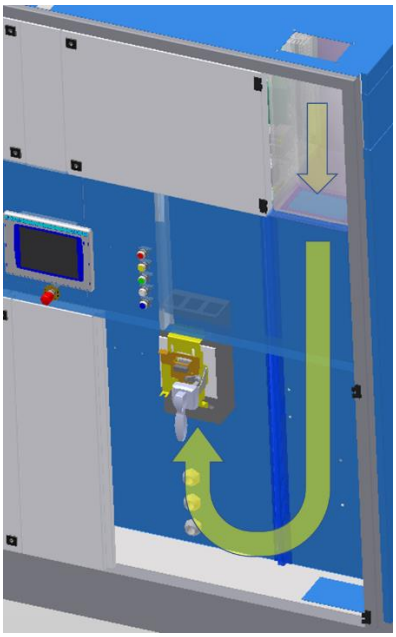


Fig. 48: Image of cable routing

6. Route the power cables all the way to the circuit breaker at the front.

Fig. 49: Circuit breaker

7. *Connect the phase lines (L1/L2/L3) to the circuit breaker's connections (Fig. 49) in the correct order.*

The wiring connections are protected by the lug cover.

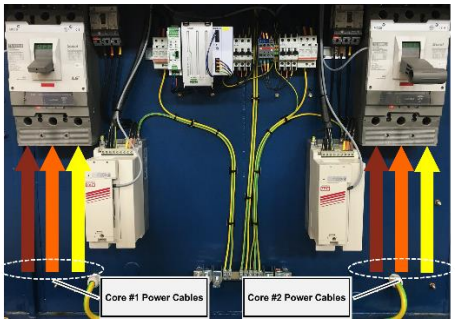


Fig. 50: Line-side connection

8. Connect the customer's power cables to the terminal lug of the circuit breakers

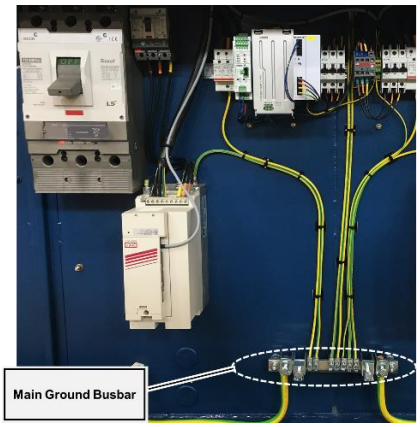


Fig. 51: Earth connection

9. Route the grounding cable to the grounding busbar and connect it.
10. Check the electrical connection.

Foundation cable routing

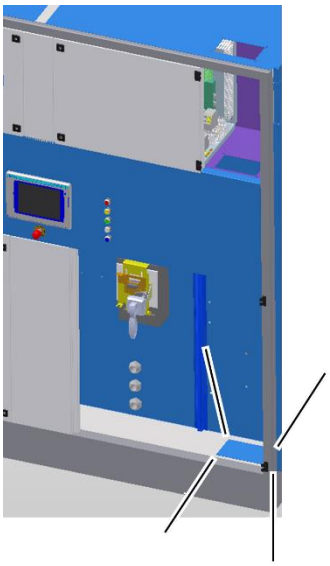


Fig. 52: Cable entry plate

1. Release both the main circuit breakers in the incoming cabinet by forcefully pressing down the fastening bar (Pos. OFF)
2. Remove the base cable entry plate on both sides (Fig. 52)
3. Drill boreholes required for attaching customer's cable glands into the cable entry plate. Attach the cable gland.

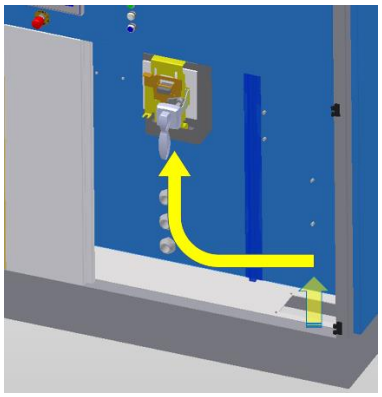


Fig. 53: Image of cable routing

4. Route the power cables from the bottom through the incoming cabinet. (through the cable glands)

Aerzen Turbo MultiCore blower requires two three-phase power feeds. Top cable routing for core #1 and core #2 is symmetrical.

Fig. 54: Circuit breaker

5. *Connect the phase lines (L1/L2/L3) to the circuit breaker's connections (Fig. 54) in the correct order.*

The wiring connections are protected by the lug cover.

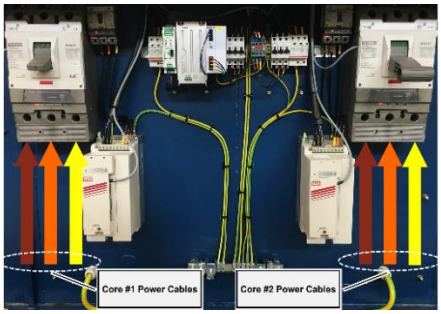


Fig. 55: Customer connection

6. Connect the customer's power cables to the terminal lug of the circuit breakers.

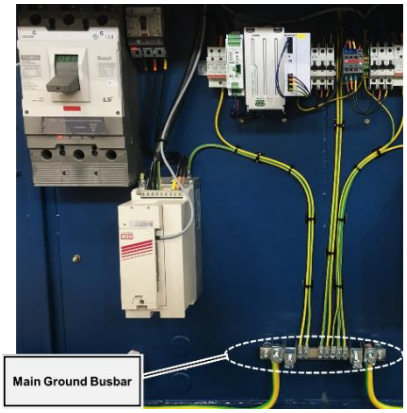


Fig. 56: Grounding busbar

7. Route the grounding cable to the grounding busbar and connect it.
8. Check the electrical connection

5.6 Integration into a process control system (optional)

The machine can be monitored, controlled and regulated via a process control system. The various connection options are explained in the following chapters.

Preparatory work

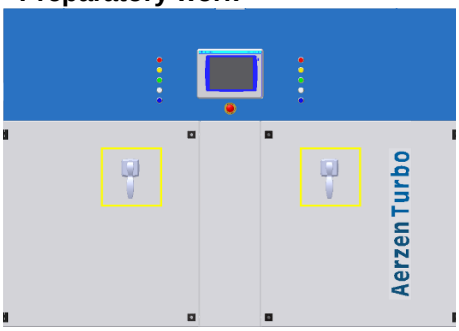


Fig. 57: Breaker handles

1. Release the main circuit breakers on the incoming cabinet by forcefully turn off the breaker handle (Pos. OFF).
2. Open the incoming cabinet doors

5.6.1 Connection via terminal block

Connecting the terminal block to a customer-side control system

The machine features a terminal block system for connection to a customer-side control system. This connection allows for the monitoring, control and regulation of the machine from the customer-side control system.

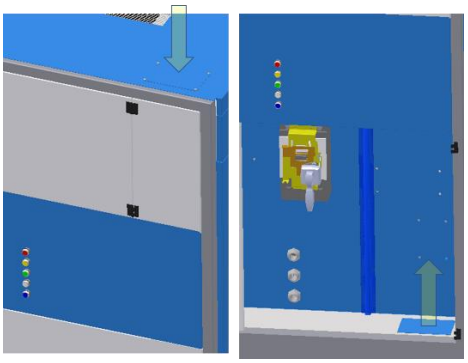


Fig. 58: Base cable plate

1. Guide the control cable, using cable glands, into the control cabinet via the top or base cable plates and then route it through the control cabinet.

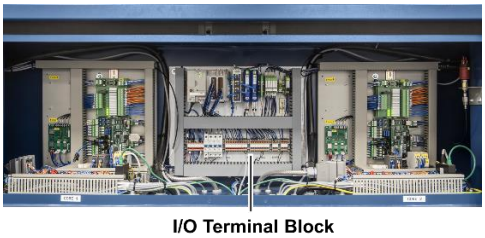


Fig. 59: Hardwire terminal block

2. Guide the control cable through the existing cable glands, into the control cabinet and onto the hardwire I/O terminal block.

3. Wire the control cable of the customer-side control system to the terminal block -X6, -X7, and -X8 of the control unit, in accordance with the following signal table.

Signal	Terminal type	Explanation (relay contact closed)	Terminal
Load	Output	Load operation active	-X7/5: Load+ -X7/6: Load-
Remote Operation Ready	Output	Machine ready for operation	-X7/3: Ready+ -X7/4: Ready-
Error Signal	Output	Turbo blower malfunction	-X7/1: Error+ -X7/2: Error-
Set Value	Input	Set value (4–20 mA)	-X8/1: SV+ -X8/2: SV-
Load / Unload*	Input	Start idling	-X6/3: Idle Load+ -X6/4: Idle Load-
Start / Stop *	Input	Start command	-X6/1: Start+ -X6/2: Start-

* potential-free connection via relay

For further information, refer to the customer's control system documentation and customer's circuit diagrams.

5.6.2 Connection via Fieldbus

Connection to process control system with fieldbus system

The machine can be connected via Fieldbus communication to a process control system with a suitable connection and monitored, controlled and regulated from there.

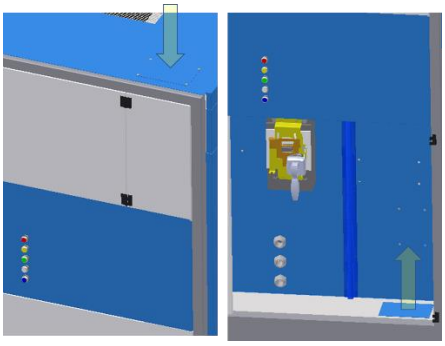


Fig. 60: Base cable plate

1. Guide the interface cable, using cable glands, into the control cabinet via the top or base cable plates and then route it through the control cabinet.

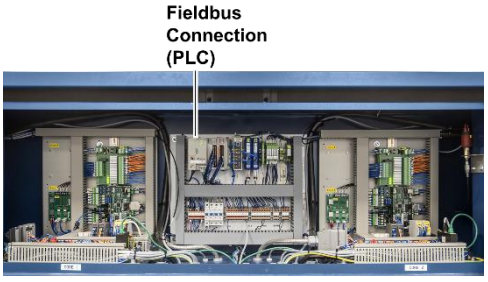


Fig. 61: Modbus TCP/RS232 connection

2. Guide the interface cable through the existing cable glands in the control cabinet and make the connection to the fieldbus connector (RJ45) on the PLC

3. *Data are exchanged in accordance with the selected fieldbus communication protocol. For further information, consult AERZEN.*

5.6.3 Completing the process control system connection

Fig. 62: Protective doors

1. Close and lock the protective doors of the control cabinet and the incoming cabinet.

If the incoming cabinet's doors cannot be inserted, check the position of the main circuit breakers on the front of the doors and, if necessary, correct it so that the main circuit breakers can be locked properly.

5.7 Last steps

After Installation of the machine, perform the following tasks.

1. Make sure that all tools, materials and other equipment used have been removed from the workspace.
2. Make sure that all acoustic hood elements and inlet air covers have been attached and locked.
3. Make sure that the protective doors are closed and locked.

6 Initial start-up

Improper commissioning

WARNING!

Risk of fatal injury from improper commissioning!

Errors during commissioning can result in fatal injury and cause substantial material damage.

– Only the manufacturer's customer service or persons contracted by the customer service may perform commissioning.
– Also contact the manufacturer for subsequent relocations.
– Do not modify the machine.

Requirements for personnel

Requirements for commissioning:

Personnel:
- Manufacturer's customer service division

Requirements for personnel

Instructing personnel to use the machine requires:

Personnel:
- Manufacturer's customer service division
- Authorized person

Instructing personnel to use the machine

As part of commissioning, the manufacturer's customer service adjusts machine parameters.

These adjustments are recorded in a log.

During commissioning, the authorized person is instructed by AERZEN, enabling him/her to perform the required operating setup and operating mode settings.

7 Operation

7.1 Safety instructions

Improper operation

WARNING!

Risk of injury from improper operation!

Improper operation may lead to serious injury and considerable material damage.

- Carry out all activities in accordance with the information and notes in this instruction manual.
- Before beginning work, observe the following:
  - Ensure that all covers and safety devices are installed and operating correctly.
  - Ensure that there are no persons in the hazard area.
- Never deactivate or bypass safety devices during operation.

Acoustic hood operation

WARNING!

Risk of injury from operation with an open acoustic hood!

Open acoustic hoods may lead to dangerous situations and cause injury during machine operation.

- Always keep the acoustic hood closed during operation.

Noise

WARNING!

Risk of injury from noise!

The noise level in the vicinity of the machine can cause serious damage to hearing.

- Always wear hearing protection while working in the vicinity of the running machine.
- Only stand in the danger zone if it is absolutely necessary.
- Never operate the machine without the acoustic hood.

Explosion and fire hazards

DANGER!

There is a risk of explosion and fire from ignition hazards!

Avoid allowing ignition hazards (open flames, flying sparks, weld spatter) into the vicinity of the machine. Sparks and incandescent or flammable objects can be sucked in through the supply air openings of the acoustic hood or through the intake silencer. The fan may ignite the mixture, causing an explosion or fire.

– Avoid ignition hazards.
– Never carry out work that generates sparks while the machine is in operation.
– Ventilate the installation site properly.

Requirements for personnel

Requirements for operation:

Using the machine Personnel:

- User

Required for recording the operating data and the results log:

Personnel:
- Authorized person

Personal protective equipment

Requirements for operation:

Protective equipment:
- Protective work clothing
- Safety shoes
- Hearing protection

Special-purpose tools

For archiving operating data and the event log

Special tool:
- USB 2.0 memory device

7.2 Shut-down in case of emergency

In hazardous situations, the movements of components must be stopped as quickly as possible and the electric power supply must be shut off.

Shut-down in case of emergency

In an emergency, proceed as follows:

1. Activate the EMERGENCY STOP immediately.
2. Inform the responsible staff.
3. Release the EMERGENCY STOP button.

4. Switch off both the main circuit breakers and secure it against restarting.
5. Disconnect the customer-side power supply.
6. Assign qualified personnel the task of rectifying the fault.
7. **WARNING!**
   An unauthorized or unregulated restart can have fatal consequences.

   Before commissioning, ensure that all safety devices are installed and operational.

7.3 Switching on the machine

Switching on

DANGER!
Risk of injury if protective equipment is missing!

1. Check whether the EMERGENCY STOP button is depressed. If necessary, unlock it by pulling it out.
2. Switch the main circuit breaker to position “1/ON”.

Fig. 63: Main circuit breaker

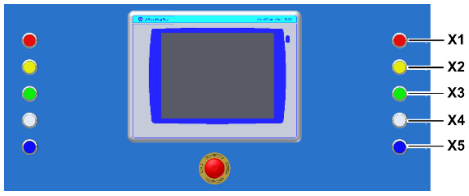


Fig. 64: Switching on

3. The machine switches on, the control unit boots up.

   ⇨ The *[ERROR]* indicator light (Fig. 64/X1) and the *[RESET]* illuminated pushbutton (Fig. 64/X5) light up, indicating an EMERGENCY STOP.

   No internal machine clearance!
4. To confirm internal machine clearance, press the *[RESET]* (Fig. 64/X5) illuminated pushbutton.
5. Confirm the error messages shown in the LCD control panel using the *„STOP“* button.

   ⇨ The *[ERROR]* indicator light goes out. The *[READY-TO-OPERATE]* indicator light (Fig. 64/X2) lights up.

6. The LCD control panel displays the corresponding message in the *„Status“* display field.
   ⇨ Machine is ready for operation.

7.4 Selecting operating setup and operating mode

7.4.1 Setting operating setup

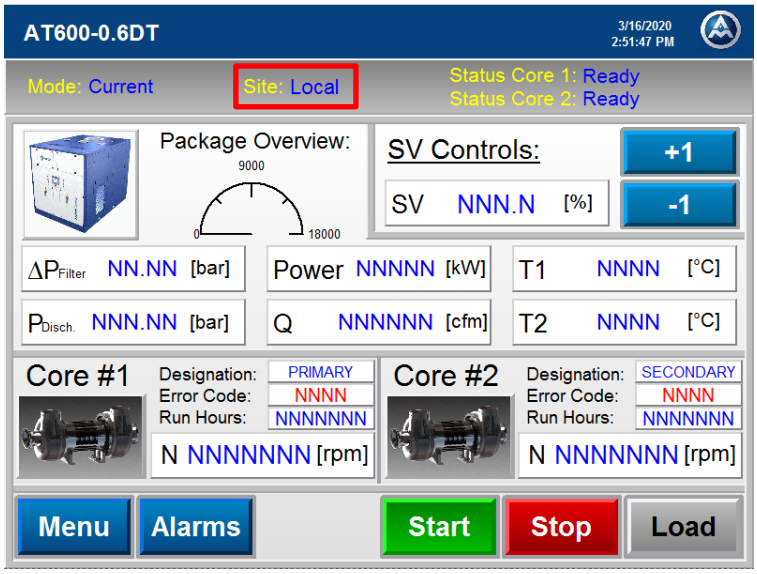


Fig. 65: Main screen

1. Press the *„Control“* button on the main screen.
   ⇨ The *„Operating setup“* screen is displayed.

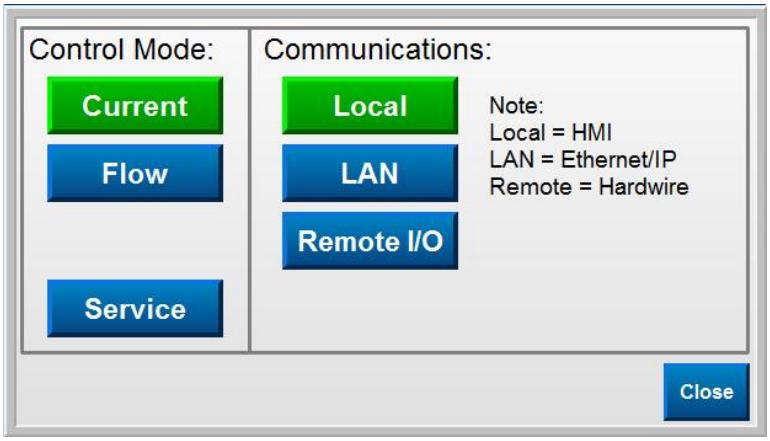


Fig. 66: "Operating mode" screen for selecting the operating mode

2. Select the desired operating mode.
3. Switch to the main screen with *„Close".*

   ⇨ The main screen shows the selected operating mode.
4. Local control system: The machine can be operated on the display.
5. Remote control via fieldbus (LAN) or I/O terminal block:

   The machine is connected to a control system provided by the customer and can be operated on the customer's respective user interface.

   Local operation via the LCD control panel is locked.

   The *„Control"* button can be used to switch to *„Local"* operating mode.

6.

List	Operating setup	Explanation
1	Local	On-site operation using the machine display
2	LAN	Control via fieldbus protocol
3	Remote I/O	Remote operation: connection of the customer's control system via an internal terminal strip

7.4.2 Setting the operating mode

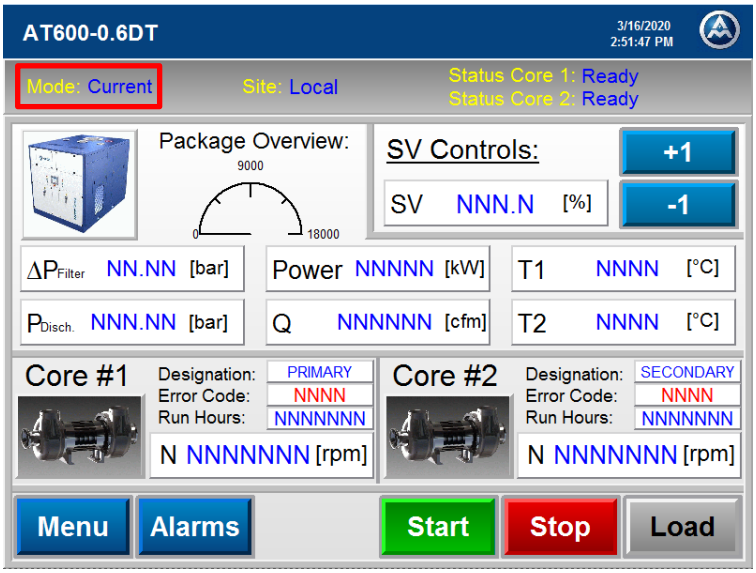


Fig. 67: "Mode" screen

1. Press the *„Mode"* button in the main screen.
   ⇨ The *„MODE State"* screen is displayed.

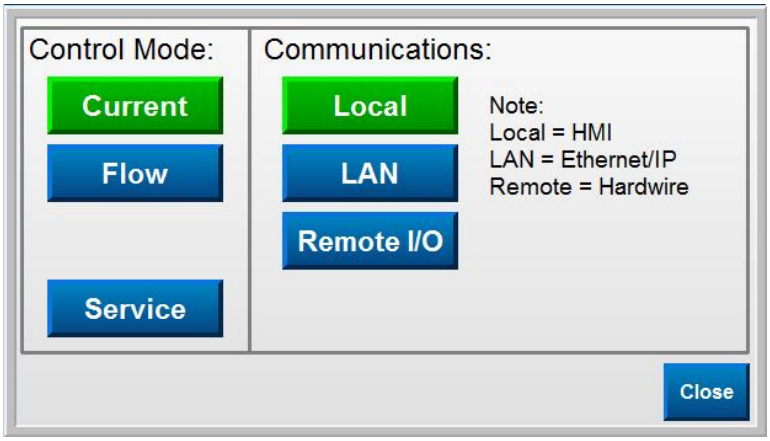


Fig. 68: "MODE State" screen

2. Select the operating mode.

List	Operating mode	Control criterion
1	*„Current control"*	Constant current draw
2	*„Volume flow control"*	Constant volume flow

3. Switch to the main screen with *„Close".*
4. The operating mode is displayed on the main screen.

7.4.3 Main screen displays

Operating status display

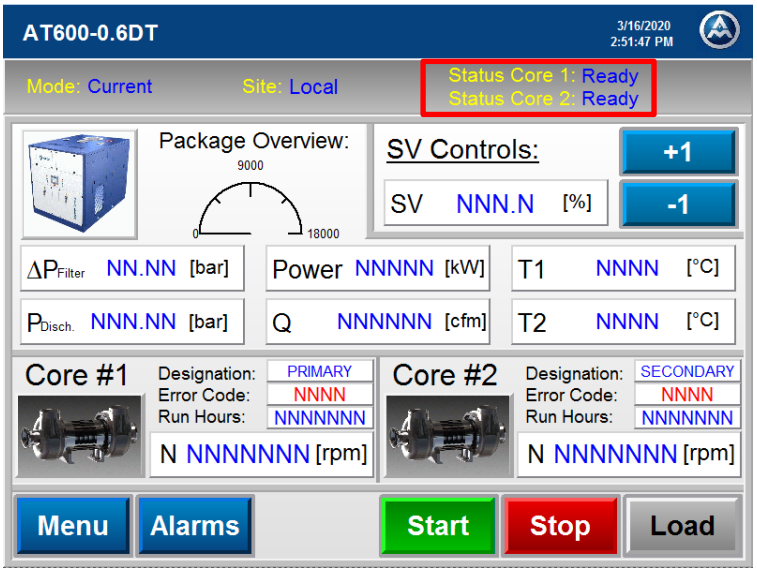


Fig. 69: "Status" screen

1. Depending on the machine's operating status, the following status messages may be shown:

Status message	Explanation
Wait	System preparing
Load	Load operation
Unload	Idle
Error	Error
Ready	Ready-to-operate

Time and date display

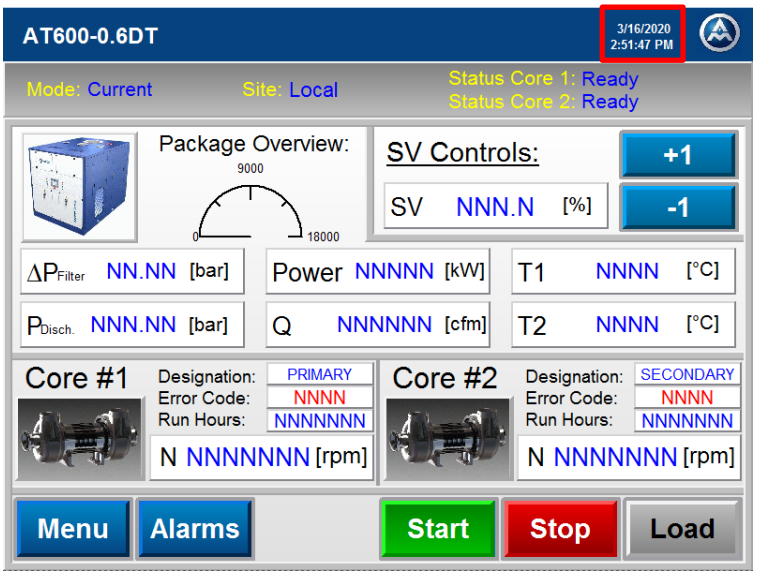


Fig. 70: "Time and date" screen

2. The time and the date are shown in the main screen (MM/DD/YYYY).

> *The date and time cannot be set via the display. Changes can only be made in the operating system by the manufacturer's customer service.*

7.4.4 Setting the set value

Setting the set value

For machine operation in load operation, a set value of > 0 is required.

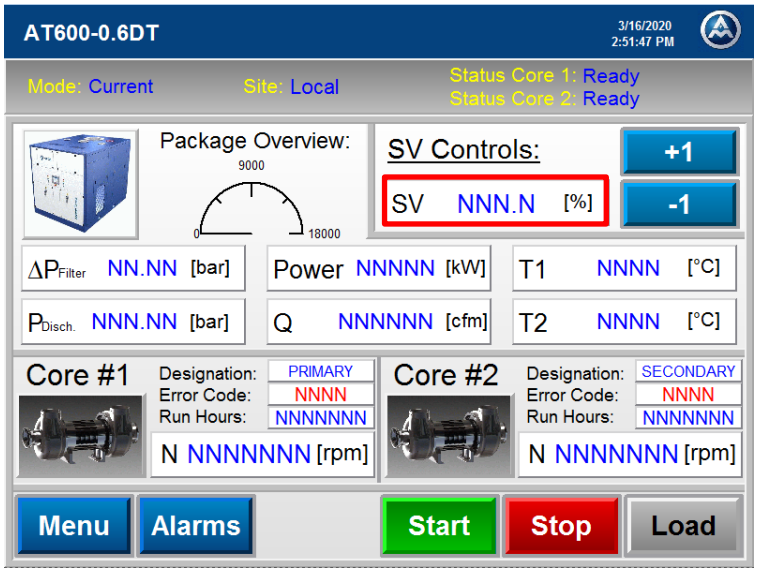


Fig. 71: "Set value in %" screen

1. Use the *„Set value"* button on the main screen to access the set value input.
   ⇨ The "Set value" screen is displayed.

Setting the set value

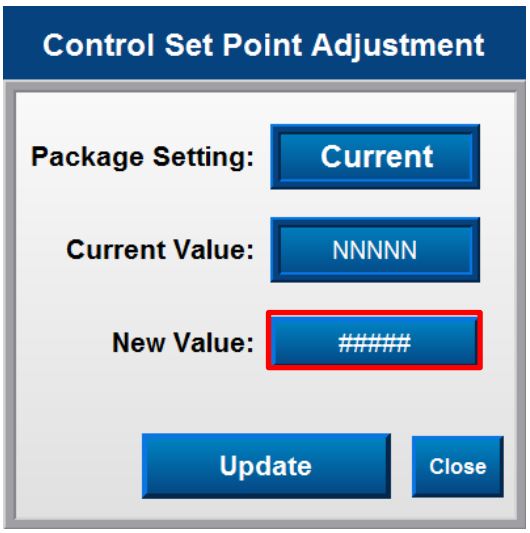


Fig. 72: "Set value" screen used to set the set value

2. Press the highlighted *„New"* button.

   ⇨ A numerical keypad is displayed.

3. Enter the required set value. Press *„Update"* to confirm and *„Close"* to complete the entry.

4. *Depending on the operating mode selected, the set value can be entered either as an absolute value or percentage up to the machine's maximum load capacity.*

   ⇨ The machine is operated with the current set value in the minimum or maximum operating range.

5. The *„Ready"* status is displayed. The machine can be started.

7.5 Service operating mode

7.5.1 Introduction

As a general rule, *„Service"* mode is to be used for the purposes of pending service/maintenance tasks on a connected acoustic hood to remove the turbo blower from the system connection to a superordinate process control system and local operating system in a way that is targeted, controlled and safe.

Thus, unauthorized access to the machine operating system by a third party or the process control system is prevented.

„Service“ mode is selected via the *„Mode“ button* on the main screen.

The authorized person is granted access to admin level login for *„Service“* mode by means of the password “xxxx”.

In *„Service“* mode the following machine functions are locked:

- Local operation of the LCD control panel (Unload, Load and Stop, in addition to the set value entry)
- Command communications from the remote control (Fieldbus) and remote control (I/O terminal block)

All status signals (actual statuses) of the turbo blower continue to be sent to the process control system and show the user of the customer’s control system the current status of the turbo blower; if necessary, the status signals can be processed further in the process control system.

NOTICE!

„Service“ should only be selected in consultation with the user of the customer’s control system. The machine should be shut down via the process control system (customer’s control system) or using the manual local operating controls. The machine should then be submitted to the service personnel for the purposes of maintenance and servicing work.

7.6 Starting the machine

Starting the machine

NOTICE!

Risk of machine damage from closed shut-off valves!

Make sure that the outlet valves in the pressure line are closed and that any shut-off valves are open.

Check whether there is an error message and, if necessary, rectify the error.

Customer-side control system

DANGER!
Risk of fatal injury if protective equipment is missing!

WARNING!
Risk of injury if the machine starts suddenly!

1. Manually activate the main circuit breakers on the machine on site:

   ⇨ Machine is ready for operation.

2. Before starting via the customer's control system:

   - Select the *„LAN“* or *„Remote I/O“* operating mode on the machine.
   - If the machine is in *„Service“* operating mode, it cannot be operated using the customer's control system.
     Select the desired operating mode.
   - Observe the machine's current operating status.
     ↳ *Chapter 7.4 „Selecting operating setup and operating mode“ on page 115*

3. Issue a start command (Start/Load) from the customer- side control system.

   ⇨ The machine is started remotely.

Starting idle operation

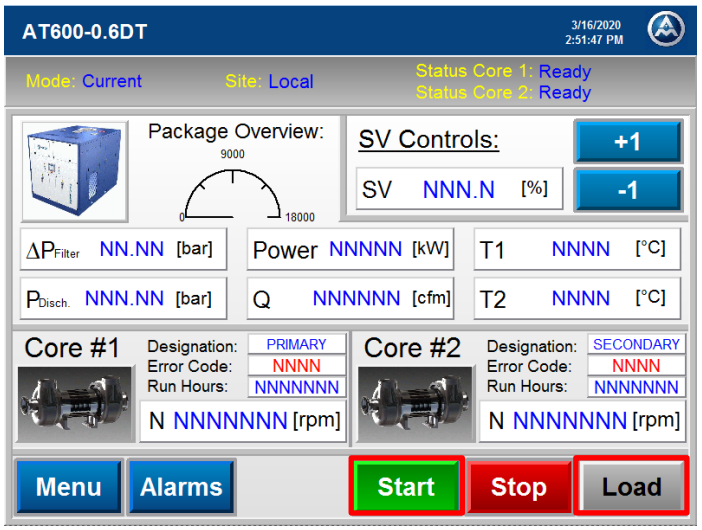


Fig. 73: Main screen

1. Switch the machine to idle operation by pressing *„Unload“*.

   ⇨ The machine powers up to idle speed. The start unloading device is open and ensures pressure equalization. Full idle speed is reached after approximately 1 minute.

   The machine is in idle operation as soon as the *[UNLOAD]* indicator light lights up. The LCD control panel displays the *„UNLOAD“* message in the *„Status“* display field.

2. Press the *„set value“* button to adjust the set value.

   Once idle speed has been reached, press the *„LOAD“* button to switch to load operation.

Starting load operation

   ⇨ The start unloading device closes and the conveying air flow is blown into the system via the pressure line. The machine powers up to the manually entered set value.

   The machine is in load operation as soon as the *[LOAD]* indicator light lights up. The LCD control panel displays the corresponding *„LOAD“* message in the *„Status“* display field.

> *The most important operating parameters can be read from the main screen at any time during „UNLOAD/LOAD“ operation.*

3. If necessary, fine-tune the set value using the graph display in order to optimize the operating point. ↳ *Chapter 7.9.1 „Displaying and adjusting the operating point“ on page 121*

7.7 Switching from load operation to idle operation

At times when the machine is not running in load mode, it should be switched to idle mode instead of being stopped entirely. This reduces strain on the machine components and ensures efficient re-engaging of load operation.

Switching from load operation to idle operation

1. Slowly reduce the current load mode set value to the minimum set value.

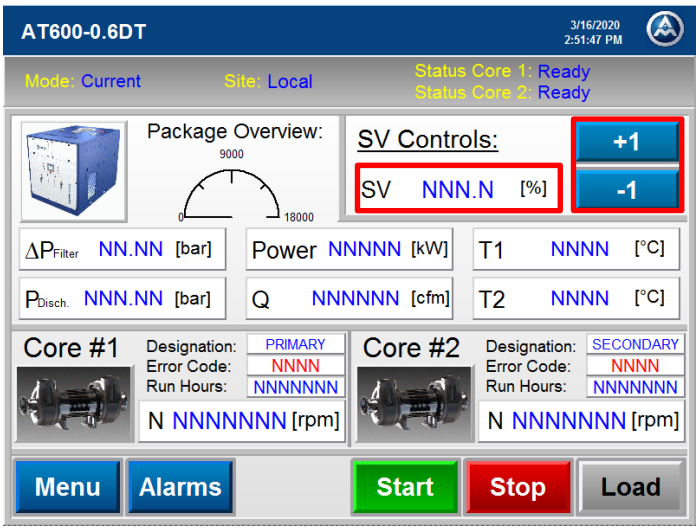


Fig. 74: Main screen

2. Switch the machine to idle operation by pressing *„UNLOAD“* .

   ⇨ The machine powers down to idle speed. Idle speed is reached after approximately 1 minute.

   The machine is in idle operation as soon as the *[UNLOAD]* indicator light lights up. The LCD control panel displays the *„UNLOAD“* message in the *„Status“* display field.

> *The machine remains in idle until it is either switched to load operation or stopped.*

7.8 Stopping the machine

Stopping the machine

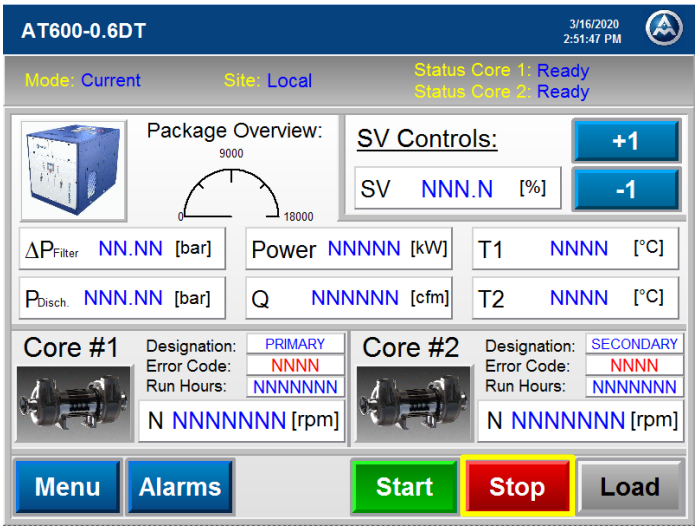


Fig. 75: Main screen

1.

NOTICE!

Increased wear through stopping the machine straight from load operation!

Switch from load operation to idle operation first. ↳ *Chapter 7.7 „Switching from load operation to idle operation“ on page 118*

2. Wait until the machine has reached idle operation.

3. The start unloading device opens and provides pressure equalization.

⇨ The *[UNLOAD]* indicator light lights up. The LCD control panel displays the *„Unload“* message in the *„Status“* display field.

Before the machine is stopped, you must observe a cooling down period in idle operation of at least 5 minutes!

4. Stop the machine by pressing *„Stop“*.

   ⇨ When the *[READY-TO-OPERATE]* indicator light lights up, the machine has stopped and is once more ready for operation. The LCD control panel displays the *„Ready“* message in the *„Status“* display field.

> *Before the machine can be restarted, the intermediate circuit voltage applied to the frequency converters needs to have dropped to approx. 70 V. The voltage drop can be monitored on the individual core overview screen under „DCLink“. This can take up to 5 minutes. During this time, the „Status“ display field shows the message „Wait“.*

Permissible starting frequency

The following two operating setups are designed to protect the machine and its electrical components, such as motors, frequency converters and IGBTs (insulated-gate bipolar transistors).

Operating setup LOAD/STOP

1. An automatic restart lock is parameterized in the control unit for the change from LOAD operating mode to STOP operating mode. The machine cannot be started during this restart lock.

   ⇨ During this time, the *„Status“* display field shows the message *„Unload“*.

2. If the machine is stopped, the intermediate circuit voltage applied to the frequency converters needs to have dropped to approx. 70 V before restarting is possible. During this time (up to 5 minutes) the machine is automatically locked and cannot be started.

   ⇨ During this time, the *„Status“* display field shows the message *„Wait“*.

3. Once the intermediate circuit voltage drops to approx. 70 V, the *„Status“* display field shows the message *„Ready“*.

   ⇨ The machine can now be restarted.

Operating mode LOAD/UNLOAD

If the machine is started from the operating mode LOAD/STOP more than 5 times a day, we recommend selecting the operating mode LOAD/UNLOAD. Here, the machine does not switch to operating mode STOP between cycles, in order to ensure non-wearing operation.

START/STOP cycles are recorded by the machine's internal control system. Cycles of more than 12 times a day are not covered by the warranty conditions. Only use higher restart frequencies and shorter run down times after consultation with the manufacturer.

7.9 Checking the operating parameters

Various operating parameters and events can be displayed in order to check operation.

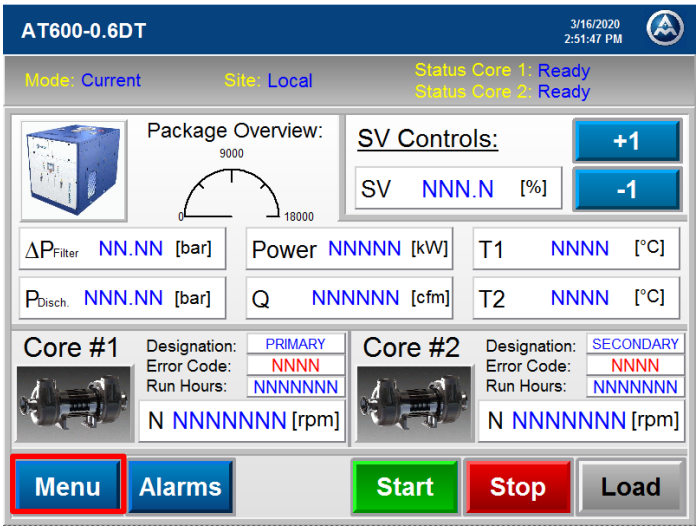


Fig. 76: Main screen

The *„Menu“* button opens the menu screen.

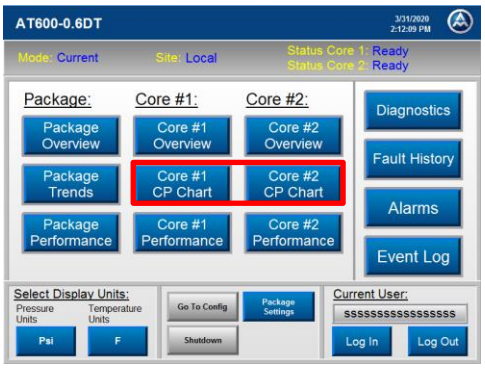


Fig. 77: Operating parameters sub-menu

7.9.1 Displaying and adjusting the operating point

The machine's operating point can be visualized in a graphic.

The display is designed to provide an overview and allow adjustment of the current operating point. The package has three performance maps available. Two are for the individual cores and the third is an overall package performance map.

To adjust the operating point, the machine must be running in load mode.

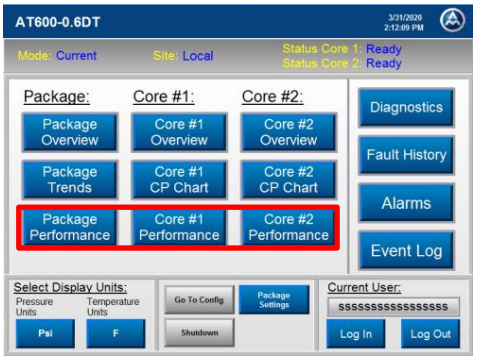


Fig. 78: Operating parameters submenu

1. Press *„Menu ► Core #X Performance“* to display the operating point of individual core.

⇨ The operating point is displayed in a pressure/volume flow diagram. The machine's current values for speed, pressure and volume flow are shown.

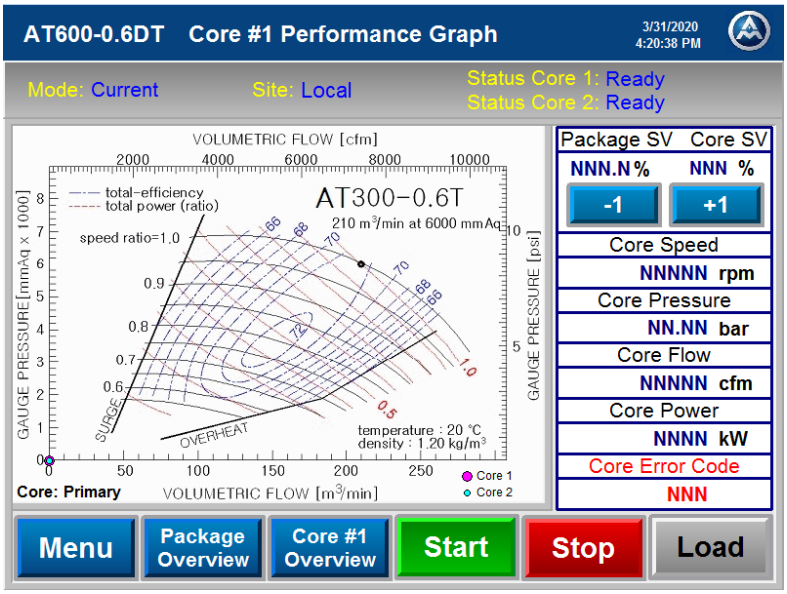


Fig. 79: "Characteristic diagram" screen for displaying the operating point of individual core

2.

NOTICE!

Observe the operating data!

Adjust the operating point as desired in the *„Set value“* display field using the *„+1“* and *„-1“* buttons.

3. Press *„Menu ► Package Performance“* to display the operating point of overall package.

   ⇨ The operating point is displayed in a pressure/volume flow diagram. The machine's current values for speed, pressure and volume flow are shown.

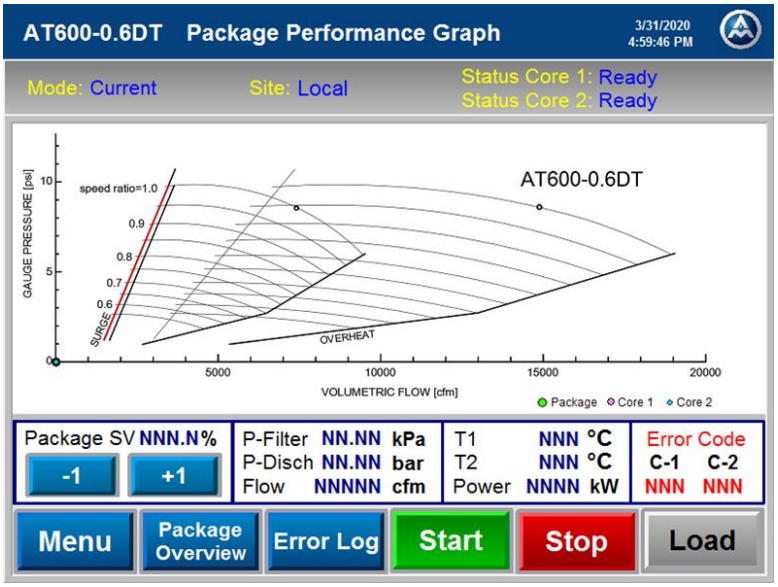


Fig. 80: "Characteristic diagram" screen for displaying the operating point of overall package

4. Switch back to the main screen using *„Package Overview“*.

7.9.2 Reviewing the event log

The event log records the time of occurrence of faults together with the most important operating values and the fault code (at the time). The list is used for fault recording and fault analysis in the event of or after a malfunction.

Displaying logged operating values

Fig. 81: Operating parameters menu

1. Press *„Menu ► Event Log“* to display the event log.

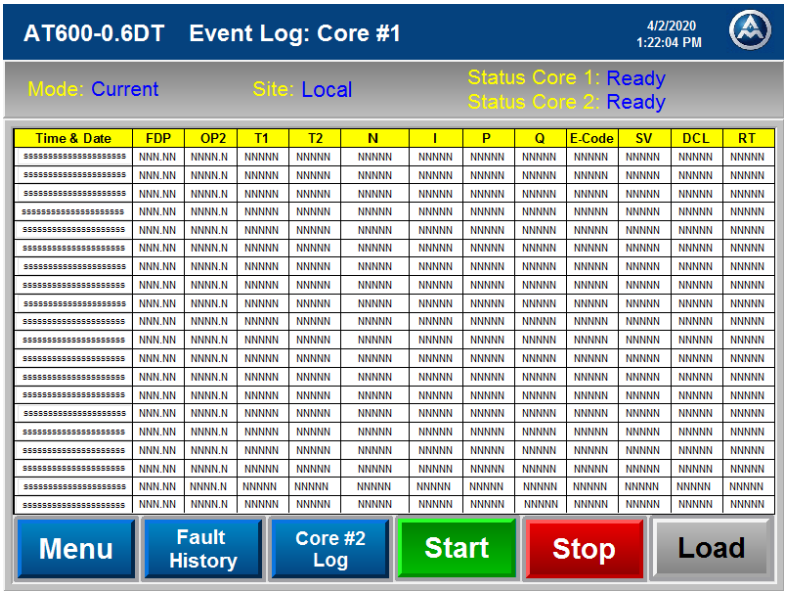


Fig. 82: “Event Log” screen for displaying the event log

7.9.3 Reviewing the trend display

The trend display allows certain operating parameters to be selected and their operating values to be displayed across a time period. In Menu screen and the individual core overview screens show buttons to access the tending display.

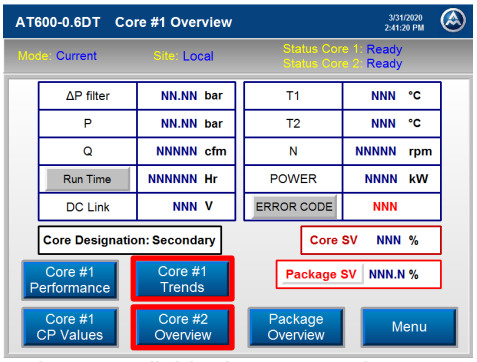


Fig. 83: Individual core overview screen

1. Press„*Menu* ► *Core #X Overview* ► *Core #X Trends*“ to call up the trend display of individual core.

   ⇨ This trend show trending data for all monitored values from the individually selected turbo core. A numerical value is shown below the trends with units listed to the right.

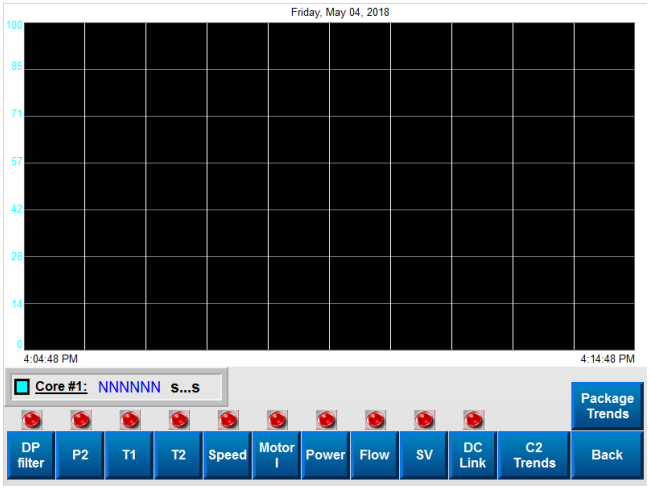


Fig. 84: Turbo core trending screen

2. Select the desired operating parameter for trend display using the buttons on the bottom (Fig. 84).

Tab. 3: Significance of the operating parameters

Designation	Explanation
DPfilter	Pressure differential at the intake filters
T1	Temperature of the air flow on the intake side
P2	Air flow's discharge pressure on the discharge side
T2	Temperature of the air flow on the discharge side
Flow	Volume flow
Speed	Machine speed
Motor I	Machine's input current
Power	Machine's power requirement
SV	Set value
DC Link	Main inverter DC-link voltage

⇨ The parameter selected is adopted for the trend display's Y-axis.

3. Press *„Menu ► Package Trends“* to call up the package trend display.

⇨ The trend display an overall package value with values from each core related to the package performance trend. A numerical value for the package and cores are shown below the trend graph with the corresponding units listed to the right of the values.

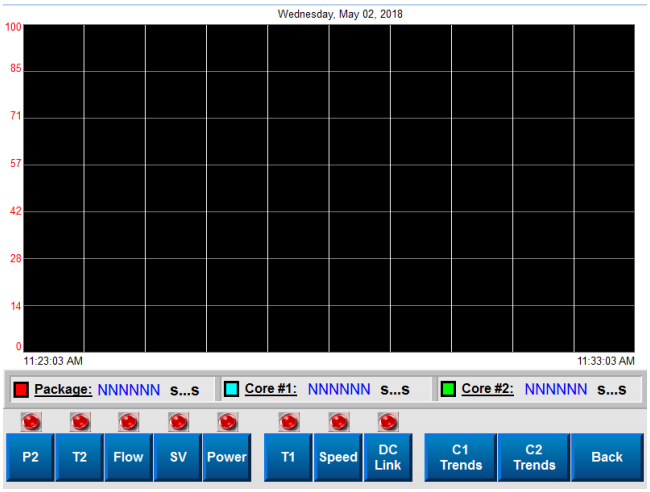


Fig. 85: Turbo package trending screen

4. Switch back to the main screen using *„Back“*.

7.9.4 Operating parameter and control parameter setup

Operating parameter setup

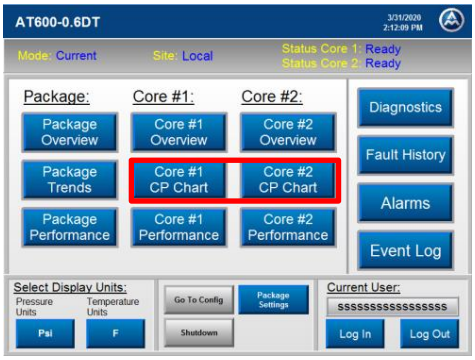


Fig. 86: Operating parameters menu

1. Press *„Menu ► Core #X CP Chart“.*
   ⇨ The control parameter screen is displayed

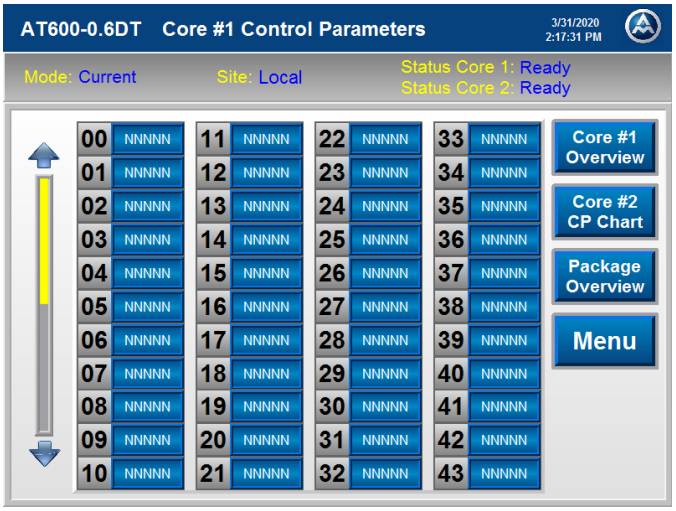


Fig. 87: CP chart screen for adjusting the operating parameters

2.

WARNING!

Changing the control parameters can result in serious damage to the machine.

They may be changed only with permission from AERZEN and/or by the manufacturer’s customer service.

3. Press the button for the parameter to be changed; the *„Control Parameter Change" screen is shown.*

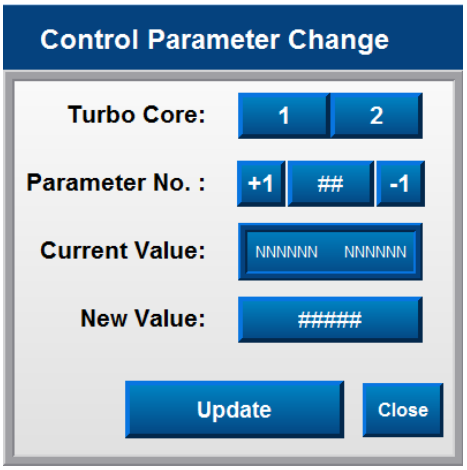


Fig. 88: Control parameter change screen

4. Enter the desired control parameter value and press *„Update"* to confirm entry.

5. Switch back to the menu screen using *„Close".*

7.10 Switching off the machine

Switching off the machine

WARNING!
Risk of injury from unbraked shut-down!

NOTICE!
Risk of machine damage from switching off improperly!

→ Switch from load operation to idle operation first. *Chapter 7.7 „Switching from load operation to idle operation“ on page 118*

Before the machine is stopped, you must observe a cooling down period in idle operation of at least 5 minutes!

LOCAL

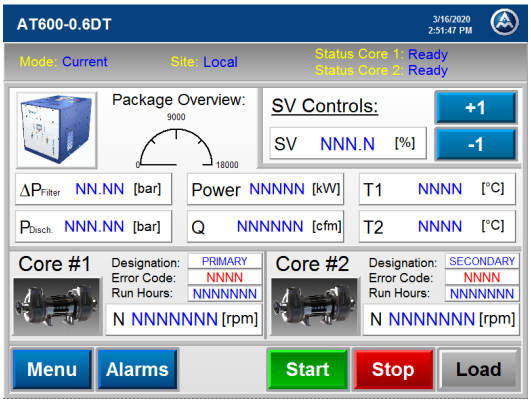


Fig. 89: Main screen

1. Stop the machine by pressing *„Stop“* .
2. Wait until the machine has stopped.
   ⇨ The *[READY-TO-OPERATE]* indicator light lights up. The LCD control panel displays the corresponding message in the *„Status“* display field.
3. Reduce the intermediate circuit voltage to <70 Vdc.
4. Set the *„Service“* operating mode *Chapter 7.5 „Service mode operating mode“ on page 114*.
   ⇨ This prevents unintentional operation after restarting.
5. Switch both the main circuit breakers on the incoming cabinet to position “0/OFF”.
   ⇨ The machine has been switched off.

Fig. 90: Main circuit breakers

Customer-side control system

WARNING!
Risk of injury from unbraked shut-down!

1. Issue a shut-down command from the customer control system.

   ⇨ The machine is switched off and powers down. The machine does not stop immediately.

2. Reduce intermediate circuit voltage to <70 VDC.

3. Further on-site operation of the machine on the LCD control panel:

   Set the *„Service“* operating mode.
   Chapter 7.5 „Service operating mode“ on page 114

   ⇨ This prevents unintentional operation after switching back on again.

4. Switch both the main circuit breakers on the incoming cabinet to position “0/OFF”.

   ⇨ The machine has been switched off.

Fig. 91: Main circuit breakers

7.11 Decommissioning

Decommissioning means the shut-down of a machine for a longer period.

Measures

1. Switch off the machine properly and secure it against an unintentional start. *Chapter 7.10 „Switching off the machine“ on page 129*
2. Lock the main circuit breaker and attach a padlock to it.
3. Ensuring that the machine is completely disconnected from the power source.
4. Disconnect the customer-side voltage supply.
5. Close the shut-off valves of the delivery lines.
6. Prevent condensate from entering the machine.

7.12 Measures for recommissioning

7.12.1 Commissioning after maintenance work

After maintenance Work stages *„Commissioning after maintenance“ on page 143*

7.12.2 Commissioning after fault rectification

After fault rectification Work stages *9.2.2 „Commissioning after malfunction rectification“ on page 151*

8 Maintenance

8.1 Safety instructions

Improperly performed maintenance work

WARNING!

Risk of injury from improperly performed maintenance work!

Improperly performed maintenance may lead to serious injury or material damage.

- Only perform maintenance work when the machine has been decommissioned.
- Secure against a restart.
- Allow the machine to cool down to the ambient temperature.
- Before beginning work, ensure that there is sufficient space for installation work.
- Check the tidiness and cleanliness of the work area.
- Only perform maintenance work with suitable tools.
- Ensure removed components are re-installed correctly.
- Re-install all fastening elements and observe the screw tightening torques.

NOTICE!

- Inform your head office of pending maintenance work on the machine!

Securing the machine against restarting

WARNING!

An unauthorized or unregulated restart can have fatal consequences.

An unauthorized or unregulated restart of the machine can lead to serious or fatal injuries. There may be people located in the hazard area.

- Before beginning work, switch off the energy supply and secure it against restarting.

Electric current

DANGER!

Risk of fatal injury from electric current!

Coming into contact with live components poses an immediate and potentially fatal risk of an electric shock. Even apparently harmless electrical components can carry high voltages.

Electronic components in the switch cabinet store electrical charges that are retained for some time even after deactivation of the power supply. The circuit breaker carries voltage even with the main circuit breaker set to off. Coming into contact with these components can lead to fatal injuries.

- Work on the electrical system should only be carried out by qualified electrical personnel.
- Prior to beginning work on live parts that do not require to carry voltage for testing, disconnect them from the building's power supply. Secure against restarting. After approx. 10 minutes waiting time, check that there is no live current.
- When working under power, avoid all contact with surrounding electrical components.
- Never use water or high-pressure jets for cleaning in the vicinity of the machine.

Requirements for personnel

The maintenance work described here may only be performed by the designated personnel. The personnel entrusted with the respective maintenance tasks are listed in the maintenance plan.

For the preparation of the maintenance plan, the following is necessary:

Personnel: ■ Service personnel

For cleaning after maintenance, the following is necessary:

Personnel: ■ User

Commissioning after maintenance work requires:

Personnel: ■ Service personnel
■ Authorized person

Personal protective equipment

The following is necessary for maintenance:

Protective equipment:
- Protective work clothing
- Safety shoes
- Protective gloves
- Safety goggles
- Industrial hard hat

Special-purpose tools

The following is necessary for maintenance:

Special tool:
- General tool kit
- Auxiliary materials, aids
- Locking key

8.2 Maintenance schedule

The following table lists the maintenance intervals that must be observed for optimal and fault-free operation of the machine.

If regular inspections reveal an increased level of wear, reduce the maintenance intervals in accordance with the signs of wear and tear. If you have any questions regarding inspection, consult AERZEN USA.

Interval	Maintenance work	Personnel
Monthly	Check filters for contamination (*8.4 „Maintenance work“ on page 136*): ■ Prefilter ■ Intake filter	User
Every 6 months	Change the filter (*8.4 „Maintenance work“ on page 136*): ■ Prefilter ■ Intake filter	User / Service personnel
Once a year	Clean the intake and exhaust air covers and exhaust outlets (*8.4 „Maintenance work“ on page 136*): ■ VFD room’s inlet louver ■ Intake opening’s inlet louver ■ VFD room’s ventilation opening ■ Start unloading device (BOV) exhaust air opening ■ Cooling system’s exhaust air opening	User / Service personnel

8.3 Inspection plan

In addition to the maintenance work to be performed by the operator, the machine must be regularly inspected by AERZEN USA.

The following table lists the inspection intervals that must be observed to ensure optimal and fault-free operation.

Interval	Maintenance work	Personnel
	Manufacturer's recommendation	
Once a year	Interim inspection: ■ Visual inspection and measurement of the conveying system's frequency converter ■ Visual inspection and measurement of the cooling air system frequency converter ■ Measurement of various electrical components ■ Measurement of the conveying system motor ■ Measurement of the cooling air system motor ■ Control unit function test ■ Function test of controls and displays ■ Visual inspection of cooling air flows for leaks ■ Safety devices function test	Manufacturer's customer service division
	Mandatory, as per applicable standards and guidelines	
Every 4 to 5 years	Main inspection: ■ Check the components of the conveying system's frequency converter for wear and replace if necessary ■ Check the cooling air system frequency converter's components for wear and replace if necessary ■ Check the control unit's components for wear and replace if necessary ■ Check and repair the conveying system's motor ■ Check and repair the cooling air system's motor	Manufacturer's customer service division
every 10 years	Servicing: ■ Replace worn components of the conveying system's frequency converter ■ Replace the cooling air system frequency converter's worn components ■ Replace the control unit's worn components	Manufacturer's customer service division

8.4 Maintenance work

8.4.1 Preparing the maintenance work

Preparation

1. Cross-check maintenance work with the responsible staff at the location.
2. Switch off the machine. *Chapter 7.10 „Switching off the machine“ on page 129*
3. Secure the main circuit breaker against restarting.

8.4.2 Checking and changing intake and compact filters

Preparatory work

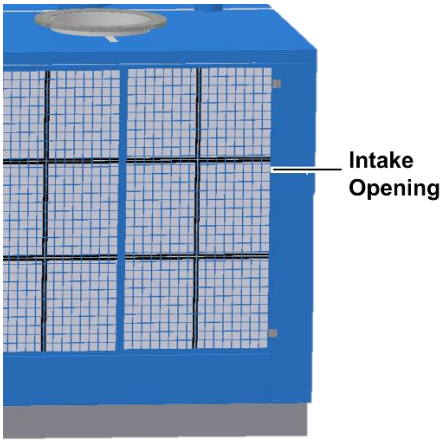


Fig. 92: Inlet louver and cassettes

The following describes how to check and change the intake filter installed in the machine. If an external intake filter in the intake piping is used, this filter must be changed instead.

1. Open the inlet filter doors
2. Give the outside a rough clean.

Checking the intake filter

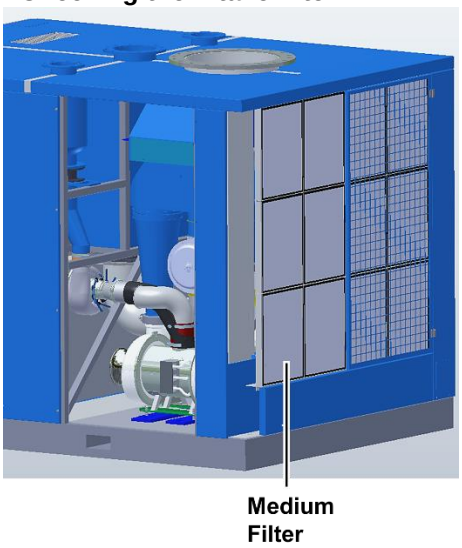


Fig. 93: Checking and changing the intake filter

3. Check the intake filter for heavy contamination and deposits.

   ⇨ Change if heavily contaminated.

Changing the intake filter

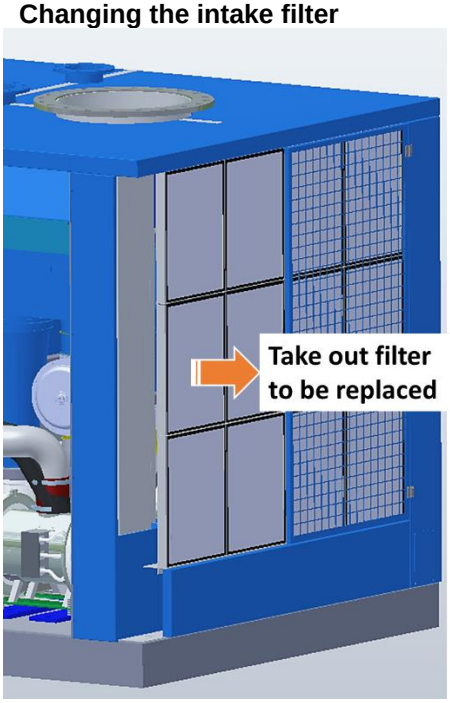


Fig. 94: Intake filter fasteners (top and bottom)

4. Remove the contaminated intake filter from the three-part support frame.

   Take care to prevent any coarse dirt from falling off the filter and into the machine!

5. Dispose of the old intake filter.
6. Give the opening a rough clean.
7. Insert the new intake filter into the support frame so that it fits correctly and fix it in place.
8. Close the inlet filter doors.

8.4.3 Checking and changing compact filter elements

Preparatory work

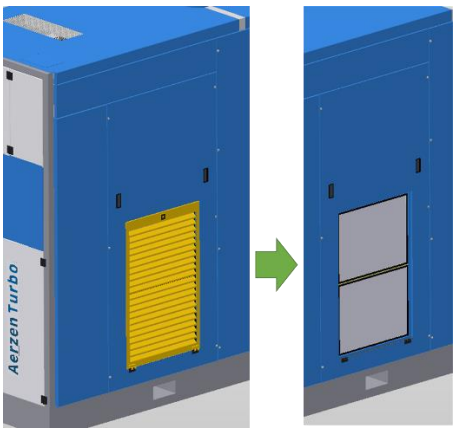


Fig. 95: Inlet louver (door)

1. Open the VFD room's inlet louver (door).

   ☞ The compact filter elements are now accessible.

2. Give the outside a rough clean.

Checking the compact filter elements

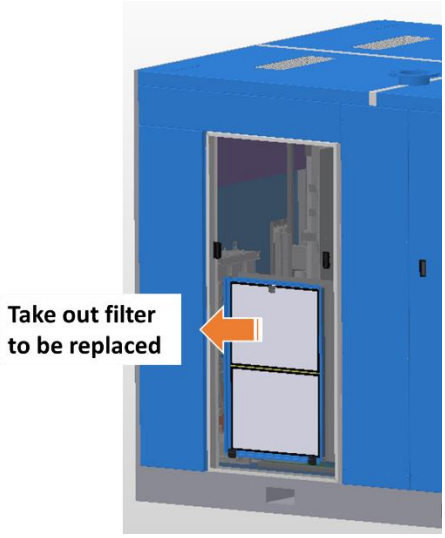


Fig. 96: Compact filter elements

3. Check the medium filter element for heavy contamination and deposits.

   ⇨ Change if heavily contaminated. (Both cores)

4. Give the outside a rough clean.

Changing compact filter elements

5. Remove medium filter element and dispose of it.
6. Remove the upper compact filter element and dispose of it.
7. Insert new medium filter element.
8. the VFD room's inlet louver (door).

Cleaning after completion Commissioning after completion

9. Clean the the workspace once the work has been completed. (↳ *Chapter 8.4.6 „Cleaning after maintenance“ on page 142*)
10. Perform the post-maintenance work stages for commissioning. (↳ *Chapter 8.4.7 „Commissioning after maintenance“ on page 143)*

    ☞ Machine is ready for operation.

11. Start the machine. (↳ *Chapter 7.3 „Switching on the machine“ on page 106*)

8.4.4 Clean the intake and exhaust air covers and exhaust air openings

Intake opening

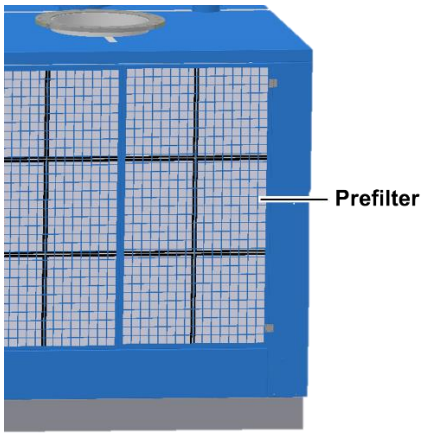


Fig. 97: Inlet louver

1. Clean the inlet filter door's prefilter.

VFD room's inlet louver (door).

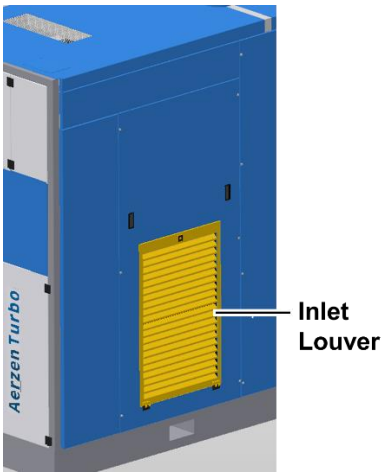


Fig. 98: Inlet louver (door)

2. Clean both VFD rooms' inlet louver (door).

Exhaust air openings

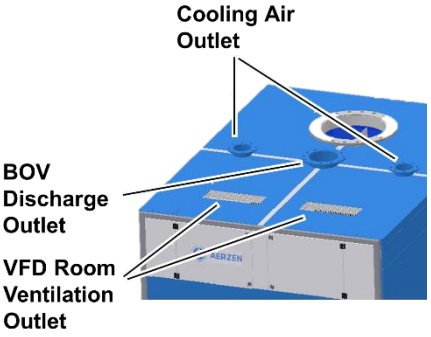


Fig. 99: Rear cover (door)

3. Clean the area of the start unloading device's (BOV) exhaust air opening – only if it's not piped.
4. Clean the area of the cooling air system's exhaust air opening – only if it's not piped.
5. Clean the area of the VFD room ventilation air opening

Cleaning after completion Commissioning after completion

6. Clean the workspace once the work has been completed. (*Chapter 8.4.6 „Cleaning after maintenance" on page 142*)
7. Perform the post-maintenance work stages for commissioning. (*Chapter 8.4.7 „Commissioning after maintenance" on page 143*)

   ⇨ Machine is ready for operation.
8. Start the machine. (*Chapter 7.3 „Switching on the machine" on page 106*)

8.4.5 Check whether the EMERGENCY STOP button is working

The EMERGENCY STOP button must be regularly checked for correct operation in order to guarantee safety.

Checking functionality

NOTICE!
The functional check of the EMERGENCY STOP button should be performed only in idle operation or STOP mode.

1. Trigger the EMERGENCY STOP function.

   ⇨ The circuit breaker is tripped. The machine is disconnected from the power supply
2. Unlock the EMERGENCY STOP.
3. Switch on the main circuit breaker.

   ⇨ Machine enters standby.

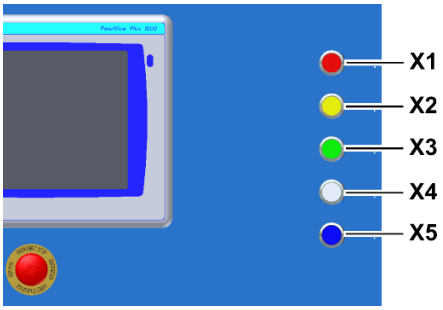


Fig. 100: Display after triggering

NOTICE!
The EMERGENCY STOP pushbutton disconnects both cores from the power supply

4. The *[ERROR]* indicator light (X1) and the *[RESET]* illuminated pushbutton (X2) must light up on both indicator light sets.

> *If not, the EMERGENCY STOP button must be checked. The machine cannot be started as long as the EMERGENCY STOP function is not present.*

5. Enable the safety switchgear to start the machine.
   Press the *[RESET]* illuminated button (X2) of each core.
   ⇨ The LED goes out.

Commissioning after completion

6. Acknowledge the error messages on the display with the *„STOP“* button.
7. Start the machine.
   ⇨ Press UNLOAD or LOAD.
8. Document the check and its result in a log.
9. Perform the post-maintenance work stages for commissioning. (*Chapter 8.4.7 „Commissioning after maintenance“ on page 143*)
   ⇨ Machine is ready for operation.
10. Start the machine. (*7.3 „Switching on the machine“ on page 106*)

8.4.6 Cleaning after maintenance

Cleaning after maintenance work

1. **NOTICE!**
   Risk of damage! Do not used high pressure cleaners, steam jet pumps, grease removal agents, thinners, compressed air etc. as cleaning methods.
2. Dust and dirt must be cleaned with suitable cloths.
3. Clean components susceptible to scratches, such as display units like the LCD control panel, with a soft, damp cloth.
4. Remove all cleaning agents from the immediate vicinity of the machine before commissioning.
5. Dispose of cloths in an environmentally-friendly way.

8.4.7 Commissioning after maintenance

Commissioning after maintenance

1. Ensure that all safety and protective equipment is installed and operational.
2. Remove all used tools, materials and other equipment from the workspace.
3. Clean the workspace. Remove processing materials and similar materials and dispose of them in the proper way.
4. Inform the responsible on-site person about the result of the fault that occurred and coordinate commissioning.
5. Ensure that there are no persons in the hazard area.
6. Release the safety on the main circuit breakers and activate it.

8.4.8 Checks after maintenance work

Inspection	After the first 3 op. hrs
Fastenings, threaded connections	Check for secure fit and, if necessary, refasten or retighten
Protective covers	Check for correct fit and secure fastening
Parameter settings	check, if necessary correct
op. hrs = operating hours	

9 Malfunctions

The following chapters describe possible causes of faults and steps to be taken to rectify them.

If faults occur frequently, reduce the maintenance intervals to match the actual loads. Consult the manufacturer.

If faults cannot be rectified using the following instructions, contact the manufacturer.

9.1 Safety instructions

Improper fault rectification

WARNING!

Risk of injury due to improper operation fault rectification!

Improper fault rectification may lead to serious injury or material damage.

- Only rectify faults after decommissioning the machine.
- Secure the machine against restarting.
- Allow the machine to cool down to the ambient temperature.
- Before beginning work, ensure that there is sufficient space for installation work.
- Check the tidiness and cleanliness of the work-space.
- Only attempt to rectify faults with suitable tools.
- Ensure removed components are re-installed correctly.
- Re-install all fastening elements and observe the screw tightening torques.
- Before restarting, check that:
  - All safety and protective equipment is installed and functioning correctly.
  - There are no persons in the hazard area.

Electric current

DANGER!

Risk of fatal injury from electric current!

Coming into contact with live components poses an immediate and potentially fatal risk of an electric shock! Even apparently harmless electrical components can carry high voltages.

Electronic components in the incoming cabinet and the VFD rooms store electrical charges that are retained for some time even after deactivation of the power supply.
Coming into contact with these components can lead to fatal injuries.

– Work on the electrical system should only be carried out by qualified electrical personnel.

Securing the machine against restarting

WARNING!

An unauthorized or unregulated restart can have fatal consequences.

An unauthorized or unregulated restart of the machine can lead to serious or fatal injuries. There may be people located in the hazard area.

– Before beginning work, switch off the energy supply and secure it against restarting.

Requirements for personnel

The fault rectification work described here may only be performed by the designated personnel. The personnel entrusted with the respective fault rectification tasks are listed in the table of fault descriptions in addition to their designated tasks.

Conduct in the event of malfunctions and for preparations for fault rectification work:

Personnel:
- Authorized electricians
- Service personnel
- Authorized person

For commissioning after rectification of a malfunction, the following is necessary:

Personnel:
- Service personnel
- Authorized person

Personal protective equipment

The following is necessary for fault rectification work:

Protective equipment:
- Protective work clothing
- Protective gloves
- Safety shoes

Special-purpose tools

For fault rectification work the following is necessary:

Special tool:
- General tool kit
- Tools for authorized electricians
- General measurement tools and equipment
- Locking key

Behavior in the event of faults

1. 

DANGER!
Risk of injury during fault rectification!

There is a distinction between:
- An error message:
  The machine is automatically brought to a standstill.
- And an alarm message:
  Stop the machine via a display command.

2. Switch off the main circuit breaker(s) and secure it against restarting.
3. Immediately inform the responsible staff on location about the fault.
4. 

DANGER!
Risk of fatal injury from electric current!

5. Ensure there is no live electricity (inputs and outputs).
6. 

The following faults table provides information on fault diagnosis, fault rectification and personnel requirements.

9.2 Fault displays

The following equipment indicates malfunctions:

LCD control panel

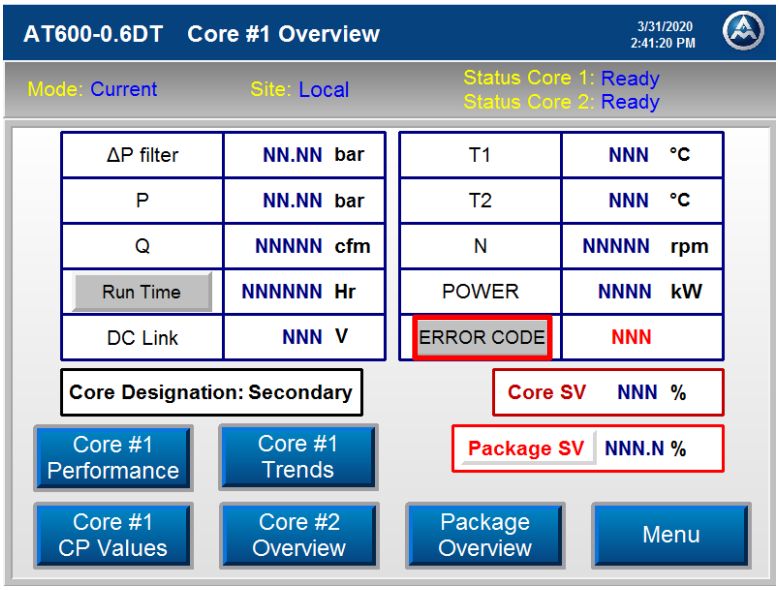


Fig. 101: Individual core overview on the LCD control panel

In the event of a fault, the LCD control panel displays a fault code in the main screen's and individual core overview's *„ERROR CODE"* display field.

A distinction is made between faults that cause an immediate machine standstill and alarm messages that describe an unusual operating status which may lead to a malfunction if not remedied.

The fault codes can be cross-referenced with the table to facilitate fault rectification.

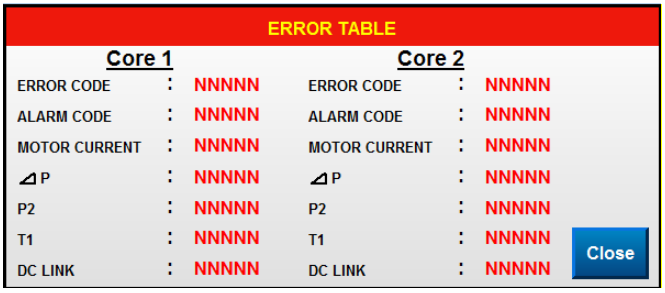


Fig. 102: List of error-related information

Pressing the *„ERROR CODE"* button displays a list of error-related operating values.

Tab. 6: The following information is displayed:

Designation	Explanation
„ERROR CODE“	Shows the malfunction’s error code.
„ALARM CODE“	Shows the alarm’s fault code.
„MOTOR CURRENT“	Shows the current measured at the motor conveying flow assembly at the time the fault occurs.
„ΔP“	Shows the pressure differential measured at the intake filters at the time of fault occurrence.
„P2“	Shows the discharge pressure applied to the pressure line at the time of fault occurrence.
„T1“	Shows the intake temperature measured at the time of fault occurrence.
„DC LINK“	Shows the intermediate circuit voltage measured on the conveying flow frequency converter at the time of fault occurrence.

Process control system

If the machine is connected to a process control system, the following fault data is transmitted and displayed in the process control system:

- Connection via I/O terminal block:
  Alarm and fault status (active/inactive)
- Connection via fieldbus: Fault status
  and fault code

Each fault status includes one collective signal for the pending faults. Determine the exact cause of the fault on the LCD control panel!

For an exact description of the indicated malfunction in the process control system, see the documentation of the process control system of the system in which the machine is integrated.

Indicator light

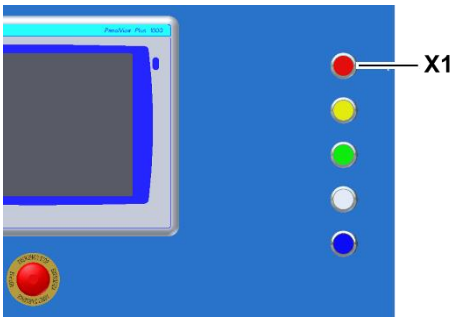


Fig. 103: Fault indicator light, fault display

The *[ERROR]* indicator light (X1) lights up to indicate a fault. The precise fault code can be read from the LCD control panel.

While the fault display remains lit, the machine cannot be started.

[ERROR] indicator light of two indicator light sets is lit up on either of two cores or both cores to indicate faulty core(s).

9.2.1 Fault diagnosis and troubleshooting

Improper handling

NOTICE!

Damage to the machine from improper handling!

A fault that causes the machine to stop may indicate a serious problem. If the fault is handled improperly, the machine may suffer damage.

– Prior to restarting the machine, contact AERZEN USA customer service and describe the fault code. *Chapter 1.4 „Addresses“ on page 10*

The following fault table lists the fault codes shown in the LCD control panel (HMI) together with notes on testing and maintenance tasks.

Any faults not listed here may be resolved by AERZEN customer service only. *Chapter 1.4 „Addresses“ on page 10*

No.	Fault description	Cause	Remedy	Personnel
101	Intake filter blocked (ΔP1 > control parameter value)	Intake filter clogged	Clean/change the intake filter	Service personnel / Authorized person
102	Discharge temperature T2 high (T2 > 140 °C)	Unusual operating status	Check operating status and restore proper operation if necessary	Authorized person

No.	Fault description	Cause	Remedy	Personnel
102	Discharge temperature T2 high (T2 > 140 °C)	Display value incorrect	Check the controller settings on the I/O board and adjust if necessary	Manufacturer's customer service division
103	Intake temperature T1 high (T1 > 40 °C)	Unusual operating status	Check ambient temperature and restore proper operation if necessary	Authorized person
		Display value incorrect	Check the controller settings on the I/O board and adjust if necessary	Manufacturer's customer service division
104	Discharge pressure P2 high (P2 > CP value*0.98)	Unusual operating status	Check the connected system's operating status and restore proper operation if necessary	Authorized person
105	High speed (speed > CP value*0.98)	Unusual operating status	Check operating status and restore proper operation if necessary	Service personnel
		Problem in the pressure line	Check pressure line and rectify any problems	Authorized person
106	Pressure increase (flow rate < flow rate increase + CP)	Unusual operating status	Check operating status and restore proper operation if necessary	Authorized person
		Set value (SV) too low	Increase the set value	Service personnel
201	Intake filter blocked (ΔP at filter > control parameter value)	Intake filter clogged	Clean/change the intake filter	Service personnel
202	Limit P2 (High) (P2 > control parameter value)	Unusual operating status	Check operating status and restore proper operation if necessary	Service personnel
		Problem in the pressure line	Check pressure line and rectify any problems	Authorized person
207	Overspeed (speed > control parameter value)	Problem in the pressure line	Check pressure line and rectify any problems	Authorized person
222	Intake temperature T1 too high (temperature > control parameter value)	T1 > set CP value	Check ambient temperature and adjust if necessary	Authorized person
224	Substantial pressure increase	Pump limit reached	Check all relevant system values and identify irregularities	Authorized person
		Set value (SV) too low	Increase the set value	Service personnel
225	Substantial pressure increase noted	Unstable operation in pump area	Check all relevant system values and identify irregularities	Authorized person

No.	Fault description	Cause	Remedy	Personnel
229	Phase failure	Phase loss or undervoltage	Check power supply and adjust if necessary	Authorized person / Authorized electricians
236	EMERGENCY STOP triggered	Intentional triggering	Eliminate reason for EMERGENCY STOP and reset EMERGENCY STOP	Service personnel
	Communication error core #X	Internal communication break	Check communication converter	Service personnel
	UPS battery fault	Bad battery	Check UPS battery	Service personnel / Authorized person
	UPS power lost	Incoming power failure	Check customer power system	Authorized person / Authorized electricians
	Package discharge pressure high warning	Unusual operating status	Check the connected system's operating status and restore proper operation if necessary	Authorized person
	Package discharge temperature high warning	Display value incorrect	Check the temperature sensor	Service personnel
	Package discharge pressure high fault	Unusual operating status / Problem in the pressure line	Check operating status and restore proper operation if necessary Check pressure line and rectify any problems	Service personnel / Authorized person
	Package discharge temperature high fault	Unusual operating status	Check operating status and restore proper operation if necessary	Service personnel / Authorized person
	Core #X power loss	Core power source down	Check power supply	Service personnel / Authorized person

9.2.2 Commissioning after malfunction rectification

Commissioning after fault rectification

1. Ensure that all safety and protective equipment is installed and operational.
2. Remove all used tools, materials and other equipment from the workspace.

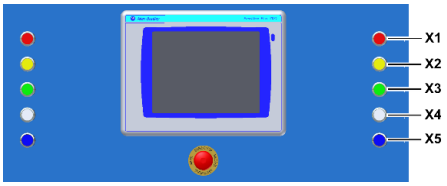


Fig. 104: Commissioning after fault rectification

3. Clean the workspace. Remove processing materials and similar materials and dispose of them in the proper way.
4. Inform the responsible on-site person about the result of the fault that occurred and coordinate commissioning.
5. Ensure that there are no persons in the hazard area.
6. Release the EMERGENCY STOP function by pulling out the EMERGENCY STOP button.
7. Release the main circuit breaker(s) and activate it.
8. To acknowledge the malfunction, press the *[RESET]* (X3) illuminated pushbutton for internal machine clearance.
9. Acknowledge the error messages shown on the LCD control panel (HMI) with the *„STOP“* button.

   ⇨ The *[MALFUNCTION]* indicator light (X1) must go out and the *[READY-TO-OPERATE]* indicator light (X2) light up
10. *While the fault display remains lit, the machine cannot be started. The fault has not been successfully rectified!*
11. Continue operation.

9.3 Checks after fault rectification

Inspection	After the first 3 op. hrs
Fault code	Checking list of fault codes
op. hrs = operating hours	

10 Disassembly and disposal

Protecting the environment and preserving resources are among the manufacturer's foremost priorities.

Once the machine's service life is over, it must be disassembled and disposed of in an environmentally-friendly way. The following is a set of recommendations for environmentally-friendly disposal.

10.1 Safety instructions

Improper disassembly

WARNING!

Risk of injury from improper disassembly!

Stored residual energy, sharp components, edges and corners on or in the machine or on the necessary tools can cause injury.

- Before beginning work, ensure there is sufficient space.
  Allow the machine to cool down to the ambient temperature.
- Proceed with caution when working with open, sharp-edged components.
- Ensure the tidiness and cleanliness of the workspace! Components and tools that are loosely stacked or lying around can cause accidents.
- Disassemble components correctly. Take into consideration the weight of each component. If necessary, use hoists.
- Secure components, so they do not topple or fall.
- If in doubt, contact the manufacturer.

Electrical system

DANGER!

Risk of fatal injury from electric current!

There is a risk of fatal injury from touching live components. The circuit breakers in the incoming cabinet carries voltage even with the main circuit breakers set to off.

Before beginning disassembly:

- Switch off the building-side power supply.
- Secure against reactivation.
- Ensure there is no live current.

Disassembling the delivery line

WARNING!

Risk of injury from compressed conveyed materials!

For the disassembly of pressurized components such as pipes, containers, hoses or valves, hot conveying material escapes with a strong gas flow. This can result in serious injury.

– Before beginning work, fully relieve pressurized components of pressure.
– Check that components are not pressurized.
– Only disassemble pressurized components when they are not under pressure.

Requirements for personnel

Requirements for disassembly:

Disassembly of electrical components

Personnel:
- Authorized electricians

Requirements for disassembly:

Disassembly of the mechanical components

Personnel:
- Service personnel

Personal protective equipment

Requirements for disassembly:

Protective equipment:
- Protective work clothing
- Safety shoes
- Hearing protection
- Protective gloves
- Safety goggles
- Industrial hard hat

Special-purpose tools

Requirements for disassembly:

Special tool:
- General tool kit
- Tools for authorized electricians
- Lifting equipment
- Transport equipment

10.2 Disassembly

Preparation and execution:

1. Immediately inform the responsible staff on location about the disassembly.
2. Switch off the machine and secure it against restarting.

3. **DANGER!**
Risk of fatal injury from electric current!

Switch off the building-side power supply and secure it against reactivation.(Lock out tag out)

4. Discharge stored residual energies.
5. If necessary, disconnect the machine control system from a connected process control system.
6. Disconnect the phase lines from the circuit breakers and the ground conductor from the ground connection.
7. Seal off the pressure delivery line and remove it.
8. Disassemble any intake piping, heat transfer pipes on the cooling air system and the pressure relief piping.
9. Remove operating and auxiliary materials and residual processing materials and dispose of them in an environmentally-friendly way.
10. In addition, clean assemblies and components thoroughly. Dismantle them in accordance with local regulations for occupational safety and environmental protection.
11. Remove the machine's foundation bolts.
12. During disassembly, there should be a general sorting of parts in accordance with disposal categories. *„Categories for sorting“ on page 156*

10.3 Disposal

The machine is composed primarily of steel, cast materials and various non-ferrous metals. In general, metallic materials are considered fully recyclable.

Proper disposal

In as far as no agreement has been made on the return or disposal of the machine, send dismantled components for recycling:

- Scrap metals.
- Send plastics for recycling.
- Sort and dispose of other components according to material composition.

Improper disposal

ENVIRONMENT!

Environmental risk from improper disposal!

Improper disposal can present a risk to the environment.

– Have insulating material, electronic waste, electronic components, auxiliary materials and chemicals disposed of by a professional waste disposal company.
– If in doubt, contact the local authorities or specialist companies for information on environmentally-friendly waste disposal.

Requirements for personnel

Disposal requirements:

Personnel:
- Skilled staff for industrial waste

Protective equipment

Disposal requirements:

Protective equipment:
- Protective work clothing
- Safety shoes
- Hearing protection
- Protective gloves
- Safety goggles
- Industrial hard hat

Special tools

Disposal requirements:

Special tool:
- Lifting equipment

Categories for sorting

Scrap iron	Non-ferrous metal (except for scrap iron)	Insulation material	Electronic waste (encoder electronics)	Auxiliary materials and chemicals
Scrap ■ Scrap steel ■ Foundry scrap ■ Scrap from non-rusting steels ■ Stainless steel scrap	Aluminium	Various isolators (in terminal boxes)	Electrical tools	
Used metal / 2A materials ■ Steel beams ■ Steel sheets	Copper	Voltage and current transformers	Measurement, control and regulatory systems	Cleaning agents and solvents

Scrap iron	Non-ferrous metal (except for scrap iron)	Insulation material	Electronic waste (encoder electronics)	Auxiliary materials and chemicals
Machines made of metal ■ Without electronics	Brass	Electric cables and leads		Paint residue
	Motor windings	Instrument wiring		Anti-corrosion agents
		Surge absorbers		Cloths (soaked in agents or chemicals)
		Heat insulation materials		
This does not include: ■ Hazardous adhesions ■ Sealed hollow parts (due to danger of deflagration or hazardous contents)	Valve disposal ■ Remove the medium before disposal! Neutralize residual medium in the valves.		This does not include: ■ PCB capacitors	■ Solvents, cleaning agents and paint residue must not be allowed to mix! ■ Agents and chemicals must be collected in separate, labelled containers.

Disposal of accessories

Motor

- For safety reasons, disposal may only be carried out by specialists for industrial waste or by return to the manufacturer!
- The encoder electronics are electronic waste.

Frequency inverter

DANGER!
Danger due to explosion of the capacitor and the formation of toxic gases!

- For safety reasons, disposal may only be carried out by specialists for industrial waste or by return to the manufacturer!
- The encoder electronics are electronic waste.

11 Technical specifications

11.1 Dimensions and weights

General information

The following dimensions and weights relate to standard variants and can vary depending on the specific design.

Exact details can be found on the installation drawing.

Information on weight can be found on the packing note and the designation on the type plate.

Dimensions, including packaging, are included in the forwarding order.

Machine

Size	Symbol (Unit)	AT600-0.6DT	AT600-0.8DT	AT600-1.0DT	AT800-0.8DT	AT800-1.0DT
Machine length	l [ft]	10’-9”	10’-9”	10’-9”	10’-9”	10’-9”
Machine width	w [ft]	7’-11”	7’-11”	7’-11”	7’-11”	7’-11”
Machine height	h [ft]	8’-7-1/4”	8’-7-1/4”	8’-7-1/4”	8’-7-1/4”	8’-7-1/4”
Machine weight (total)	m [lbs]	12,500	11,500	11,500	12,500	11,500
These dimensions and weights relate to the standard design and are approximate values. The information can vary depending on the order.						

11.2 Technical data

Environmental limits for operation

Data		Value	Unit
Temperature range	Operation	-4 to 104	°F
	Transport/storage	-13 to 131	°F
Relative humidity, maximum	Operation	70	%
	Transport/storage	<+50 (*non-con-densing*)	%
Max. installation elevation	Operation	3,280	ft
Rated input voltage	Operation	480	Vrms
Rated input frequency	Operation	50/60	Hz