

All about $CO_2$

# INSTRUCTION MANUAL

TRANSLATION

## ASCO DRY ICE PELLETIZER P15 EVO

from SN 25-031-001

ascoco2.com



Retain for future use and keep a copy near the machine.

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**THANK YOU VERY MUCH!**

Congratulations - You have acquired a quality product from
ASCO CARBONDIOXIDE LTD



| | |
|---|---|
| | **NOTE** |
| | Please read this instruction manual carefully before installing and commissioning this product, especially chapter "General Safety Instructions" and the separate document "General Information and Safety Instructions – Working with $CO_2$". |

Should you have any questions, please do not hesitate to contact us.

ASCO CARBONDIOXIDE LTD

## PURPOSE OF DOCUMENT

This manual contains important information and instructions for the safe use of the dry ice pelletizer P15 EVO, including transport, installation, commissioning, adjustment, operation and disposal.

This instruction manual must be read and understood by all persons who carry out work with or on the pelletizer.



**NOTICE**

This document has been drafted and edited with the greatest care and according to our best knowledge. The authors and publishers shall not be liable for damage arising from incorrect or incomplete information in this document.

If something is unclear, the German version of the operating manual is the reference document.

## WARRANTY

The warranty terms below apply in all countries. Please find the conditions for repairs to your machine within the warranty period in our General Terms and Conditions, which you received together with our order confirmation. Please contact the closest authorised ASCO distributor or the ASCO Customer Service Department in the event of a warranty claim. Please submit proof of purchase, the serial number of your device and the operating hours completed to date.

### Version of instruction manual

| Version (year/month) | Note |
|---|---|
| Version V1.0 (2025/09) | First version |
| Version V1.1 (2025/09) | Adjustment of exhaust pipe connection<br>Information on exhaust pipe length |
| Version V1.2 (2025/09) | New chapter 4.3.6.<br>Chapter 6.1. adaptions table |
| Version V1.3 (2025/10) | Warning note machine in operation without liquid $CO_2$ supply |
| Version V1.4 (2026/08) | Insulation of $CO_2$ liquid pipes<br>Accumulation of $CO_2$ |

# 1 GENERAL SAFETY INSTRUCTIONS

## 1.1 ACCOMPANYING DOCUMENTS

The following separate documents are an integrated part of this instruction manual.

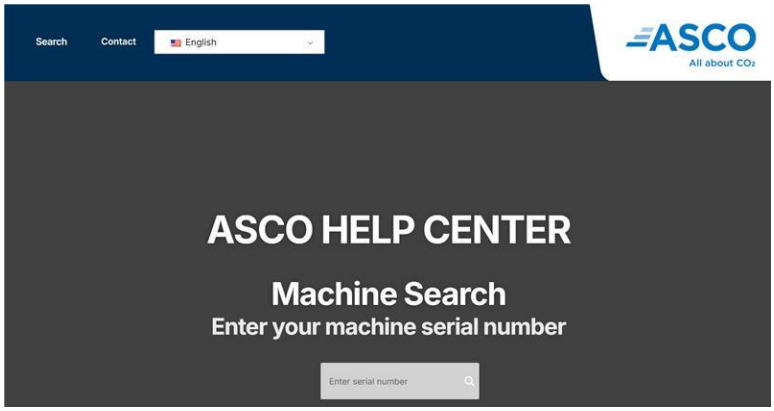
- Document "General Information and Safety Instructions – Working with $CO_2$"
- Spare parts list
- Electrical circuit diagram
- Hydraulic plan
- EU Declaration of Conformity

### 1.1.1 DIGITAL ACCESS DOCUMENTS

The digital documents are available under the following QR code and link.

ASCO Help Center

https://help.ascoco2.com/




After entering the serial number, digital access is possible to the operating instructions, spare parts list and other important documents.

## 1.2 DRAWINGS AND SYMBOLS

Many accidents with devices are caused because operators ignore instructions, including safety instructions, of the manufacturer. In this document, internationally recognised symbols and signal words are used to highlight hazards and hazardous situations in the work environment.
Warnings are presented as follows:



**DANGER**

**Describes a hazard with a high degree of risk.**
If these instructions are not followed, this will result in death or serious injury (leading to disability).



**WARNING**

**Describes a hazard with a medium degree of risk.**
If these instructions are not followed, this may result in death or serious injury (leading to disability).



**CAUTION**

**Describes a hazard with a low degree of risk.**
If these instructions are not followed, this may result in slight or moderate injury.

**Note, user tips, minor material damage at the most:**



**NOTE**

**Designates general instructions with subsequent action.**
User tips and recommendations for work are given, which have no effect on the health and safety of personnel but do require certain behaviour or action.

…Highlights useful tips and recommendations plus information for efficient and fault-free operation.



**NOTE**

**Describes general notes.**
Practical user tips and work recommendations are given which do not, however, have any effect on the safety and health of staff.

...highlights useful tips and recommendations plus information for efficient and fault-free operation.

**Instructions designed to prevent serious damage to property:**



**CAUTION**

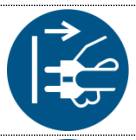
**Describes a potentially damaging situation.**
If these instructions are not followed, material damage will result.

… indicates a potentially damaging situation which may lead to material damage if these instructions are not followed.

### 1.2.1 Pictograms used in this document

Safety instructions in this manual where non-compliance poses a danger to persons and property, are highlighted with a general warning symbol.

| | |
|---|---|
|  | **General warning symbol** |
|  | **Warning: electric voltage** |
|  | **Warning: risk of suffocation** |
|  | **Warning: low temperature** |
|  | **Warning: risk of injury to hand** |
|  | **Warning: hot surface** |
|  | **Warning of sudden loud noise** |
|  | **Warning of automatic machine start-up** |
|  | **Slippery surface** |
|  | **Wear eye protection** |
|  | **Wear hearing protection** |
|  | **Wear hand protection** |
|  | **Wear foot protection** |

| | |
|---|---|
|  | **Use head protection** |
|  | **Disconnect mains plug** |
|  | **Refer to instruction manual** |

### 1.2.2 Operator qualification

- The machine may only be operated by authorised and instructed staff.

Operators must be trained by an authorized person (operator or manufacturer) in the following points:

- Safe handling of dry ice and/or liquid/gaseous $CO_2$
- See also document "General Information and Safety Instructions – Working with $CO_2$"
- Operation and maintenance of the ASCO system
- Safety measures / protective equipment
- Use of personal protection clothing

- Repair work must be carried out by qualified skilled workers.

Trained engineers or technicians for:

- Mechanical engineering
- Electrical engineering
- Hydraulic engineering
- Refrigeration engineering

- The manufacturer offers staff training, including refresher sessions. For details, please contact our Customer Service Department.

## 1.3 IMPORTANT SAFETY INSTRUCTIONS



**WARNING**

**Risk of damage or injury from unsupervised machine operation!**

- Operation of the machine by a single worker is prohibited.
- The machine must be operated in the presence / under the supervision of multiple members of staff.



**WARNING**

**Danger due to malfunction of $CO_2$ injection valve or leakage of $CO_2$ pipeline!**

Check and replace solenoid valve and $CO_2$ pipelines regularly according to the maintenance schedule.

In the event of leakage or malfunction of the solenoid valve (e.g. continued injection), proceed as follows:

- Stop the machine (EMERGENCY-STOP)
- Immediately close the manual $CO_2$ shut-off valve in the $CO_2$ liquid line
- Depressurize the machine as described in chapter 5.2.9
- Switch off the machine as described in chapter 5.2.10
- Turn the main switch to OFF
- Arrange for repairs to be made





**DANGER**

**Risk of injury from high carbon dioxide concentration!**
**Risk of suffocation and damage to health through carbon dioxide!**
Low concentration (3-5%) causes headaches and makes breathing difficult.
High concentration (7-10%) causes headaches and nausea and leads to unconsciousness.
Even higher concentration leads to unconsciousness and death.
The highest non-hazardous $CO_2$ concentration is 5000 ppm.
A higher concentration is very dangerous to humans (German MAK Scale IV).

- Operate the device only in well-ventilated spaces.
- The area in which the machine is installed must be equipped with $CO_2$ gas detectors alarms.
- Observe the instructions in the separate document "General Information and Safety Instructions – Working with $CO_2$".

**Risk of injury from electric power!**
Exposed electrical contacts, electrostatic discharge, physical impact on electrical systems, etc. pose a high safety risk.

- All work on the electrical equipment must be performed by qualified specialist technicians.



**WARNING**

**Danger of explosion!**
- Do not operate the machine in a potentially explosive atmosphere.

## Personal protective equipment



**⚠ WARNING**

**Risk of injury from propelled parts!**
Due to the high $CO_2$ pressure, parts might be propelled at high speed.
- When operating the pelletizer, always wear safety goggles.
- All persons near the pelletizer must always wear suitable protective goggles.



**⚠ WARNING**

**Risk of injury from high sound level!**
The noise level during dry ice production is very high.
- When operating the pelletizer, always wear hearing protection.
- All persons near the pelletizer must always wear approved hearing protection.



**⚠ CAUTION**

**Risk of injury to the hands!**
Scrapes, cuts, crushing injuries, penetration wounds, etc.
For example, burns, scalds and frostbite caused by hot or cold energy sources and/or the environment.
- When operating the pelletizer, always wear suitable protective gloves.
- All persons standing close to the pelletizer must wear suitable protective gloves.



**⚠ CAUTION**

**Risk of injury to the feet!**
- Always wear suitable foot protection when operating the pelletizer.
- All persons near the pelletizer must always wear suitable foot protection.



**⚠ CAUTION**

**Risk of head injury!**
- During work in connection with the transport, installation and commissioning of the pelletizer, wear suitable head protection.

## Safety signs attached to the machine

### Rating plate




Fig. 1

### Safety instructions

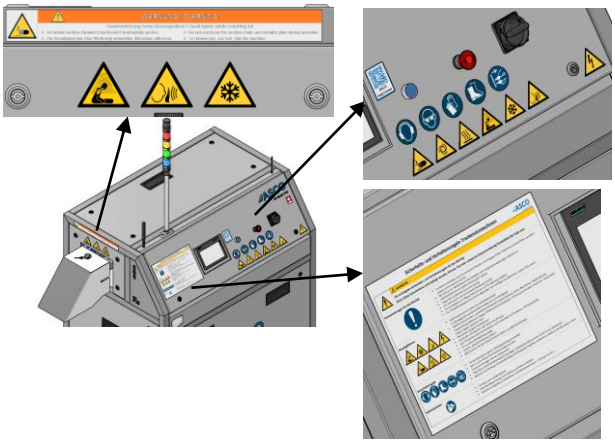


Fig. 2

## Safe handling of dry ice

**CAUTION**

**Risk of frostbite from contact with dry ice!**
Solid carbon dioxide (dry ice) has a temperature of approximately -79°C (-110.2°F), which can cause frostbite injuries if it comes into contact with the skin.
The dry ice's low temperature results in icing of most of the parts of the pelletizer.

- Do not touch parts covered in dry ice without suitable protective clothing.
- Prevent prolonged contact with dry ice / iced components.
- Always read the supplier's safety sheet carefully and strictly follow the instructions.

**WARNING**

**Risk of injury to hands when reaching into machine!**

- During machine operation, never reach into the extruder plates.
- To remove jammed product, shut down the machine and use suitable tools.

## 1.4 SAFETY COMPONENTS



**DANGER**

**Risk of injury or damage due to missing safety components!**

- Only start the pelletizer after you have made sure that all safety components are properly installed and in working order.

**Risk of injury from electric power!**

Exposed electrical contacts, electrostatic discharge, physical impact on electrical systems, etc. pose a high safety risk.

- Work on electrical installations may only be carried out by trained and qualified personnel.

## 1.5 SAFETY INSTRUCTIONS FOR THE CONTROL SYSTEM

The pelletizer is equipped with the following safety functions:

| Safety function | Category, PL/SIL |
|---|---|
| Mains disconnection device with EMERGENCY STOP function | Cat. 1, PL c/SIL 1 |
| Temperature monitoring and switching off by hydraulic components | Cat. 1, PL c/SIL 1 |
| Shutting off $CO_2$ inflow and outflow by solenoid valve | Cat. 1, PL c/SIL 1, limited service life |

The machine is equipped with the following safety devices:

- Main switch
- EMERGENCY-STOP button
- Release button 
- Safety covers (fig. 3)
- Safety valve (fig. 4)
- Safety signs (fig. 5)
- $CO_2$ connection (fig. 6)
- Protective hood for ejecting dry ice pellets

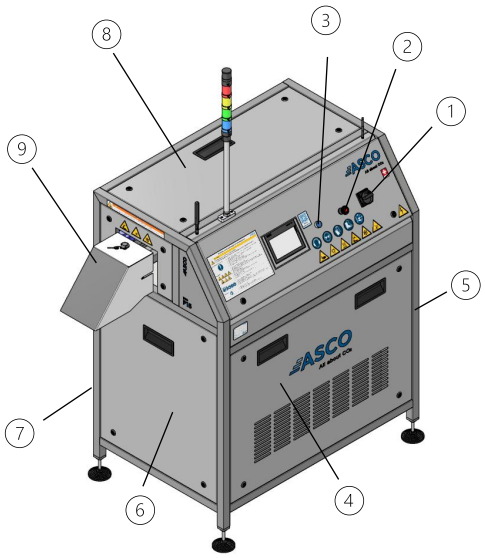



Fig. 3

1 Main switch
2 EMERGENCY STOP button
3 Release button
4 Front guard covers (top and bottom)
5 Guard covers right (top and bottom)
6 Guard covers left (top and bottom)
7 Guard covers rear (top and bottom)
8 Top guard cover
9 Protective hood for ejecting dry ice pellets



Fig. 4

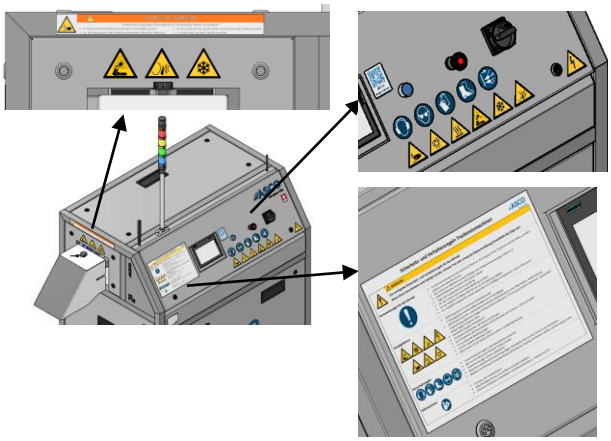


Fig. 5

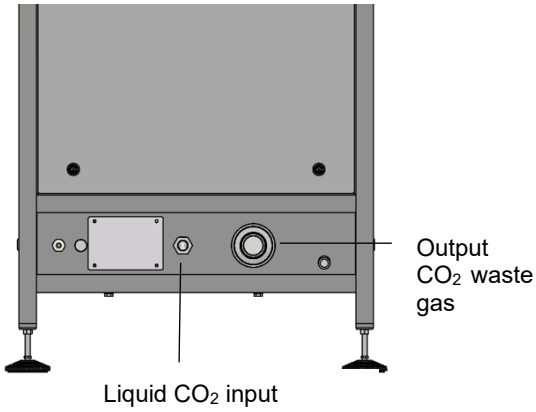



Fig. 6

| | |
|---|---|
| | **NOTE** |
| | Pictograms and warning signs are subject to wear and tear. These can also be ordered from the manufacturer in another language version. |

| | |
|---|---|
| | **NOTE** |
| | The machine can be integrated into an external emergency stop circuit.<br>The integrator is responsible for the integration of an external emergency stop or for integrating the machine into an external emergency stop.<br>In any case, the emergency stop strategy and all associated standards must be observed.<br>The integration may only be carried out by qualified personnel.<br>A circuit example can be found in the machine's electrical documentation. |

## 1.6 INTENDED USE

Production of dry ice pellets from liquid $CO_2$ using various standardized extruder plates. Only extruder plates approved by ASCO may be used.
The waste gas must be discharged in a safe manner to the atmosphere or transferred to another machine.

| | |
|---|---|
| | **WARNING** |
| | **Risk of damage or injury from unsupervised machine operation!**<br>▪ Operation of the machine by a single worker is prohibited.<br>▪ The machine must be operated in the presence / under the supervision of multiple members of staff. |

Intended use also includes observing the chapter 2.2 “TECHNICAL DATA"

## 1.7 DECLARATION OF CONFORMITY

The EU Declaration of Conformity is included in the appendix to this instruction manual.

## 1.8 SPARE PARTS LIST / DRAWINGS / CIRCUIT DIAGRAMS

The spare parts list/drawings and circuit diagrams are attached to this manual.



**WARNING**

**Risk of injury or damage due to unsuitable spare parts!**
The use of unsuitable spare parts can lead to safety hazards.
This applies in particular to safety components.

- Only use original spare parts.

## 1.9 IT SECURITY VULNERABILITIES



**WARNING**

**Risk of damage from IT security vulnerabilities!**
Unless properly protected, the interface of the control for data exchange and external access might pose a security risk!

- Limit logical and physical access to the control system by external IT systems to what is absolutely necessary.
- Maintain current security measures on external IT systems that access the control system and install updates.
- Keep your external IT systems up to date.
- Implement authentication and access control mechanisms.

- Limit the access rights of individual users to what they really need.
- Shut down/disable external connections and services that are not in use.
- Keep user accounts up to date, update access rights (passwords).
- Respond to threat alerts indicating vulnerabilities of your IT system.

If you use remote maintenance and service:

- Make use of features that automatically terminate remote access sessions after a certain time has elapsed.
- Implement encryption for the initialization and continued access for remote maintenance/service.

# 2 TECHNICAL SPECIFICATION

## 2.1 MACHINE ASSEMBLIES

| | |
|---|---|
| 1 | Guard cover, front |
| 2 | Control panel |
| 3 | Discharge unit |
| 4 | Machine base |
| 5 | Extruder plate |
| 6 | Ventilation slots (for hydraulic unit cooling system) |

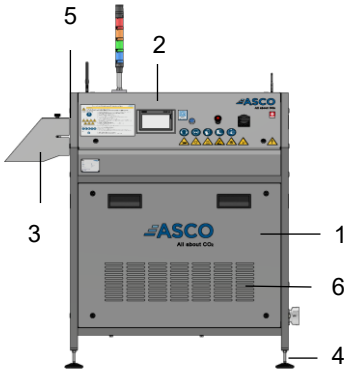


Fig. 7

| | |
|---|---|
| 1 | Guard cover, left bottom |
| 2 | Guard cover, left top |

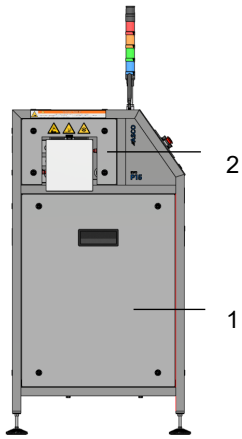


Fig. 8

| | |
|---|---|
| 1 | Guard cover, rear bottom |
| 2 | Guard cover, rear top |
| 3 | Ventilation slots (for hydraulic unit cooling system) |

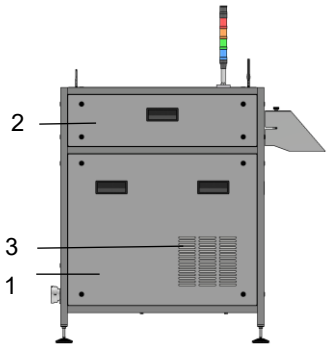


Fig. 9

| | |
|---|---|
| 1 | Guard cover, right |
| 2 | Guard cover, right top |
| 3 | $CO_2$ waste gas connection |
| 4 | Liquid $CO_2$ connection |
| 5 | Condensate drain |
| 6 | Power cord |
| 7 | Network connection to Internet customer |

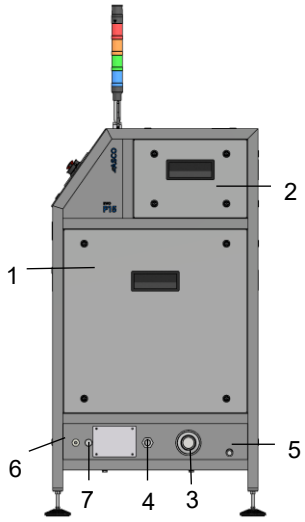


Fig. 10

| | |
|---|---|
| **1** | **HMI** |
| 2 | EMERGENCY-STOP button |
| 3 | Main switch |
| 4 | Electrical cabinet lock |
| 5 | Release button |
| 6 | Signal tower |
| 7 | Antenna WIFI |
| 8 | Antenna 4G |

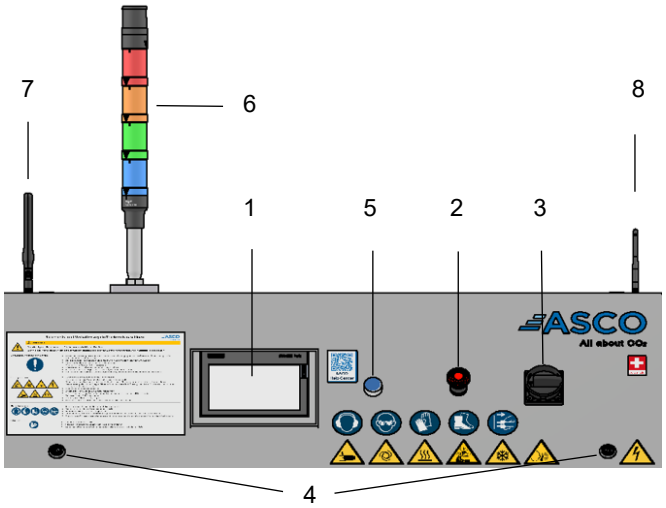


Fig. 11

## 2.2 TECHNICAL DATA

| | |
|---|---|
| Capacity: | Depending on the extruder plate used:<br>Pellet size 1.7 mm up to 140 kg/h ± 5 %<br>(0.0669 in up to 308 lb/h ± 5%)<br>Pellet size 3 mm: up to 150 kg/h ± 5%<br>(0.1181 in up to 330 lb/h ± 5%)<br>Pellet size 10 mm: up to 150 kg/h ± 5%<br>(0.3937 in up to 330 lb/h ± 5%) |

| | |
|---|---|
| | Pellet size 16 mm: up to 150 kg/h ± 5%<br>(0.6299 in up to 330 lb/h ± 5%)<br>Highly compressed dry ice pellets at a pressure of min. 17 bar (246 psi) (liquid $CO_2$) with a waste gas line of max. 3 m (9 ft). |
| Pellet size: | Cylindrical pellets Ø approx. 1.7 - 16 mm (0.0669 – 0.6299 in)<br>Depending on installed extruder plate |
| Liquid $CO_2$ delivery pressure: | 16-18 bar (232-261 psi) / Pressure fluctuation per 8h max. 1 bar (14.5 psi) |
| $CO_2$ liquid quantity reference: | Up to 375 kg/h (826 lb/h) |
| Liquid $CO_2$ purity: | min 99.9 % v/v<br>Moisture content of liquid $CO_2$ 5-60 ppm (v/v) or atmospheric dew point between -65° C (-85°F) and -47° C (-52.6°F)<br>Free of oil, sugar, rust, steel particles and other contaminants |
| Liquid $CO_2$ temperature: | Adhere to these values in order to maintain the specified production rate:<br>at 15 bar (217 psi) -> -28.5 °C (-19.3°F)<br>at 17 bar (246 psi) -> -24.5 °C (-12.1°F)<br>at 20 bar (290 psi) -> -19.5 °C (-3.1°F) |
| Liquid $CO_2$ supply line: | Minimum 19 mm (0.748 in) inner diameter insulated with as few elbows and connections as possible. For a cable length of more than 3 m (9 ft), use an inner diameter of 25 mm (0.9842 in). For cable lengths exceeding 20 m (65 ft), contact ASCO. |
| Insulation cable for liquid $CO_2$: | Elastomeric foam with low thermal conductivity (0.035 W/mk) of the type "K flex". Minimum thickness 50 mm (1.969 in).<br>Recommendation: Protect the $CO_2$ liquid line with an aluminium sheath. |
| Liquid $CO_2$ supply fitting: | 1" BSP internal thread |
| Waste gas back pressure: | $CO_2$ 0.5 bar (7.25 psi) |
| Waste gas line fitting: | Rp 3", female thread |
| Waste gas in $CO_2$ waste gas line: | Up to 225 kg/h (496 lb/h) |
| $CO_2$ leakage emissions: | To be determined on site by operating company |
| Dripping water after machine stop: | 0.25 litres (0.0660 gal) |
| Requirements<br>Recovery system: | Please contact: ASCO CARBONDIOXIDE LTD |
| Sound pressure level: | Under normal operating conditions this is 70dBA<br>When starting and in case of malfunction, ice layer breakage >88 dBA |
| Drive: | Hydraulic |
| Recommended fluid: | Mineral oil according to DIN 51524 part 2 |
| Fluid grade: | 16/13 according to ISO 4406 |
| Fluid viscosity: | ISO VG 46 |
| Maximum fluid volume: | 100 litres (26.4 gal) |
| Electrical power supply (standard): | CE: 400V / 25A / 50Hz / 3 phases + earth<br>US: 480V / 25A / 60Hz / 3 phases + earth |
| Short-circuit current Icp: | 6 kA |
| Dimensions* (L x W x H): | Without electric signal tower:<br>1560 x 800 x 1510 mm (61.42 x 31.59 x 59.45 in)<br>With electric signal tower:<br>1560 x 800 x 2190 mm (61.42 x 31.59 x 86.22 in) |

| | |
|---|---|
| Weight* (net): | approx. 440 kg (970 lb) |
| Weight* (packed): | approx. 550 kg (1212 lb) |
| Expected lifespan | 20 years (assuming proper maintenance) |

* All information refers to the machine without hydraulic oil

**Permissible ambient conditions**

| | |
|---|---|
| Floor | Sealed, level industrial floor |
| Site protected against | ▪ Water on the floor<br>▪ Oxygen deficiency, ventilation<br>▪ Dust, dirt, pollution and mist<br>▪ Electromagnetic interference<br>▪ Humidity (air humidity < 60%)<br>▪ Contaminants |
| Location of installation | Industrial hall<br>Protected against adverse ambient conditions |
| Ambient temperature | Minimum ambient temperature +5 °C (+41 °F) to maximum + 40 °C (+104 °F) |
| Lighting | Adequate lighting of machine and adjacent areas |

# 3 TRANSPORT

## 3.1 TRANSPORT BY PALLET TRUCK OR FORKLIFT TRUCK

All products that can be packaged are protected with suitable packaging. The packaging is designed to withstand normal stresses and impacts along the transport chain, including during transport by sea, land and air, as well as during correct handling and storage. High quality packaging does not relieve those involved in the logistic chain from their duty of care when handling the products. This applies to the time from the manufacture of the packaging and the packing of goods to be sent until the delivery of the shipment.

After delivery of the ASCO pelletizer, the machine must be inspected for damage in transit. If there is damage, the commissioned shipping company must be contacted in order to record the damage.
Check whether the delivery is complete.



**WARNING**

**Risk of injury or damage during on-site transport and installation work!**
The centre of gravity of the machine is not in the middle of the machine. Use a fork lift truck for exact placement of the pelletizer.
- Transportation by crane or hoist is not allowed.



**WARNING**

**Risk of injury due to improper transport work!**
- The ASCO pelletizer is transported in an upright position on wood profiles with feet.
- Never transport the machine tipped forward or to the side!
- When transporting the pelletizer on a vehicle, secure it to the goods platform so that it cannot shift.



**WARNING**

**Risk of injury or damage due to unqualified personnel!**
All tasks in connection with the transport of the machine must be carried out by qualified and suitably trained skilled workers.



**WARNING**

**Risk of head injury!**
- During work in connection with the transport, installation and commissioning of the pelletizer, wear suitable head protection.



**DANGER**

**Risk of injury due to improper transport!**
- It is the responsibility of the transport and logistics company to carry out all transport procedures professionally, and according to best practice.
- The goods must be loaded, unloaded and put into storage for transport by a specialist company.
- The transport company must ensure that the country-specific requirements for safety and all statutory regulations are complied with, and that staff have the necessary qualifications and training.



**CAUTION**

**Risk of injury or damage during on-site transport and installation work!**
- Observe the instructions and regulations for the transport and installation of the machine.
- The tasks described below must be performed by qualified and suitably trained skilled workers and while the machine is disconnected from the power supply.

## 3.2 UNPACKING OF AND ON-SITE TRANSPORTOF PELLETIZER

- Dispose of packaging material for recycling.

**On-site transport of machine without pallet**

- Lift the machine with a pallet truck (forklift truck)
- Position the pelletizer correctly on a level industrial floor; floor anchoring is not necessary



**⚠ CAUTION**

**Risk of injury or damage from improper on-site transport!**

- Note the centre of gravity of the machine, see Fig. 12 (centre of gravity not in the middle)
- For the exact placement of the pelletizer, use an industrial truck (forklift)
- Transport by crane or hoist is not permitted.

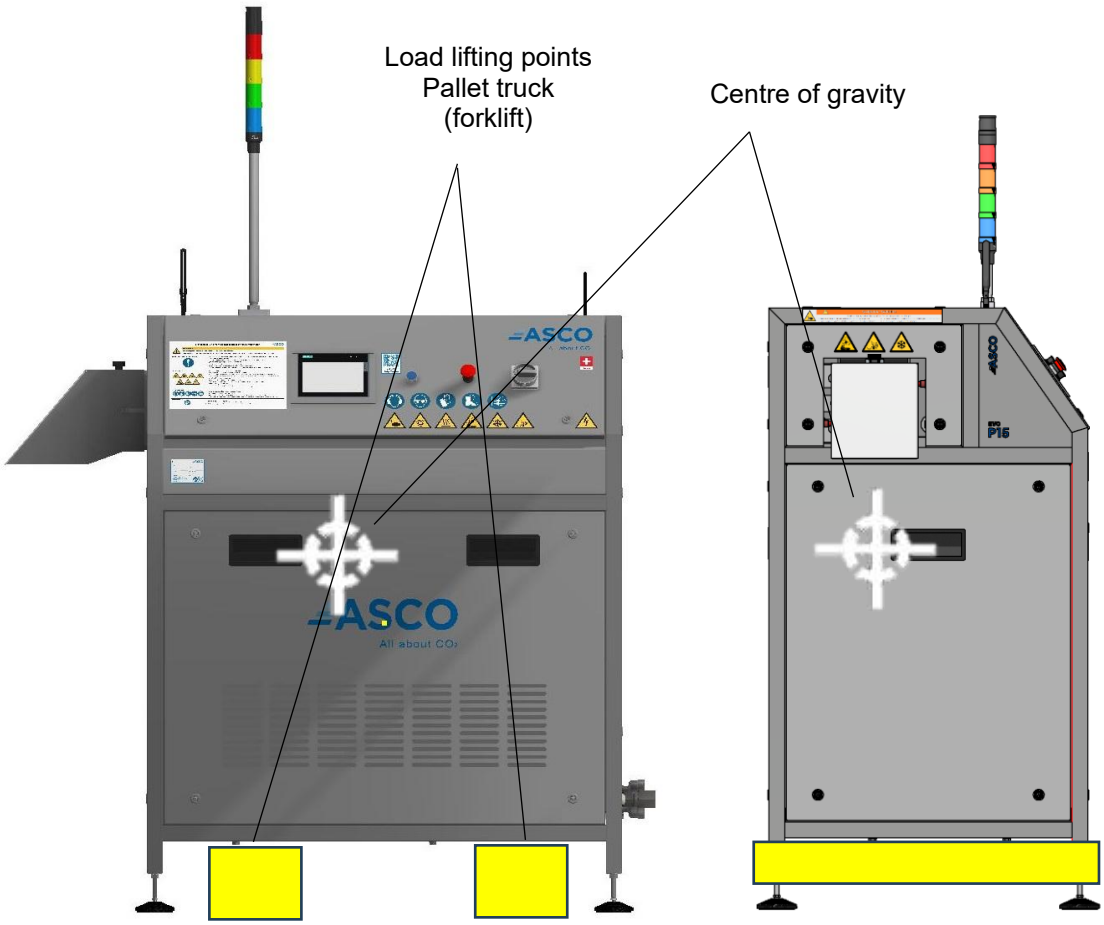



Fig. 12

| | |
|---|---|
| | **CAUTION** |
| | The pelletizer was fully assembled and tested before delivery. Prior to shipping, the hydraulic fluid has been drained from the machine. |

## 3.3 STORAGE



**CAUTION**

**Damage due to insufficient protection of pelletizer!**
- For prolonged storage, the pelletizer must be protected against external influences.

- Store the pelletizer in a dry place.
- Storage temperature between +10°C (+50 °F) and +40°C (+104 °F)
- Air humidity between 30% and 60%.
- Store the pelletizer so that it is protected against the elements (e.g. in a closed warehouse).
- Protect the pelletizer from external influences.
- The ASCO standard packaging is designed for storage up to maximum one year. For longer storage, replace the packaging with VCI foil. The foil must be protected from sunlight. "Volatile Corrosion Inhibitors" and the "BRANOROST Chip U".

# 4 INSTALLATION



**NOTE**

All work described in this section must be carried out by a qualified, trained and professional technician.
ASCO CARBONDIOXIDE LTD shall not be liable for damage caused by non-compliance with the instructions and recommendations in this chapter.



**DANGER**

**Danger due to automatic start-up of the machine!** The machine can be started automatically externally (remote operation) without authorization from the operating personnel.

Before installation, commissioning, maintenance, cleaning and troubleshooting, please note the following points:

- Deactivate all interfaces in the Interfaces Settings menu (see chapter 5.1.19
- The main switch is set to “OFF” and secured with a padlock to prevent it from being switched on again.



**WARNING**

**Protect the area around the pelletizer against influences from ambient conditions and processes performed in its vicinity!**
See chapter 2.2 "TECHNICAL DATA" (Permissible ambient conditions)

- The operating company is responsible for the safe and professional installation of the machine
- All work in connection with the installation of the machine performed by qualified and trained skilled workers



**WARNING**

**Risk of head injury!**
- During work in connection with the transport, installation and commissioning of the ASCO pelletizer, wear suitable head protection.



**WARNING**

**Risk of injury or damage from damaged hoses and loose connections!**
- Before connecting hoses and fittings, check the coupling elements for damage.
- Make sure that all hose and cable connections are correctly established and properly tightened!
- In the event of interruptions or damage due to incorrect installation, any warranty claim against ASCO CARBON DIOXIDE LTD will be void.



**CAUTION**

The ASCO pelletizer was fully assembled and tested before delivery. Prior to shipping, the hydraulic fluid has been drained from the machine.

- Refill oil before switching on the machine



**WARNING**

**Risk of injury or damage due to pressure!**

- All pipe sections in which liquid $CO_2$ can be trapped must be equipped with a 25 bar (362.6 psi) safety valve.
- A shut-off valve and relief tap must be installed upstream of the machine.



**WARNING**

**Before removing any guards of the pelletizer or carrying out any work on the pelletizer:**

- Stop the pelletizer, set the main switch to "OFF" and disconnect the power plug!
- Depressurise the pelletizer!
- Observe all local safety regulations!



**CAUTION**

**Machine in operation without liquid $CO_2$ supply**

If the machine is operated without liquid $CO_2$, the sealing ring heats up and can lead to damage to the sealing ring and other components.

If these instructions are not followed, material damage will result:

- Only operate the machine with liquid $CO_2$
- Operating the machine without liquid $CO_2$ is prohibited!
- During installation, commissioning, operation, maintenance, servicing, and troubleshooting, do not run the machine for longer than 2 minutes without a $CO_2$ liquid supply.



**DANGER**

**Danger due to automatic start-up of the machine!**

Before removing any cover from the machine or performing any work on the mechanics and hydraulics, proceed as follows:

- Depressurize the machine as described in chapter 5.2.9
- Switch off the machine as described in chapter 5.2.10
- Turn the main switch to OFF
- Ensure that the machine is stopped, the main switch is turned to "OFF" and the power plug is pulled out!
- Ensure all local safety regulations are met!
- Covers can be removed.
- Arrange for repairs to be made



**WARNING**

**Risk of suffocation!**

Working in enclosed, unventilated spaces presents a suffocation hazard due to high carbon dioxide concentration!

- When working in enclosed spaces, ensure that there is adequate ventilation to keep the carbon dioxide concentration in the ambient air below a dangerous level.
- We strongly recommend installing $CO_2$ sensors.
- Observe document "General Information and Safety Instructions – Working with $CO_2$".



**DANGER**

**Risk of damage to health from $CO_2$!**

- Any measures required on the operator's side must be assessed and defined by the operator based on a local risk analysis (HAZOP), e.g. venting points for safety valves, drain valves, degassers, etc.
- Depending on the local conditions, a separate assessment must be conducted to determine all the locations where $CO_2$ can accumulate.
- The $CO_2$ escapes at high velocity and at a very high noise level.
- Loose parts or dirt particles are blown about by the escaping gas.
- Install the prescribed $CO_2$ warning equipment.
- All persons standing in the vicinity of $CO_2$ pipework or devices, must be equipped with personal $CO_2$ warning devices.
- Use personal protective equipment such as safety goggles, safety shoes with anti-slip soles, hearing protection, gloves and $CO_2$ warning devices.
- Processes upstream and downstream of the machine must be designed so that they work properly at all times, even in the event of power loss.
- See also separate document "General Instructions and Safety Information – Working with $CO_2$".



**CAUTION**

**Risk of injury due to insufficient lighting!**

- It is the responsibility of the operating company to ensure that the machine and the adjacent areas are properly lit.





**DANGER**

**Risk of injury due to pressure!**
**Risk of injury due to improper piping and welding!**

- All welding work must be carried out by qualified specialist technicians
- The local legal permissions are required for this.
- The welding technique must be performed according to best practice. All statutory welding regulations and rules must be adhered to.
- After welding, the pipelines must be professionally cleaned and flushed. Otherwise, fittings, valves, instruments and other components might become contaminated and/or damaged. This can result in serious damage to the machine.
- Professionally insulate all liquid $CO_2$ lines against heat gain. Provide additional protection for the insulation against mechanical damage and UV radiation.
- The pipeline must be inspected and approved for operation by a qualified specialist technician.



**WARNING**

**Risk of injury from pressurised machine!**

- Prior to carrying out work on the machine, shut off the $CO_2$ supply.
- All installation must be carried out when the machine is depressurised. Depressurise the system.



**WARNING**

**Risk of injury or damage due to access to machine by third parties!**

- Protect the pelletizer so that unauthorised persons cannot access or interfere with it.
- Prevent unauthorised access to the pelletizer (e.g. by installing a gate with lock).
- Secure the pelletizer against unintentional switching on (e.g. by attaching a padlock to the main switch).

## 4.1 ELECTRICAL CONNECTION



**DANGER**

**Risk of injury from electric power!**
Exposed electrical contacts, electrostatic discharge, physical impact on electrical systems, etc. pose a high safety risk.

- All work on the electrical equipment must be performed by qualified specialist technicians and when the machine is de-energised. Risk of injury from electric power and loose screws!
- Protect all electrical cables so that they cannot become damaged.
- Use of high-performance cables sufficiently dimensioned for the current load.
- Test and inspect the electrical system prior to commissioning and at least every 100 operating hours.
- Check cables before each use and repair them professionally if damaged. In the event of damage to a cable, it is forbidden to start the machine.
- Check the earth conductor and the power cables for damage and replace them, if necessary
- $CO_2$ pipeline segments Apply protective earthing

Before connecting the machine to the power mains, check the following:

- All safety components are properly installed and in working order.
- All cable connections are correctly tightened.
- All earthing connections and terminals are in place and securely connected.
- All screws are tightened.

For relevant connection data see chapter 2.2 "TECHNICAL DATA" and circuit diagram.

### 4.1.1 Connecting the signal tower



Fig. 13

Attach the stand to the appropriate location on the machine. The M12 connector connection is located in the machine area.

## 4.2 INSTALLATION INSTRUCTIONS FOR LIQUID $CO_2$ SUPPLY AND WASTE GAS LINES



**WARNING**

**Danger due to incorrect supply line!**
ASCO recommends that no filter units are installed in the liquid $CO_2$ supply line to the pelletizer, as these could lead to pressure loss and the formation of snow. ASCO shall not be responsible for malfunction or damage resulting from the installation of such filters.
Please note the instructions below.



**WARNING**

**Danger due to malfunction of $CO_2$ injection valve or leakage of $CO_2$ pipeline**

Check and replace solenoid valve and $CO_2$ pipelines regularly according to the maintenance schedule.
In the event of leakage or malfunction of the solenoid valve (e.g. continued injection), proceed as follows:

- Stop the machine (EMERGENCY-STOP)
- Immediately close the manual $CO_2$ shut-off valve in the $CO_2$ liquid line
- Depressurize the machine as described in chapter 5.2.9
- Switch off the machine as described in chapter 5.2.10
- Turn the main switch to OFF
- Arrange for repairs to be made



**NOTE**

For long pipelines, we recommend installing a degassing valve.

| | |
|---|---|
| Liquid $CO_2$ line | Non-rusting metal; installation free of oil and grease; pipeline with as few elbow sections as possible; Radius min. 3 x Ø, working pressure 16-18 bar (232-276 psi). |
| Waste gas line | Polyethylene or galvanised steel; with as few elbow sections as possible; Radius min. 3 x Ø, working pressure approx. 0.5 bar (7.25 psi). |
| Insulation | Preferably made from synthetic rubber, e.g. Armaflex, Kaiflex.<br>Insulation thickness min. 50 mm on all sides. |
| Outdoor lines | Install insulation that provides protection against the elements. |
| Safety | All pipe sections where liquid $CO_2$ can be trapped must be equipped with a 25 bar (362.6 psi) safety valve.<br>A shut-off valve and relief tap must be installed upstream of the machine. |
| Installation of pelletizer | Preferably at level of $CO_2$ tank.<br>Maximum height 10 m (32 ft.) above tank level. |

| SUPPLY LINE | up to 3 m (9,843 ft) Length / inner diameter | up to 20 m (65,616 ft) length / inner diameter | from 20 m (65,616 ft) Length |
|---|---|---|---|
| **P15 EVO** | min. 19 mm (0.7480 in) | min. 25 mm (0.9842 in) | Contact ASCO Customer Service Department |

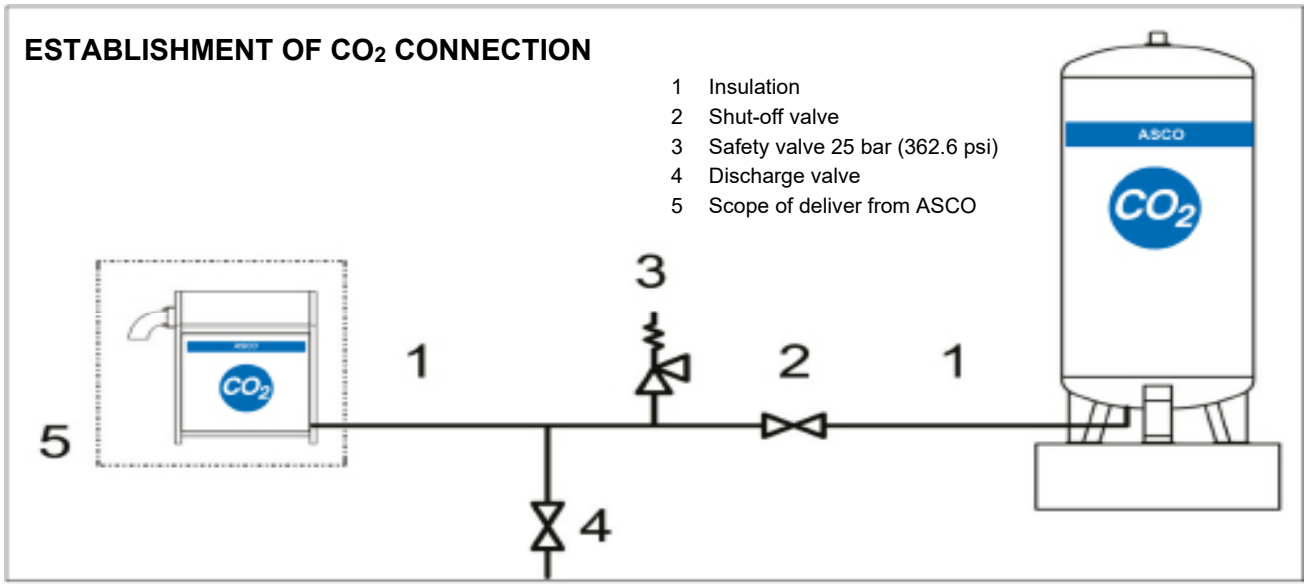


Fig. 14

| $CO_2$ waste gas line | up to 3 m (9,843 ft) Length / inner diameter | from 3 m (9,843 ft) Length / inner diameter | from 15 m (49.21 ft) Length |
|---|---|---|---|
| **P28 EVO** | min. 75 mm (2.953 in) | min. 75 mm (2.953 in) | Contact ASCO Customer Service Department |

**CAUTION**

**Hazards from working under pressure and lack of testing!**

- All connecting work must be performed by qualified skilled workers and when the machine is de-energised and depressurised. See chapter 5.2.9 and chapter 5.2.10.
- Test, inspect and service the $CO_2$ lines prior to commissioning and at least every 1000 operating hours or annually Observe all applicable national and international regulations and standards.



**WARNING**

**Risk of injury or damage due to pressure and missing shut-off valves and relief taps!**

- All pipeline sections where liquid $CO_2$ might become trapped must be equipped with a safety valve and relief tap.
- A shut-off valve and relief tap must be installed upstream of the machine.
- Drain lines for safety valves and relief taps might contain condensate/water. If there is back pressure and/or icing, they might not drain sufficiently.
- Proper layout of drainage lines, pipelines, safety valves, discharge valves, etc.

  Layout according to national/international standards and measures specified in the operating company's risk analysis (HAZOP).



**DANGER**

**Risk of injury due to pressure, incorrect design or missing equipment!**

- Install a safety valve wherever liquid $CO_2$ can be trapped.
- Maintain correct safety valve design (25 bar / 362.6 psi).
- The correct layout of the drainage line of the safety valve must be determined by a qualified specialist.
- The relief tap/ball valve must be installed by the operating company.
- The operating company must have the safety valves inspected and tested at the intervals prescribed by the manufacturer (see maintenance matrix) and according to the applicable statutory regulations. All performed tests must be documented.
- Recommendation: Test or replace the safety valves every 2 years.



**DANGER**

**Danger due to automatic start-up of the machine!**

Before removing any cover from the machine or performing any work on the mechanics and hydraulics, proceed as follows:

- Depressurize the machine as described in chapter 5.2.9
- Switch off the machine as described in chapter 5.2.10
- Turn the main switch to OFF
- Ensure that the machine is stopped, the main switch is turned to "OFF" and the power plug is pulled out!
- Ensure all local safety regulations are met!
- Covers can be removed.
- Arrange for repairs to be made



**WARNING**

**Risk of suffocation!**

Working in small, enclosed and unventilated spaces presents a suffocation hazard due to high $CO_2$ concentration!

- When working in enclosed spaces, ensure that there is adequate ventilation to keep the $CO_2$ concentration in the ambient air below a dangerous level.
- Use $CO_2$ sensors with warning devices.
- See separate document “General Instructions and Safety Information – Working with $CO_2$”.



**NOTE**

The operator must ensure that the maximum working pressure in the supply line is not exceeded. The maximum operating pressure is included in the technical specification of the pelletizer. The machine has no internal pressure regulation.

- Carefully remove the lid and side walls of the transport box.
- Inspect the machine for signs of transport damage. Check all screws on the housing panels to make sure that they are properly tightened.
- Install the pelletizer as close as possible to the $CO_2$ storage tank, preferably at a distance of max. 3 m (9,843 ft). The pelletizer must be placed on a firm and level surface, protected from moisture and steam.

**CAUTION**

Set the ejection-side levelling feet 15 mm (0.59 in) higher than the opposite ones.
This allows any condensate that may form in the press chamber to drain away and prevent damage to the machine.

- Access area for operation and maintenance work must be at least 2 m on the operating side and 1 m on each of the other sides.

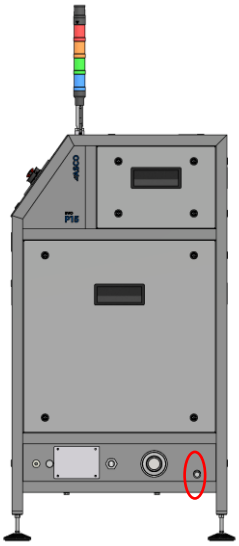
**When connecting to the $CO_2$ tank, please note:**

- Preferably use a hose insulated at the connection point.
- The connection to the pelletizer has a 1" female thread fitting (fig. 14, 1).
- The waste gas line has a 3" female thread fitting (fig. 14, 3).
- Run the other end of the line out of the building or connect it to a recovery system. The back pressure in the waste gas line must not exceed 0.1 bar (1.45 psi).



Fig. 15

- The liquid $CO_2$ line must be insulated and have no branches, constrictions or valves that could impede the free flow of liquid $CO_2$.



Condensate drain

Fig. 16

- Attach a drain hose to the condensate drain outlet.
- Prior to assembly, ensure that the lines for the liquid $CO_2$ and for the $CO_2$ waste gas are free of cutting oil, burrs and other machining residue.
- Avoid laying these cold lines above electrical components as these could be damaged by dripping condensate.
- Before insulating the liquid $CO_2$ supply line, pressurise it to ensure that there are no leaks.

| | |
|---|---|
|  | **WARNING**<br>**Risk of injury or damage due to pressure!**<br>Shut off $CO_2$ supply.<br>▪ Close the shut-off device (ball valve) of the $CO_2$ supply line.<br>▪ Start the machine to depressurise it.<br>▪ Residual pressure through the discharge valve in the supply line. |

If you have any queries, please contact ASCO.

## 4.3 COMMISSIONING AND INITIAL TESTING



**DANGER**

**Danger due to automatic start-up of the machine!** The machine can be started automatically externally (remote operation) without authorization from the operating personnel.

Before installation, commissioning, maintenance, cleaning and troubleshooting, please note the following points:

- Deactivate all interfaces in the Interfaces Settings menu (see chapter 5.1.19)
- The main switch is set to “OFF” and secured with a padlock to prevent it from being switched on again.



**WARNING**

**Danger due to incorrect commissioning work!**

- The chapter “Safety Instructions” must be read and understood
- All safety components must be present and functional
- Commissioning work may only be carried out in the presence of at least two specialists (one-man operation prohibited).



**CAUTION**

**Machine in operation without liquid $CO_2$ supply**
If the machine is operated without liquid $CO_2$, the sealing ring heats up and can lead to damage to the sealing ring and other components.

If these instructions are not followed, material damage will result:

- Only operate the machine with liquid $CO_2$
- Operating the machine without liquid $CO_2$ is prohibited!
- During installation, commissioning, operation, maintenance, servicing, and troubleshooting, do not run the machine for longer than 2 minutes without a $CO_2$ liquid supply.

### 4.3.1 Inspection of the location of installation before commissioning



**NOTE**

Depressurize and de-energize the machine: see chapter 5.2.9 "Depressurising the machine“ and chapter 5.2.10 "De-energising the machine".



**WARNING**

**The operating company must ensure that there are no further potential hazards from adjacent work processes, environmental conditions, etc. at the place of installation of the pelletizer!**
See chapter “2.2 TECHNICAL DATA" (Permissible ambient conditions)

- The operating company is responsible for the safe and professional installation of the machine.
- All work in connection with commissioning must be performed by qualified skilled workers.

### 4.3.2 Inspection of the $CO_2$ pipeline system and the warning devices



**DANGER**

**Danger due to lack of risk assessment and definition of additional measures!**

- Any measures required on the operator's side must be assessed and defined by the operator based on a local risk analysis (HAZOP), e.g. venting points for safety valves, drain valves, degassers, etc.
- During commissioning, the operating company must check whether all safety measures have been implemented correctly.
- Depending on the local conditions, a separate assessment must be conducted to determine all the locations where $CO_2$ can accumulate.
- Do not operate in closed spaces. Risk of suffocation.
- Caution, the $CO_2$ escapes at high speed and at a very high noise level.
- Loose parts or dirt particles are blown about by the escaping gas.
- $CO_2$ warning equipment is mandatory.
- All persons standing in the vicinity of $CO_2$ pipework or devices, must be equipped with personal $CO_2$ warning devices.
- Use prescribed personal protective equipment such as safety goggles, safety shoes with anti-slip soles, hearing protection, gloves and $CO_2$ warning devices.
- Processes upstream and downstream of the pelletizer must be designed so that a safe operating state is maintained at all times, even in the event of power failure.



**DANGER**

**Risk of injury or damage due to pressure!**

- Install a safety valve wherever liquid $CO_2$ can be trapped.
- Maintain correct safety valve design (25 bar / 362.6 psi).
- The correct layout of the drainage line of the safety valve must be calculated by a qualified specialist.
- The relief tap/ball valve must be installed by the operating company.
- The operating company must have the safety valves inspected and tested at the intervals prescribed by the manufacturer and according to the applicable statutory regulations.
- Asco recommends checking or replacing the safety valves every 2 years.

### 4.3.3 Inspection of the weld joints





**DANGER**

**Risk of injury due to pressure!**
**Risk of injury due to improper piping and welding!**

- All welding work must be carried out by qualified specialist technicians
- The local legal permissions are required for this.
- The welding technique must be performed according to best practice. All statutory welding regulations and rules must be adhered to.
- After welding, the pipelines must be professionally cleaned and flushed. Otherwise, fittings, valves, instruments and other components might become contaminated and/or damaged. This can result in serious damage to the machine.
- Professionally insulate all liquid $CO_2$ lines against heat gain. Provide additional protection for the insulation against mechanical damage and UV radiation.
- The pipeline must be inspected and approved for operation by a qualified specialist technician.

### 4.3.4 Inspection of the electrical installation



**DANGER**

**Risk of injury due to electric power and loose screws!**
All work on the electrical equipment must be performed by qualified specialist technicians.
Before connecting the machine to the power mains, check the following:

- Test protocols for the electrical installation in accordance with EN 60204-1, chapter 18 or the local regulations for the commissioning of electrical installations have been drawn up.
- All safety components are correctly installed and in a safe operating state.
- All cable connections are correctly tightened.
- All earthing terminals and connections are in place and securely connected.
- $CO_2$ pipeline segments Apply protective earthing
- All screws are tightened.
- No unprotected electrical contacts.
- Protection from external electrostatic phenomena.
- Sufficient protection from external influences on the electrical equipment.
- Use cable protection ducts.
- Use suitable, approved high-performance cables.
- Correct dimensioning of the connection cable.
- The cables must be inspected for damage before each use. If damage is discovered, have it professionally repaired. If there is damage to the cables, it is forbidden to operate the machine.

### 4.3.5 Checking the environment of the ASCO Pelletizer



**WARNING**

**Danger due to missing protective devices!**

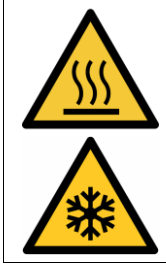
- Before every start-up of the machine, make sure that all safety guards are closed and all other safety equipment is in place and working properly.
- Check whether the upstream installation is designed for the liquid $CO_2$ consumption of the machine and make sure that the prescribed ambient conditions are met. See chapter "Technical data".



**CAUTION**

**Risk of slipping!**

- Connect the drip tray to a drainage system.
- Check draining water regularly to ensure it drains away freely.
- Risk of slipping due to condensate on the floor.



**WARNING**

**Danger from contact with parts of high or low temperature**

- All safety guards must be closed.

**WARNING**

**Risk of injury or damage due to access to machine by third parties!**

- Protect the pelletizer so that unauthorised persons cannot access or interfere with it.
- Prevent unauthorised access to the pelletizer (e.g. by installing a gate with lock).
- Secure the pelletizer against unintentional switching on (e.g. by attaching a padlock to the main switch).

### 4.3.6 Checking the installation of the extruder plate

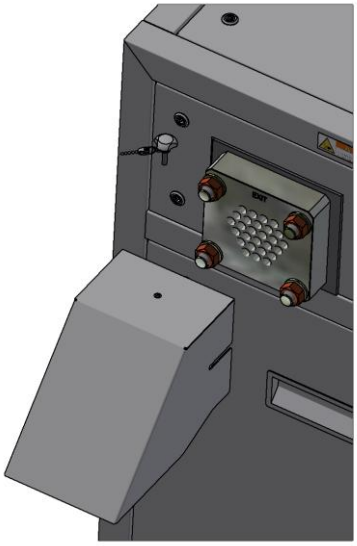


Fig. 17

- Fit the extruder plate and the ejector (Fig. 17) to the pelletiser and tighten the M24 nut. See torque specifications in Section 6.3 ‘TIGHTENING TORQUES’.

### 4.3.7 Checking and filling the hydraulic unit

- Fill the hydraulic unit with fluid. For filling quantities, see chapter 2.2 "TECHNICAL DATA"

**NOTE**

To ensure that the fluid is clean, pass it through a filter unit with a mesh size of 10 µm or less when filling the machine
See also chapter 6.2 "CHANGING THE HYDRAULIC FLUID"

- Open the front cover of the machine. Switch on the hydraulic system in menu "Manual Operation" to check the direction of rotation of the electric motor (fig. 18). The motor must rotate in the direction of the arrow. After checking, switch off the motor.
- The direction of rotation of the oil cooler should also be checked. If the oil cooler rotates in the direction of the arrow, it can be switched off again.

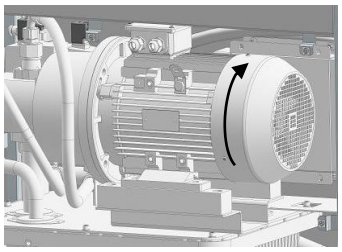


Fig. 18

**WARNUNG**

**Risk of injury from electric power!**

If the motor rotates in the opposite direction, you exchange the two phases at the connection terminals.

**CAUTION: Disconnect the mains plug!**

### 4.3.8 Functional test

- Start production as described in chapter 5.2 "START PRODUCTION“
- After to be sure the main motor turn on the right rotation and that no movement piston is occurred, stop immediately the machine and follow the chapter “4.3.9 Reinitialisation hydraulic pump”
- Perform a function test: if necessary, make adjustments and then run the test again.
- Stop the machine as follows:



**WARNING**

**Depressurise the machine!**

1. Close the ball valve in the liquid $CO_2$ supply line.
2. Continue producing until the $CO_2$ pressure is at 0 bar. (Below 14 bar / 203 psi an alarm is displayed that the $CO_2$ pressure is not optimal)
3. Press the button "END": 

.
4. Wait until the hydraulics have come to a standstill and then turn the main switch to "OFF".



**WARNING**

**De-energise the machine!**

- Turn the main switch to "OFF".
- Disconnect the pelletizer from the mains power supply.

- Commissioning and testing completed.

### 4.3.9 Reinitialisation hydraulic pump

| | |
|---|---|
|  | **DANGER**<br>**Risk of injury due to hydraulic oil!**<br>The following risks exist:<br>▪ Hazardous machine movements<br>▪ Whipping up of hose lines<br>▪ Parts being ejected away<br>▪ Leakage of pressurized fluid<br>▪ Slipping on leaks (oil spills)<br>▪ Fire hazard<br>▪ Skin and eye contact with pressurized fluids<br>▪ Inhalation of spray mist<br><br>The following work must only be carried out by qualified hydraulic technicians! |

- Disconnect the DN19 hydraulic hose on the hydraulic block side.
- Place the end of the hydraulic hose DN19 into a separate container.
- Briefly switch ON the unit for approximately 2/3 seconds until for fill approx 1 or 2 liters of oil on the container then immediately switch it off again the machine.
- Reinstall the hydraulic hose on the hydraulic block.
- Now the unit is now ready for use.

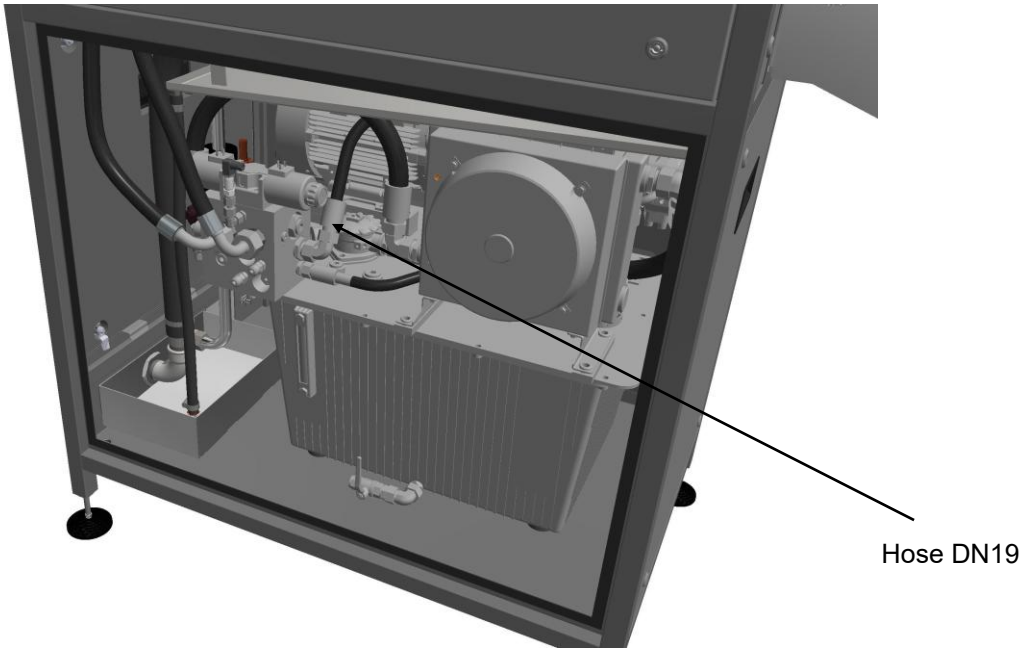



Fig.19

# 5 MACHINE OPERATION



**DANGER**

**Danger due to automatic start-up of the machine!**
The machine can be started automatically externally (remote operation) without authorization from the operating personnel.

- Deactivate all interfaces in the Interfaces Settings menu (see chapter 5.1.19)



**WARNING**

**Precondition for operation:**
- All safety instructions have been read and understood, see chapter 1 "GENERAL SAFETY INSTRUCTIONS".
- The machine has been correctly installed.



**WARNING**

**The operating company must ensure that there are no further potential hazards from adjacent work processes, environmental conditions, etc. at the place of installation of the pelletizer!**
See chapter 2.2 "TECHNICAL DATA" (Permissible ambient conditions)

- The operating company is responsible for the safe and professional installation of the machine
- All work in connection with the installation of the machine performed by qualified skilled workers.



**CAUTION**

**Risk of slipping!**
- Connect the drip tray to a drainage system.
- Check draining water regularly to ensure it drains away freely.
- Risk of slipping due to condensate on the floor.
- Wear safety shoes with anti-slip soles!



**WARNING**

**Danger from unsupervised machine and operating personnel!**
- Operation of the machine by a single worker is prohibited.
- Only operate the machine in the presence/supervision of several people.



**CAUTION**

**Machine in operation without liquid $CO_2$ supply**
If the machine is operated without liquid $CO_2$, the sealing ring heats up and can lead to damage to the sealing ring and other components.

If these instructions are not followed, material damage will result:

- Only operate the machine with liquid $CO_2$
- Operating the machine without liquid $CO_2$ is prohibited!
- During installation, commissioning, operation, maintenance, servicing, and troubleshooting, do not run the machine for longer than 2 minutes without a $CO_2$ liquid supply.



**WARNING**

**Risk of injury or damage due to access to machine by third parties!**
- Protect the pelletizer so that unauthorised persons cannot access or interfere with it.
- Prevent unauthorised access to the pelletizer (e.g. by installing a gate with lock).
- Secure the pelletizer against unintentional switching on (e.g. by attaching a padlock to the main switch).



**WARNING**

**Danger due to malfunction of $CO_2$ injection valve or leakage of $CO_2$ pipeline!**
Check and replace solenoid valve and $CO_2$ pipelines regularly according to the maintenance schedule.
In the event of leakage or malfunction of the solenoid valve (e.g. continued injection), proceed as follows:

- Stop the machine (EMERGENCY-STOP)
- Immediately close the manual $CO_2$ shut-off valve in the $CO_2$ liquid line
- Depressurize the machine as described in chapter 5.2.9
- Switch off the machine as described in chapter 5.2.10
- Turn the main switch to OFF
- Arrange for repairs to be made





**DANGER**

**Risk of injury or damage due to missing safety components!**
- The pelletizer may only be operated if all safety devices are installed and in good and safe condition.
- Extruder plate(s) must be installed before switching on the machine.

**Risk of injury from electric power!**
Exposed electrical contacts, electrostatic discharge, physical impact on electrical systems, etc. pose a high safety risk.
- Work on electrical installations may only be carried out by trained and qualified personnel.



**WARNING**

**Risk of injury due to swirling dry ice pellets!**

- During machine operation, all persons not directly involved in its operation must keep clear of the machine.
- Cordon off the work area.
- During machine operation, never touch or reach into the discharge unit.
- At the end of the shift: Depressurize the system, turn the main switch to OFF.



**WARNING**

**Risk of suffocation!**

Working in enclosed, unventilated spaces presents a suffocation hazard due to high carbon dioxide concentration!

- When working in enclosed spaces, ensure that there is adequate ventilation to keep the carbon dioxide concentration in the ambient air below a dangerous level.
- Use $CO_2$ warning devices.



**WARNING**

**Risk of injury to hands when reaching into machine!**

- Do not reach into the extruder plates at the discharge side when the machine is in operation.
- Make sure the ejection cover is correctly installed.
- To remove jammed product, shut down the machine and use suitable tools.



**WARNING**

**Danger from hot surfaces!**

Burns and scalds from hot or cold mediums of parts.

- When operating the pelletizer, always wear suitable protective gloves.



**WARNING**

**Danger from sudden loud noise!**

- When operating the pelletizer, always wear hearing protection.
- All persons standing close to the pelletizer must wear approved hearing protection.



**DANGER**

**Danger due to automatic start-up of the machine!**

Before removing any cover from the machine or performing any work on the mechanics and hydraulics, proceed as follows:

- Depressurize the machine as described in chapter 5.2.9
- Switch off the machine as described in chapter 5.2.10
- Turn the main switch to OFF
- Ensure that the machine is stopped, the main switch is turned to "OFF" and the power plug is pulled out!
- Ensure all local safety regulations are met!
- Covers can be removed.
- Arrange for repairs to be made

**Tests to be carried out before switching on:**

- $CO_2$ warning device installed and in operation
- Ventilation installed and in operation
- Fan inlets and outlets must be free
- Liquid $CO_2$ lines must be open
- Pelletizer pressure must be on
- $CO_2$ waste gas line must be open
- Process at $CO_2$ outlet must be ready
- Condensate must freely drain off
- Check whether there is sufficient air supply

| | NOTE |
|---|---|
| | To activate certain functions, such as manually controlling the actuators, a login is required.<br>User: ASCO<br>Password: ASCO<br>Password-protected functions must only be used by trained and authorised workers. |

### 5.1.1 Navigation page 1

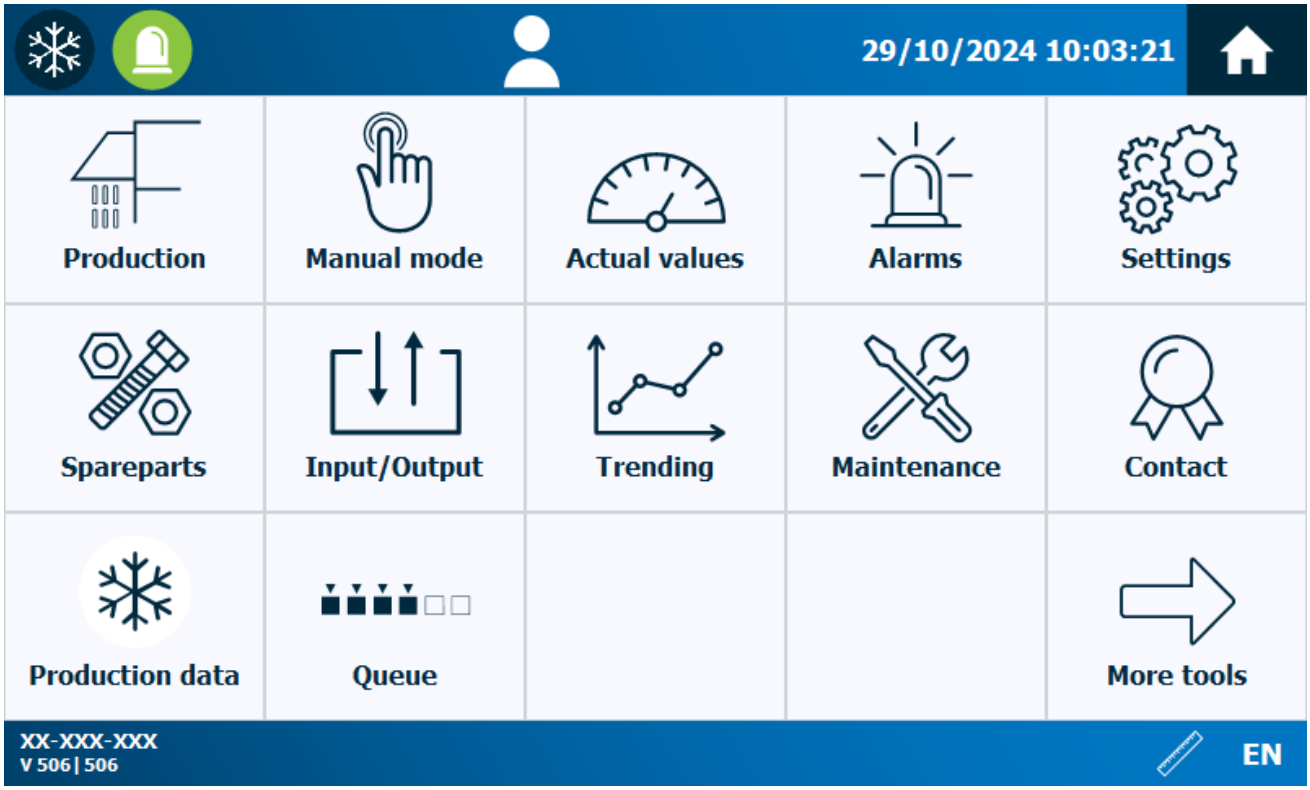
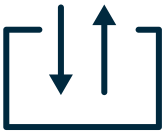



Fig. 20

| | |
|---|---|
| | Indicates production status. Press to call up "Production" page.<br>Blue: Dry ice production not running<br>Green: Dry ice production running |
| | Alarms: Press to call up "Alarms" page.<br>Green: No pending alarms<br>Orange: At least 1 pending warning (no production blockage)<br>Red: At least 1 pending alarm (production blockage) |
| | Press the Home button to call up the navigation page displayed above. |
| **EN** | Press to switch between different languages. |
| | This also results in a change from metric to imperial units. |

| | |
|---|---|
|  | Press to call up the "Production" page. |
|  | Press to call up the "Manual Operation" page. |
|  | Press to call up the "Actual Values" page. |
|  | Press to call up the "Alarms" page. |
|  | Press to call up the "Settings" page. |
|  | Press to call up the "Spare Parts" page. |
|  | Press to call up the "Input/Output" page. |
|  | Press to call up the "Trending" page. |
|  | Press to call up the "Service" page. |
|  | Press to call up the "Contact" page. |
|  | Production queue |
|  | Production data |
|  | Press to open 5.1.2 Navigation page 2. |

### 5.1.2 Navigation page 2

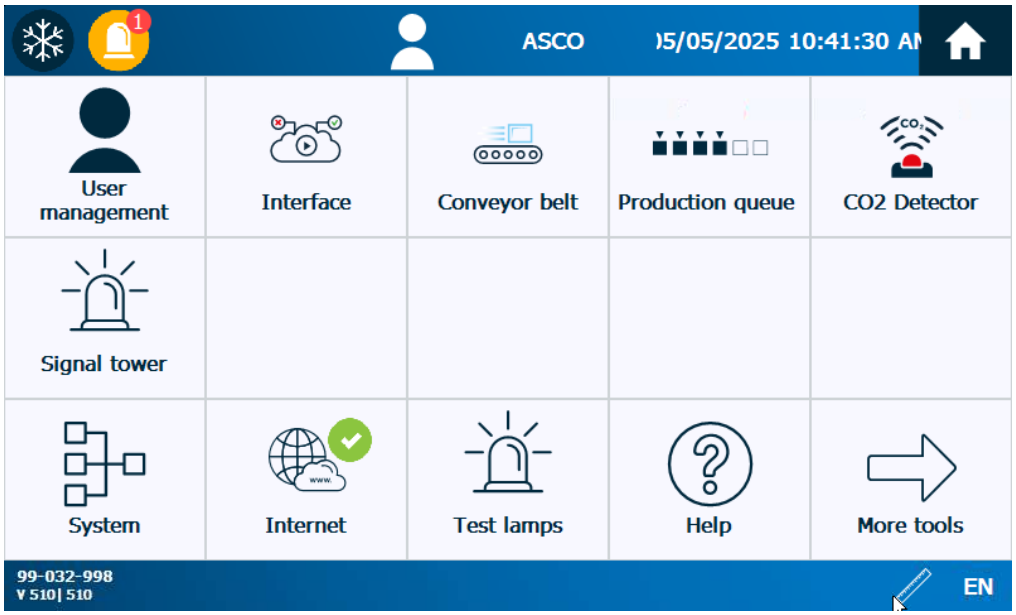


Fig. 21

| | |
|---|---|
| | **Press this button to call up the log-in dialog and user management page. Following successful logging in, the name of the logged-in user is displayed to the right. To log out, press this button again.** |
| | Press for Interface Settings -> 5.1.19 Settings - Interface |
| | Press for Conveyor Belt Settings -> 5.1.22 Settings – Conveyor Belt |
| | Press for Queue Settings -> 5.1.8 Configuring the production queue |
| | Press for $CO_2$ Detector Settings -> 5.1.21 Settings - CO2 Detector |
| | Press for Signal Tower Settings -> 5.1.24 Settings – Signal Tower |
| | Press for System Settings -> 5.1.25 System Settings |
| | Press for Internet Settings -> 5.1.26 Internet Settings |
| | Lamp test<br>By pressing the "Lamp test" button, all lamps will light up as long as the button is pressed.<br>The following lamps are lit:<br>- Release button<br>- Emergency Stop button<br>- Signal tower (blue, green, yellow, red, buzzer) |

| | |
|---|---|
|  | Press to open 5.1.1 Navigation page 1. |

### 5.1.3 Settings for production

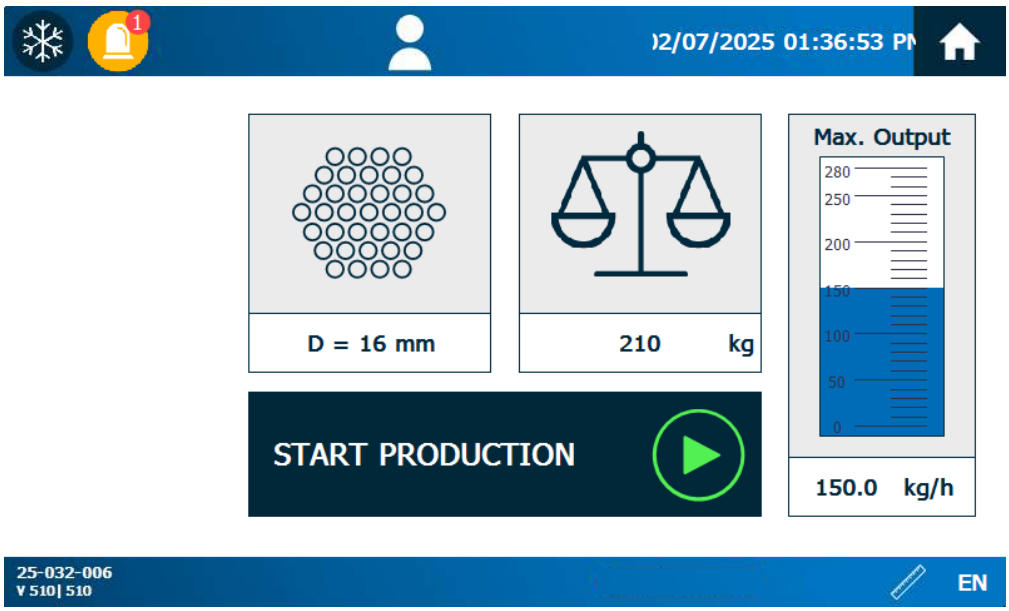
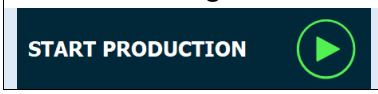



Fig. 22

| | |
|---|---|
| **START PRODUCTION** | The machine starts production. |
|  | Press this button to call up a pop-up dialog where you can configure the currently installed extruder plate. The settings should correspond to the currently installed extruder plate. |
|  | Press this button to call up a pop-up dialog for switching between operating modes:<br>- Fixed quantity: Production continues until the target quantity is reached (4 available setpoints).<br>- Continuous production: Production continues until the machine is stopped manually. |
| **70 kg** ∞ | If "Fixed quantity" is selected, the target quantity is displayed.<br>If "Continuous production" is selected, the ∞ symbol is displayed |
|  | Press to start production |

### 5.1.4 Selecting quantity for production




Fig. 23

| | |
|---|---|
|  | Continuous production: |
|  | User-defined quantity |
|  | Pre-selection 100kg dry ice box AT126 (quantity configurable) |
|  | Pre-selection 188kg dry ice box AT240W (quantity configurable) |
|  | Pre-selection 344kg dry ice box AT440 (quantity configurable) |
| X | Pressing closes the window |

### 5.1.5 Selecting pellet size for production

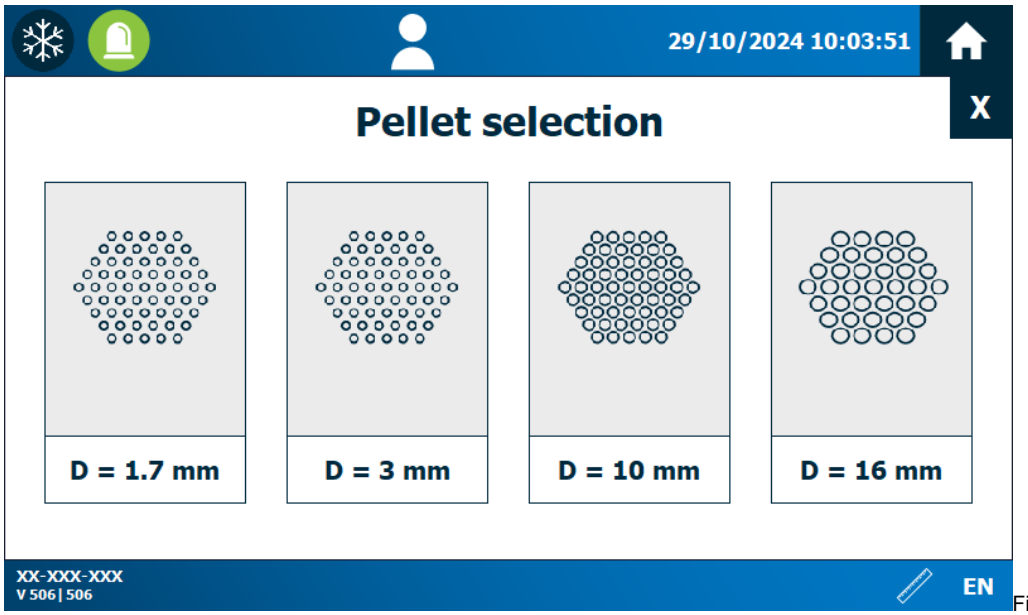


Fig. 24

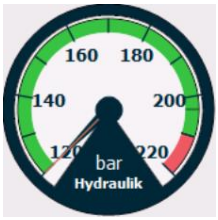
Select installed extruder plate

| | |
|---|---|
| | 1.7mm pellets |
| | 3mm pellets |
| | 10mm pellets |
| | 16mm pellets |
| X | Press to close the page |

### 5.1.6 Production is running (fixed quantity)




Fig. 25

| | |
|---|---|
|  | Current $CO_2$ pressure |
|  | Current hydraulic pressure |
| **0 %** | Progress display |
| **Target quantity** | The quantity selected at the start of production |
| **Open quantity** | The quantity still to be produced |
| **Time remaining** | The time remaining until the target quantity has been produced. |
| **END** | Press to end production. |
| **DRAIN CO2** | After pressing, the machine produces dry ice until a $CO_2$ pressure of zero bar is reached. When a $CO_2$ pressure of zero bar is reached, the machine stops production automatically. |

### 5.1.7 Production is running (continuous production)

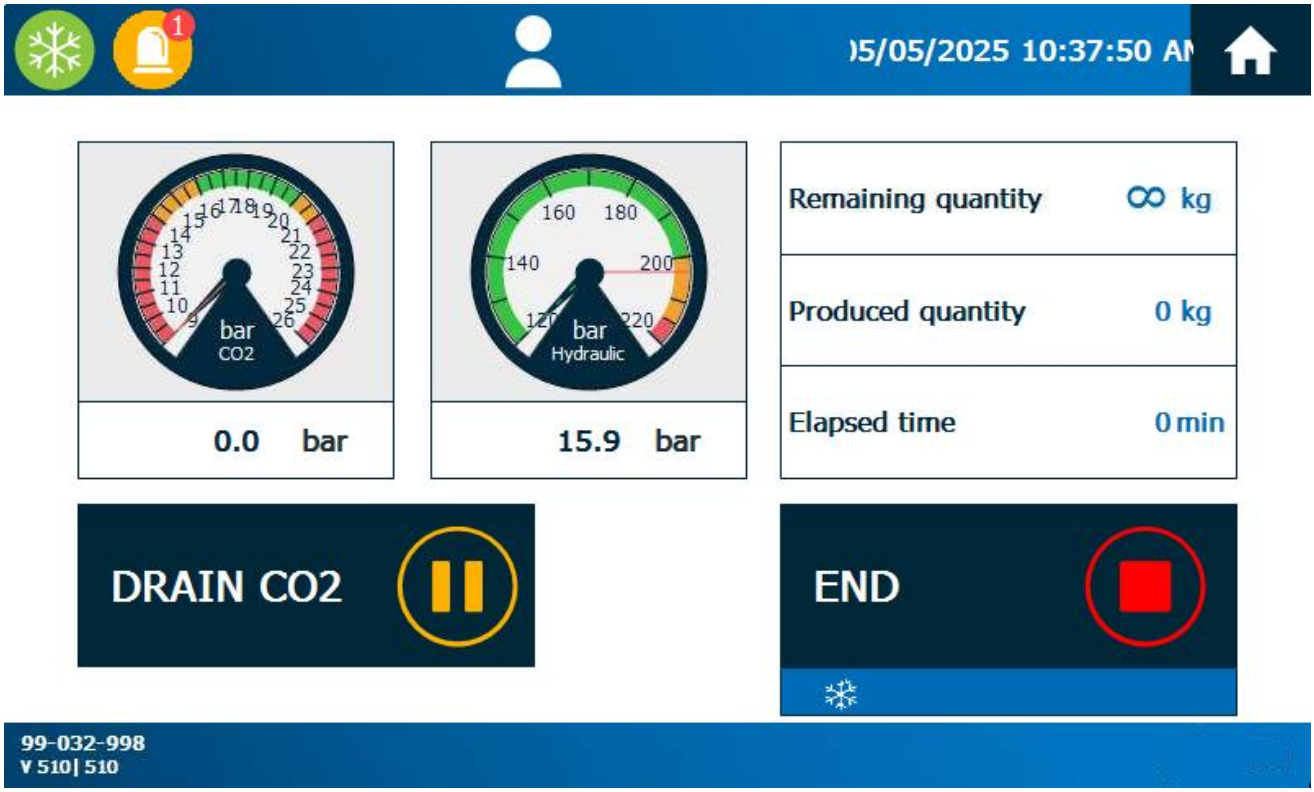
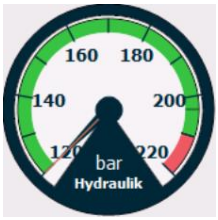



Fig. 26

| | |
|---|---|
|  | Current $CO_2$ pressure |
|  | Current hydraulic pressure |
|  | Animation |
| **Target quantity** | The quantity selected at the start of production. (here: Free production) |
| **Quantity produced** | The quantity produced since the start of production |
| **Run time** | The time elapsed since the start of production |
|  | Press to end production. |
|  | After pressing, the machine produces dry ice until a $CO_2$ pressure of zero bar is reached. When a $CO_2$ pressure of zero bar is reached, the machine stops production automatically. |

### 5.1.8 Configuring the production queue

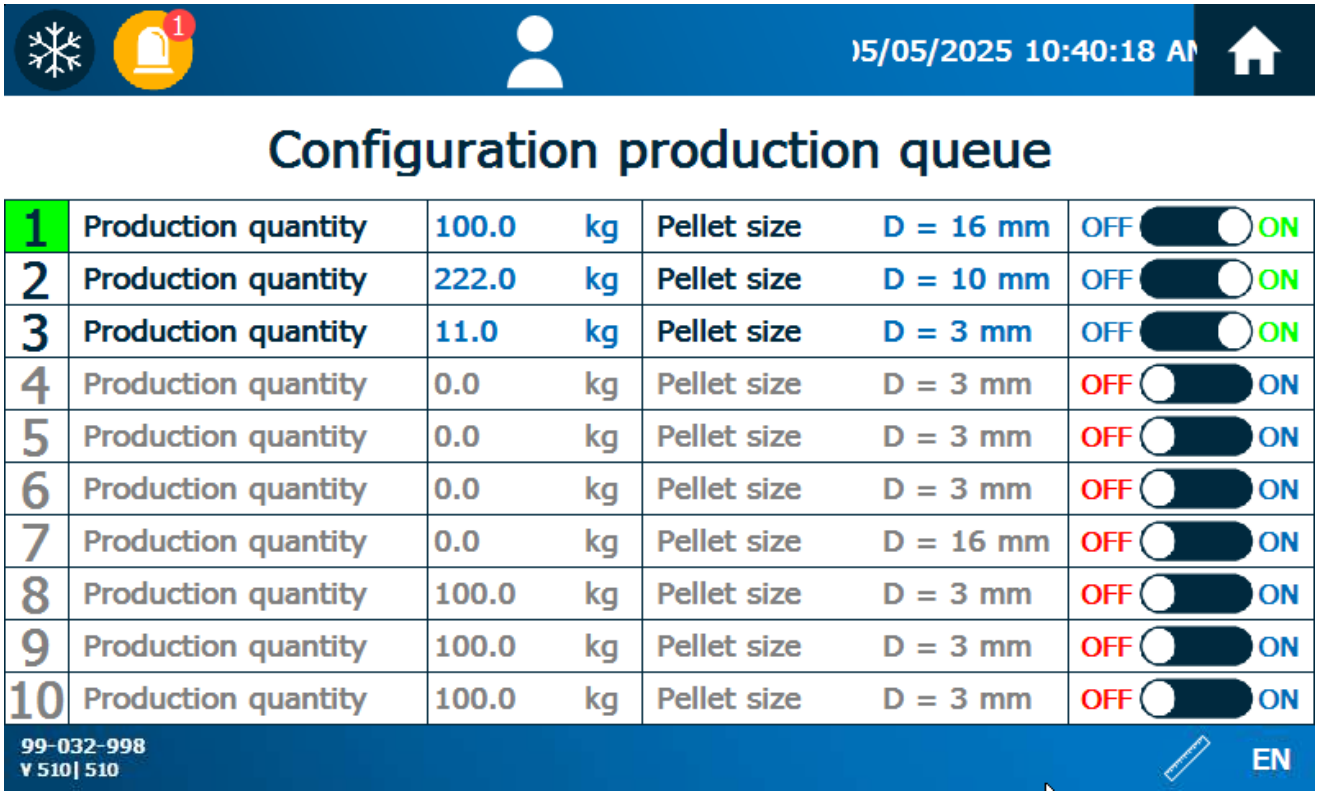



Fig. 27

The production queue can be configured here.

This queue is processed after configuration.

### 5.1.9 Evaluating the production data

The machine stores data from the last production orders.

The data from the current production is stored in data set "0". Once production is complete, this data is moved to data set 1.

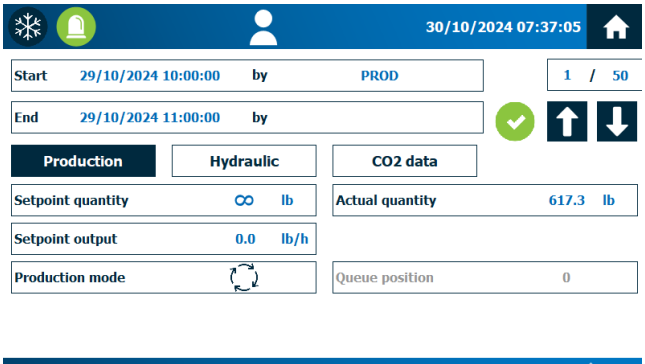



Fig. 28

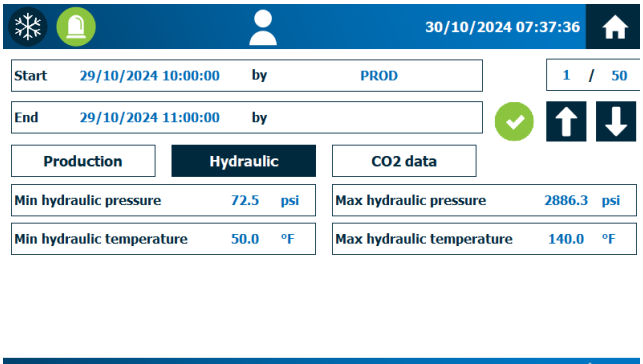



Fig. 29

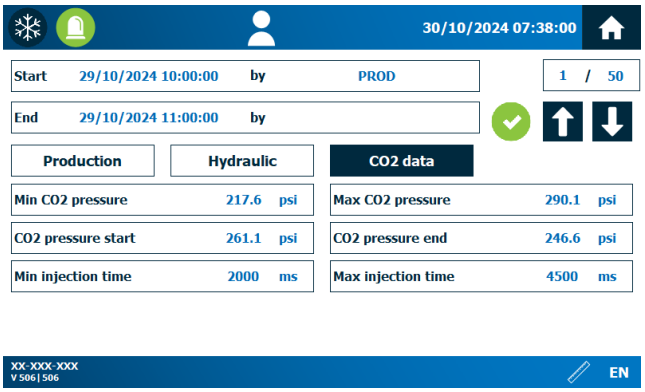



Fig. 30

### 5.1.10 Machine manual mode

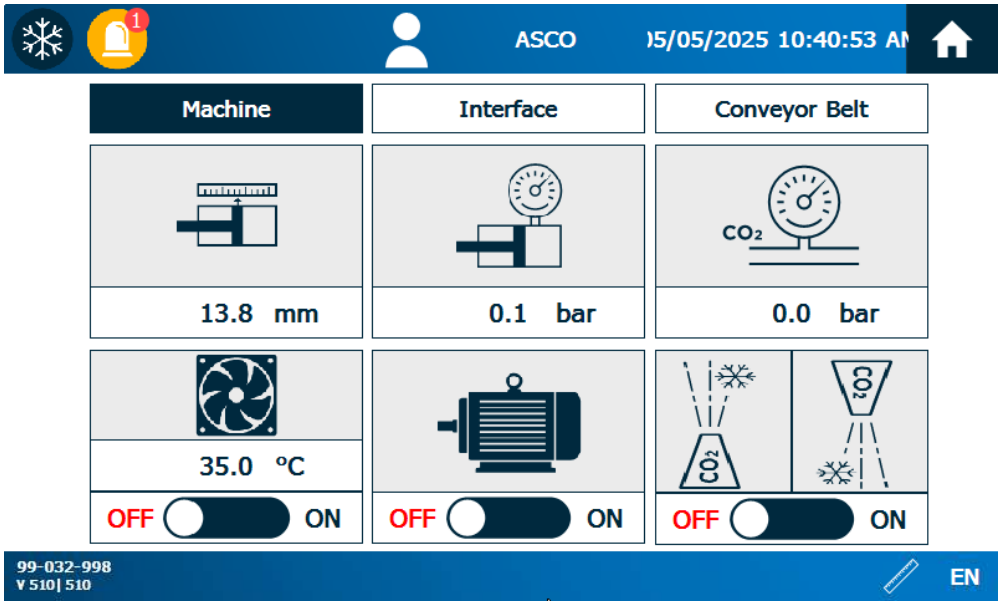
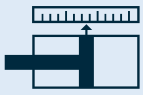
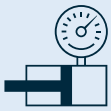
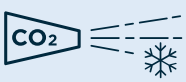



Fig. 31

| | |
|---|---|
|  | Current position of the piston, measured from the front.<br>Discharge position = 0 mm |
|  | Pressing makes it possible to move the piston forwards or backwards manually. (Buttons only visible when hydraulic motor is switched on) |
|  | Current pressure in piston. |
|  | Current $CO_2$ pressure. |
|  | Press to switch the fan on manually.<br>The fan switches on automatically when the hydraulic oil needs to be cooled in manual mode. |
|  | Press to make switch on the hydraulic motor manually.<br>The hydraulic motor has a start-up time of approximately 4 seconds. The piston can only be moved after the start-up time has elapsed.<br>A green check mark confirms that the hydraulic pump has started up completely.<br>The fan is switched on automatically in manual mode when the current situation requires it. (Hydraulic motor ON and hydraulic temperature too high) |
|  | Press to switch on the $CO_2$ valves manually (valves are open as long as button is pressed). The $CO_2$ valves can be switched individually or in combination.<br>By pressing the “OFF – ON” button, both valves are switched. |

### 5.1.11 Interface manual mode

If the interface signals are switched in manual mode, note the behaviour of the partner machine.

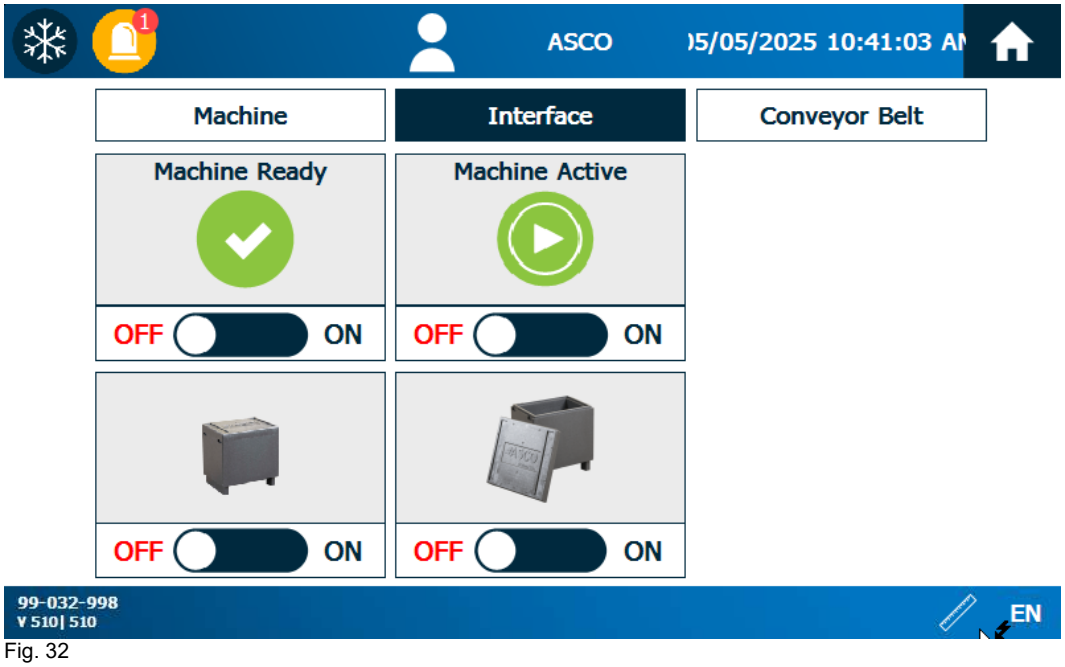


Fig. 32

| | |
|---|---|
|  | Machine is ready<br>Signals that the machine is ready to switch to automatic mode |
|  | Machine is active<br>The machine is in automatic mode |
|  | Batch is finished<br>Current production batch is completed. Machine is waiting for confirmation |
|  | Machine is emptied<br>Machine has run out of power. No more $CO_2$ pressure on the machine |

### 5.1.12 Manual mode - Conveyor belt

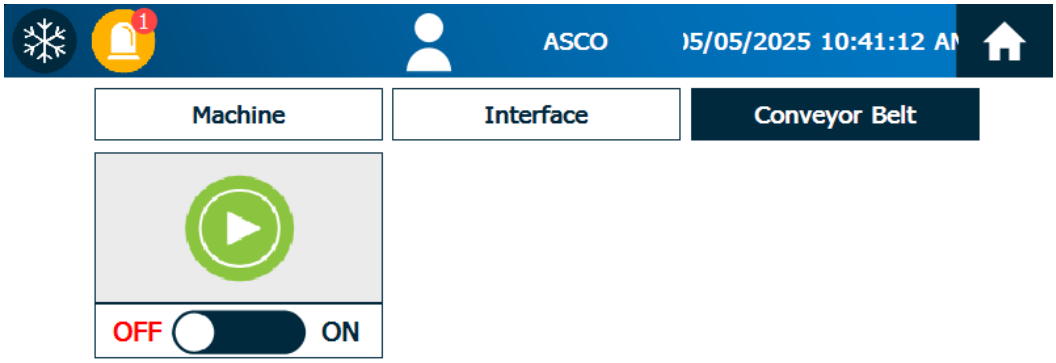



Fig. 33

| | |
|---|---|
|  | Conveyor belt ON<br>Gives a start command to the connected conveyor belt |

### 5.1.13 Current values - Overview

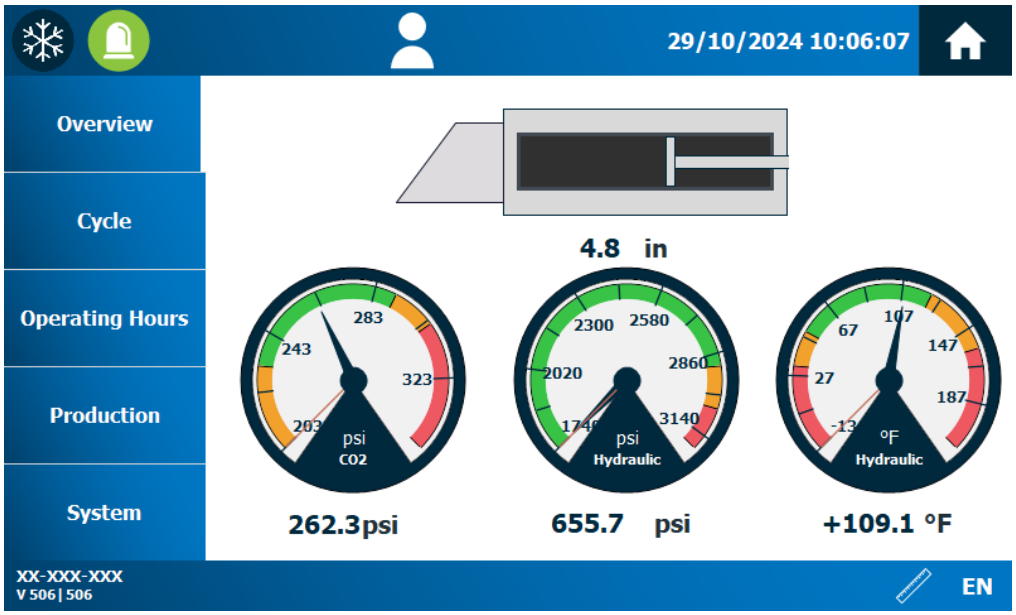
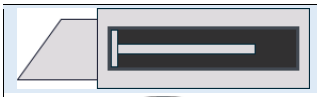
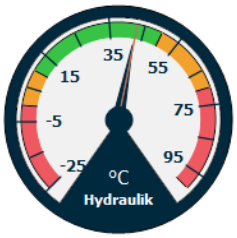



Fig. 34

| | |
|---|---|
|  | Current position of the piston, measured from the front.<br>Discharge position = 0 mm |
|  | Current $CO_2$ pressure |
|  | Current pressure in piston. |
|  | Current temperature of the hydraulic oil |

### 5.1.14 Current values - Cycle

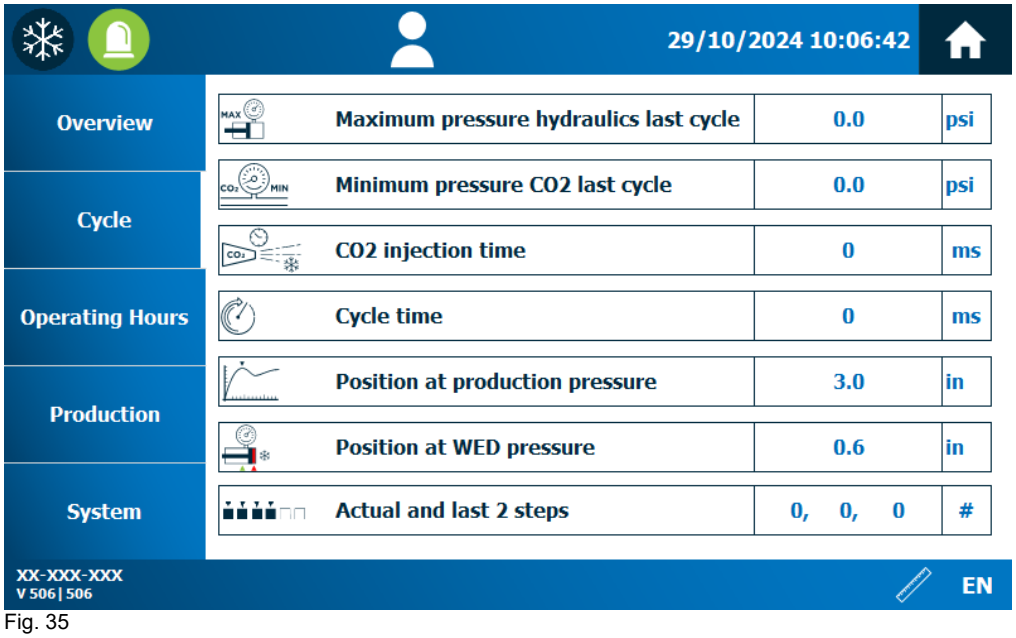
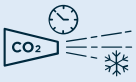
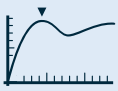



Fig. 35

| | |
|---|---|
|  | Display of the maximum hydraulic pressure of the last cycle |
|  | Display of the minimum hydraulic pressure in last cycle |
|  | Display of the currently calculated $CO_2$ injection time |
|  | Cycle time |
|  | Position when production pressure is reached |
|  | Position when WED pressure is reached |
|  | Current and last 2 steps |

### 5.1.15 Current values - Operating hours

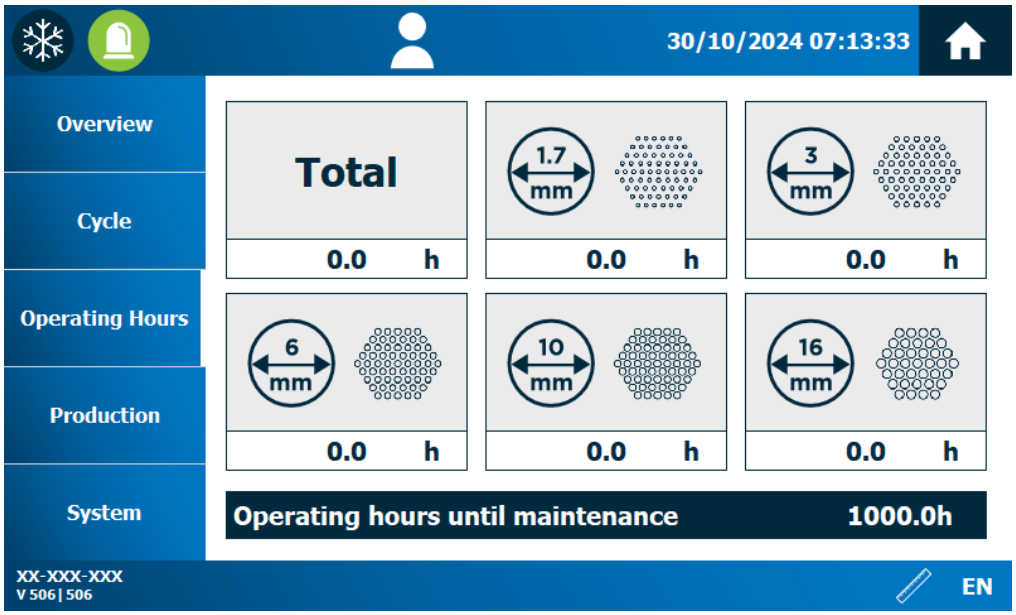


Fig. 36

| | |
|---|---|
| **TOTAL** | Total operating hours of pelletizer |
| 1.7 mm | Operating hours - 1.7mm pellets |
| 3 mm | Operating hours - 3mm pellets |
| 6 mm | Operating hours - 6mm pellets |
| 10 mm | Operating hours - 10mm pellets |
| 16 mm | Operating hours - 16mm pellets |
| **Hours until service** | Operating hours until next service is due |

### 5.1.16 Current values - Production

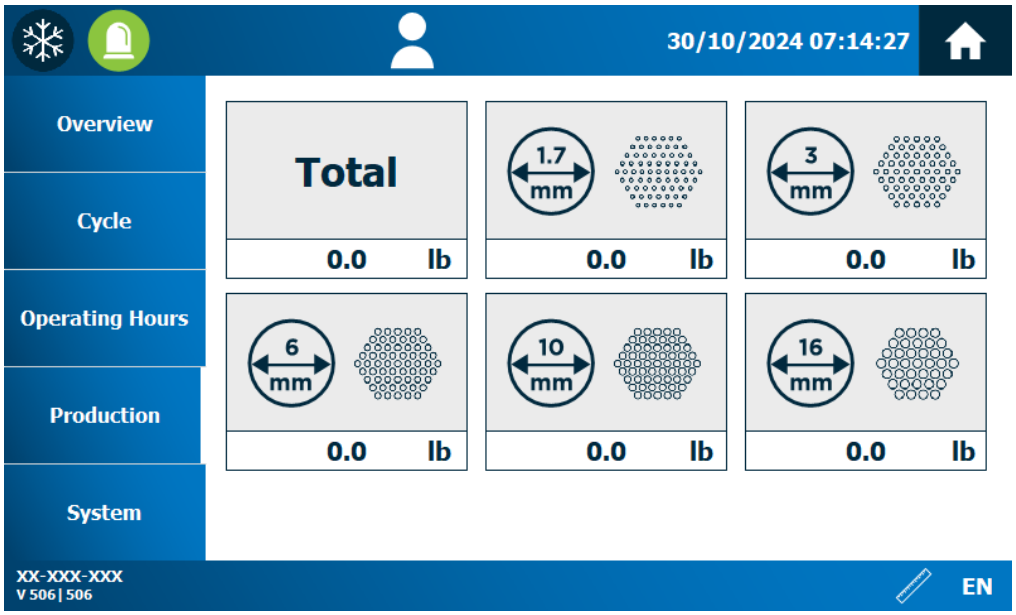



Fig. 37

| | |
|---|---|
| **TOTAL** | Total quantity of pellets produced |
| 1.7 mm | Quantity of 1.7mm pellets produced |
| 3 mm | Quantity of 3mm pellets produced |
| 6 mm | Quantity of 6mm pellets produced |
| 10 mm | Quantity of 10mm pellets produced |
| 16 mm | Quantity of 16mm pellets produced |

### 5.1.17 Current values - System

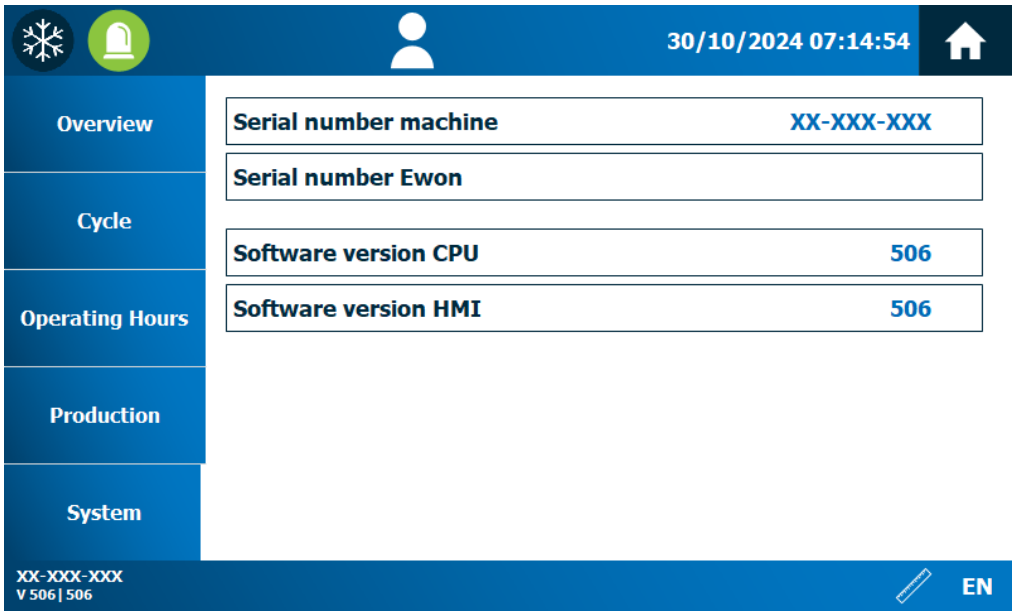



Fig. 38

| | |
|---|---|
| **System serial number** | Serial number of system as recorded in ASCO system |
| **eWON serial number** | The serial number of the remote maintenance unit |
| **Software version CPU** | The software version of the PLC |
| **Software version HMI** | The software version of the HMI |

### 5.1.18 Settings overview

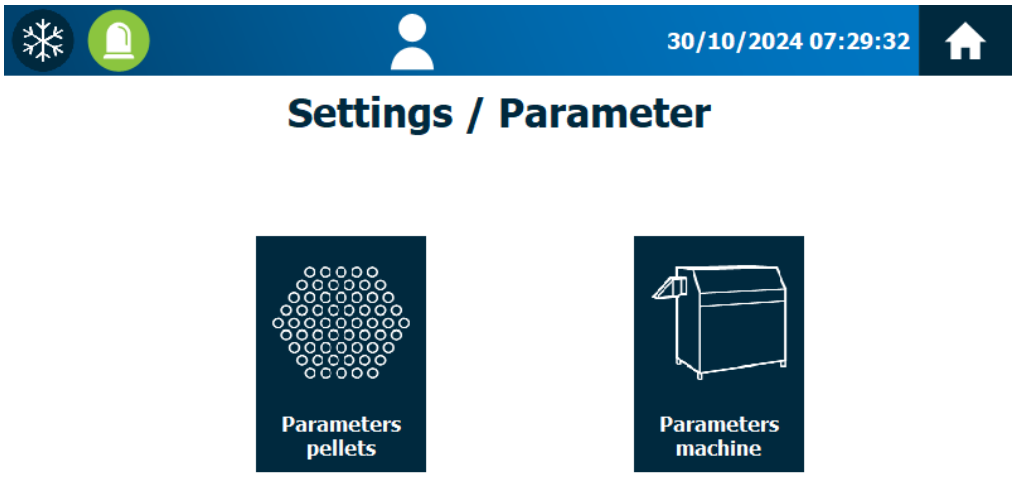
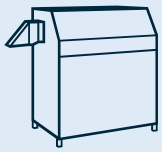



Fig. 39

| | |
|---|---|
|  | Press opens the Pellets Parameters page<br>(Only for ASCO and certified bodies) |
|  | Press opens the System Parameters page<br>(Only for ASCO and certified bodies) |

### 5.1.19 Settings - Interface

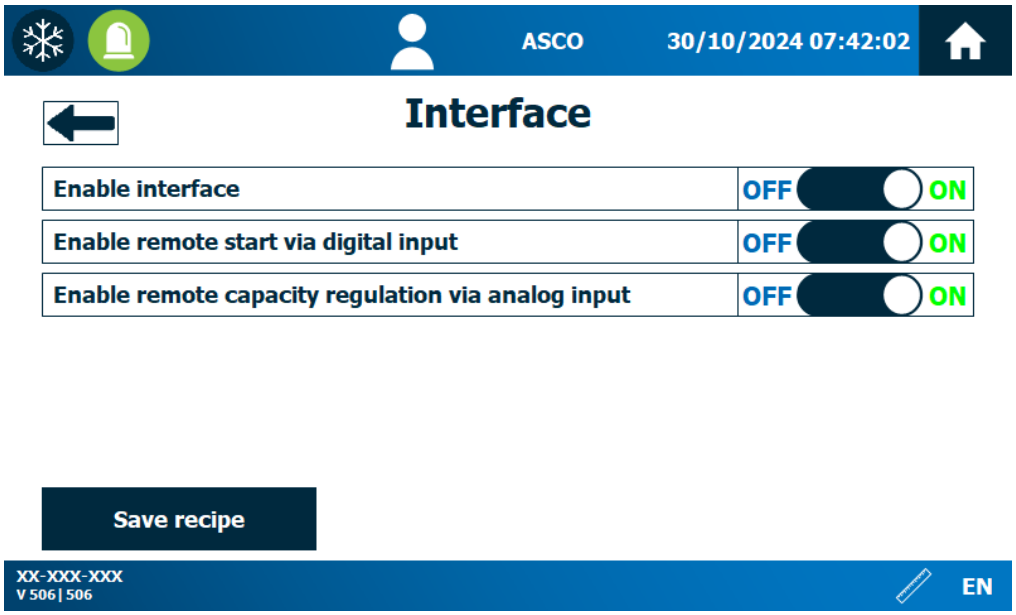



Fig. 40

The user "ASCO" is required to configure the interface settings.

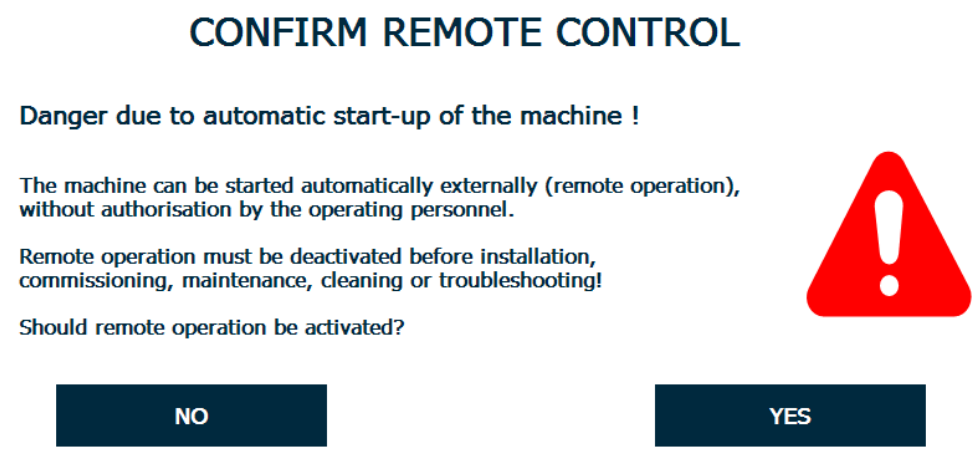
On this page, you can specify the interface for external machine start signals. If the switch is set to "OFF", external signals are ignored.

If the interface is activated, status signals from the machine are sent out.
If the parameters “Allow external start via digital input” are activated, the machine can be started by external signals.

If the parameter “Allow external power control via analog input” is set, the power setting is specified via the analog input.

### 5.1.19.1 Switching on the machine with remote

When the machine is switched on, the following field appears on the control panel if remote operation is activated.






**DANGER**

**Danger due to automatic start-up of the machine!** The machine can be started automatically externally (remote operation) without authorization from the operating personnel.

- Deactivate all interfaces in the Interfaces Settings menu (see chapter 5.1.19)
- The main switch is set to “OFF” and secured with a padlock to prevent it from being switched on again.



**NOTE**

For more detailed information on connecting the external interface, please refer to the electrical diagram.

### 5.1.20 Settings - User Management

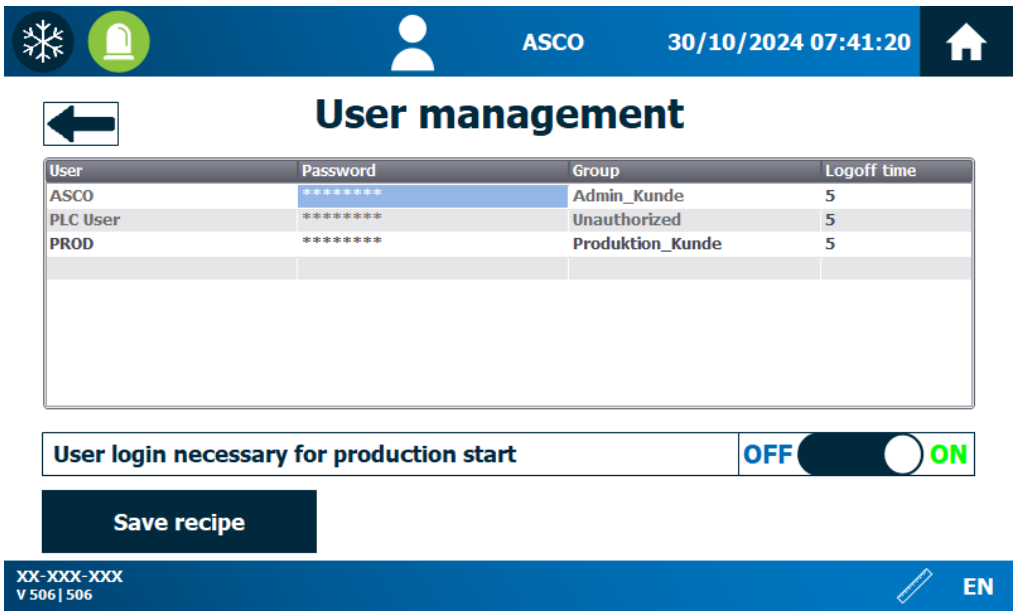



Fig. 41

The user “ASCO” is required to configure the user management settings.

You can create your own users in the user management. The new users can be assigned to predefined groups with different operating rights.

The user group Admin_Customer makes all settings available to the customer.
The Production_Customer user group only has access to production-relevant settings.

The user "PROD" is intended for normal operation of the machine. This includes starting and stopping production, as well as viewing production data.

The user “ASCO” is reserved for the shift manager. This user allows the configuration of the machine, as well as all functions of the user "PROD".

If the setting “User login required to start production” is enabled, login is required to start production.
This ensures that only authorized personnel can switch on this machine. Which logged in user started and ended production is recorded under the production data.

### 5.1.21 Settings - CO2 Detector (OPTION)

This machine interface is designed for a $CO_2$ detector distributed by ASCO.

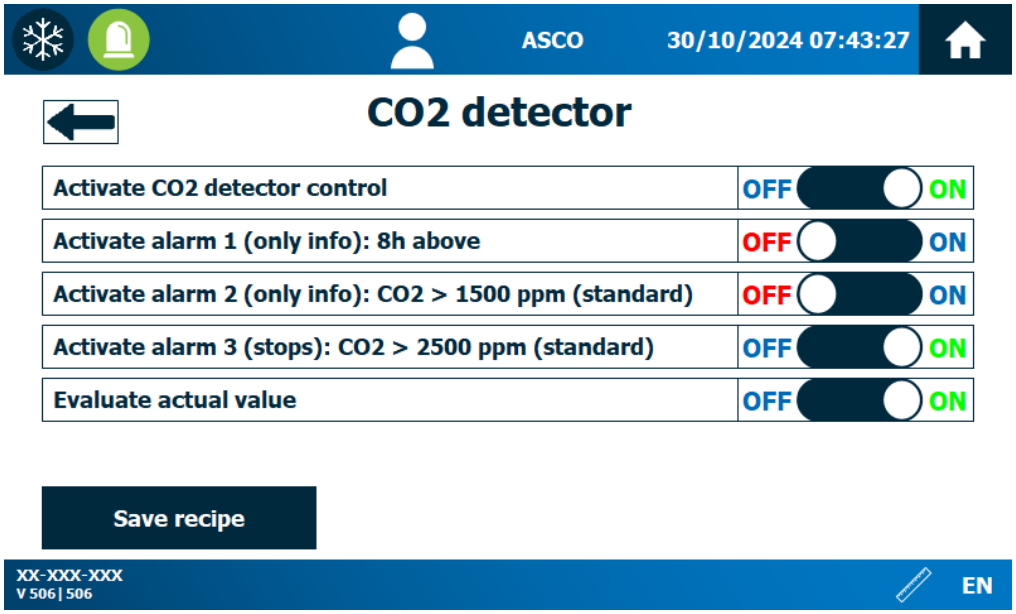



Fig. 42

To configure the $CO_2$ detector settings, the user "ASCO" is required.

The parameter “Activate $CO_2$ detector control” activates the evaluation of a $CO_2$ detector.

The parameter "Activate Alarm 1" activates the evaluation of the alarm "$CO_2$ Alarm 1: 8h over 0.5%" on the machine panel. This alarm is only a message and does not deactivate the machine. When this alarm is triggered cannot be configured on the $CO_2$ detector.

The parameter "Activate Alarm 2" activates the evaluation of the alarm "$CO_2$ Alarm 2: info only" on the machine panel. This alarm is only a message and does not deactivate the machine. When this alarm is triggered can be configured on the $CO_2$ detector.

The parameter "Activate Alarm 3" activates the evaluation of the alarm "$CO_2$ Alarm 3: Machine stops" on the machine panel. This alarm is only a message and does not deactivate the machine. When this alarm is triggered can be configured on the $CO_2$ detector.

| | NOTE |
|---|---|
| | For detailed information on connecting the external interface, please refer to the electrical diagram. |

### 5.1.22 Settings – Conveyor Belt (OPTION)




Fig. 43

To configure the conveyor belt settings, the user "ASCO" is required.

The parameter "Activate conveyor belt control" activates the control of a conveyor belt connected to the pelletizer.

The parameter “Feedback conveyor belt is ON present” evaluates the current status of the conveyor belt. If this parameter is activated, the alarm “Conveyor belt not ON” can be generated.

The parameter "Conveyor belt run-on time" allows the conveyor belt to run for the number of seconds after automatic operation has ended. This allows the conveyor belt to run empty. The run-on time is the time it takes for a pellet of dry ice to travel on the conveyor belt to the next machine.

| | |
|---|---|
| | **NOTE** |
| | For detailed information on connecting the external interface, please refer to the electrical diagram. |

### 5.1.23 Settings - Production Queue

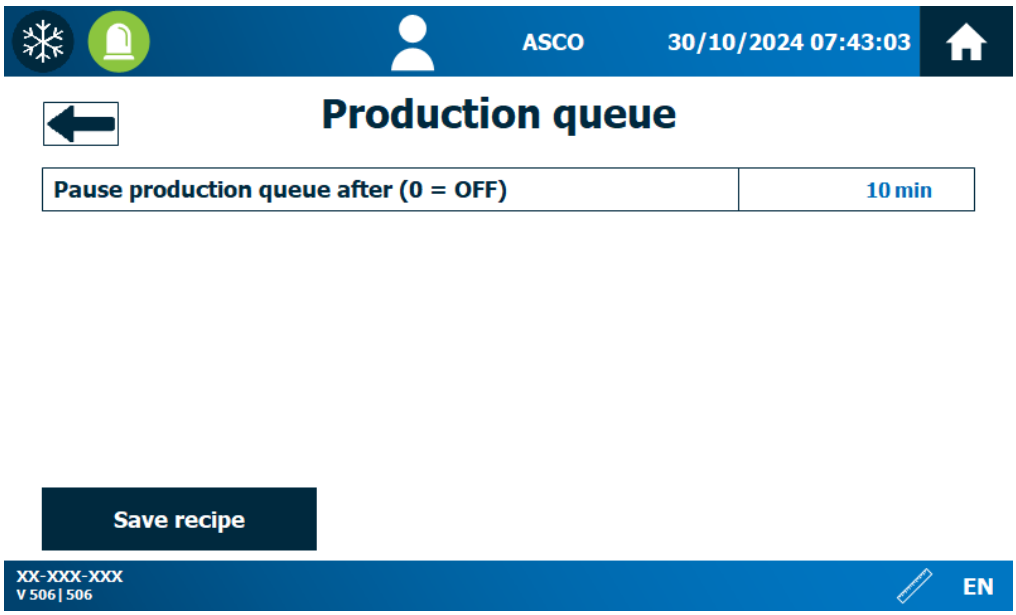



Fig. 44

The user "ASCO" is required to configure the production queue settings.

Once a production batch is completed, the machine stops production. A new production batch must be restarted.

### 5.1.24 Settings – Signal Tower

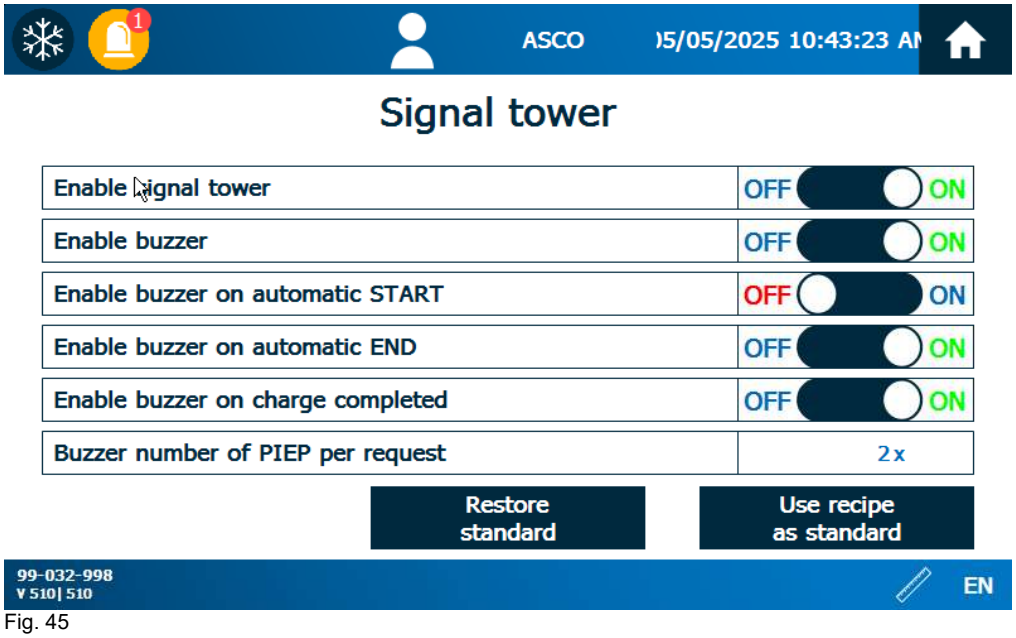



Fig. 45

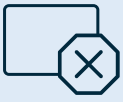
To configure the signal tower settings, the user "ASCO" is required.

| | |
|---|---|
|  | Blue indicates that operator intervention is necessary |
|  | Green indicates active production |
|  | Yellow indicates a stationary machine |
|  | Red indicates a fault on the machine |
|  | Buzzer signals a change in state of the machine<br>The buzzer can be configured in the signal tower settings. |

### 5.1.25 System Settings




Fig. 46

| | |
|---|---|
|  | If the machine is connected to the Internet, the date and time are automatically obtained from the Internet according to the set time zone.<br><br>If the machine is not connected to the Internet, the time can be set directly. |
|  | Press to call up a page that is not touch-sensitive so that the screen can be cleaned (timeout 30 seconds) |
|  | Press to call up a dialog for screen calibration |
|  | Press to log out the currently logged-in user |
|  | Press to end the runtime |
|  | Press to switch between different languages |
|  | Press to switch between unit systems (metric or imperial). |

### 5.1.26 Internet Settings

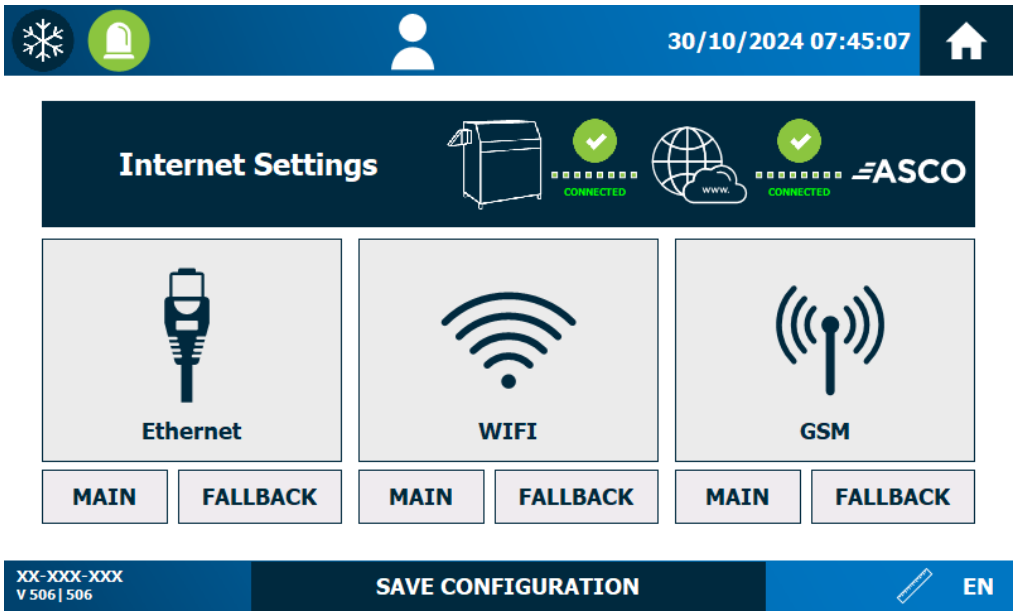



Fig. 47

With this ASCO pelletizer it is possible to select a main (MAIN) and a fallback solution (FALLBACK) for the Internet connection. It is possible to identify which type is selected for which scenario via the green frame.

| | |
|---|---|
|  | Display concerning whether the system is connected to the Internet. (Pressing updates status) |
|  | Display concerning whether VPN connection is in order (Pressing updates status) |
|  | Here you can make the Ethernet settings for the Internet connection. (Only for ASCO and certified bodies) |
|  | Press to adjust WIFI settings for internet connection. (Only for ASCO and certified bodies) |
|  | The GSM settings for the Internet connection can be made here. (Only for ASCO and certified bodies) |

### 5.1.27 Internet settings – Configure IP addresses

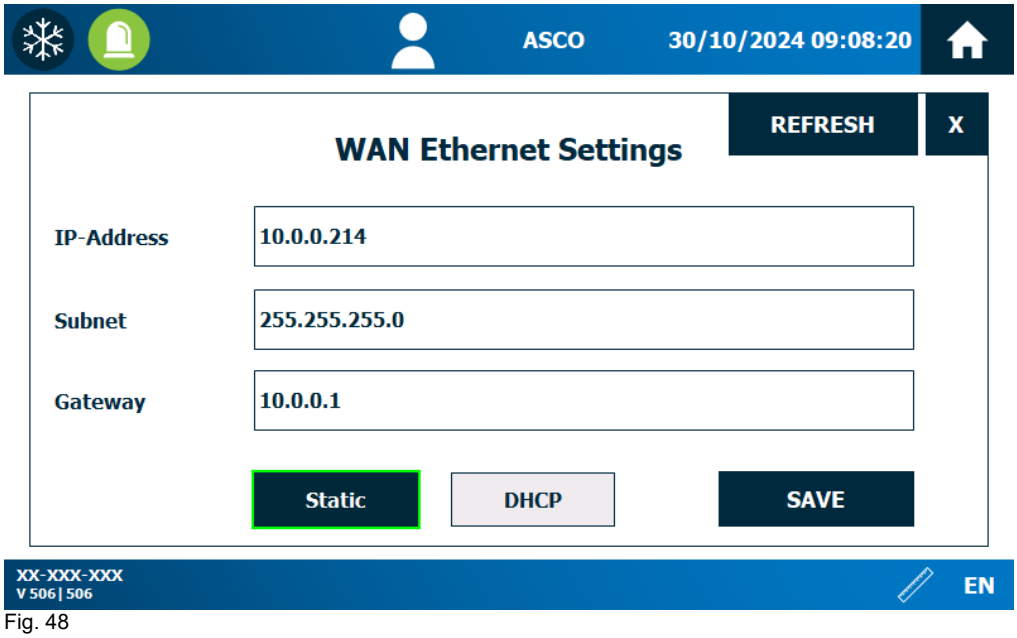



Fig. 48

Network settings for accessing your network can be entered here.

You can obtain the values for this configuration from your IT administrator.

If you do not know any specific settings, use “DHCP” as the first value.

**WARNING**

**Risk of damage from IT security vulnerabilities!**
Unauthorized access can lead to unintentional changes to control functions and hazards.
- Observe IT security measures, see chapter 1.9 IT SECURITY VULNERABILITIES

### 5.1.28 Internet settings – Configure WIFI

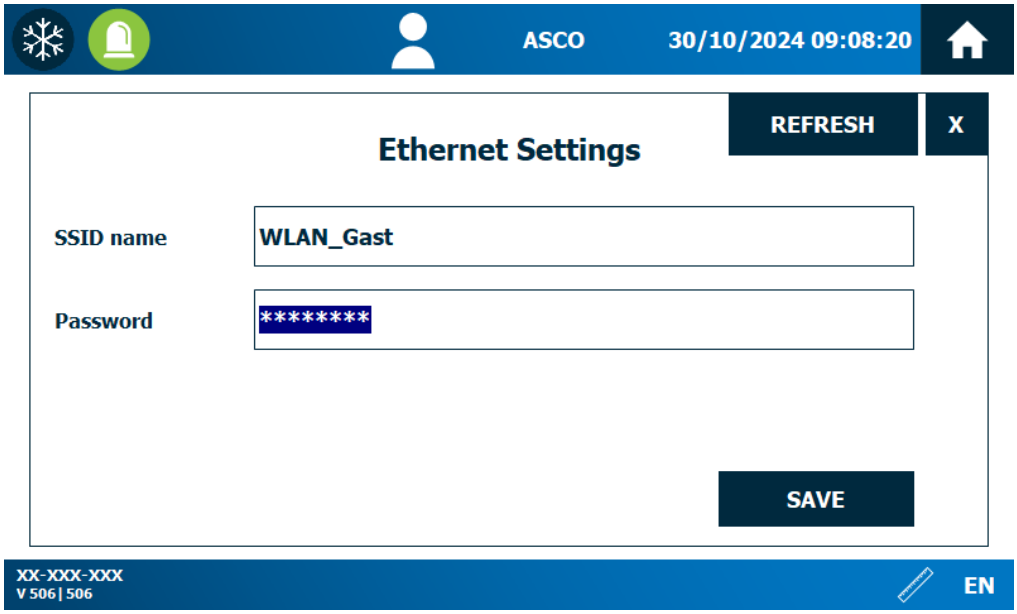



Fig. 49

| Parameter name | Function |
|---|---|

| | |
|---|---|
| SSID name | Name of the WiFi network |
| Password | Password of the WiFi network |

### 5.1.29 Internet settings – Configure GSM

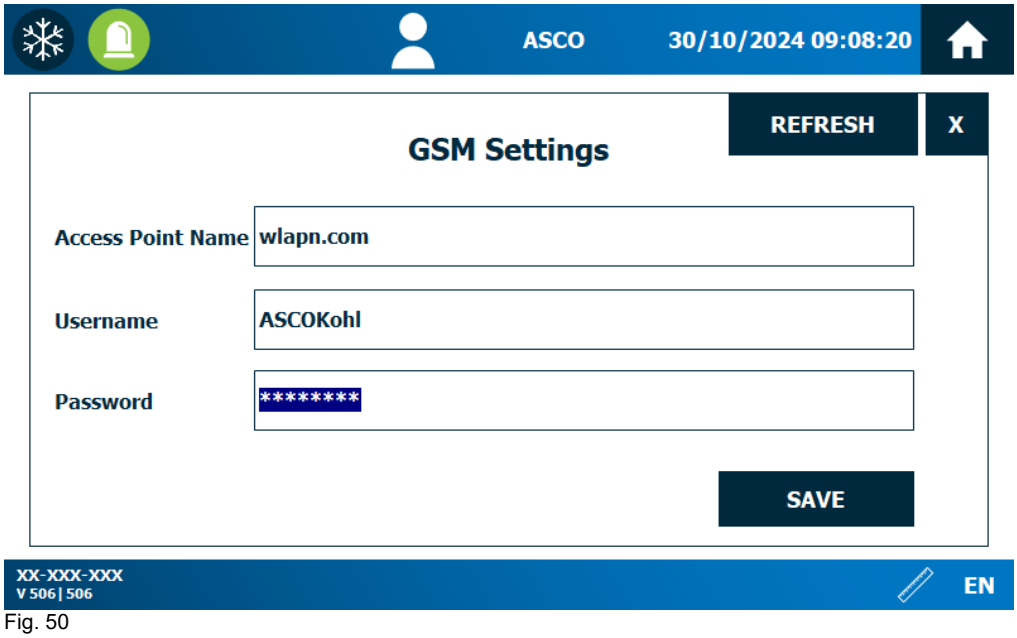



Fig. 50

If you use the SIM card provided by ASCO, no settings are necessary here.

If you use your own SIM card, you must enter the data provided by your Internet provider here so that an Internet connection can be established.

### 5.1.30 Input – Output - Overview

The input-output overview pages display the current status of the digital inputs and outputs.
By pressing any field, a description of the respective symbol is shown.

These pages are purely informative and provide support for troubleshooting or service.

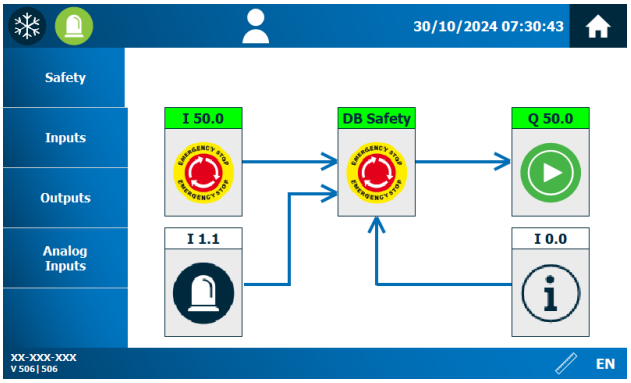


Fig. 51

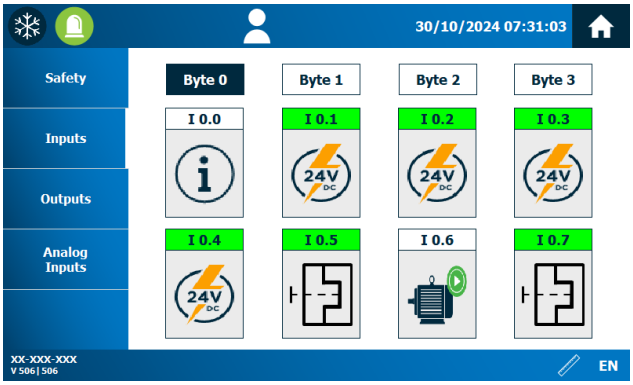


Fig. 52

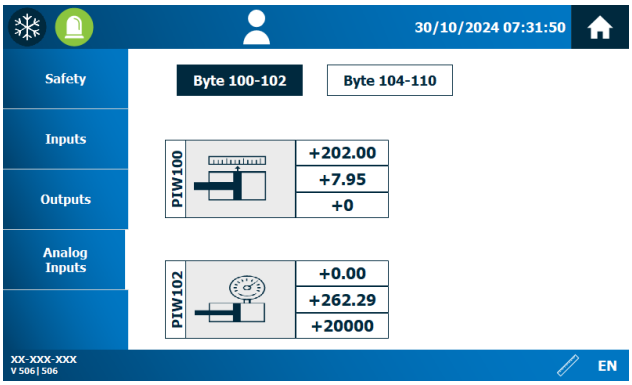


Fig. 53

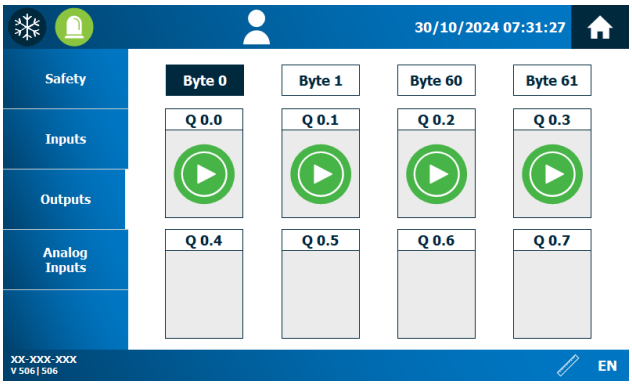


Fig. 54

| | |
|---|---|
| | **NOTE** |
| | The address field represents the logical signal state.<br><br>Green = logical 1<br>White = logical 0<br><br>If the field is green, an active 24V signal is received at the input.<br>If the field is white, there is no active 24V signal at the input. |

### 5.1.31 ASCO Help Center




Fig. 55

This QR code provides direct access to the ASCO Help Center.

### 5.1.32 Trending

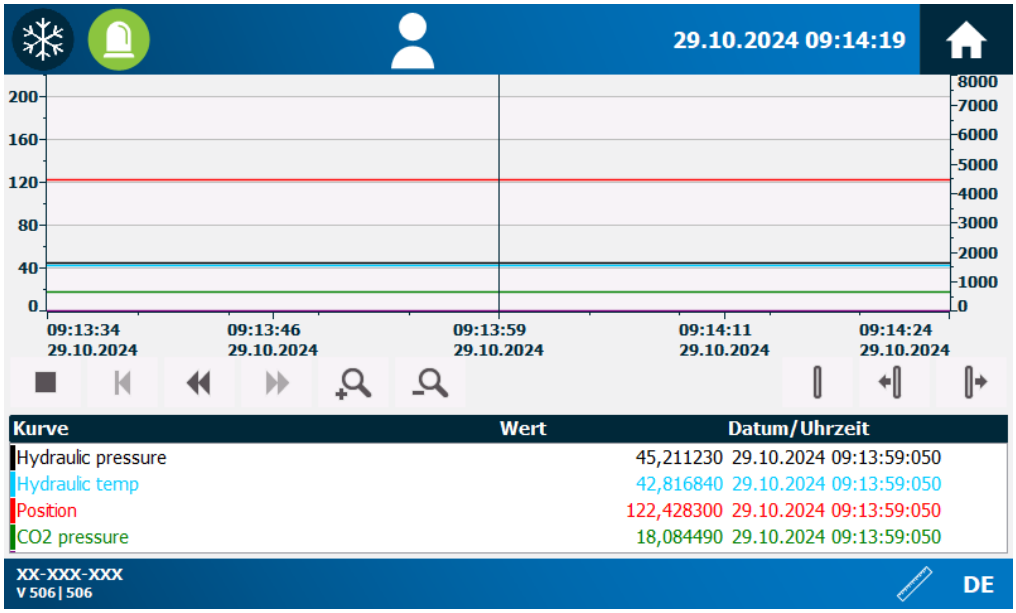



Fig. 56

In this view, the following values can be observed live in trend curve format:

- Hydraulic pressure (black)
- Piston position (red)
- $CO_2$ pressure (green)
- $CO_2$ injection time (violet)

### 5.1.33 Overview of service

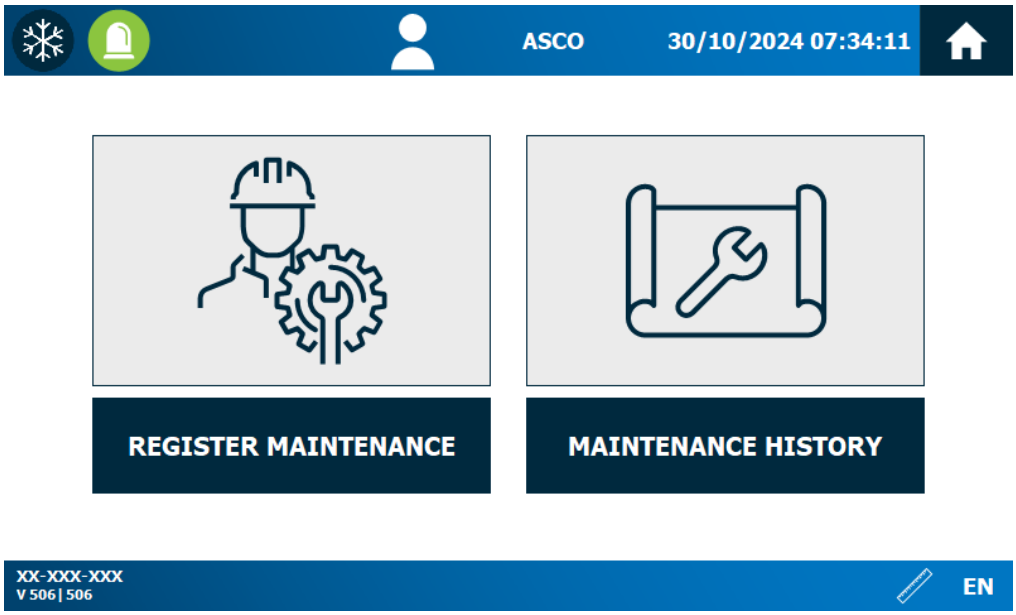
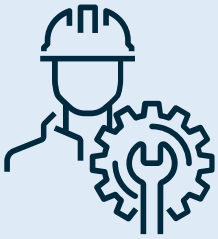



Fig. 57

| | |
|---|---|
|  | Pressing opens the page “Alarm History” |
|  | Pressing opens the page “Service History” |

### 5.1.34 Service Registration

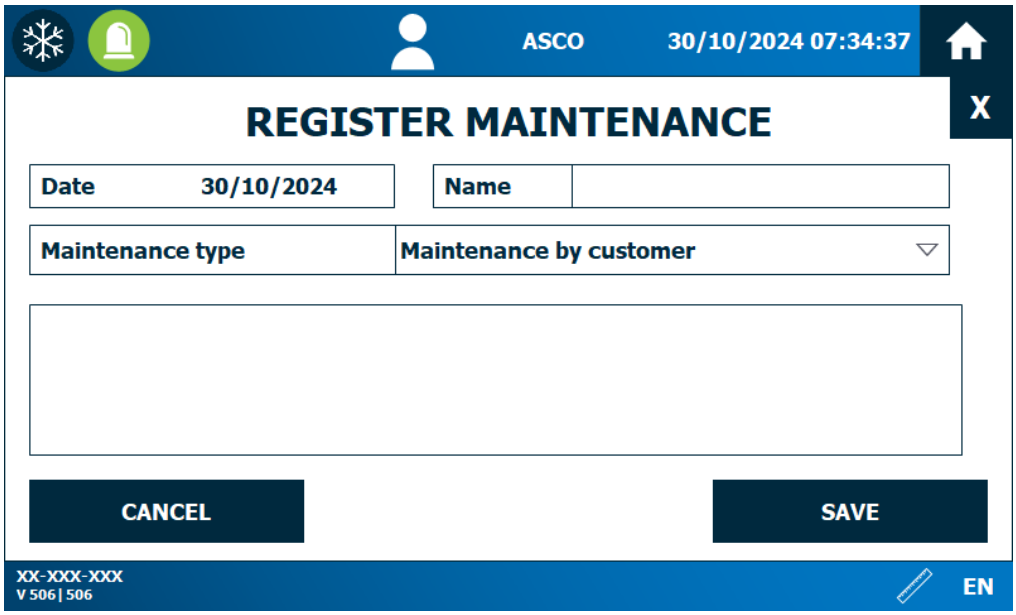


Fig. 58

Here a user of the system can register a service provided that he/she is logged in. The service type recorded in Service History at a later stage is “Service by customer”. This enables the user to reset the alarm 11 and the “Hours to service”. Caution! A service performed by the customer in no way replaces a service performed by ASCO.

### 5.1.35 Service History

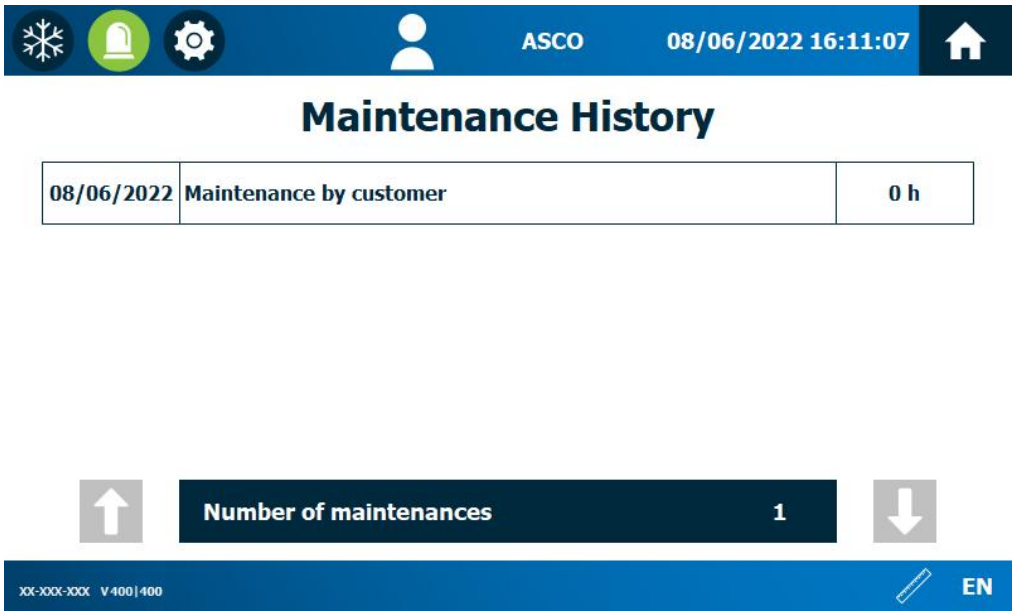



Fig. 59

Here a user of the system can check the service operations carried out provided that he/she is logged in. The date, service type and number of operating hours to carrying out the service can be checked for a service operation.

### 5.1.36 Alarms

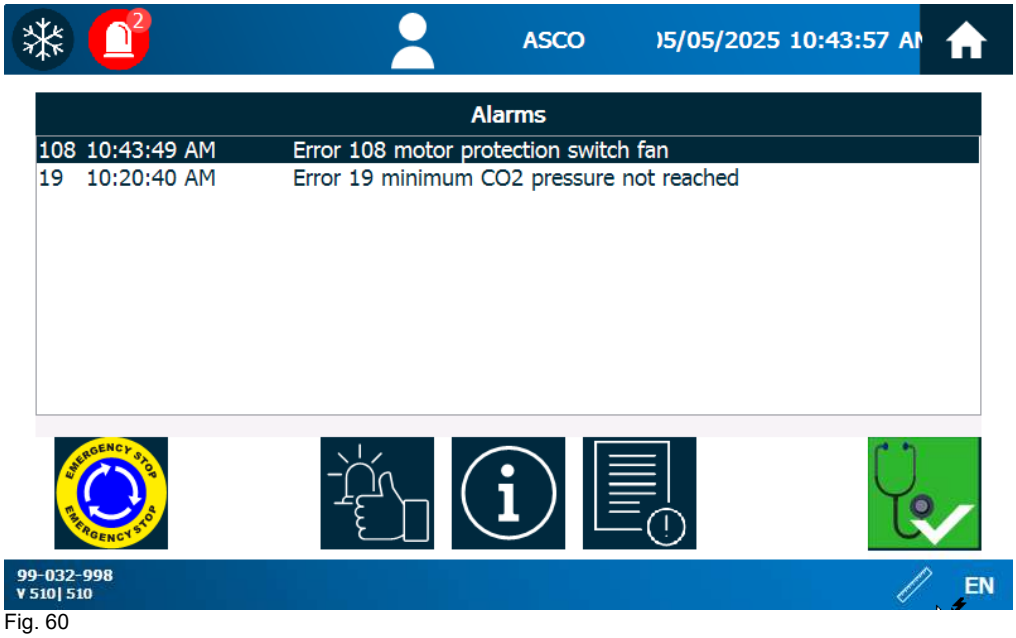



Fig. 60

All pending alarms are listed here.

Detailed descriptions of the alarms can be found under “7 TROUBLESHOOTING”

| | |
|---|---|
|  | Press to acknowledge the emergency stop.<br>This function requires confirmation by the release button.<br>The emergency stop can only be acknowledged by the user "ASCO". |
|  | Pressing will acknowledge all pending errors.<br>Alarms that have not been resolved are listed again immediately. |
|  | Opens the menu “5.1.37 Alarms – Detailed information“<br>Active pending alarms are marked “RED”. |
|  | Opens the alarm history |

### 5.1.37 Alarms – Detailed information

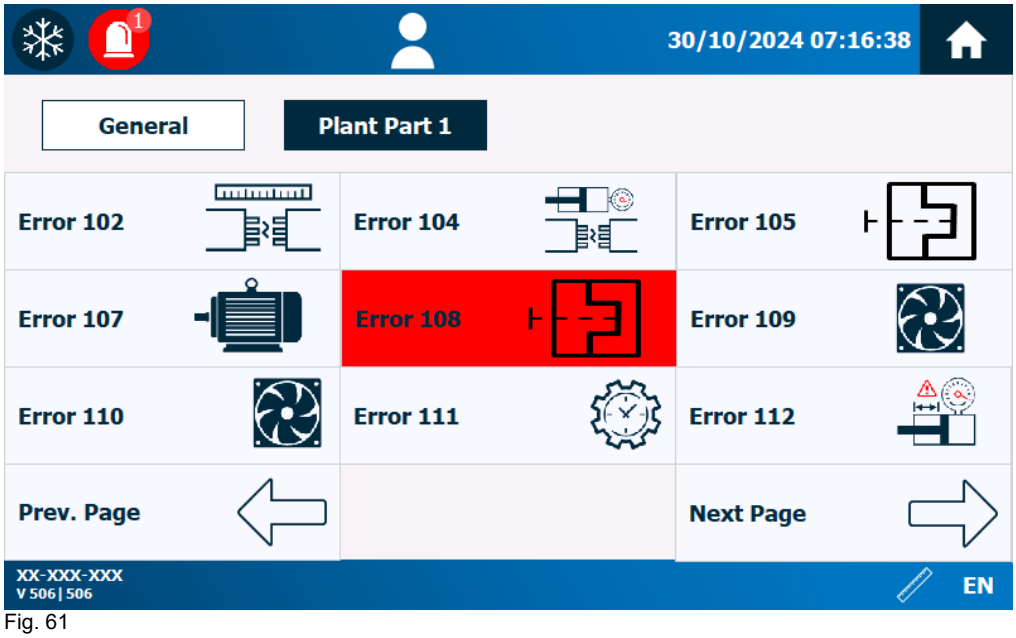



Fig. 61

Active alarms are marked red.

By pressing the respective alarm field, further information about the cause and remedy of the error is displayed.

Further information at “5.1.38 Alarms – Error description".

Detailed descriptions of the alarms can be found under “7 TROUBLESHOOTING”

### 5.1.38 Alarms – Error description (example)

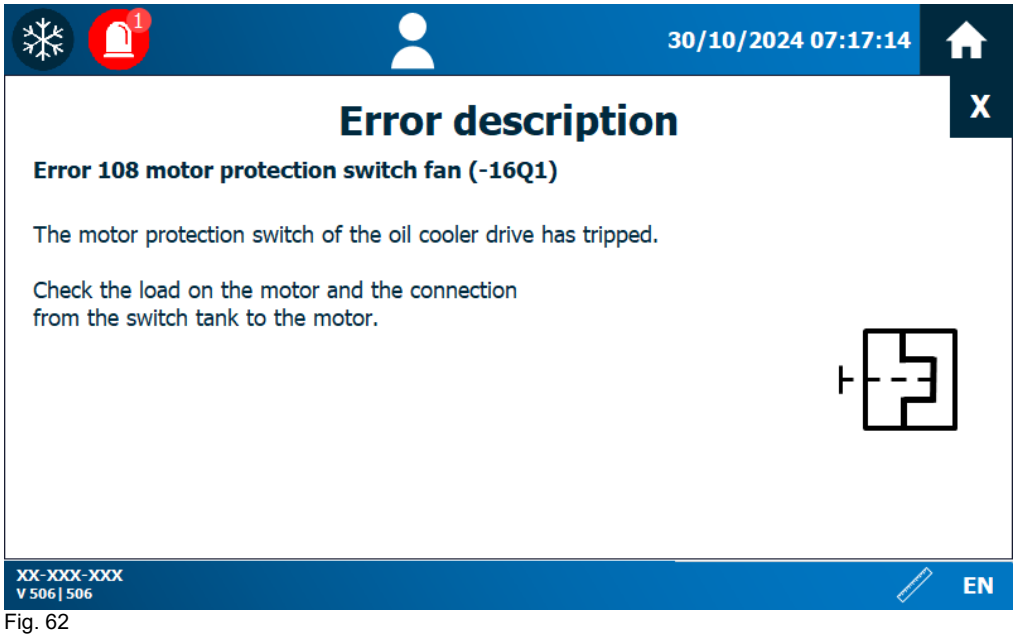



Fig. 62

Detailed information about the cause of the error and how to resolve it is displayed here.

Detailed descriptions of the alarms can be found under “7 TROUBLESHOOTING”

### 5.1.39 Contact




Fig. 63

## 5.2 START PRODUCTION



**DANGER**

**Risk of injury or damage due to missing safety components!**

- Only start the pelletizer after you have made sure that all safety components are properly installed and in working order.
- Extruder plate(s) must be installed

**Risk of injury from electric power!**

Exposed electrical contacts, electrostatic discharge, physical impact on electrical systems, etc. pose a high safety risk.

- All work on electrical equipment must be performed by suitably qualified specialist technicians.



**WARNING**

**Risk of injury from propelled dry ice pellets!**

- During machine operation, all persons not directly involved in its operation must keep clear of the machine.
- Cordon off the work area.
- During machine operation, never touch or reach into the discharge unit.
- At the end of the shift: Depressurize the system, set the main switch to 0.



**WARNING**

**Risk of suffocation!**

Working in enclosed, unventilated spaces presents a suffocation hazard due to high carbon dioxide concentration!

- When working in enclosed spaces, ensure that there is adequate ventilation to keep the carbon dioxide concentration in the ambient air below a dangerous level.



**WARNING**

**Risk of injury to hands when reaching into machine!**

- During machine operation, never reach into the extruder plates.
- To remove jammed product, shut down the machine and use suitable tools.



**WARNING**

**Precondition for operation:**

- All safety instructions have been read and understood.
- Install the machine correctly



**CAUTION**

**Machine in operation without liquid $CO_2$ supply**

If the machine is operated without liquid $CO_2$, the sealing ring heats up and can lead to damage to the sealing ring and other components.

If these instructions are not followed, material damage will result:

- Only operate the machine with liquid $CO_2$
- Operating the machine without liquid $CO_2$ is prohibited!
- During installation, commissioning, operation, maintenance, servicing, and troubleshooting, do not run the machine for longer than 2 minutes without a $CO_2$ liquid supply.

Once the machine has been connected properly, observe the following instructions for safe handling:

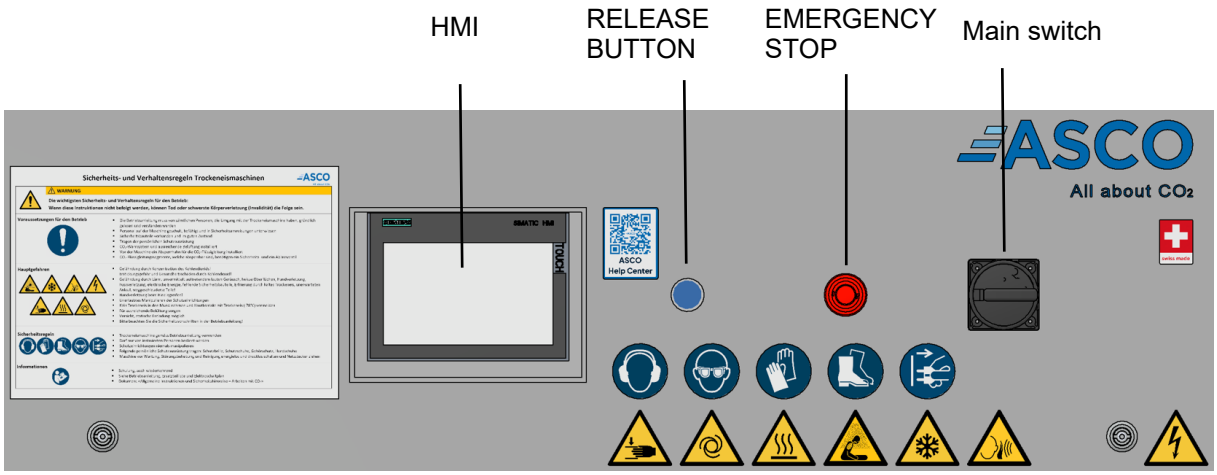



Fig. 64

- Never block the ventilation slots (fig. 7 and 9).
- Check the power cable for visible damage.
- Check the liquid $CO_2$ line and the $CO_2$ waste gas line for damage.
- Waste gas line must be free, back pressure must be below 0.1 bar (1.45 psi).
- Check the collecting tray and the condensate drain for blockage.
- The pelletizer chamber and the extruder plate must be clean and dry.
- Check the oil level in the hydraulic system.
- Mount the extruder plate and the discharge unit.
- Position a dry ice box or container under the discharge unit.
- Turn the main switch to "I".
- If necessary, release the EMERGENCY-STOP button.
- Slowly open the shut-off valve in the liquid $CO_2$ supply line upstream of the machine.
- Open the shut-off valve in the $CO_2$ waste gas line upstream of the machine

| | |
|---|---|
| | **CAUTION** |
| | If the shut-off valve is opened too quickly, the liquid $CO_2$ supply line might become blocked. |

### 5.2.1 Select production type

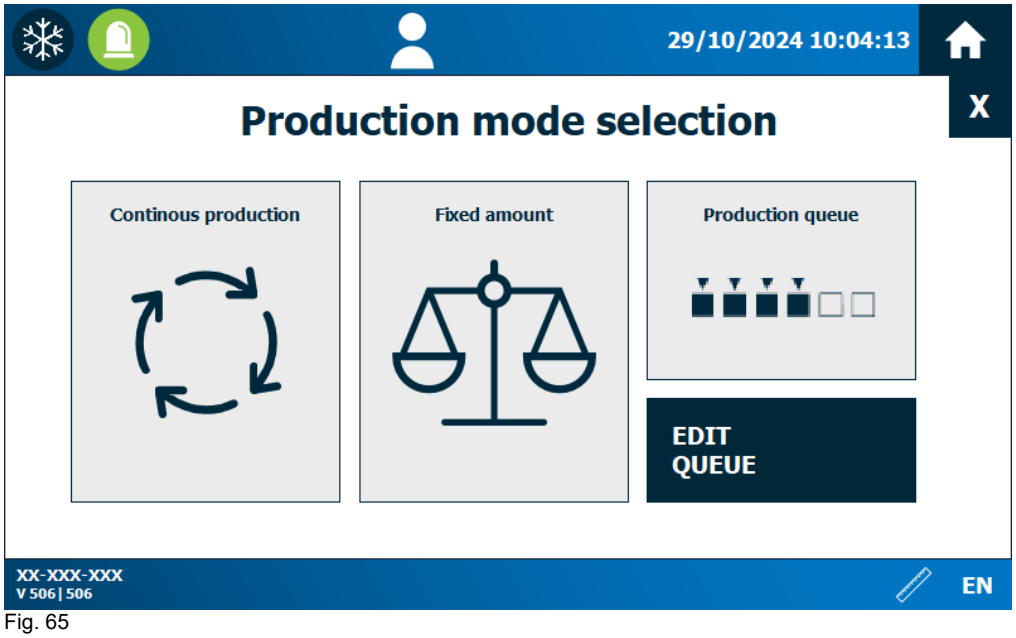



Fig. 65

If the production type “Production queue” is selected, it must be configured beforehand. Configuring the production queue is described in “5.1.8 Configuring the production queue".

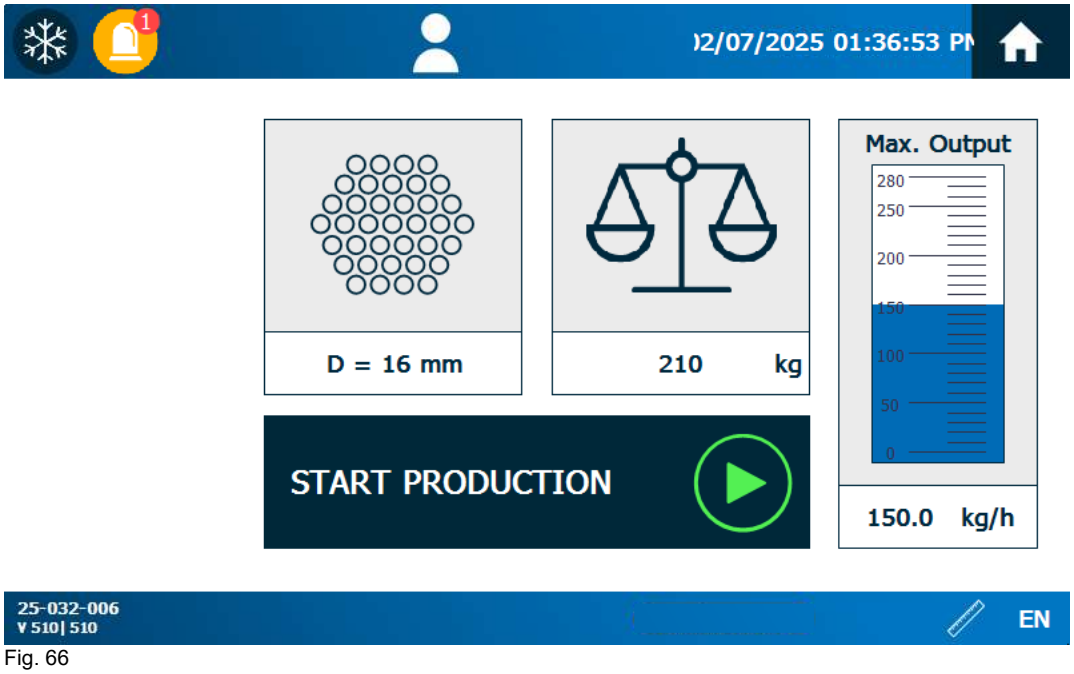



Fig. 66

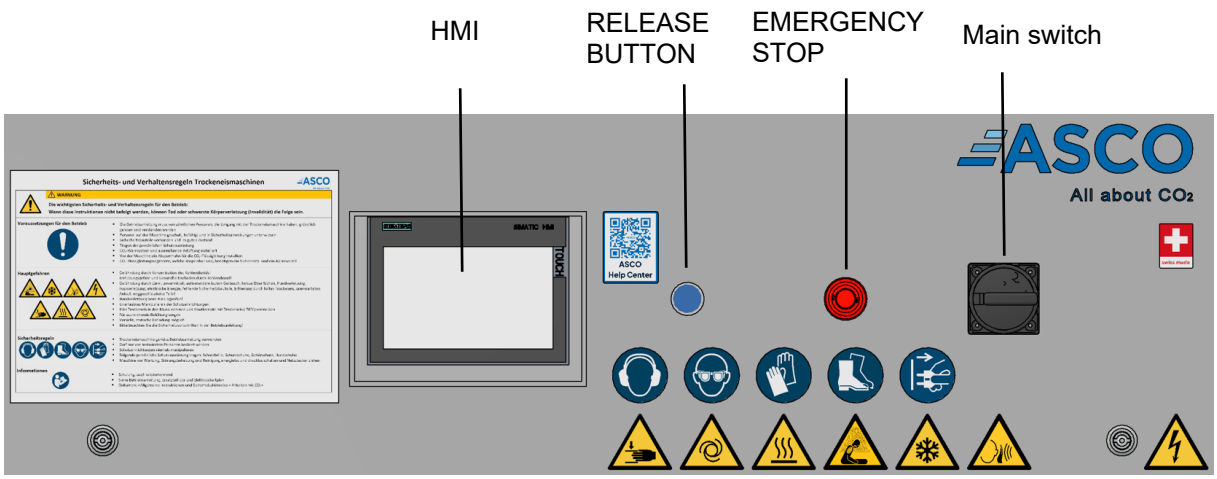



Fig 67

- On the touch screen page *Production pre-selection*, select operating mode .
- Press the button *START PRODUCTION* START PRODUCTION
- The machine initialises the system.
- $CO_2$ is injected into the machine.
- The machine performs a number of cycles to build up an ice layer (WED) on the extruder plate (pressure side).
- When this ice layer is in place, production starts automatically.

### 5.2.2 Starting fixed quantity production

- On the touch screen page *Production pre-selection*, select operating mode .
- Enter the dry ice quantity you wish to produce.
- Press the button *START PRODUCTION* START PRODUCTION
- The machine initialises the system.
- $CO_2$ is injected into the machine.
- The machine performs a number of cycles to build up an ice layer (WED) on the extruder plate (pressure side).
- When this ice layer is in place, production starts automatically.
- The machine stops automatically when the entered quantity has been produced and resets the counter to the entered value.

### 5.2.3 Stop machine for production change

- Press the button "END": 

.
- The machine piston moves to the front end position and production stops.
- Depressurize and de-energize the machine as described in chapter 5.2.9 and 5.2.10
- The extruder plate can be changed as soon as the hydraulics are switched off. / Install extruder plate
- Turn the main switch to “ON”.
- Slowly open the shut-off valve for $CO_2$ waste gas in front of the machine
- Slowly open the shut-off valve in the liquid $CO_2$ supply line upstream of the machine

### 5.2.4 Fastening the nuts on the extruder plate

| | |
|---|---|
| | **CAUTION** |
| | **Danger from ⚠ frostbite!**<br>▪ When changing the extruder plate, it must be ensured that the parts are not in a deep cold state.<br>▪ Wait for warming time |

- Remove/install the extruder plates together with the O-rings

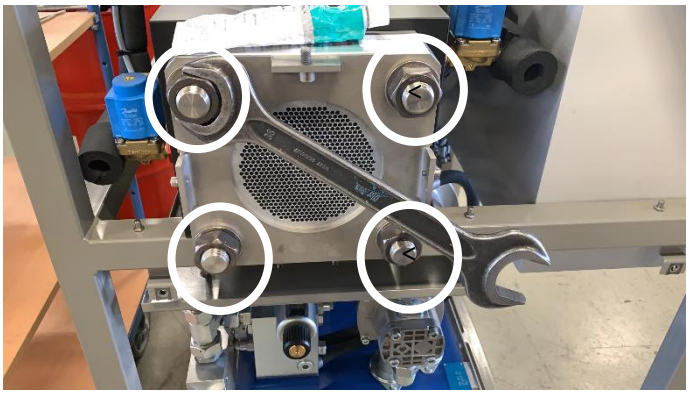


Fig.68

- Mount the ejection bracket
- Tighten nuts lightly with 60 Nm (44 ft lb)

| | |
|---|---|
| | **CAUTION** |
| | Regularly grease the M24 nuts (e.g. with Molykote)  |

- Mount the hopper

### 5.2.5 Stop machine for end of production , normal shutdown

**WARNING**

**Risk of injury or damage due to pressure**

1. Close the ball valve in the liquid $CO_2$ supply line.
2. Continue producing until the $CO_2$ pressure is at 0 bar. Below 14 bar (203 psi) an alarm is displayed that the $CO_2$ pressure is not optimal
3. Press the button "END": 

.
4. Wait until the hydraulics have come to a standstill and then turn the main switch to "OFF".
5. Close the shut-off valve for $CO_2$ waste gas line downstream of the machine

**WARNING**

**If the machine is left idle for too long, there is a risk of icing**
If this is not done, condensate upstream of the extruder plate might freeze when the machine is switched on, causing

- Move the press piston manually to the rearmost position as described in chapter 5.1.10
- Depressurize the machine as described in chapter 5.2.9
- Switch off the machine as described in chapter 5.2.10
- Disassemble the extruder plate
- Blow out the pelletizer chamber with oil-free compressed air and dry it with a cloth.
- Mounting the extruder plate
- Turn the main switch to "ON"
- Move the press piston manually to the front position as described in chapter 5.1.10
- Switch off the machine 5.2.10 "De-energising the machine"

### 5.2.6 Interrupt operation briefly, normal short-term shutdown

- Press the button "END": 

.
- To resume production, press the button *"START PRODUCTION"* 




**WARNING**

**If the machine is left idle for too long, there is a risk of icing**
If this is not done, condensate upstream of the extruder plate might freeze when the machine is switched on, causing damage.

- Move the press piston manually to the rearmost position as described in chapter 5.1.10
- Depressurize the machine as described in chapter 5.2.9
- Switch off the machine as described in chapter 5.2.10
- Disassemble the extruder plate
- Blow out the pelletizer chamber with oil-free compressed air and dry it with a cloth.
- Mounting the extruder plate
- Turn the main switch to "ON"
- Move the press piston manually to the front position as described in chapter 5.1.10
- Slowly open the shut-off valve for $CO_2$ waste gas in front of the machine
- Slowly open the shut-off valve in the liquid $CO_2$ supply line upstream of the machine

### 5.2.7 Emergency shutdown

- Press the EMERGENCY STOP button.

### 5.2.8 Restart after emergency stop

- Reasons for the EMERGENCY STOP and troubleshooting see chapter “7 TROUBLESHOOTING”
- Acknowledge the error message.
- Manually clear the machine
- The machine is now again ready for production.

### 5.2.9 Depressurising the machine



**WARNING**

**Depressurise the machine!**
Shut off $CO_2$ supply.
- Close the shut-off valve (liquid $CO_2$ line) upstream of the pelletizer. Close the shut-off valve (gas $CO_2$ line) downstream of the pelletizer.
- Release the pressure upstream and downstream of the pelletizer by opening the discharge valve.
- Secure the shut-off valves against unintentional opening and label them, if necessary.

### 5.2.10 De-energising the machine



**WARNING**

**Do not leave the machine running unattended!**
After production has ended and the machine's $CO_2$ lines have been emptied:

- Turn the main switch to "OFF".
- Disconnect the pelletizer from the mains power supply.

# 6 MAINTENANCE, SERVICING, CLEANING

The ASCO pelletizer has been designed according to best engineering practice for user-friendliness, it requires only minimum maintenance.

However, the ASCO pelletizer must be inspected for damage before it is started. This enhances its operational safety and extends its service life.



**DANGER**

**Danger due to automatic start-up of the machine!**
The machine can be started automatically externally (remote operation) without authorization from the operating personnel.

Before installation, commissioning, maintenance, cleaning and troubleshooting, please note the following points:

- Deactivate all interfaces in the Interfaces Settings menu (see chapter 5.1.19).
- The main switch is set to “OFF” and secured with a padlock to prevent it from being switched on again.



**WARNING**

**Securing machine prior to maintenance work**
- The main switch is set to “OFF”.
- All applicable safety regulations must be complied with!
- Depressurize and de-energize the machine as described in chapter 5.2.9 and 5.2.10



**NOTE**

The electrical system must be inspected prior to commissioning, and then at least every 100 operating hours. Before every machine start, the operator must perform a visual inspection for damage to cables, exposed electrical components and mechanical parts.



**NOTE**

When working on electrical connections on the engine and the electrical control system, the direction of rotation of the oil cooler and the hydraulic pump must be checked.
See chapter 4.3.7 “Checking and filling the hydraulic unit”
If the motor rotates in the opposite direction, you exchange the two phases at the connection terminals.



**CAUTION**

**Machine in operation without liquid $CO_2$ supply**
If the machine is operated without liquid $CO_2$, the sealing ring heats up and can lead to damage to the sealing ring and other components.

If these instructions are not followed, material damage will result:

Only operate the machine with liquid $CO_2$
Operating the machine without liquid $CO_2$ is prohibited!
During installation, commissioning, operation, maintenance, servicing, and troubleshooting, do not run the machine for longer than 2 minutes without a $CO_2$ liquid supply.



**WARNING**

**Risk of injury of damage from improper maintenance and servicing!**
- All service and maintenance work must be carried out by trained and qualified skilled workers using approved tools and devices.
- Heavy loads must be handled with suitable lifting equipment



**WARNING**

**Danger due to malfunction of $CO_2$ injection valve or leakage of $CO_2$ pipeline!**
Check and replace solenoid valve and $CO_2$ pipelines regularly according to the maintenance schedule.
In the event of leakage or malfunction of the solenoid valve (e.g. continued injection), proceed as follows:

- Stop the machine (EMERGENCY-STOP)
- Immediately close the manual $CO_2$ shut-off valve in the $CO_2$ liquid line
- Depressurize the machine as described in chapter 5.2.9
- Switch off the machine as described in chapter 5.2.10
- Turn the main switch to OFF
- Arrange for repairs to be made



**WARNING**

**Risk of injury from hot hydraulic fluid when changing fluid!**
- Hydraulic fluid tends to remain hot for some time after the machine has been switched off.
- To top up hydraulic fluid, use a filter unit with a mesh size of max. 10 µm
- Incorrect handling of hot fluid can cause serious injury from scaling and even lead to blindness, if it comes into contact with the eyes!
- Collect and dispose of the waste fluid according to the applicable statutory regulations.



**CAUTION**

**Risk of injury or damage from damaged or leaking hoses!**
- Replace damaged or leaking hydraulic hoses without delay!
- Never operate the machine with damaged or leaking lines.
- Hydraulic fluid escaping under high pressure can result in serious injury and damage to property and the environment!



**CAUTION**

**Risk of injury or damage from improper maintenance!**

- Never clean the pelletizer chambers and associated parts with a solvent or detergent.
- When handing cold parts, wear protective gloves.
- Only ever use original ASCO spare parts.



**WARNING**

**Risk of injury or damage from inadvertent operation of hydraulic cylinder and $CO_2$ injection!**

- Set the 24V DC fuse correctly according to the electrical diagram, otherwise the machine may be damaged.
- The hydraulic cylinder could be activated and thus possibly activated.
- The injection valves switch uncontrolled.



**DANGER**

**Danger due to automatic start-up of the machine!**

Before removing any cover from the machine or performing any work on the mechanics and hydraulics, proceed as follows:

- Depressurize the machine as described in chapter 5.2.9
- Switch off the machine as described in chapter 5.2.10
- Turn the main switch to OFF
- Ensure that the machine is stopped, the main switch is turned to "OFF" and the power plug is pulled out!
- Ensure all local safety regulations are met!
- Covers can be removed.
- Arrange for repairs to be made



**WARNING**

**Danger from sudden loud noise!**

- When operating the pelletizer, always wear hearing protection.
- All persons standing close to the pelletizer must wear approved hearing protection.



**WARNING**

**Danger from hot surfaces!**

Burns and scalds from hot or cold mediums of parts and/or the environment.

- When operating the pelletizer, always wear suitable protective gloves.

## 6.1 INSPECTIONS OF OPERATING EQUIPMENT AND WEAR PARTS



**⚠ WARNING**

**Risk of injury due to improper maintenance!**
When performing maintenance on the pelletizer, please note the following points:

- Unplug the mains plug to prevent unexpected movements of the pelletizer piston!
- Shut off the liquid $CO_2$ supply and depressurise the machine!
- All work on the electrical equipment of the machine must be carried out by specialists with electrical engineering qualifications.



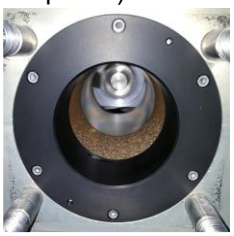
**NOTE**

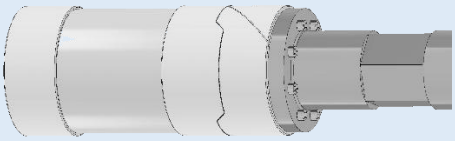
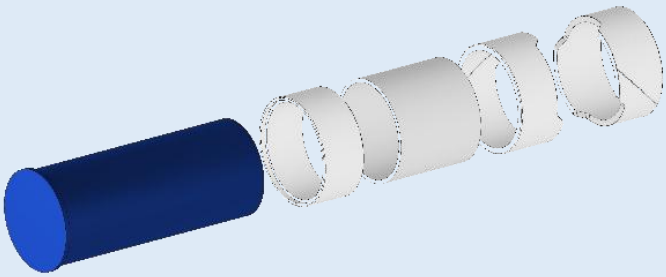
It is recommended to keep wear parts in stock. To avoid a longer machine downtime due to a missing spare part.

- Wear parts are included in the maintenance chapter
- Contact ASCO customer service or if available directly via QR code HMI

Contact ASCO CARBON ACID AG customer service every five years or every 8000 hours of operation (whichever comes first) to have the hydraulic cylinder seal replaced.

| Component | Task | Before each startup | each 40 h or 1 month*** | each 100 h or 3 months*** | each 1000 h or 6 months*** | each 2000 h or 1 year*** | each 3000 h or 2 years*** | each 10000 h or 10 years*** |
|---|---|---|---|---|---|---|---|---|
| Safety devices | ▪ Visual inspection of all safety devices. Missing or defective safety devices (guards / signs) must be replaced without delay. | X | X | X | X | X | X | X |
| Release button EMERGENCY STOP Signal tower | ▪ Lights checking | X** | X | | | | | |
| $CO_2$ liquid and waste gas lines | ▪ Inspect for damage and leakage; seal and re-tighten fittings and connections, if necessary. | X | X | X | X | X | X | X |
| Liquid $CO_2$ line safety valve | ▪ Visual inspection | | | | X | X | X | X |
| | ▪ Replace safety valve | | | | | | X | X |
| Condensate tray and line | ▪ Inspect for damage and leakage; seal and re-tighten fittings and connections, if necessary. | X | X | X | X | X | X | X |
| Power cable and plug | ▪ Check for damage. | X | X | X | X | X | X | X |
| Pelletizer | ▪ Clean the inside and outside of the dry ice pelletizer, as oil and dust residue can cause failure. | | X | X | X | X | X | X |
| Fluid cooler | ▪ Perform a function test. | | X | X | X | X | X | X |
| Solenoid valves | ▪ Perform a function test. | | X | X | X | X | X | X |
| | ▪ Replace solenoid valves | | | | X | X | X | X |

| Component | Task | before each startup | each 40 h or 1 month*** | each 100 h or 3 months*** | each 1000 h or 6 months*** | each 2000 h or 1 year*** | each 3000 h or 2 years*** | each 10000 h or 10 years*** |
|---|---|---|---|---|---|---|---|---|
| EMERGENCY STOP | ▪ Perform a function test of the EMERGENCY-STOP button. | | X | X | X | X | X | X |
| Degassing bushing | ▪ Maximum inner diameter = 115.6 mm (4.55 in) must not be exceeded<br>▪ (after removing extruder plate, fully retract the pelletizer piston)<br> Fig. 69  Fig. 70 | | X | X | X | X | X | X |
| | ▪ Replace degassing bushing. | | | | X | X | X | X |
| Connecting elements | ▪ Check all screws and connections for proper fixture. If necessary, re-tighten carefully. | | | X | X | X | X | X |

| Component | Task | before each startup | each 40 h or 1 month*** | each 100 h or 3 months*** | each 1000 h or 6 months*** | each 2000 h or 1 year*** | each 3000 h or 2 years*** | each 10000 h or 10 years*** |
|---|---|---|---|---|---|---|---|---|
| Piston slide ring | ▪ Replace the piston slide rings.<br><br>Fig. 71<br><br>Fig. 72 | | | | X | X | X | X |
| Electrical components | ▪ Have all electrical installations inspected by a qualified electrician.<br>Only by qualified plant maintenance personnel! | | | | | X | X | X |

| Component | Task | before each startup | each 40 h or 1 month*** | each 100 h or 3 months*** | each 1000 h or 6 months*** | each 2000 h or 1 year*** | each 3000 h or 2 years*** | each 10000 h or 10 years*** |
|---|---|---|---|---|---|---|---|---|
| Hydraulic unit | ▪ Check fluid level. | X | X | X | X | X | X | X |
| | ▪ Inspect all hydraulic lines, hoses and connections for leakage. Repair all leaks without delay. | | X | X | X | X | X | X |
| | ▪ Replace the fluid filter in the hydraulic unit. | | | X* | X | X | X | X |
| | ▪ Change fluid | | | X* | X | X | X | X |
| | ▪ Inspect all hydraulic hoses and replace them, if necessary. | | | | | | X | X |
| | ▪ Replace the coupling between the motor and the hydraulic pump. | | | | | X | X | X |
| | ▪ Replace the hydraulic hoses. | | | | | | | X |
| | ▪ Replace the hydraulic pump and the hydraulic cylinders. | | | | | | | X |

*valid only for the first time the number of hours is reached, no longer applicable thereafter
**before commissioning and weekly thereafter
*** whichever arrives first

## 6.2 CHANGING THE HYDRAULIC FLUID

As the fluid plays an important role for smooth and continuous operation of the pelletizer, it is extremely important that the fluid volume and the fluid state are regularly checked as described in this operating manual.



**WARNING**

**Danger due to improper oil changes!**

- All service and maintenance work must be carried out by trained and qualified skilled workers.
- Only change the oil when the oil has cooled down.
- The pelletizer must be depressurized and de-energized, main switch to "0/OFF".
- When handing hot fluid, proceed with extra caution, as there is a risk of serious injury from scaling and even of blindness, if the fluid comes into contact with the eyes!
- Caution! Risk of scalding!
- Collect and dispose of the waste fluid according to the applicable statutory disposal regulations!



**NOTE**

The hydraulic unit is delivered without fluid.
Fill the fluid through a filter with a mesh size of max. 10µm.
Recommended hydraulic oil: ISO VG46

### 6.2.1 Changing the hydraulic fluid by means of fluid change device

- Keep a suitable container ready near the hydraulic unit.
- Loosen the cap on the filler neck (Fig. 73). Insert the suction pipe of the oil change device and guide the drain pipe into the appropriate oil collection container.



Fig.73

- Start the oil change device and empty the hydraulic tank.
- Replace the fluid filter at the top of the hydraulic unit.
- Insert the suction tube into the drum with fresh fluid and place the drain line into the tank of the hydraulic unit.
- Start the fluid change process. Fill the hydraulic unit to the appropriate fluid level mark.
- Close the lid of the filler neck. Start the pelletizer and check the fluid level through the sight glass (fig. 74). Top up fluid, if required.

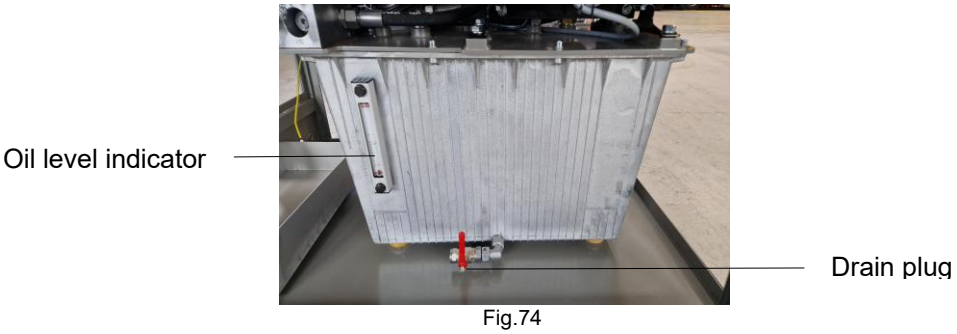



Fig.74

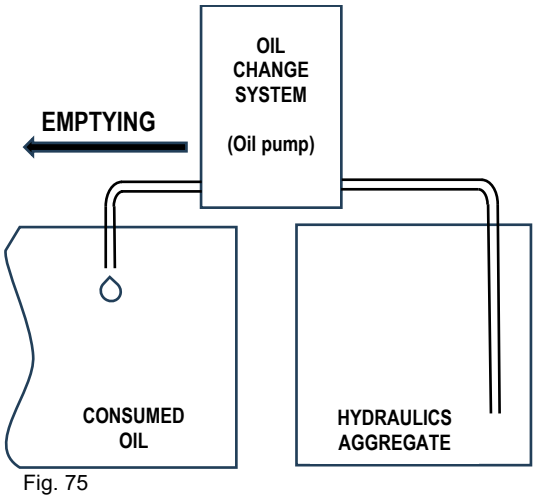



Fig. 75

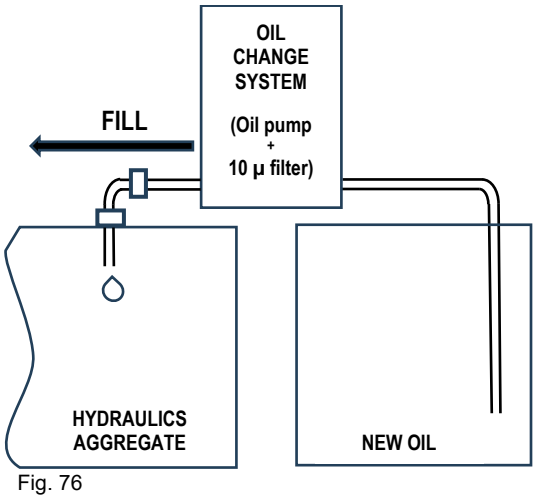
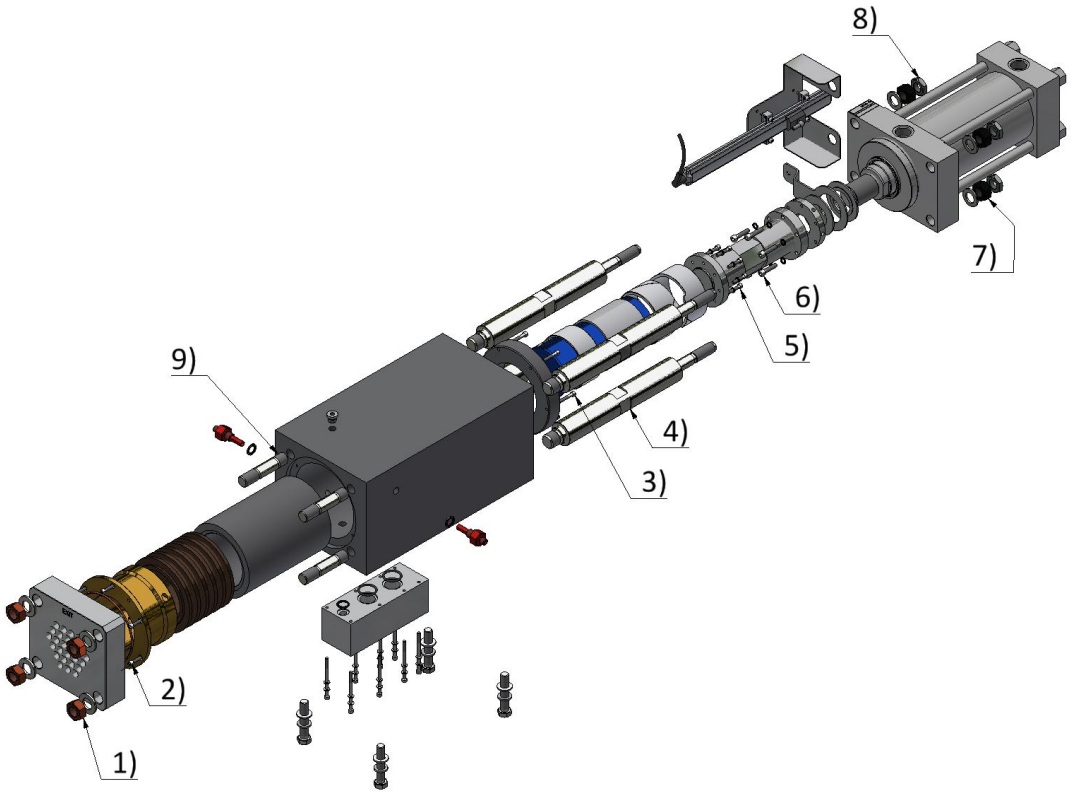



Fig. 76

## 6.3 TIGHTENING TORQUES

With the exception of the tightening torques specified in fig. 77, there are no specific tightening torques for screws of ASCO products.




| Item | Nm / ft lb | Remarks |
|---|---|---|
| 1 | 60 / 44 | Use low-temperature silicone grease |
| 2 | 9 / 7 | - |
| 3 | 9 / 7 | Use Loctite 243 |
| 4 | 300 / 221 | - |
| 5 | 9 / 7 | - |
| 6 | 19 / 14 | - |
| 7 | 180 / 133 | - |
| 8 | 50 / 37 | Use Loctite 243 |
| 9 | - | Use Loctite 243 |

Fig. 77

## 6.4 CLEANING



**DANGER**

**Danger due to automatic start-up of the machine!**
The machine can be started automatically externally (remote operation) without authorization from the operating personnel.

Before installation, commissioning, maintenance, cleaning and troubleshooting, please note the following points:

- Deactivate all interfaces in the Interfaces Settings menu (see chapter 5.1.19
- The main switch is set to “OFF” and secured with a padlock to prevent it from being switched on again.



**WARNING**

**Risk of injury or damage from improper cleaning!**
Before carrying out any cleaning task, ensure the following:

- The dry ice pelletizer is stopped, switch off the power, see chapter 5.2.10 "De-energising the machine ", the main switch is set to "OFF" and the power plug is pulled out!
- The entire pelletizer is depressurised! See chapter 5.2.9 "Depressurising the machine"
- All applicable safety regulations must be complied with!
- It is now safe to remove the cover guards and to carry out cleaning work.



**CAUTION**

**Risk of injury due to failure to use personal protective equipment!**

- Wear safety glasses, hearing protection and suitable gloves for cleaning work.

### Pelletizer chamber and extruder plate



**CAUTION**

**Risk of injury or damage from use of unsuitable cleaning agent!**

- Never clean the pelletizer chambers and associated parts with a solvent or detergent.
- Wear suitable gloves when working on cold parts.

- The pelletizer chamber and the extruder plate should be cleaned at least once a week.
- Before cleaning, ensure that all the parts have warmed to ambient temperature.
- Switch on the pelletizer and move the piston manually to the rearmost position.
- Switch off the machine, set the main switch to “0/OFF”, and unplug the power cord.
- Wipe out and dry the pelletizer chamber with a clean cloth. There must be no residue in the pelletizer chamber.
- Blow out and dry the extruder plate with dry, oil-free compressed air. In the process, check the parts for damage.

### Rest of machine (monthly cleaning)

- Clean the inside and outside of the machine, using a conventional industrial detergent.

# 7 TROUBLESHOOTING



**WARNING**

**Risk of injury or damage due to unqualified personnel!**
All the tasks described in this chapter must only ever be carried out by trained and qualified personnel.
- Ensure that all safety instructions are known and fulfilled.



**WARNING**

**Risk of injury or damage from $CO_2$ under pressure!**
Shut off $CO_2$ supply.
- Close the shut-off valve (liquid $CO_2$ line) upstream of the pelletizer. Close the shut-off valve (gas $CO_2$ line) downstream of the pelletizer.
- Release the pressure upstream and downstream of the pelletizer by opening the discharge valve.
- Secure the shut-off valves against unintentional opening and label them, if necessary.



**DANGER**

**Danger due to automatic start-up of the machine!**The machine can be started automatically externally (remote operation) without authorization from the operating personnel.

Before installation, commissioning, maintenance, cleaning and troubleshooting, please note the following points:

- Deactivate all interfaces in the Interfaces Settings menu (see chapter 5.1.19
- The main switch is set to “OFF” and secured with a padlock to prevent it from being switched on again.



**DANGER**

**Danger due to automatic start-up of the machine!**

Before removing any cover from the machine or performing any work on the mechanics and hydraulics, proceed as follows:

- Depressurize the machine as described in chapter 5.2.9
- Switch off the machine as described in chapter 5.2.10
- Turn the main switch to OFF
- Ensure that the machine is stopped, the main switch is turned to "OFF" and the power plug is pulled out!
- Ensure all local safety regulations are met!
- Covers can be removed.
- Arrange for repairs to be made



**WARNING**

**Risk of injury to hands when reaching into machine!**
- During machine operation, never reach into the extruder plates.
- To remove jammed product, shut down the machine and use suitable tools.



**WARNING**

**Risk of injury due to use of unsuitable spare parts!**
- Only use original spare parts.



**CAUTION**

**Machine in operation without liquid $CO_2$ supply**
If the machine is operated without liquid $CO_2$, the sealing ring heats up and can lead to damage to the sealing ring and other components.

If these instructions are not followed, material damage will result:

- Only operate the machine with liquid $CO_2$
- Operating the machine without liquid $CO_2$ is prohibited!
- During installation, commissioning, operation, maintenance, servicing, and troubleshooting, do not run the machine for longer than 2 minutes without a $CO_2$ liquid supply.

The “WHO” tower describes who is allowed to carry out the work: Operator or qualified personnel, if necessary ASCO customer service

| Fault | Possible cause | Remedy | Who |
|---|---|---|---|
| No dry ice snow is produced | Tank pressure too low, $CO_2$ supply rate too low, or excessive pipeline resistance in supply line | Increase tank pressure, increase feed rate and modify supply line according to instructions. | Specialist |
| | Gas in liquid $CO_2$ line | Wait until liquid $CO_2$ is fed to system. | Operator |
| | Solenoid valves in the liquid $CO_2$ line are not working properly | Check whether the two solenoid valves are working correctly. | Operator |
| | Solenoid valves in the liquid $CO_2$ line are not switching | Are solenoid valves 1 and 2 working properly? If so, you should hear a clicking sound. If there is no clicking sound, the pelletizer controller may not be sending a signal to the valves. Inspect the connecting cables for damage. | Specialist |
| | Solenoid valves in the liquid $CO_2$ line are blocked. | Check solenoid valves and replace, if necessary. | Specialist |
| Too much snow in the recovery line | Check the sintered bush for damage. | Replace defective sintered bush. | Specialist |
| | Liquid $CO_2$ solenoid valves not working | Check whether the solenoid valves are blocked (open). | Specialist |
| Overflow at condensate trap | Condensate trap drain blocked or clogged | Clean drain and condensate trap. | Operator |
| | Drain line is blocked | Clean drain line.<br>(intended use) | Operator |
| Cylinder fails to move or is stuck at stop | Hydraulic solenoid valves do not work. | Check whether the two solenoid valves are working correctly. | Operator |
| | Hydraulic solenoid valves do not switch | Are solenoid valves 1 and 2 working properly? If so, you should hear a clicking sound. If there is no clicking sound, the pelletizer controller may not be sending a signal to the valves. Inspect the connecting cables for damage. | Operator |
| | Solenoid valves blocked | Check solenoid valves and replace, if necessary. | Specialist |
| $CO_2$ solenoid valve remains open | Malfunction due to short circuit or damage | Replace the solenoid valves. Inspect the connecting cables for damage. | Specialist |

## 7.1 SOFTWARE ERRORS / ALARMS

**NOTE**

When contacting the ASCO Customer Service Department, keep the following details to hand:
- Serial number of machine
- For machine operating hours, see chapter 5.1.15 "Current values - Operating hours"
- Software version of the machine see chapter 5.1.17 "Current values - System"

## 7.2 ALARM LIST

| Error, alarm | Cause of error | Troubleshooting |
|---|---|---|
| Error 01 Emergency Stop | The machine's emergency stop was triggered. | ▪ Check the safety of the machine<br>▪ When using the interface, also pay attention to the surrounding machines.<br>▪ After successfully eliminating all hazards, reset the emergency stop. |
| Error 02<br>Emergency stop feedback | The feedback from the emergency stop contactors does not match the current expected signals. | ▪ Contact ASCO customer support! |
| Error 03 Wire break pressure sensor $CO_2$ (-120B7) | No measured values are received from the sensor. | ▪ Check the sensor and the connection from the controller to the sensor for interruption or damage. |
| Error 06 Overtemperature hydraulic motor | The hydraulic pump drive is too hot. | ▪ Check motor and connection for damage.<br>▪ Check the drive load.<br>▪ Check the environment and compare it with the data in the operating instructions.<br>▪ Check the hydraulic oil used and compare it with the operating instructions. |
| Error 19 Minimum pressure $CO_2$ not reached | The minimum recommended $CO_2$ pressure was exceeded for a longer period of time. | ▪ To achieve maximum production capacity, increase $CO_2$ pressure. |
| Error 20 Maximum pressure $CO_2$ exceeded | The maximum $CO_2$ pressure was exceeded. | ▪ Reduce $CO_2$ pressure to avoid damaging the internal components of the machine. |
| Error 30 Maximum time without internet exceeded | Machine without internet connection for too long. | This rental machine has been disconnected from the internet for too long.<br>▪ Connect machine to the Internet.<br>▪ Contact ASCO Customer Support |
| Error 51<br>Machine locked | Machine locked by the interface. | ▪ Check signals on the previous or following machine or deactivate the interface if it is not needed. |

| Error name | Cause of error | Troubleshooting |
|---|---|---|
| Error 52 Wire break power control | Wire break in the power control detected. | ▪ Check the cabling and interface settings. |
| Error 53 Hydraulic oil temperature measurement equivalence error (110B3) | Signal position of the hydraulic oil temperature switch provides incorrect values. | ▪ Check oil temperature, sensor and switch wiring. |
| Error 56 24V power supply faulty (40G1) | The control voltage power supply is faulty. | ▪ Contact ASCO Customer Support. |
| Error 57 24V fuse generally blown (41F3) | The 24V control voltage fuse has blown. | ▪ Check wiring and switch fuse back on.<br>▪ If the problem occurs repeatedly, contact ASCO Customer Support. |
| Error 58 24V emergency stop fuse triggered (41F5) | The 24V control voltage fuse has blown. | ▪ Check wiring and switch fuse back on.<br>▪ If the problem occurs repeatedly, contact ASCO Customer Support. |
| Error 59 24V fuse interface 1 triggered (41F7) | The 24V control voltage fuse has blown. | ▪ Check wiring and switch fuse back on.<br>▪ If the problem occurs repeatedly, contact ASCO Customer Support. |
| Error 60 F-PM module error -> contact ASCO | Error in the security module. | ▪ Restart machine.<br>▪ Press the emergency stop button and acknowledge the emergency stop message.<br>▪ Contact ASCO Customer Support. |
| Error 61 $CO_2$ Alarm 1: 8h over 0.5% | $CO_2$ detector alarm 1 is active. | ▪ Stop production and ventilate |
| Error 62 $CO_2$ Alarm 2: Only information | $CO_2$ detector alarm 2 is active. | ▪ Stop production and ventilate |
| Error 63 $CO_2$ Alarm 3: Machine stops | $CO_2$ detector alarm 3 is active. | ▪ Escape |
| Error 64 $CO_2$ detector: Wire break | No measured values are received from the sensor. | ▪ Check the sensor and the connection from the controller to the sensor for open circuits or damage. |
| Error 65 Conveyor belt not ON | The conveyor belt was started by the machine, but there was no feedback. | ▪ Check the wiring and settings of the machine. |

| Error name | Cause of error | Troubleshooting |
|---|---|---|
| Error 70 Connection monitoring PLC <-> HMI | Network connection between PLC and HMI is disconnected. | ▪ Check the network cabling and power supply of the affected components.<br>▪ Contact ASCO Customer Support. |
| Error 71 Connection monitoring PLC <-> EWON | Network connection between PLC and EWON is disconnected. | ▪ Check the network cabling and power supply of the affected components.<br>▪ Contact ASCO Customer Support. |
| Error 102 Wire break linear measuring system (-120B1) | No measured values are received from the sensor. | ▪ Check the sensor and the connection from the controller to the sensor for open circuits or damage. |
| Error 104 Wire break pressure sensor hydraulic (-120B9) | No measured values are received from the sensor. | ▪ Check the sensor and the connection from the controller to the sensor for open circuits or damage. |
| Error 105 Motor protection switch hydraulic motor (-15Q1) | The motor protection switch of the hydraulic pump drive has tripped. | ▪ Check the load on the motor and the connection from the control cabinet to the motor.<br>▪ Check that the correct hydraulic oil is used for your environment. |
| Error 107 Contactor hydraulic motor (-15Q2) | The feedback from the soft starter of the hydraulic pump motor does not match the currently required feedback. | ▪ Check the wiring and functionality of the soft starter. |
| Error 108 Motor protection switch fan (-16Q1) | The motor protection switch of the oil cooler drive has tripped. | ▪ Check the load on the motor and the connection from the control cabinet to the motor. |
| Error 109 Fan overtemperature (-16M1) | The oil cooler drive has too high a temperature. | ▪ Check motor and connection for damage.<br>▪ Check the drive load.<br>▪ Check your environment and compare it with the data in the operating instructions.<br>▪ Check the hydraulic oil used and compare it with the operating instructions. |

| Error name | Cause of error | Troubleshooting |
|---|---|---|
| Error 110 Contactor fan (-16Q5) | The feedback from the motor contactor from the oil cooler does not match the currently required feedback. | ▪ Check wiring and contactor functionality. |
| Error 111<br>Service due | | ▪ Contact ASCO customer support and schedule a service appointment.<br>▪ Alternatively, carry out service yourself according to the instructions in the operating instructions. |
| Error 112<br>Maximum pressure in safety zone | Hydraulic pressure exceeded within the protection zone. | ▪ Follow instructions to relieve overpressure within the protection zone.<br>1. Disassemble the extruder plate<br>2. Press ice block with plunger<br>3. Mounting the extruder plate<br>See chapter 5.2.4 "Fastening the nuts on the extruder plate" |
| Error 113<br>Hydraulic fluid level low | Hydraulic oil level below the limit. | ▪ Check the hydraulic system for leaks and fill the tank with hydraulic oil according to the instructions in the operating manual. |
| Error 114<br>Hydraulic oil temperature high (-120B9) | | ▪ Check the ambient temperature of the machine.<br>▪ Check the cooler airflow in manual mode.<br>▪ Contact ASCO Customer Support. |
| Error 115<br>Max. permissible cycle time exceeded | The cycle time of a production cycle has been exceeded. | ▪ Contact ASCO Customer Support. |
| Error 117 End position front not reached | | ▪ Check the position sensor setting in manual mode.<br>▪ Check that the press piston moves freely.<br>▪ Contact ASCO Customer Support. |
| Error 118 Rear end position not reached | | ▪ Check the position sensor setting in the operating instructions.<br>▪ Check that the press piston moves freely.<br>▪ Contact ASCO Customer Support. |

| Error name | Cause of error | Troubleshooting |
|---|---|---|
| Error 121 Maximum hydraulic pressure exceeded (backwards) | During the backward movement of the piston the hydraulic pressure was exceeded. | ▪ Check the sintered bushing and press chamber for damage.<br>▪ Contact ASCO Customer Support. |
| Error 122 Hydraulic pressure too low | The hydraulic pressure during the process is too low. | ▪ Check hydraulic pressure in manual mode and adjust pressure relief valve if necessary.<br>▪ Contact ASCO Customer Support. |
| Error 123 Maximum hydraulic pressure exceeded (forward) | During the forward movement of the piston the hydraulic pressure was exceeded. | ▪ Check hydraulic pressure in manual mode and adjust pressure relief valve if necessary.<br>▪ Check the sintered bushing and press chamber for damage.<br>▪ Contact ASCO Customer Support. |
| Error 124 Homing invalid (-120B1) | Measured reference position out of tolerance. | ▪ Check the fastening of the linear sensor.<br>▪ Adjust the linear sensor to the correct position if necessary.<br>▪ Contact ASCO Customer Support. |
| Error 127 Wire break hydraulic oil temperature sensor (-120B9) | No measured values are received from the sensor. | ▪ Check the sensor and the connection from the controller to the sensor for open circuits or damage. |
| Error 153 Equivalence error hydraulic oil temperature (-120B9) | The hydraulic oil temperature sensor is providing incorrect values. | ▪ Check the hydraulic oil temperature at the tank and the sensor wiring.<br>▪ Contact ASCO Customer Support. |
| Error 154 $CO_2$ valve 1 opened too long (-130Y1) | $CO_2$ valve was open for too long.<br>The valve was closed automatically. | ▪ Check tank pressure and restart machine. |
| Error 155 $CO_2$ valve 2 opened too long (-130Y3) | $CO_2$ valve was open for too long.<br>The valve was closed automatically. | ▪ Check tank pressure and restart machine. |
| Error 156 Piston position inaccurate (-120B1) | ▪ The piston does not reach the end position.<br>▪ The referenced end positions deviate too much from the current positions. | ▪ Check the installation of the position sensor and magnetic encoder.<br>▪ Restart production. |
| Error 157 Unexpected hydraulic pressure | The hydraulic pressure does not match the currently expected value. | ▪ Check the current status of the hydraulic unit and the displayed hydraulic pressure.<br>▪ Check the function of the hydraulic pressure sensor. |

## 7.3 AUTOMATIC SAFETY SHUTDOWN




Fig. 78

| | |
|---|---|
| **Function** | If the hydraulic pressure in the area of the degassing bushings rises above 80 bar, the machine stops and starts the safety area function. |
| **Procedure in the event of a safety shutdown** | After a safety shutdown, the pelletizer chamber is normally filled with dry ice snow. To prevent this, the operator is given detailed instructions on the screen on how to proceed to make the machine again ready for operation.<br><br>▪ As defective injection valves can cause problems, first shut off the $CO_2$ supply line.<br>▪ Remove the discharge unit and the extruder plate.<br>▪ Switch on the hydraulic system.<br>▪ Move the cylinder forward to empty the entire pelletizer chamber.<br>▪ ⚠ Do not reach into the pelletizer chamber.<br>▪ Switch off the hydraulic system.<br>▪ Clean the discharge unit and the extruder plate and reattach them.<br>▪ The machine is ready for operation.<br>▪ If the safety range monitoring system is triggered repeatedly at short intervals, contact the ASCO Customer Service Department. |

# 8 DECOMMISSIONING, DISMANTLING, DISPOSAL



**WARNING**

**Risk of injury due to improper disassembly work!**

- All of the work in connection with decommissioning, dismantling, and disposal must be carried out by trained and qualified skilled workers.
- Only use suitable tools and devices.
- Heavy loads must be handled with suitable lifting equipment

Have the machine parts recycled by a specialist waste disposal contractor.



**NOTE**

**Environmental hazard due to improper and unlawful disposal!**

ASCO machines are designed based on the key principles of ecological design and contain high-quality materials (metals, plastics, electrical components, electrical cables, etc.), which can be recycled at the end of their service life.

Ensure that all materials are recycled and, if necessary, disposed of in accordance with the current environmental directives and local regulations for safe waste disposal.

# 9 APPENDICES

## 9.1 DOCUMENT "GENERAL INFORMATION AND SAFETY INSTRUCTIONS – WORKING WITH $CO_2$"

## 9.2 SPARE PARTS LIST

## 9.3 ELECTRICAL CIRCUIT DIAGRAM

## 9.4 HYDRAULIC PLAN

## 9.5 EU DECLARATION OF CONFORMITY