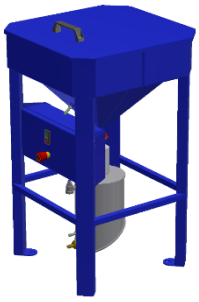
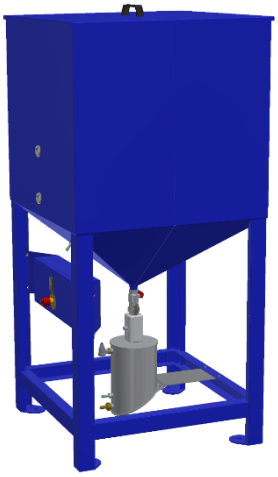
Operating manual

Abrasive Hopper
952000, 952800, 952900, OM-952500, BO-952900; IWE-952900,

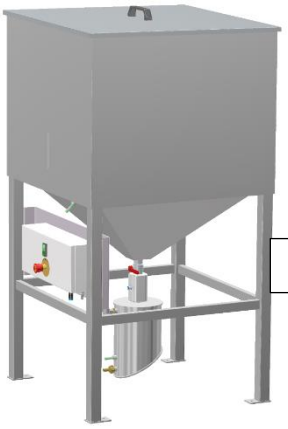
952900



952800



952000



OM-952500

Operating manual

ALLFI AG - Riedenmatt 1 – CH-6370 Stans

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July 2022

Scope of application

The present operating manual is valid for ALLFI Abrasive Hopper:

- 952000 Abrasive Hopper 1300 kg
- 952800 Abrasive Hopper 100 kg
- 952900 Abrasive Hopper 1300 kg
- OM-952500 Abrasive Hopper 1000 kg, 230V
- BO-952900 Abrasive Hopper 1300 kg RAL 7016
- IWE-952900 Abrasive Hopper 1300 kg RAL 9002

The descriptions are not necessarily shown with all available options. Function and execution with mounted options is done in the same way & manner.

The following options are available:

- 952156 230V-Option
- 040056 Y-distributor for supplying two abrasive dosing units
- Colors RAL 5003, other colors on request

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1 General

1.1 Information on use of the operation manual

The present operation manual is part of the product. It must be read and understood by all the persons working with the Abrasive Hopper before operating. The manual must be stored within spitting distance as well as always accessible to the persons, working with the Abrasive Hopper.

Should you have any questions regarding the content of the manual, please contact the manufacturer directly.

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1.2 Scope of delivery

The individual parts contained in the shipment can be gathered from the set list in the appendix A (technical drawing and part list). Upon receipt, the shipment has to be checked for integrity. Possible detected defectives must be reported immediately to the manufacturer.

1.3 Warranty claim

The ALLFI AG grants warranty for the shipped parts as followed:

- Material- and manufacturer faults of 12 months from date of delivery or
- Defects within the first 2’000 hours of operation

Following spare parts are excluded from the warranty:

- Sieve
- Pinch valve
- Ball valve
- Filter
- Silencer
- Sensors for level monitoring

1.4 Target group

These operating instructions are intended for the following personnel:

- Installation staff
- Machine operators
- Maintenance staff

1.5 Warranty claim

ALLFI AG rejects any claims for liability on the part of the manufacturer for damage to property and personal injury, as well as operational malfunctions resulting from non-compliance with these operating manual.

This includes, for example, damage as a result of:

- Inadmissible use of the abrasive hopper.
- Inadequate maintenance
- Disregard of operating instructions
- Chemical or electrolytic influences
- Use of non-original parts, original spare parts or original accessories
- Unauthorized modification
- Untrained or insufficiently trained personnel

Ignoring these instructions is at the sole risk and liability of the operator. ALLFI AG is also not liable for any loss of production.

1.6 Life cycles of the machine

The machine goes through the following life cycles:

- Transport
- Assembly
- Operation
- Maintenance
- Disassembly
- Disposal

2 Safety

The waterjet cutting technique involves dangers. Poorly instructed users can cause damage to property and personal injury due to incorrect behavior. Read and follow the instructions in this operating manual to operate this machine safely. Do not carry out any independent conversion measures or repairs on the unit.

2.1 Declaration of symbols

This operating manual contains important notes and symbols, which are to be considered and followed. These are:

DANGER

Points to a danger situation. If not avoided, death or heavy injuries are the consequence.

WARNING

Points to a danger situation. If not avoided, death or heavy injuries could be the consequence.

CAUTION

Points to a danger situation. If not avoided, light or medium body injuries could be the consequence.

NOTE

Points to a danger situation. If not avoided, light or medium body injuries could be the consequence.

Danger symbol without key word: Additional notes

2.2 Intended use

The abrasive hopper is used to convey sand for abrasive waterjet cutting. The abrasive hopper must be firmly screwed to the floor and may only be used completely assembled. Grounding, potential equalization and sand hose must be connected. The cover must always be in place during operation. Sand quantity up to 2000g/min. Filling can be done with 25kg bags or 1000kg big bags (except 952800). When filling with big bags, they must not be placed on the abrasive hopper. The max. filling height is the top edge of the hopper so that the lid can be placed properly. Only dry sand mesh 60 to 250 may be used. The technical limit values must always be observed.

2.3 Inadmissible use

As an inadmissible use of the abrasive hopper counts amongst others:

- The use of any abrasive other than sand.
- Any mixing of additives to the sand.
- Excessive stress on the abrasive hopper (e.g. air pressure > 8bar).
- Exceeding the permissible limits of use (see technical data, chap.3.3),
- Any structural changes to the abrasive hopper.

- Any change to the software.
- Operation of the abrasive hopper without it being screwed to the floor.
- Operation of the abrasive hopper without the lid in place.
- Operating the abrasive hopper without it being grounded or the potential equalization connected.
- Placing a non-empty big bag on the abrasive hopper.
- Operating the abrasive hopper with dismantled or deactivated technical protective devices (e.g. pressure relief valves).
- Operating the abrasive hopper without the sand hose being connected on both sides and secured with clamps.
- Use of abrasive sand finer than mesh 250 or coarser than mesh 60.

All further from the intentional application deviating applications of the abrasive hopper are inadmissible. Should you have questions, please contact the manufacturer directly.

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2.4 Information signs on the machine

Info panel "Message signals "
This adhesive is applied to the terminal box of the abrasive hopper. With its help, the operator can better interpret the message signals of the LED strips.

Message signals (LED-Strips)	
Continuous	**System not switched on**
1 x Interval	**Warning Service required**
2 x Interval	**Warning filling quantity abrasive hopper → sensor**
3 x Interval	**Fault filling quantity pressure vessel → sensor**
4 x Interval	**Fault differential pressure (P_{diff} < 2,5 Bar)**

2.5 Foreseeable misapplication

The machine must not be used for purposes other than those for which it is intended. The following foreseeable misuses are not permitted:

- Overfilling the hopper so that the lid cannot be placed properly.
- Placing a non-empty big bag on the hopper.
- Abrasive hopper not screwed onto the floor.
- Operating the abrasive hopper when the lid is not placed on the hopper.

2.6 Residual risks

The residual risks listed below are to be reduced by the owner/operator of the abrasive hopper by means of the following measures:

Operation phase	Damage	Danger	Reason	(possible) measures
Operation	Physical injuries	Leakage of compressed air and or sand under pressure	Deflagration from open end of the conveying hose	Operate abrasive hopper only completely assembled (incl. cover)
				Do not open the hose coupling under pressure
				Wear protective glasses when working on the system
				Secure sand hose with clamps
			Vent closed or clogged	Never close the vent
				Test the vents during regular function tests
				Replace filter on pressure vessel according to instructions (see 8.4)
				Wear protective glasses when working on the system
Filling the Abrasive hopper	Physical injuries	Crushing of limbs during filling of the abrasive hopper	lack of safety distance	Do not step under suspended loads Keep your distance Train personnel

2.7 Safety installations

Emergency stop: The machine is switched off. If the emergency stop is wired to the higher-level system, the entire system is switched off.

Hopper cover: Must always be placed on the hopper during operation..

Safety devices that are not always functional or can be bypassed pose a risk to the operator. The owner must ensure that they are in working order at all times.

2.8 Personal protection equipment

The Owner must offer his staff following protection equipment while he’s working:

Ear protector against:

- Noise emissions

Wear protection glasses against:

- Fluids, sand and dust particles
- Flying fragments

Hand guards against:

- Sharp edges of components
- Intrusion of micro particles into the skin

Inhalation protection against:

- Dust particles, micro particles and spray mist

2.9 Qualification of the staff

The abrasive hopper may only be operated and maintained by certified, trained staff.

2.10 Special safety instructions

2.10.1 Transport, assembly, commissioning

- Transport strictly as described under 4.1
- Observe the requirements for the installation site (see 5.2)

2.10.2 Operation

- Do not step under suspended loads (big bag)
- Wear protective equipment during filling of sand (see 7.5)

2.10.3 Cleaning, maintenance, servicing

- Before any manipulations on the machine:
  Switch off the abrasive hopper system and depressurize the compressed air line.

2.10.4 Decommissioning, disassembly, disposal

- Close ball valve
- Disconnect abrasive hopper from compressed air and power supply

2.11 Duties of the owner

- Regular maintenance
- Carry out safety instructions
- Carry out trainings

2.12 Duties of the staff

- Read and follow the operating instructions
- Wear necessary protective equipment

3 Product description

3.1 General function of the machine

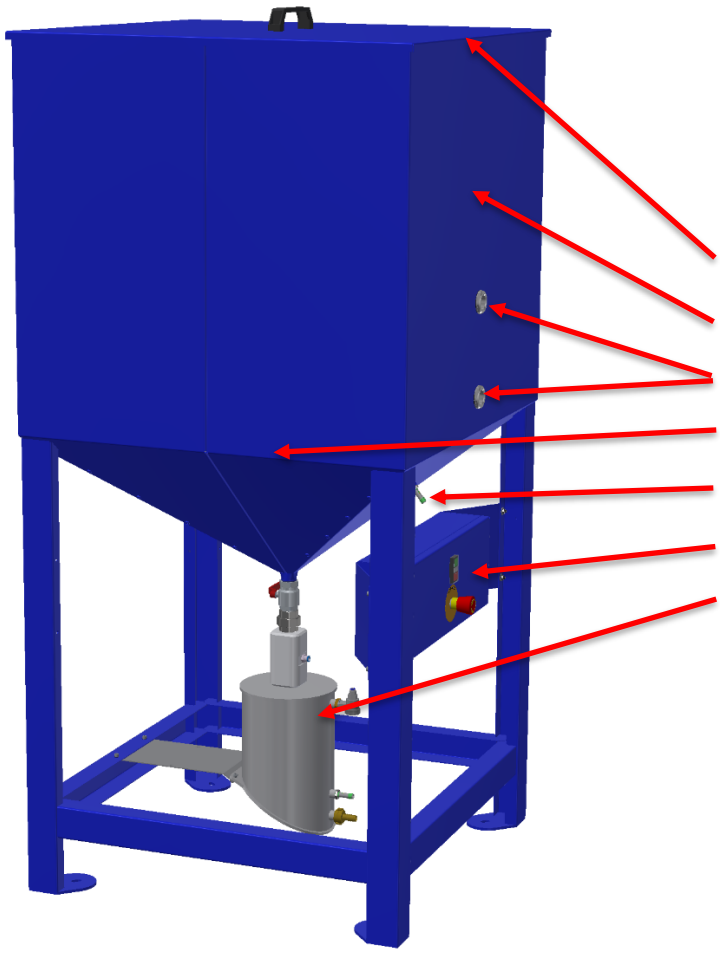
The abrasive hopper is used to convey abrasive sand for abrasive waterjet cutting. The abrasive is stored in the abrasive hopper (contents see 3.3). The sand enters the pressure vessel through a pinch valve which is periodically opened and closed. From there it is conveyed by compressed air (max. 5 bar) through a hose into the storage container of the abrasive dosing unit. For trouble-free operation, the carried air in the abrasive feeder must be able to escape without pressure via a vent.

⚠ CAUTION

The vessel vent of the abrasive feeder must be sufficiently large and always open, otherwise the vessel may burst.

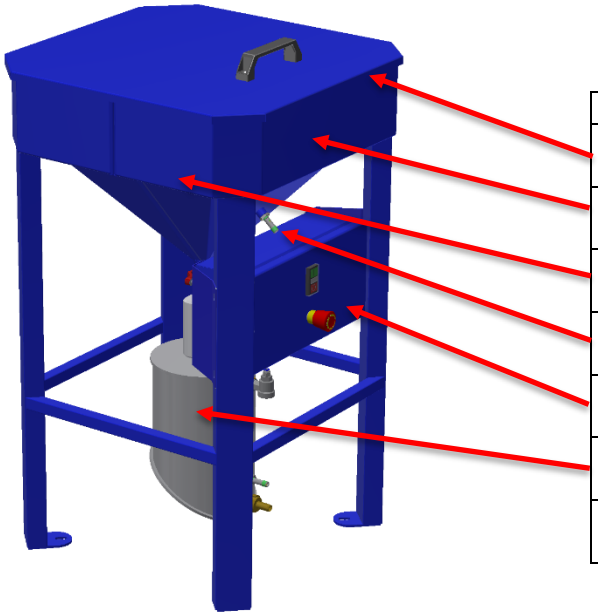
3.2 Structure

3.2.1 Abrasive Hopper 1300 kg, 952000



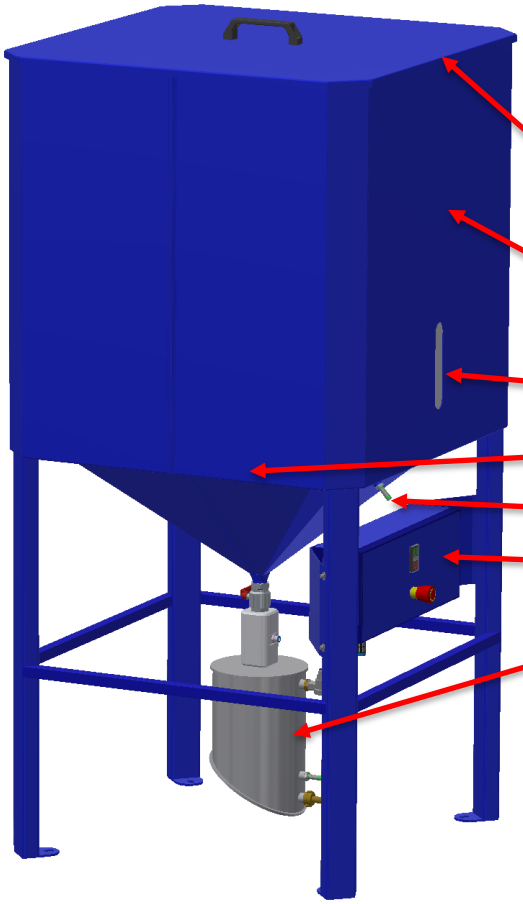
Naming	Piece	Item no.
Cover	1	952011
Hopper with frame	1	952009
Sight glass	1	952913
Sieve insert (inside the hopper)	1	952030
Capacitive sensor	2	032008
Control	1	952921
Pressure vessel assembly	1	952020
Bolt anchor	4	000346

3.2.2 Abrasive Hopper 100 kg, 952800



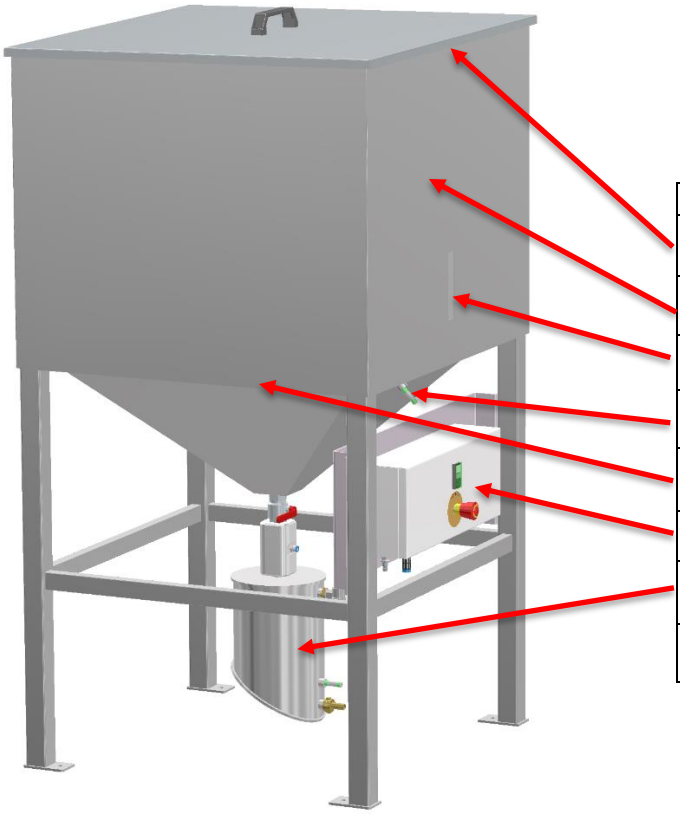
Naming	Piece	Item no.
Cover	1	952826
Funnel and frame	1	952801
Sieve insert (inside the funnel)	1	952831
Capacitive sensor	1	032008
Control 400	1	952821
Pressure vessel assembly	1	952822
Bolt anchor	4	000346

3.2.3 Abrasive Hopper 1300 kg, 952900



Naming	Piece	Item no.
Cover	1	952926
Hopper with frame	1	952901
Control plexi	1	952943
Sieve insert (inside the hopper)	1	952930
Capacitive sensor	1	032008
Control	1	952921
Pressure vessel assembly	1	952822
Bolt anchor	4	000346

3.2.4 Abrasive Hopper 1000 kg, OM-952500

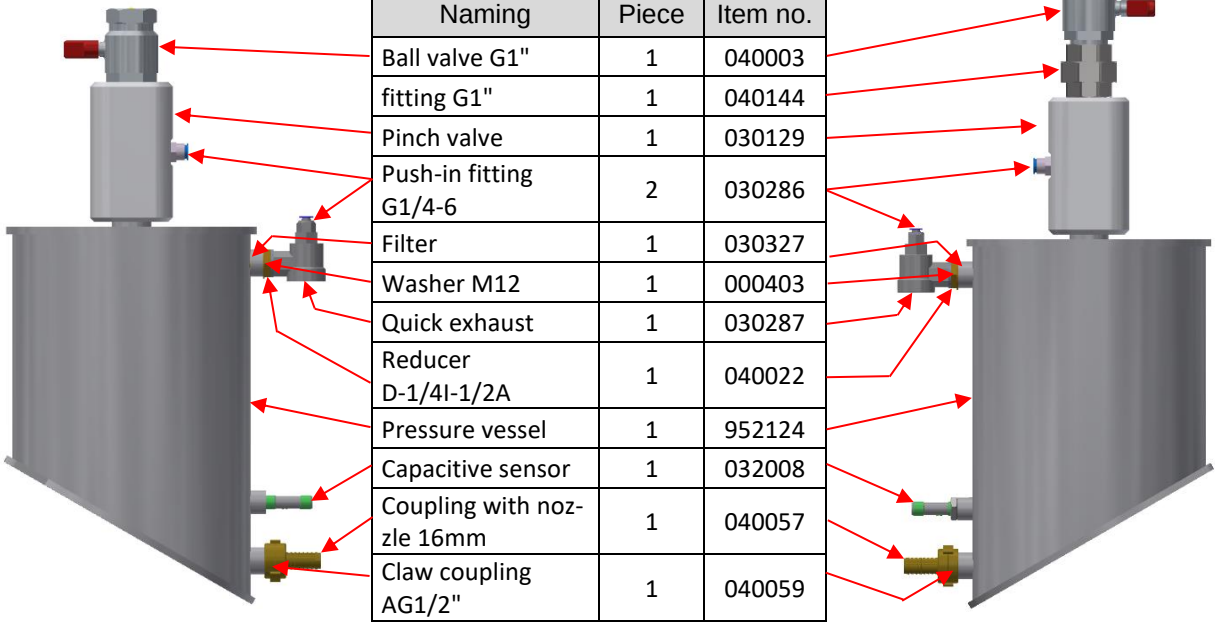


Naming	Piece	Item no.
Cover	1	952131
Hopper with frame	1	952128
Control plexi	1	952943
Capacitive sensor	1	032008
Sieve insert (inside the hopper)	1	952129
Control	1	OM-952521
Pressure vessel assembly	1	952822
Bolt anchor	4	000346

3.2.5 Pressure vessel

For OM-952500, 952800, 952900

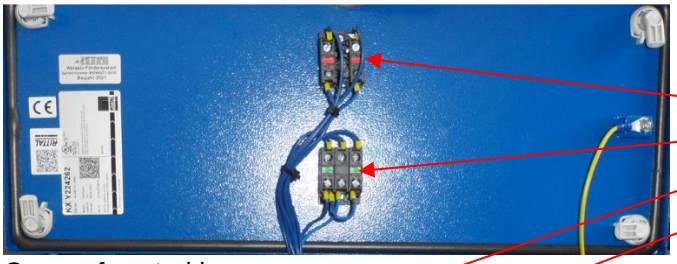
for 952000



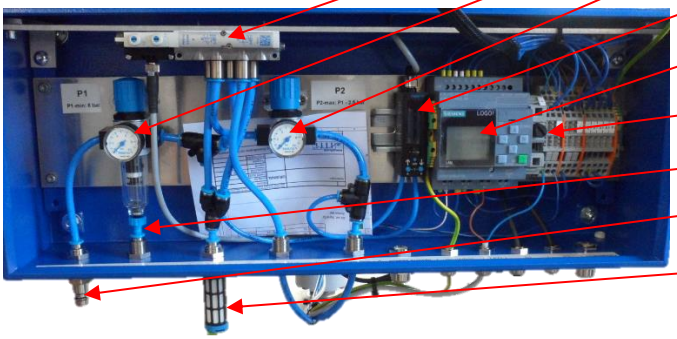
Naming	Piece	Item no.
Ball valve G1"	1	040003
fitting G1"	1	040144
Pinch valve	1	030129
Push-in fitting G1/4-6	2	030286
Filter	1	030327
Washer M12	1	000403
Quick exhaust	1	030287
Reducer D-1/4I-1/2A	1	040022
Pressure vessel	1	952124
Capacitive sensor	1	032008
Coupling with nozzle 16mm	1	040057
Claw coupling AG1/2"	1	040059

3.2.6 Control/pneumatics

Electrical diagrams see appendix



Cover of control box

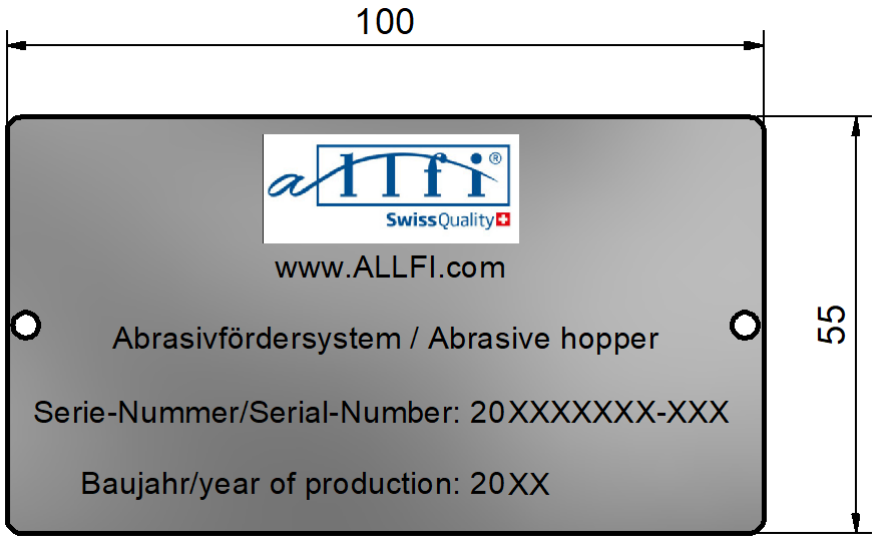


control box open

Naming	Piece	Item no.
Emergency stopS3	1	032171
Switch/Light S1/S2/P1	1	032105
Solenoid valve K1/K2	1	030288
Filter control valve	1	030289
Pressure control valve	1	030290
Differential pressure sensor	1	032329
PLC LOGO!	1	032027
Fuse slow blow 250V 1.6A	1	032183
Condensate drain	1	
Coupling plug KS4-1/4-A	1	030230
Silencer	1	030272

3.3 Technical data

3.3.1 Type plate



The type plate is fixed on the outside of the control box or inside on the lid.

3.3.2 Dimensions and weights Abrasive Hopper 952000, 1300 kg

Height: 1854 mm

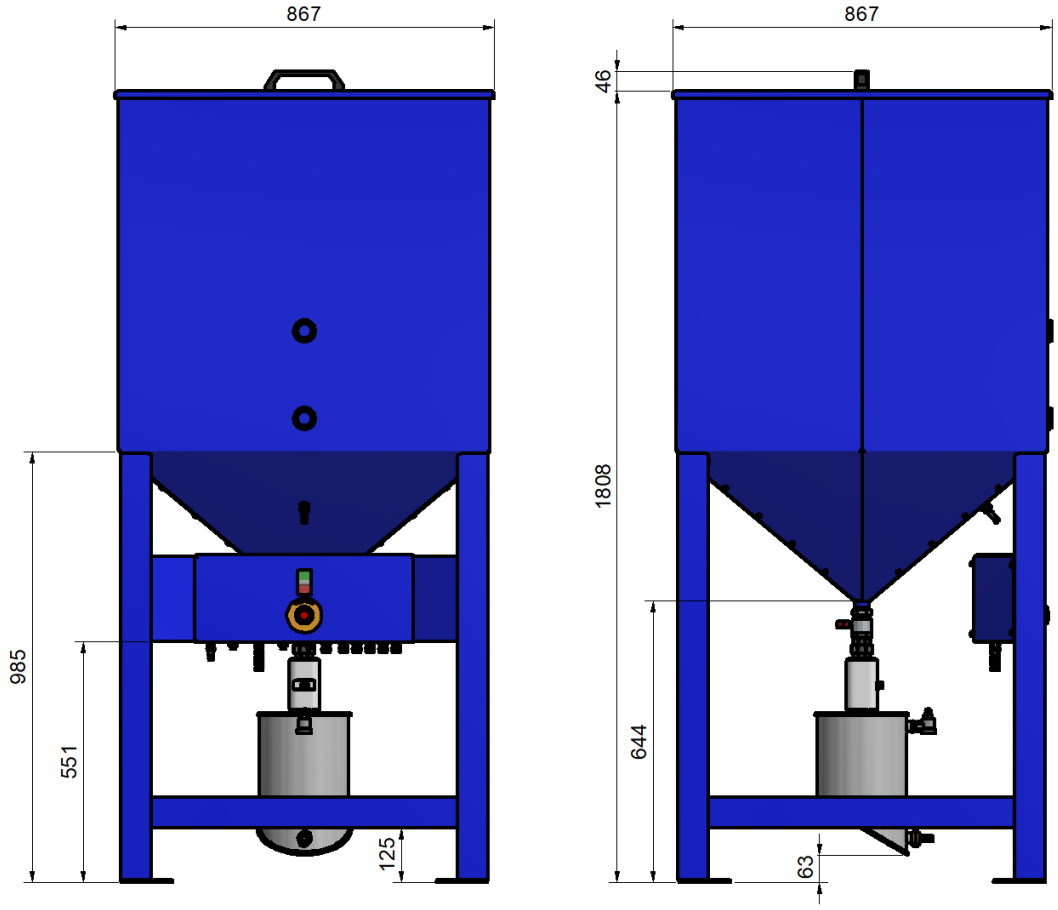
Width: 870 mm

Depth: 870 mm

Empty weight: approx. 140 kg

Operating weight full: approx. 1440 kg

Filling quantity abrasive hopper: approx.1300 kg



3.3.3 Dimensions and weights Abrasive Hopper 292800, 100 kg

Height: 1100 mm

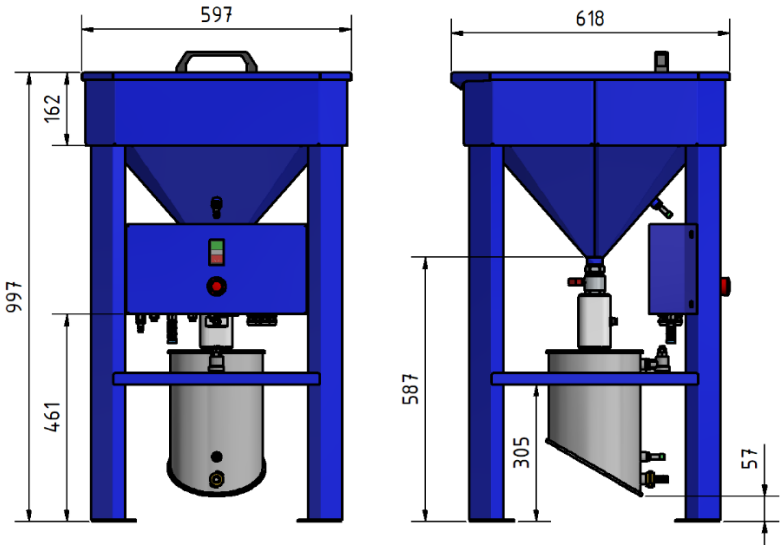
Width: 597 mm

Depth: 618 mm

Empty weight: approx. 65 kg

Operating weight full approx. 165 kg

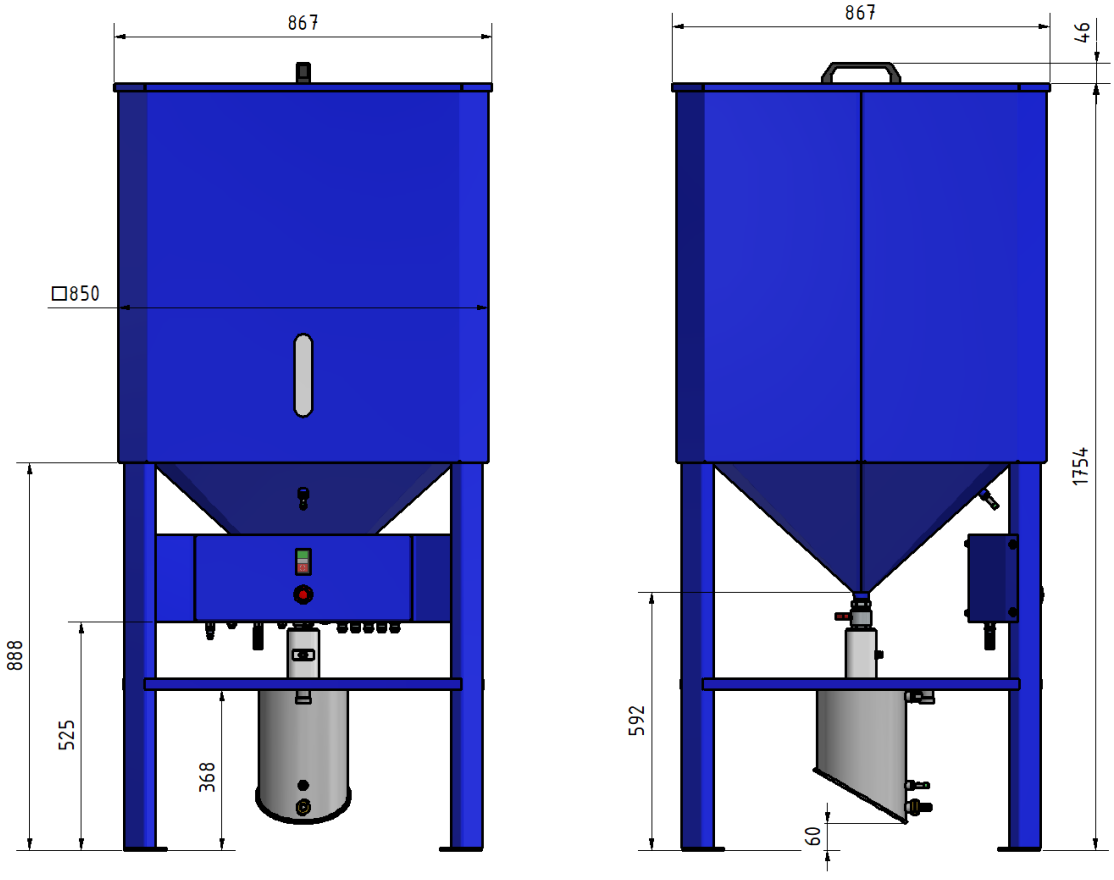
Filling quantity abrasive hopper: approx. 100 kg



3.3.4 Dimensions and weights Abrasive Hopper 952900, 1300 kg

Height:	1801 mm
Width:	870 mm
Depth:	870 mm
Empty weight:	approx. 140 kg
Operating weight full:	approx. 1440 kg

Filling quantity abrasive hopper: approx. 1300 kg



3.3.5 Dimensions and weights Abrasive Hopper OM-952500, 1000 kg

Height: 1645 mm

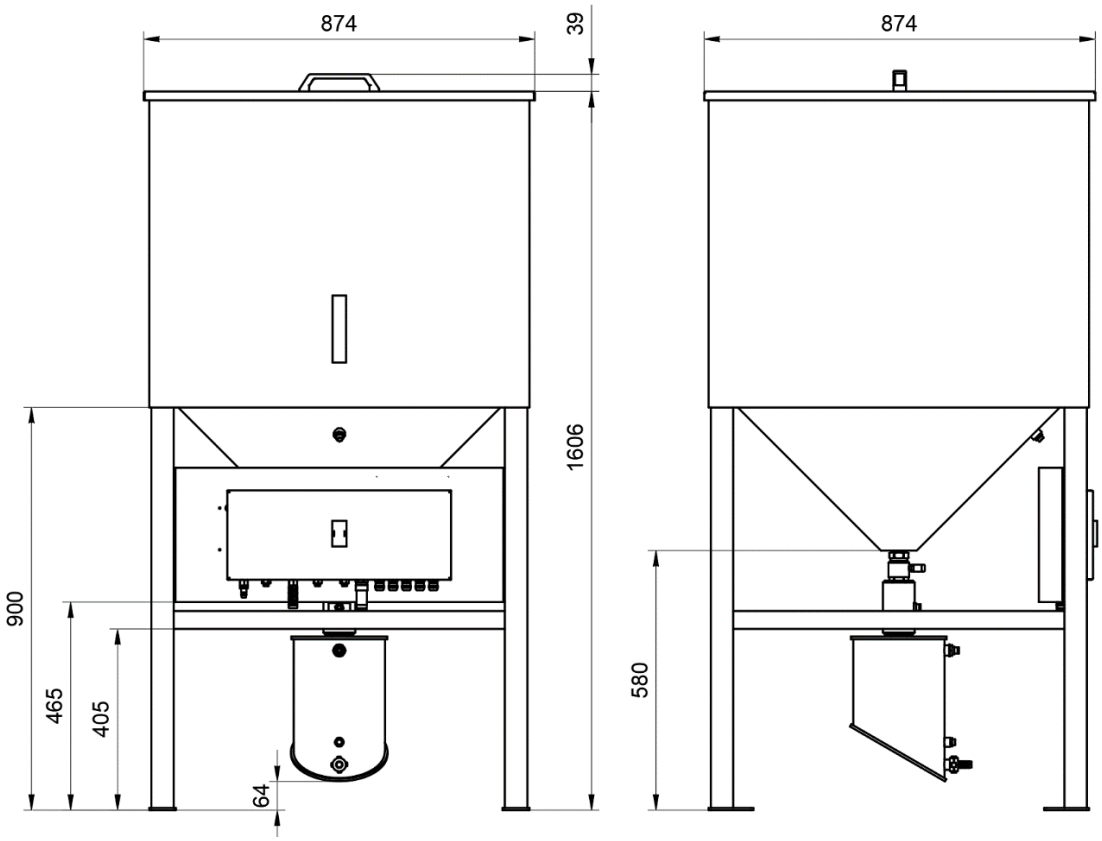
Width: 880 mm

Depth: 880 mm

Empty weight: approx. 140 kg

Operating weight full: approx. 1140 kg

Filling quantity abrasive hopper: approx. 1000 kg



3.3.6 Mechanics

Flow rate : 0 to approx. 2.000 g/min (with abrasive hose inner-Ø=16mm, L=20m)

Abrasive hose connection: Hose nozzle for hose D=16mm

Temperature min./max.: 0 / +50°C

Emission sound pressure level: less than 70 dB(A)

NOTE

To prevent the formation of condensation, large temperature fluctuations should be avoided as far as possible.

3.3.7 Data and connected loads pneumatics

Pressure vessel:	Volume	approx. 6.5 dm^3
	Max. allowed pressure	6 bar
Compressed air supply	Pressure:	6 bar bis 10 bar
	Quality	compressed air must be dry and oil-free
	Air consumption	5 bis 25 nL/min (depending on sand consumption and delivery pressure)
	air connection:	Plug nipple quick coupling Ø 6mm
Pinch valve P1:	Control pressure:	6 bis 8 bar
Pressure vessel P2:	Operating pressure:	1 bis 5 bar
	Differential pressure P1 - P2:	min. 2,5 bar

3.3.8 Electrical connection values

Supply voltage:	24 VDC (21,6V – 26,4V) 230 VAC, als Option mit integriertem Netzteil
Power consumption:	approx. 20W

3.4 Limits for operation and storage

The limits of the machine according to the Machinery Directive are defined in chapter 2 Safety and chapter 3.3 Technical data.

3.5 Accessories / options / wear parts

			
Article:	230V option	Y-distributor	Hose electrically conductive [In metres]
Article no:	952156	040056	040141
Function:	Supply 230VAC instead of 24VDC	For supply of two abrasive feeder	As connection to the abrasive feeder

			
Article:	Sensor	Sinter filter	pinch valve
Article no:	032008	030327	030129
Function:	Level sensor for Abrasive hoppers and pressure vessel	Venting pressure vessel	Shut off pressure vessel

			1 Difference pressure switch 1 Connection cable 1 SD card 2 T-piece 0.5m Hose Ø4 
Article:	Hose sleeve	Ball valve G1"	Upgrade kit differential pressure
Article no:	030134	040003	952922
Function:	Replacement sleeve for pinch valve	Shut off hopper	Retrofit of differential pressure monitoring for older abrasive hopper

4 Transport, packaging and storage

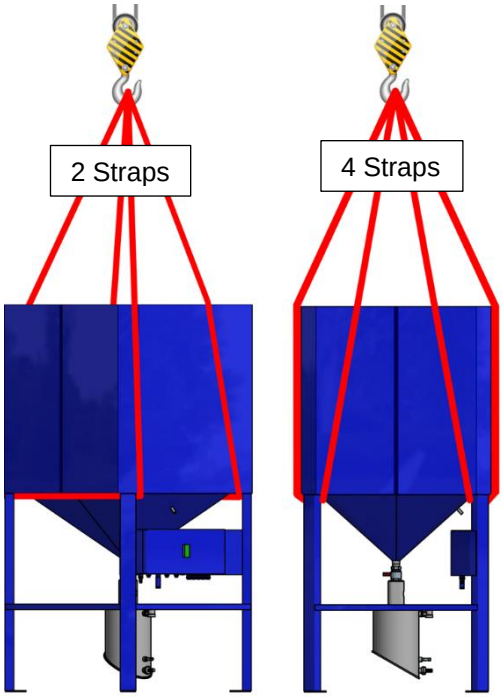
4.1 Lifting and transporting

DANGER

Ensure that NO ONE is under or near the abrasive hopper during transport.

4.1.1 Abrasive Hopper 952000, 952900, OM-952500

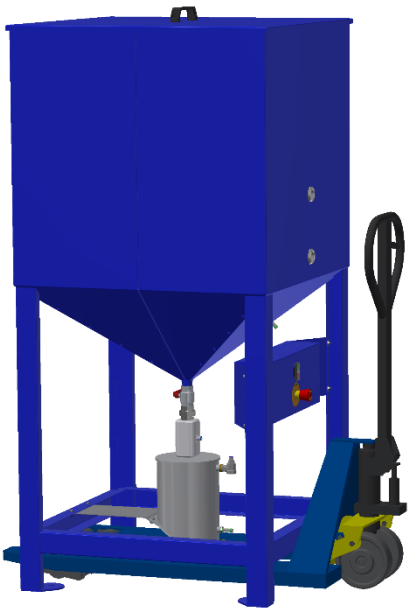
- Lifting/transporting with crane:
  With two or four straps around the tops of the legs



NOTE
The lid must be removed first. It could be damaged by the straps. **The hopper must be empty. Otherwise, it could be pressed in by the straps.**

4.1.2 Abrasive Hopper 952000

- Lifting/transporting with forklift or pallet jack:
  Lifting at the cross brace.

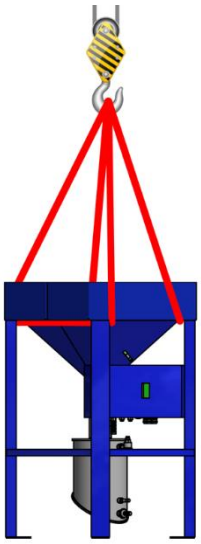


NOTE
When retracting the forks, make sure that the pressure vessel is not touched.

⚠ WARNING
The bunker may be filled with sand up to the lower display glass. **Danger of tipping!** **Forklift: Place the forks as far out as possible.** **To prevent tipping, lift the hopper only as high as necessary.**

4.1.3 Abrasive Hopper 100 kg, 952800

- Lifting/transporting with crane:
  With two straps around the tops of the legs



NOTE

The hopper must be empty. Otherwise, the lid could be damaged by the straps.

4.2 Packing

The abrasive hopper is supplied in a package. The packing consists of:

- - Euro pallet
- - cardboard
- - Wrapping foil and adhesive tape

4.3 Disposal

The packaging must be disposed of properly in accordance with the locally applicable national regulations.

4.4 Storage

The abrasive hopper may only be stored in closed rooms with a level and solid base. The following specifications must be met:

Max. humidity at 40°C	[%]	90
Min. temperature	[°C]	-5
Max. temperature	[°C]	+50

5 Installation and Mounting

5.1 Requirements for the staff to be performed

Installation and assembly may only be carried out by demonstrably trained staff.

DANGER

Work on electrical components may only be carried out by qualified staff!

5.2 Requirements for the installation site

The abrasive hopper may only be set up in closed rooms with a level and solid floor. The load-bearing capacity of the floor must be approved for the gross weight (see 3.3). It must be possible to anchor the machine to the floor. The room must be high enough to allow filling of the hopper.

Escape routes must be available and must never be blocked.

Max. humidity at 40°C	[%]	90
Min. temperature	[°C]	0
Max. temperature	[°C]	+50

Recommended minimum room heights:

- Abrasive hopper 95200, 952900, OM-952500
  - Filling with 25kg Abrasive bags 2.9m
  - Filling with big bag 4.0m
- Abrasive hopper 100 kg, 952800
  - Filling with 25kg Abrasive bags 2.2m

5.3 Mounting the machine

5.3.1 Fixing to the floor

The abrasive hopper must be fixed to the floor using the four bolt anchors supplied, part number 000346, via the foot plates.

Drill hole-Ø 10mm, Drill hole depth 70mm

5.3.2 Potential equalization

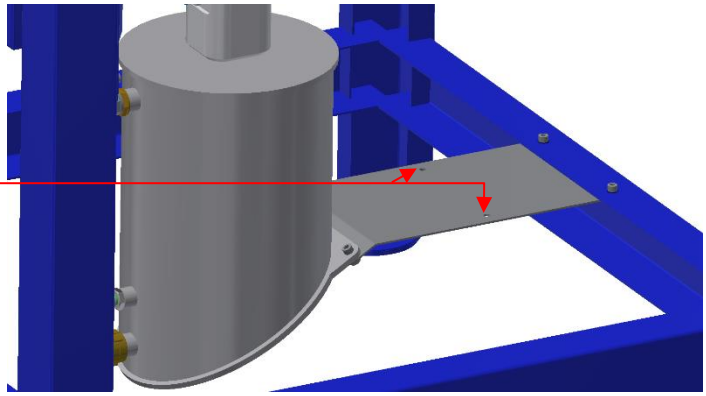
The sand flow leads to a static charge of the abrasive hopper. To avoid electric shock, the system must be electrically connected to the main grounding rail.

At the **Abrasive hopper 95280, 952900, OM-952500** this is ensured via the ground conductor.

At the **Abrasive hopper 952000** the potential equalization must be connected to the support of the pressure vessel.

Screw size: M6.

As a minimum cable cross-section, we recommend 6mm² Cu.



5.3.3 Connect compressed air

The compressed air can be connected to the machine by means of a quick coupling. Connection data see 3.3.7.

5.3.4 Electrical supply

Standard supply 24 VDC
Terminal assignment see electrical diagram (located in the terminal box).
Connection data see 3.3.8.

A 230 VAC power supply is available as an option.
Terminal assignment see electrical diagram (located in the terminal box).
Connection data see 3.3.8

5.3.5 External emergency stop

The abrasive hopper can be integrated into the emergency stop circuit of the entire plant.
For the terminal assignment, see the electrical diagram (located in the terminal box).

The emergency stop of the abrasive hopper can be used to switch off the entire plant and the emergency stop of the entire plant can be used to switch off the abrasive hopper.

5.3.6 Connect the sand hose

- The sand hose must be connected to the abrasive hopper as well as to the abrasive dosing unit and fixed with clamps.
- The hose must be laid in such a way that no one can trip over it.
- The sand hose must be laid with little tension and must not exert any pull on the pressure vessel.
- The sand hose must be electrically conductive.
- Inner Ø 16mm.
- Observe minimum bending radius of 80mm.

6 Commissioning

6.1 Requirements for the staff to be performed

Commissioning may only be carried out by demonstrably trained staff.

6.2 Adjusting the pressure regulators

- Pressure gauge P1 (left) 6 to 8bar
- Pressure gauge P2 (right): Principle: As low as possible, as high as necessary.
  Start with 1.5bar and increase in 0.5bar increments as necessary until perfect conveying occurs. max. 5bar
  P2 must be at least 2.5bar lower than P1.
- After each pressure increase, give the system time to settle.
- The differential pressure is monitored by means of the control system (see 7.3.4)

6.3 Fill abrasive hopper with sand

⚠ CAUTION

Ensure that NO ONE is under, in or near the abrasive hopper and the big bag during filling.

The forklift must not collide with the abrasive hopper.

When filling with 25 kg abrasive bags, use a suitable lifting device.

Protective equipment must be worn: safety goggles, hand protection, respiratory protection.

6.3.1 Abrasiv Hopper, 95200, 952900, OM-952500

See chapter 7.5.1

6.3.2 Abrasiv-Hopper 100 kg, 952800

See chapter 7.5.2

6.4 Switch on the machine

Before switching on the machine, check the clamps of the sand hose for tightness and make sure that the abrasive hopper is filled with sand and the cover is closed.

1. Set ball valve to passage (see picture on the right)
2. Switch on or connect compressed air
3. Switch on power supply
4. Press the green button on the front panel.
   The abrasive hopper is now started
   As soon as the solenoid valve of the pressure vessel is supplied with power, the lamp between the green and red button lights up. The abrasive hopper is now in working mode and the sand is automatically conveyed.
   Note: The start-up of the PLC takes approx. 15 seconds.

6.5 Switch off the machine

Press red butten on the front panel.
Working mode is ended, and the pressure vessel is depressurized.

7 Operation

7.1 Requirements for the staff to be performed

The abrasive hopper may only be operated by demonstrably trained staff.

7.2 Notes for safe operation

Machine must be completely assembled and screwed to the floor.

Grounding must be connected.

The cover must be placed on the hopper.

The sand hose must be laid in such a way that no one can trip over it.

The sand hose must be laid with little tension and must not exert any tension on the pressure vessel.

The sand hose must be connected at both ends and fixed with clamps.

7.3 Warning and error messages (LED strip)

Warning and error messages are displayed by means of LED strips:

Continuous signal	Power supply on, but machine not switched on.
1 x interval	warning Service required (see 7.3.1)
2 x interval	warning sand filling level in hopper deep → sensor (see 7.3.2)
3 x Interval	fault sand filling level in pressure vessel deep → sensor (see 7.3.3)
4 x Interval	fault differential pressure → P_{diff} < 2.5 bar (see 7.3.4)

If it is difficult to interpret the signals of LED strips, the control box can be opened. An additional message text is shown on the display of the control unit.

A yellow background means in this case: Warning.

A red background means in this case: Fault

7.3.1 Service display

Recharge cycles and operating hours of the abrasive-hopper is monitored. When a predefined value is reached, a service message via LED strips will be displayed.

(1 x flashing followed by a pause)

In addition, a message text is shown on the control unit.

The abrasive hopper will not be switched off.

When this service message is issued, the following wear parts must be replaced, and the following checks must be carried out in order to continue a trouble-free operation:

- Sinter filter 030327 of the quick exhaust valve (see chapter 8.4)
- Pinch valve or its hose sleeve (see chapter 8.5)
- Check the pressure of the pressure regulators (see chapter 6.2)
- Check tightness of pneumatics and sand

The message is reset by: Press button "OFF" once, then hold it down for 10 seconds.

7.3.2 Sand level monitoring in hopper

If the sand level falls below the hopper sensor, a warning message is issued via the LED strips.
(2 x flashing followed by a pause)

In addition, a message text is shown on the control unit.

The abrasive hopper will not be switched off.

The remaining time to refill abrasive sand is for:
Abrasive hopper 1300 kg: 2 to 6 hours
Abrasive hopper 100 kg: 20 to 60 minutes

Die verbleibende Zeit um Abrasivsand nachzufüllen beträgt für:
Abrasiv-Fördersystem 1300 kg: 2 bis 6 Stunden
Abrasiv-Fördersystem 100 kg: 20 bis 60 Minuten

Refilling the abrasive hopper with sand see 7.5.

The warning message goes out as soon as the sand level rises above the sensor.

If no sand is refilled, the system will come to a standstill due to the pressure vessel running empty (the abrasive hopper switches off)

7.3.3 Sand level monitoring in pressure vessel

When the sand level falls below the pressure vessel sensor, the filling process is triggered. If the sensor does not detect sand filling, a message is issued via the LED strips.

(3 x flashing followed by a pause)

In addition, a message text is shown on the control unit.

The abrasive hopper will be switched off.

The error message can be used for further messages or actions on a higher-level controller.
(Output Q4, see electrical diagram in appendix)

Reset message:
Press the green "ON" button once.
The Abrasive hopper is ready to be switched on again.

7.3.4 Differential pressure too little

The differential pressure sensor monitors the differential pressure between the control pressure P1 acting on the pinch valve (pressure gauge left) and the operating pressure P2 in the pressure vessel (pressure gauge right). Too little differential pressure leads to premature wear on the pinch valve.

If the differential pressure is less than 2.5bar for longer than 2 seconds, a message is displayed via the LED strips.

(4 x flashing followed by a pause)

In addition, a message text is shown on the control unit.

If the error is active for longer than 4 seconds, the abrasive hopper will be switched off.

The error message can be used for further messages or actions on a higher-level controller.
(Output Q4, see electrical diagram in appendix)

Reset message:
Press the green "ON" button once.
The Abrasive hopper is ready to be switched on again.

7.4 Operating and display elements

Button "ON" (green) → switches on the machine

Button "OFF" (red) → switches off the machine

Push button Emergency Stop → Machine is made powerless and switches off

Ball valve (above pressure vessel) → Shut off the hopper

Condensation drain (in control box) → Drain accumulated condensed water

Light white → Pressure vessel pressurized with compressed air

LED strip red → indicates warning and fault messages (see 7.3)

Display on PLC (in control box) → shows warning and fault messages in detail

7.5 Refilling the hopper with sand

⚠ CAUTION

Ensure that NO ONE is under, in, or near the abrasive hopper and big bag during filling.

Use safe ascent device for sieve control, cover manipulation and sand re-filling.

Forklift must not collide with abrasive hopper.

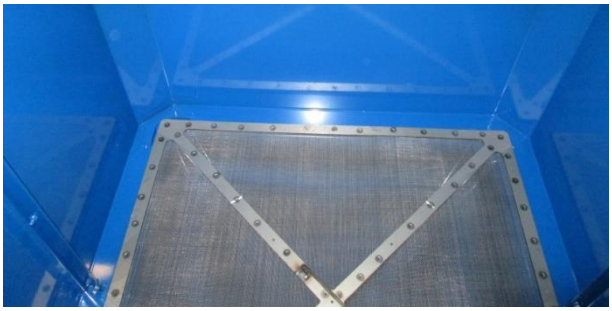
When filling with 25 kg abrasive bags, use a suitable lifting device.

Wear protective equipment: goggles, hand protection, respiratory protection.

7.5.1 Abrasive hopper, 952000, 952900, OM-952500

1. Remove cover from hopper.

2. check sieve insert:
   - Must fit snugly
   - Must not show any damages
   - Remove any foreign bodies



3. Lift the big bag (1 t) over the opening of the hopper by using a crane or forklift.

4. Open the big bag at the bottom using the opening tab provided for this purpose. Make sure that NO other persons are under, in or directly next to the abrasive hopper and the big bag.

NOTE

As long as the sieve insert is not completely covered with sand, it must be filled in dosed, otherwise the sieve insert will be damaged (pushed through) by the sand load.

5. Place cover on hopper.

⚠ WARNING

Do not place a non-empty big bag on the hopper. The abrasive hopper is not designed for this additional load.

7.5.2 Abrasive hopper 100 kg, 952800

1. Open cover of hopper.
2. check sieve insert:
   - Must fit snugly.
   - Must not show any damages.
   - Remove any foreign bodies.
3. Fill hopper with 25kg sand bags.

NOTE

As long as the sieve insert is not completely covered with sand, it must be filled in dosed, otherwise the sieve insert will be damaged (pushed through) by the sand load.

4. Close cover of hopper.

8 Maintenance and servicing

⚠ CAUTION

Before any manipulations on the abrasive hopper:

Switch off the machine and secure it against being switched on by third parties. Depressurize the compressed air line.

In case of problems regarding maintenance work, please contact the following address:

ALLFI AG
Riedenmatt 1
CH-6370 Stans
Phone: +41 (0)41618 05 05
Fax: +41 (0)41 618 05 10
E-Mail: service@allfi.com

8.1 Requirements for the staff to be performed

The abrasive hopper may only be serviced and maintained by demonstrably trained personnel.

8.2 Regular maintenance

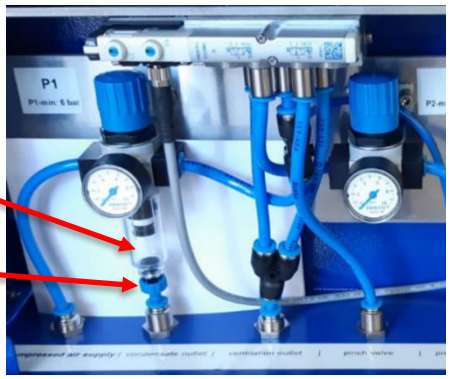
What	By whom	When
Check machine for leaks (sand and compressed air)	Owner	Weekly
Drain condensed water (see 8.3)	Owner	Weekly
Check the sieve insert for foreign bodies (see 7.5)		When refilling sand
Check pressure P1 and P2 (see 6.2)	Owner	If “Warning -Maintenance necessary”
Check condition of sand hose	Owner	If “Warning -Maintenance necessary”
Venting of the abrasive feeder	Owner	If “Warning -Maintenance necessary”

8.3 Condensed water

- Empty condensed water

Condensed water separator

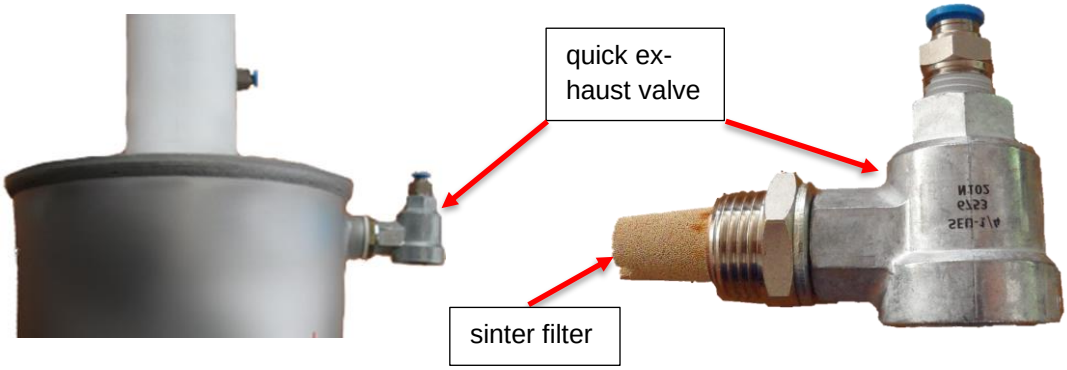
If necessary, open the valve to drain the condensate (blue nut).



8.4 Replace filter in pressure vessel

For trouble-free operation, it is important to change the sinter filter of the quick exhaust valve when service is indicated (see 7.3.1).

1. Switch off the machine.
2. Depressurize the compressed air line.
3. Disconnect the hose from the quick exhaust valve.
4. Remove the quick exhaust valve from the pressure vessel.

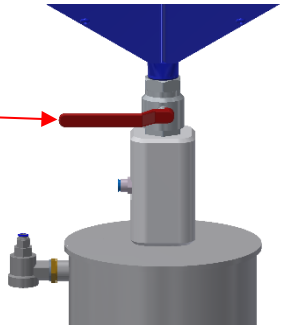


5. Replace sinter filter with new one (for replacement filter see 3.5).
6. Screw in the quick exhaust valve and connect the hose.

8.5 Replace pinch valve

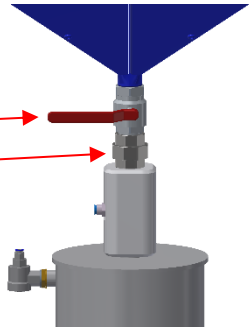
When service is indicated or if the pinch valve leaks (compressed air escaping from the hopper or sand in the damper), the pinch valve or the hose sleeve inside it must be replaced.

8.5.1 Abrasive Hopper 952800, 952900, OM-952500

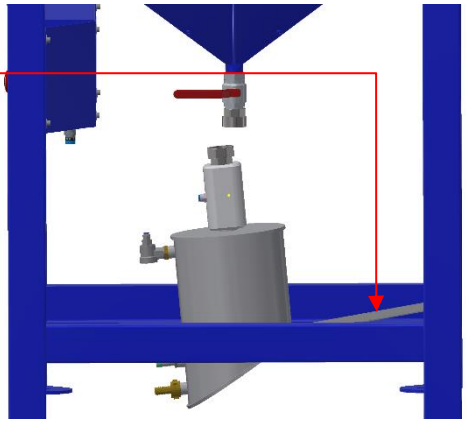


1. Switch off the machine.
2. Depressurize the compressed air line.
3. Stop sand supply by closing the ball valve.
4. Unplug cables and hoses from pressure vessel and pinch valve.
5. Unscrew the pressure vessel.
6. Unscrew pinch valve and replace with new one or replace hose sleeve inside (for spare part see 3.5).
7. Wrap sufficient Teflon tape around both threads. Tighten threads only hand-tight. Observe orientation.
8. Connect cables and hoses.
9. Open sand supply by opening the ball valve.

8.5.2 Abrasive Hopper 952000



1. Switch off the machine
2. Depressurize the compressed air line
3. Stop sand supply by closing the ball valve
4. Loosen the coupling nut between the pinch valve and the ball valve.



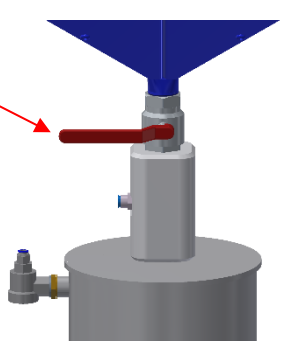
5. Swivel the pressure vessel downwards. It is now only held at the support plate
6. Unscrew pinch valve and replace with new one or replace hose collar (Spare part see 3.5)
7. Wrap sufficient Teflon tape around both threads when mounting. Tighten threads only hand-tight.
8. Lift the pressure vessel upwards and tighten the coupling nut.
9. Open sand supply→ open ball valve

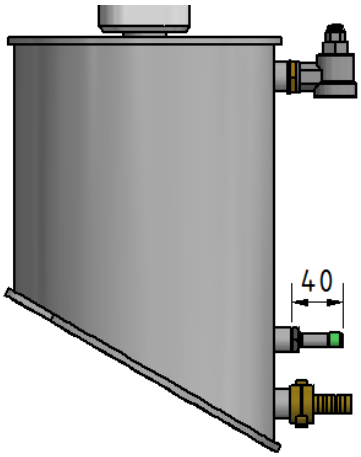
8.6 Replace level sensor of pressure vessel

NOTE
The level sensor can only be replaced when the sand level is below the sensor.

1. Switch off the machine.
2. Depressurize the compressed air line.

3. Stop sand supply by closing the ball valve.
4. Unplug sand hose, to empty pressure vessels.
5. Disconnect the sensor cable from the pressure vessel.
6. Replace sensor with new one (Spare part see 3.5) .
   Observe screw-in depth of 40mm (see picture on the right).
   Make sure that the internal thread is free of sand.
7. Connect the sensor cable.
8. Open sand supply by opening the ball valve.

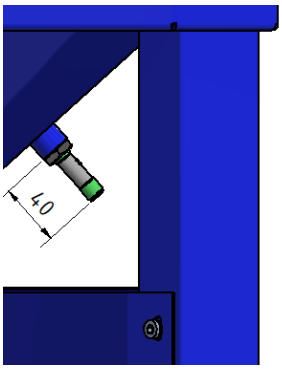




8.7 Replace level sensor off hopper

NOTE
The level sensor can only be replaced when the sand level is below the sensor.

1. Switch off the machine.
2. Disconnect the sensor cable from the hopper.
3. Replace sensor with new one. (for spare part see 3.5)
   Observe screw-in depth of 40mm (see picture on the right).
   Make sure that the internal thread is free of sand.
4. Connect the sensor cable.



8.8 Replace ball valve

NOTE
Before the ball valve can be replaced, the hopper must be completely emptied. One possibility is, to pump the sand in service mode into a big bag by guiding the sand hose into a big bag.

CAUTION
The abrasive hose must be well secured. **Protective equipment must be worn.**

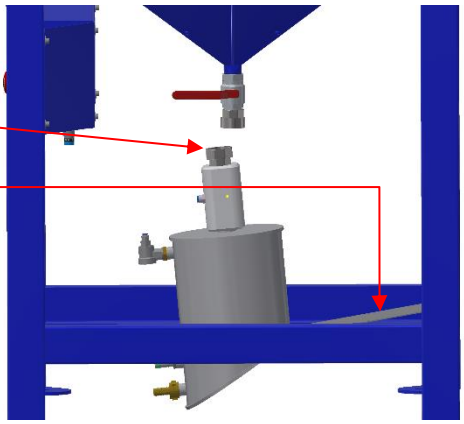
8.8.1 Abrasive hopper 952800, 952900, OM-952500

1. Switch off the machine.
2. Depressurize compressed air line.
3. Unplug cables and hoses from pressure vessel and pinch valve.
4. Unscrew pressure vessel and pinch valve.

5. Unscrew ball valve and replace with new one.
   (Spare part see 3.5)
6. The operating lever may of the ball valve have to be screw on turned by 180°.
   See picture on the right, in open position.
7. Wrap sufficient Teflon tape around both threads. Tighten threads only hand-tight. Observe orientation.
8. Connect cables and hoses.
9. Open sand supply by opening the ball valve.

8.8.2 Abrasive Hopper 952000

1. Switch off the machine.
2. Depressurize compressed air line.
3. Loosen the coupling nut between the pinch valve and the ball valve.
4. Swivel the pressure vessel downwards.
   It is now only held at the support plate.
5. Unscrew ball valve and replace with new one.
   (Spare part see 3.5)
6. Wrap Teflon tape around both threads when mounting.
7. Lift the pressure vessel upwards and tighten the coupling nut.



8.9 Reset of the machine

If the abrasive hopper has an obvious malfunction, this can be remedied by resetting the PLC control.

Press “Escape”

Select the option „Stop“

Confirm with „Yes“ OK

Restart the program with „Start“

9 Troubleshooting

9.1 Requirements for the staff to be performed

Troubleshooting on the abrasive hopper may only be carried out by demonstrably trained staff.

9.2 Malfunctions and troubleshooting

⚠ CAUTION

Before any troubleshooting on the abrasive hopper:

Switch off the machine and secure it against being switched on by third parties. Depressurize the compressed air line.

Error	Possible causes	Action
Message service needed *(1x flashing)*	Service interval reached	Perform service and reset service counter (see 7.3.1)
Message sand filling level in hopper deep *(2x flashing)*	Hopper empty	Refill hopper (7.5)
	Sensor hopper dirty	Clean Sensor
	Sensor hopper defective	Replace sensor (8.7)
	Sensor cable hopper defect	Replace sensor cable
Message sand filling level in pressure vessel deep *(3x flashing)*	Pressure vessel empty, since hopper is empty	Refill hopper (7.5) and check function of hopper sensor and replace it if necessaire (8.7)
	Pinch valve defect	Replace pinch valve (8.5)
	Sensor pressure vessel dirty	Clean / replace sensor (8.6)
	foreign body blocked in ball valve	Clean ball valve
Message differential pressure fault *(4x flashing)*	No inlet air pressure	Connect air pressure
	Differential pressure too low	Adjust pressure controller (6.2)
	Differential pressure sensor defect	Replace sensor
Slow depressurization in the pressure vessel	Filter pressure vessel fouled	Replace filter (8.4)
	Quick bleed valve defect	Replace valve (8.4)
Abrasive enters the "Pneumatic control for pressure vessel"	Filter pressure vessel damaged	Replace filter (8.4)
Compressed air from the pressure vessel escapes into the hopper while the pinch valve is closed	pinch valve defect	Replace pinch valve (8.5)
	Differential pressure too low	Check Differential pressure (min. 2.5 bar) (6.2)
Compressed air from pressure vessel does not switch on	Sensor pressure vessel defect	Replace sensor (8.6)
	Sensor pressure vessel dirty	Clean sensor
Abrasive sand does not flow out of the pressure vessel (no warning signal)	Sensor pressure vessel defect	Replace sensor (8.6)
	Sensor pressure vessel dirty	Clean sensor
	Abrasive sand wet	Use dry abrasive sand
	Abrasive sand wet (wet compressed air)	Use dry compressed air / drain off condensate water
Sand in silencer	pinch valve defect	Replace pinch valve (8.5)
Air comes out of the hopper	pinch valve defect	Replace pinch valve (8.5)
	Differential pressure too low	Adjust pressure controller (6.2)

10 Decommissioning/Deinstallation/Disposal

10.1 Requirements for the staff to be performed

This work may only be carried out by demonstrably trained staff.

10.2 Decommissioning

1. Completely empty the hopper. This can be done by pumping the sand in service mode into a big bag by guiding the sand hose into the big bang.

CAUTION
The abrasive hose must be well secured. **Protective equipment must be worn.**

2. Switch off abrasive hopper.

10.3 Deinstallation

1. Disconnect compressed air supply.
2. Disconnect power supply and grounding.

DANGER
Work on electrical components may only be carried out by qualified staff!

3. Remove the hose to the abrasive conveying system.
4. Remove floor anchors.
5. Carry away. (see 4.1)

10.4 Disposal

The abrasive hopper consists of metal and plastic parts, as well as electrical components.
All metal parts can be recycled.
Electronic and plastic parts must be disposed professionally in accordance with the locally applicable regulations.

CE

EU-Konformitätserklärung
EU Declaration of Conformity

Der Hersteller / Bevollmächtigter: The manufacturer / authorized representative:	ALLFI AG Riedenmatt 1 CH-6370 Stans Schweiz
Bevollmächtigte Person, für die Zusammenstellung der technischen Unterlagen: *Authorized person, for the compilation of technical documentation:*	ALLFI AG Beat Meyer Riedenmatt 1 CH-6370 Stans Schweiz
Produktbezeichnung / *Equipment name:*	Abrasiv Fördersystem / *Abrasive hopper*
Modell / *Model:*	952000, 952800, 952900, BO-95290, IWE-952900, OM-952500

Hiermit erklären wir, dass die hier aufgeführten Maschinen allen einschlägigen Bestimmungen der Richtlinie **Maschinen (2006/42/EG)** entsprechen. Die Maschinen entsprechen weiterhin allen Bestimmungen der Richtlinie **Druckgeräte (2014/68/EU)**.
*We confirm, that the machines listed here comply with all relevant regulations of the Directive **2006/42/EC** (Machinery Directive). The machines also comply with all the regulations of the Directive **2014/68/EU** (Pressure Equipment).*

Folgende harmonisierte Normen wurden angewandt:
The following harmonized standards have been applied:

DIN EN ISO 12100:2011-03	Sicherheit von Maschinen – Allgemeine Gestaltungsleitsätze *Safety of machinery - General principles for design*
DIN EN 60204-1:2019-06	Sicherheit von Maschinen – Elektrische Ausrüstungen von Maschinen – Teil 1: Allgemeine Anforderungen *Safety of machinery - Electrical equipment of machines - Part 1: General requirements*
DIN EN ISO 9606-1:2017-12	Prüfung von Schweissern – Schmelzschweissen – Teil 1: Stähle *Testing of welders - melt welding - Part 1: Steels*

Folgende sonstige technische Normen und Spezifikationen wurden angewandt:
The following other technical standards and specifications have been applied:

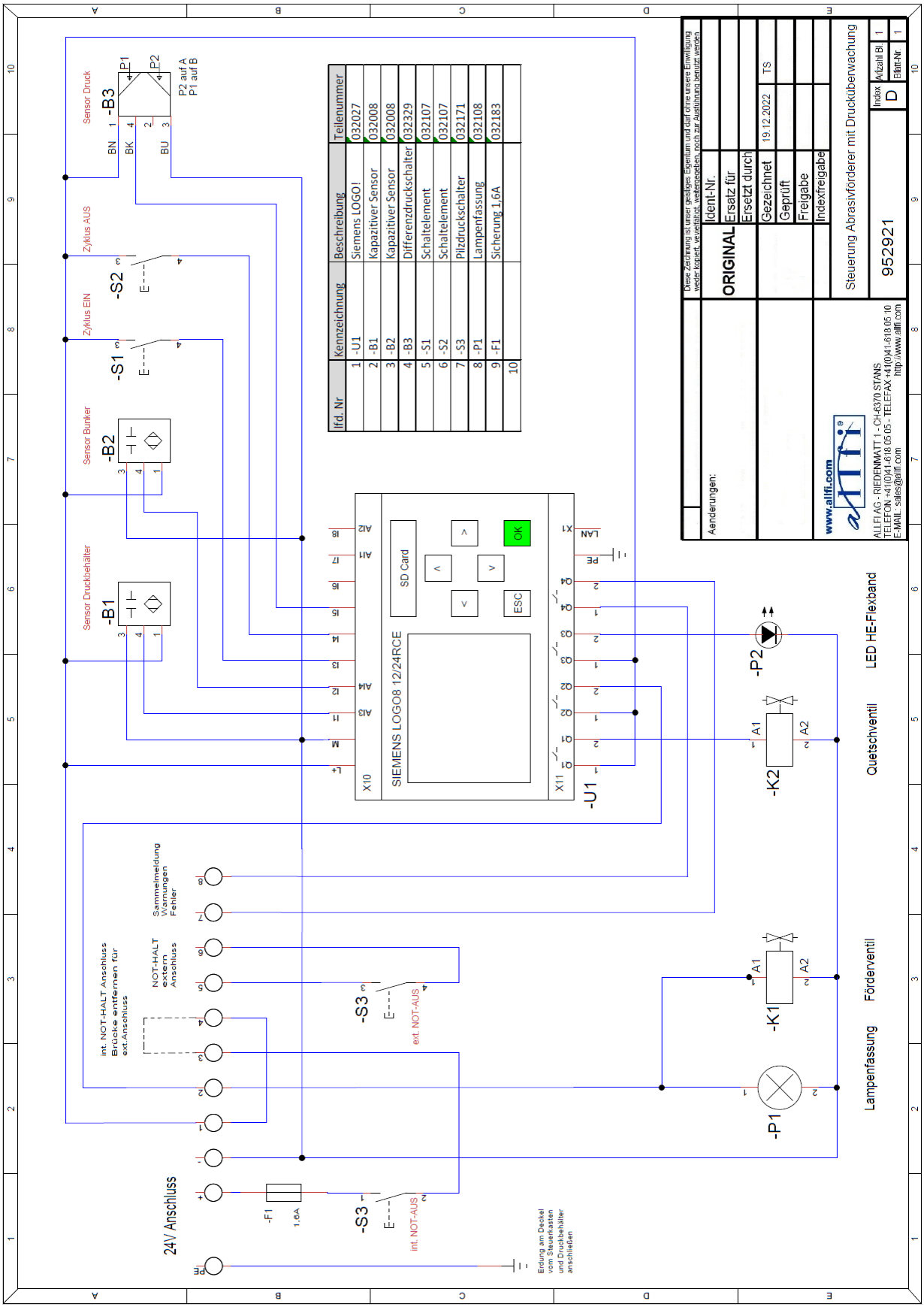
DIN EN ISO 9001:2015-11	Qualitätsmanagementsysteme – Anforderungen *Quality management systems – requirements*
AD 2000-Merkblatt HP 3:2014-11	Schweissaufsicht, Schweisser *Welding supervision, welder*

Stans, 28.09.2022

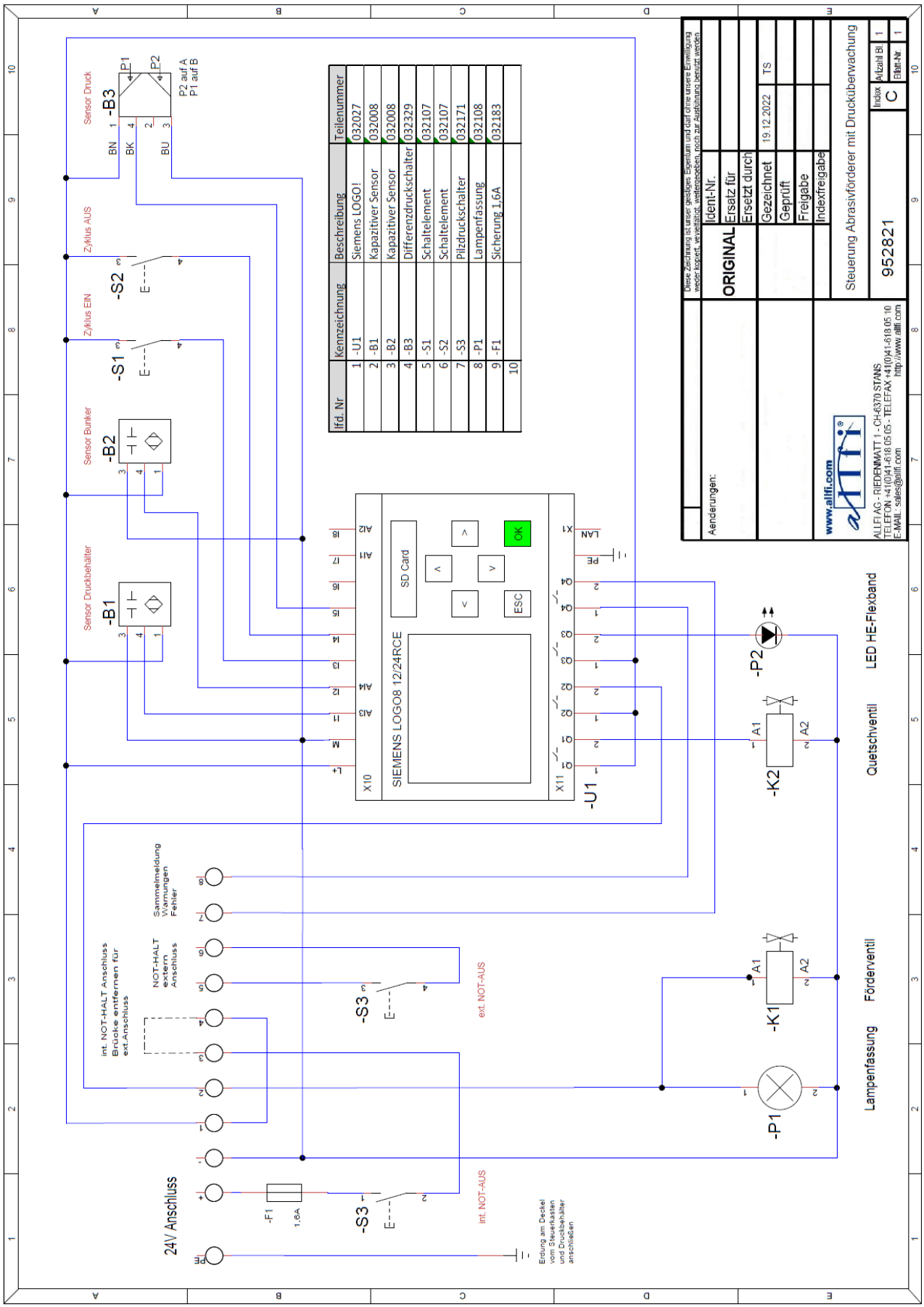
ALLFI AG

Beat Meyer, CEO

Appendix 1
Electrical diagram to abrasive hopper 952000, 952900

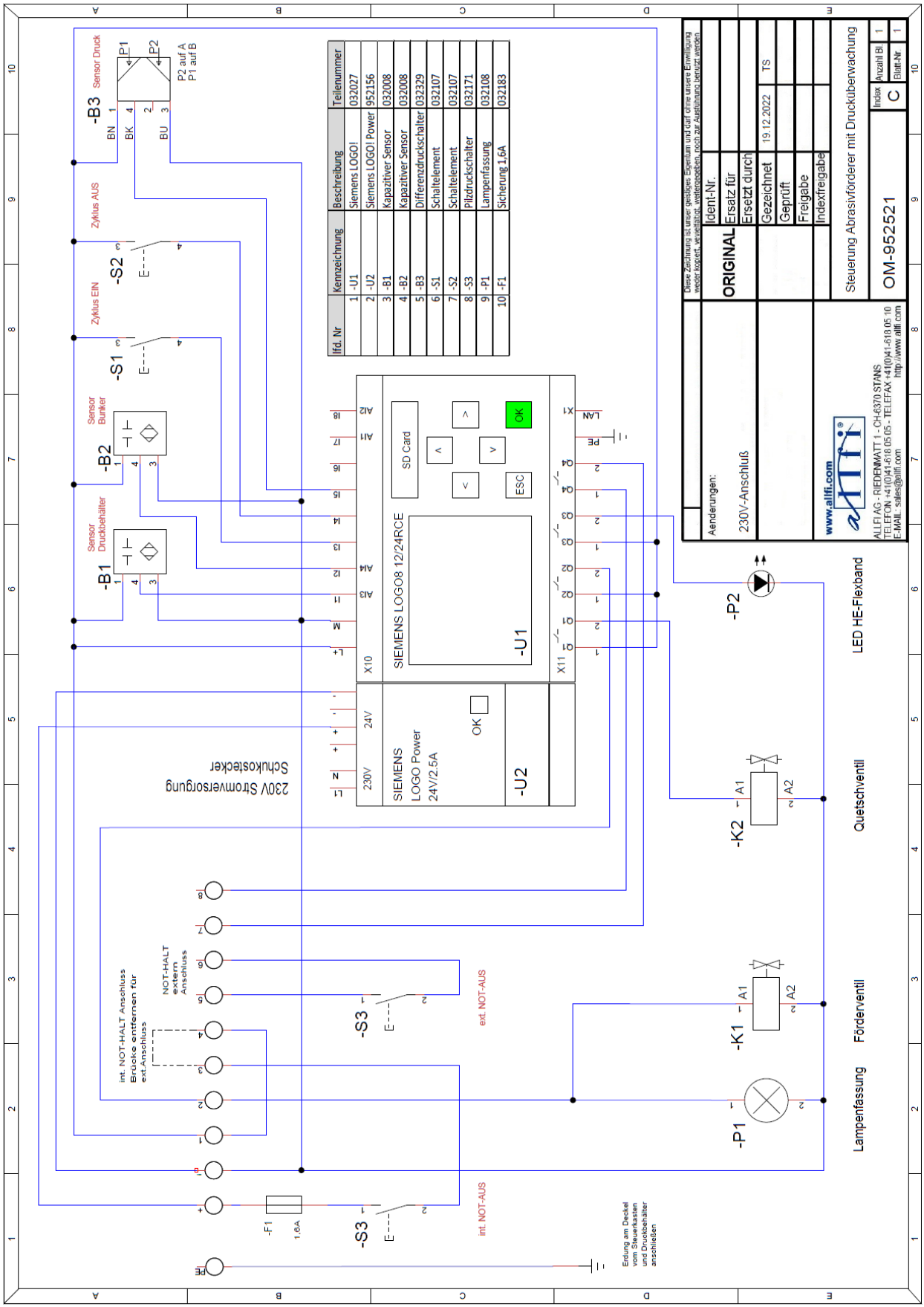


Appendix 2
Electrical diagram to abrasive hopper 952800



lfd. Nr	Kennzeichnung	Beschreibung	Teilenummer
1	-U1	Siemens LOGO!	032027
2	-B1	Kapazitiver Sensor	032008
3	-B2	Kapazitiver Sensor	032008
4	-B3	Differenzdruckschalter	032329
5	-S1	Schaltelement	032107
6	-S2	Schaltelement	032107
7	-S3	Pilzdruckschalter	032171
8	-P1	Lampenfassung	032108
9	-F1	Sicherung 1,6A	032183
10			

Appendix 3
Electrical diagram with power supply 230V to abrasive hopper 952000, 952900, 952500-OM



lfd. Nr	Kennzeichnung	Beschreibung	Teilenummer
1	-U1	Siemens LOGO!	032027
2	-U2	Siemens LOGO! Power	952156
3	-B1	Kapazitiver Sensor	032008
4	-B2	Kapazitiver Sensor	032008
5	-B3	Differenzdruckschalter	032329
6	-S1	Schaltelement	032107
7	-S2	Schaltelement	032107
8	-S3	Pilzdruckschalter	032171
9	-P1	Lampenfassung	032108
10	-F1	Sicherung 1,6A	032183

Pneumatic diagram