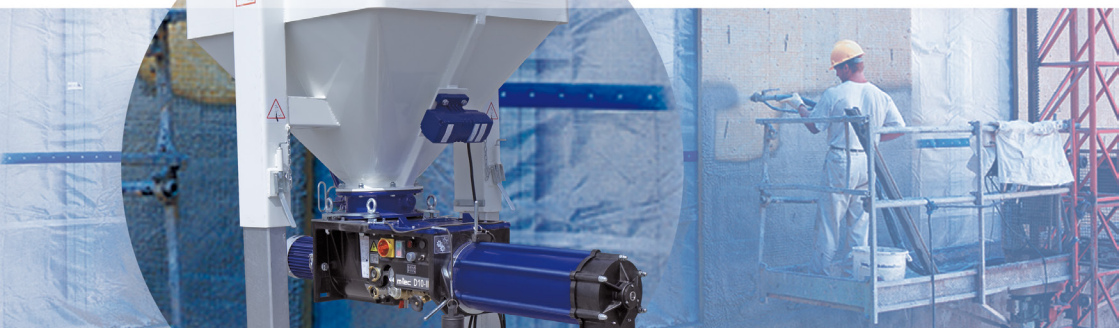


Operating instructions

Small silo PS1,2/0 0 bar version



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The manufacturer reserves the right to modify the specifications to the respective state of progress without specific prior notice. m-tec will be pleased to provide information on the current status of and any changes or additions to these operating instructions.

Dear Customer,

Thank you for choosing a product from m-tec mathis technik gmbh.

Our small silo PS is state of the art under all the applicable standards and EC Directives and has been awarded the GS symbol for "tested safety" by the professional association.

EC prototype no. CZ -
Factory no.
Type
Year built
Capacityl
Max operating pressure bar
Max operating temperature60 °C

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1 Safety

1.1 General safety guidelines

This m-tec small silo PS has been designed, built, and tested for safe and reliable operations in accordance with the state of the art and has left our production facilities in perfect condition with respect to safety requirements.



Nevertheless, the silo can be dangerous to persons and property if it is operated incorrectly. Before the silo is commissioned, these operating instructions must be read in their entirety by all personnel assigned to the silo, the information on safety observed, and any questions on their contents immediately clarified.

The operator should read the descriptions thoroughly to become familiar with handling the m-tec small silo PS. This prevents injury to persons and damage to property and ensures that the operator can work properly with the silo.

Failing to observe these operating instructions, or even individual sections, can cause damage to the silo and raise the risk of accident for the operator!

Failing to operate the machine properly or for uses other than those specified herein renders void all liability and warranties on the part of the manufacturer.

Only spare parts and accessories supplied by m-tec may be used. If nonapproved spare parts and accessories are used, m-tec mathis technik gmbh will assume no liability for damage caused.

The manufacturer will assume no liability for damage caused by unauthorised conversions or modifications to the silo.

1.2 Intended application



The small silo PS is intended only to be filled with and emptied of materials such as cement, lime, gypsum, and other powdery or granular substances.

The silo must never be charged with flammable, liquid, or organic substances.

The operator may have to consult the specifications for the respective charging material and material container.

1.3 Symbols used in these operating instructions

These operating instructions use the following symbols to refer to the potential risks of using the small silo PS.

WARNING!

This symbol is used for all work that may present a risk to life and limb when the silo is not handled properly. Observe the work instructions precisely and proceed with care.



IMPORTANT!

This symbol is used for all work that may pose risks to property and the efficient course of operations. Observe these instructions precisely.



ENVIRONMENT!

This symbol is used for potential risks to the environment when the respective instructions are not observed properly. The information marked with this symbol should be particularly observed for the protection of our environment.



INFORMATION!

This symbol is used for important or additional information on the silo or documentation.



1.4 Work safety



The silo operator is responsible for ensuring that all personnel assigned to the small silo PS have been trained to handle this and observe the corresponding rules and information on safety.

In each and every case observe the rules and regulations in force in your country for handling silos and pressure vessels.

- The silo must be sited at no less than one silo height plus one metre from embankments and trenches.
- The site must be flat and stable. The siting area must be able to bear a foundation pressure of at least 250 kN/m². The requisite stability can be obtained when the silo is sited on wooden beams 250–300 cm long, 30 cm wide, and at least 8 cm thick.
- The siting area, the bedding, and the beams must be secured against washout and lateral slipping.
- Before siting the silo on public ways the processor must receive approval from the authorities and the silo secured in compliance with the highway code.
- The silo may be transported only with forklifts, hand lifts, or cranes at the provided suspension points.
- The max total weight may not be exceeded!
- The hoisting gear must be designed to carry weights of at least 3,000 kg.
- The silo must be lifted high enough that the tube feet do not bear weight. This is achieved either via a crane working via the crane eyes or a forklift truck, using the upper forklift receivers. Once this has been done, the socket pins on the silo feet can be released and pulled out.

- Repairs and modifications must be conducted on the silo by authorised, qualified personnel only.
- The maximum operating pressure of the silo and the maximum temperature may not be exceeded. Both of these specifications are listed on the ratings plate.

In addition to these operating instructions, also the following stipulations apply to how the small silo PS is handled in Germany:

BGV A1	General stipulations
BGV C12	Silos (0 bar version)
BGI 694	Instructions on how to handle ladders and steps
DIN 4124	Siting silos near builtup pits and trenches
DIN 1054	Maximum foundation loads
StVO	Highway code
BSV	Ordinance on Industrial Safety and Health

2 Description of the silo

2.1 Range of application

The small silo PS is intended only to be filled with and emptied of materials such as cement, lime, gypsum, and other powdery or granular substances.

The silo must never be charged with flammable, liquid, or organic substances.

The operator may have to consult the specifications for the respective charging material and material container.

m-tec small silos PS can be used with all conventional application machines.

The silo is designed for an operating pressure of 0 bar.



2.2 Technical data

Silo type	Small silo PS
Volume	1.2 m ³
Empty weight	approx 445 kg
Max total weight*	approx 2600 kg
Operating pressure	0 bar
Variable overall height:	
retracted	2100 mm
extended	2950 mm
Width x depth	1200 x 1200 mm
Discharge height	1375 mm

* charged, including attached application machine

Connections	
Venting sockets	1" with solid coupling
Silo flap valve	DN250
Domed cover	DN450

2.3 General view

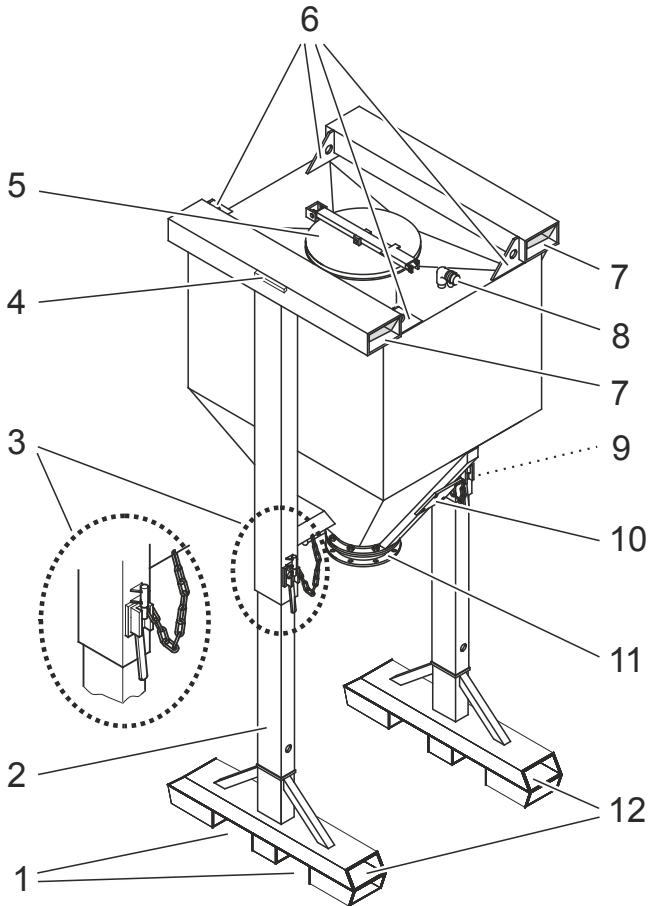


Fig. 1: General view

- | | | | |
|---|-----------------------------------|----|---|
| 1 | hand lift receiver | 8 | venting socket |
| 2 | extendable tube foot | 9 | delivery note box (not shown) |
| 3 | socket pin in the foot with lock | 10 | vibrato plate |
| 4 | stop for brick fork receiver | 11 | discharge flange with silo flap valve (not shown) |
| 5 | domed cover | 12 | lower forklift receivers |
| 6 | crane eyes for vertical transport | | |
| 7 | upper forklift receivers | | |

2.4 Wiring diagrams for silo flap valve / vibrator plate

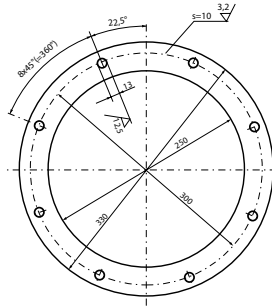


Fig 2 –
Wiring diagram for silo flap valve DN250

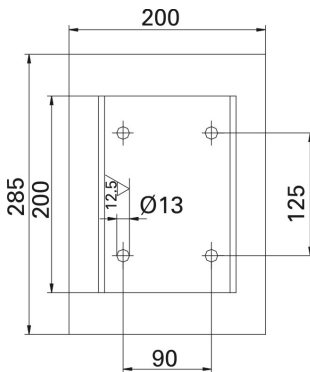
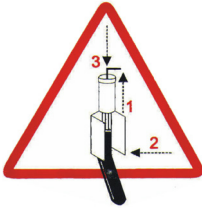


Fig 3 –
Wiring diagram for jogger plate

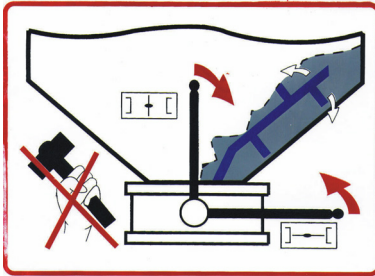
2.5 Symbols on the silo



*Handling the
socket pins in the
feet*



*Forklift and hand lift
receiver*



*Operating the mechanical
aerator*

3 Transport



Before every transport, charging, and startup, the silo must be examined for damage in the form of dents, deformation, cracking, and corrosion, in particular on the supporting feet, struts, and receiver hardware. When damage is established this must be remedied by authorised personnel before the silo is put to any further use.

There must be no unauthorised personnel inside the danger zone when the silo is loaded, transported, and unloaded.

The silo may be transported only with forklifts, hand lifts, or cranes at the provided suspension points.

The silo may be transported only when vertical.

The max total weight may not be exceeded!

The hoisting gear must be designed to carry weights of at least 3,000 kg.

Before loading or transporting the silo the responsible personnel must ensure that

- ***all attached parts (e.g. shutter, vibrator, application machine) are firmly secured,***
- ***all apertures are sealed shut,***
- ***the silo is retracted and the supporting feet are locked in place.***

The site on which the silo is deposited must exhibit adequate load bearing properties ($\delta = 250 \text{ kN/m}^2$).

The small silo PS can be transported by forklift, hand lift, crane, and truck.

3.1 Preparing for transport

There must be no unauthorised personnel inside the danger zone when the silo feet are retracted.



The silo must be lifted high enough that the tube feet do not bear weight. This is achieved either via a crane working via the crane eyes or a forklift truck, using the upper forklift receivers. Once this has been done, the socket pins on the silo feet can be released and pulled out.

- Close and lock the silo's flap valve.
- Lift the small silo PS high enough that the tube feet do not bear weight. This is achieved either via a crane working via the crane eyes or a forklift truck, using the upper forklift receivers.
- Unlock and draw out the socket pin.
- Lower the silo to the stop.
- Lift the pin lock, insert the socket pin, and secure the lock.
- Remove any adhering residue.

3.2 Transport by forklift or hand lift

The lower forklift and hand lift receivers may be used only when the silo has been retracted.



The silo is fitted on the top and bottom with forklift receivers for transport (Fig 1, 7 + 12).

Under the bottom forklift receivers there are receivers for a hand lift (Fig 1, 1).

3.3 Transport by crane



When the silo is transported with a crane the four sling ropes must be attached to the provided crane eyes (Fig 1, 6) only.

3.4 Loading a brick fork



The brick fork may be used to carry only the empty silo. The brick fork must be applied to the stop (Fig 1, 4) provided for this purpose.

3.5 Transport by truck



The silo must be retracted when it is transported by truck.

Transporting the silo by truck must take into account the load distribution, the maximum laden weight, and the axle loads.

The silo must be secured against slipping and tilting during transport.

The silos must be arranged so that they cannot cause damage to each other.

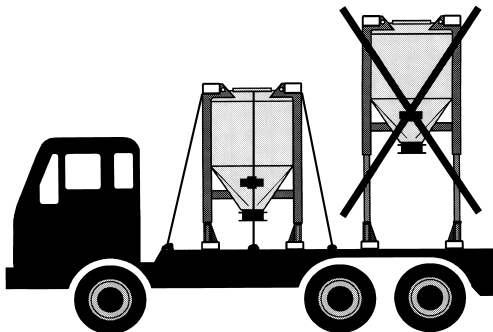


Fig 4 – Transport by truck

4 Unloading

There must be no unauthorised personnel inside the danger zone when the silo is loaded, transported, and unloaded.



Observe the stipulations under Section 3 “Transport”.

Never deposit silos on public thoroughfares without permission.

The unloading site must allow the safe arrival and departure of the transporting vehicle. The silo site must be determined explicitly by site management and must be a horizontal, plane, and hardstanding surface of about 3 x 3 m protected against washout and slipping. A safety distance of no less than 4 m must be maintained between the silo and any embankments, pits, and ditches.

General rule –

Safety distance to edge of embankment = silo height + 1 m, for the small silo PS therefore: 3 m (max extended height) + 1 m = 4 m



The base beams must not lie parallel to the edge of the embankment.



While the silo is being unloaded the depositing site must be constantly monitored and the unloading procedure aborted whenever necessary. The silo must always be vertical.

5 Charging



Before every transport, charging, and startup, the silo must be examined for damage in the form of dents, deformation, cracking, and corrosion, in particular on the supporting feet, struts, and receiver hardware. When damage is established this must be remedied by authorised personnel before the silo is put to any further use.

The small silo PS must be charged only with dustlike, grainy substances like cement, lime, plaster, paint, etc.

The max total weight may not be exceeded!

The small silo PS should never be charged with flammable, liquid, or organic substances.

The small silo PS should be charged free of shock. The charging pressure generated in the silo may not exceed 0.1 bar; the venting socket must therefore be kept open during the charging process.

The operator may have to consult the specifications for the respective charging material and material container.

A ladder must be used for some work prior to or during charging.

Use only suitable, undamaged ladders, and note the safety instructions for handling these.

Place the ladder at the correct angle between the upper forklift receivers on the silo.

Before the silo is charged:

- *drain off any charge residue or condensation through the silo's open flap valve*
collected material must be disposed of properly.



- *close the silo flap valve*
- *remove the blank cap from the venting socket (Fig 1, 8) and check the line for unobstructed passage*
- *disengage the lock on the domed cover, and open the cover*

5.1 Charging at the plant

The small silo PS must be retracted before it is charged through the aperture in the domed cover.

- Charge the small silo PS with no more than 1.2 m³ of material in accordance with the charging system's specifications.
- After charging, close tightly the domed cover, and check the rubber gasket.
- Reattach the blank cap to the venting socket.

5.2 Charging from big bags

The big bag may be emptied only through an additional safety device (e.g. m-tec art. no. 708432).

The big bag may not be deposited on this safety device, but must be suspended from the crane for the entire emptying process.

There must be no personnel under suspended loads!

The small silo PS must be retracted before it is charged through the aperture in the domed cover.

- Ensure that the domed cover is open.
- Place the safety device on the upper forklift receiver.
- Align the big bag over the safety device.
- Insert the emptying nozzle into the aperture in the domed cover, and open the big bag.



6 Startup

6.1 Setting the working height



There must be no unauthorised personnel inside the danger zone when the silo feet are extended.

- Disengage and remove the socket pins in the feet (Fig 5, 2).

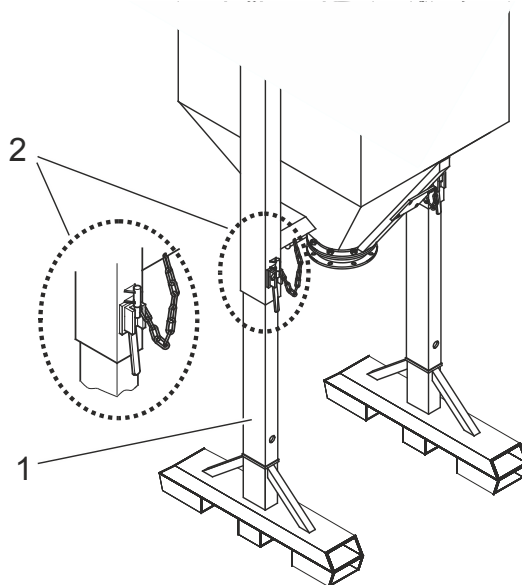
Take note of Chapter 3 for the next step.

- Lift the small silo PS high enough that the tube feet can be driven to the stop. This is achieved either via a crane working via the crane eyes or a forklift truck, using the upper forklift receivers (Fig. 5. 1).
- Raise the socket pin lock, insert the socket pins, and engage the lock.

The small silo PS is now set securely to the material discharge height of 1.3 m.

Fig 5 – Extendable tube foot

- 1 tube foot
- 2 socket pin in the foot with lock



6.2 Startup

The small silo PS can be used with all conventional processing machinery for masonry mortar and plaster.

Before installing a processing machine the operator must always first consult its operating instructions.



Once the processing machine has been installed correctly and is ready for operations:

- open the silo's flap valve (by pulling up the lever)
- the silo's flap valve must be closed for longer breaks between operations

6.3 Mechanical aerator

The small silo PS is fitted as standard with a mechanical aerator that improves the flow of material.

6.4 Vibrating unit (optional)

An electric vibrator can be installed to improve the material flow.

This vibrator may be installed only on the provided vibrator plate (Fig 1, 10).

***The vibrator must not be switched on when there is only a residual quantity in the silo or when the silo is empty!
The vibrator may cause the silo to start moving.***



7 Cleaning and storage



The small silo PS must be completely empty and cleaned before it is put in storage or charged with a different material.

7.1 Cleaning

- Clean the vessel cover and gaskets.
- Drain off any residue through the silo flap valve.



Dispose of residue in accordance with the environmental provisions.

7.2 Storage



The site on which the silo is deposited must exhibit adequate load bearing properties ($\delta = 250 \text{ kN/m}^2$).

No more than two retracted small silos PS may be stacked on top of each other in the stored state.

8 Corrective and regular maintenance

m-tec mathis technik gmbh accepts no liability for any losses incurred through failure to observe the stipulations for corrective and regular maintenance.



The silo must be examined for damage in the form of dents, deformation, cracking, and corrosion, in particular on the supporting feet, struts, and lugs. When damage is established this must be remedied by authorised personnel before the silo is put to any further use.

The following work must be performed at regular intervals:

- Apply lubricant to the domed cover's hinge (Fig 6, 4) and the silo flap valve (Fig 6, 6).
- Check that the domed cover's rubber gasket (Fig 6, 3) is undamaged and sits correctly.
- Check that the venting socket (Fig 6, 5) is clear over its whole length.
- Check tightness and function of the silo closing flap.
- Check for damage to the aerator on the silo's flap valve.
- Check that the tube feet (Fig 6, 1), socket pins, and their locks (Fig 6, 2) run smoothly.
- Check that the attached parts (vibrator, silo flap valve, application machine, etc.) are secure.

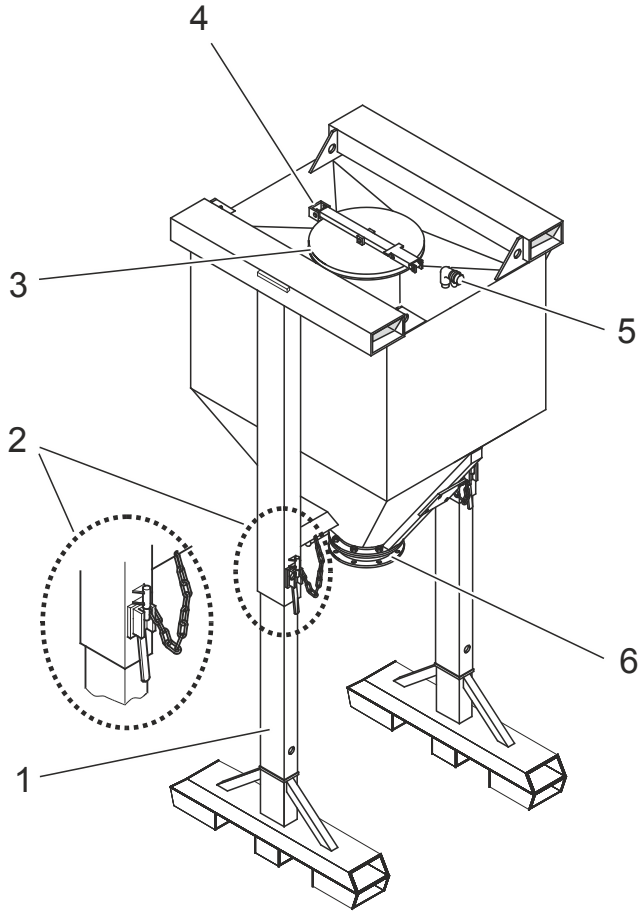


Fig 6 – Maintenance parts

- 1 extendable tube foot
- 2 socket pin in the foot with lock
- 3 domed cover's rubber gasket
- 4 domed cover's hinge
- 5 venting socket
- 6 silo flap valve (not shown)

9 Spare parts and accessories



Only spare parts and accessories supplied by m-tec may be used. If nonapproved spare parts and accessories are used, m-tec mathis technik gmbh will assume no liability for damage caused.

The manufacturer will assume no liability for damages caused by unauthorised conversions or modifications to the machine.

Request our detailed spare parts catalogue for additional information, spare parts and accessories.

For all questions and orders please consult your competent sales department.

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