

DMF – 5EB.2

DMF – 20EB.2

DMF – 50EB.2

DMF – 200EB.2

Manufacturer:

sera GmbH
sera-Straße 1
34376 Immenhausen
Germany
Tel.: +49 5673 999-00
Fax: +49 5673 999-01

info@sera-web.com
www.sera-web.com

Keep the operating manual for future use!

Record the exact type and serial number here.
(can be read off the type plate of the dry material feeder)

Type :

Serial No. :

These data are important in the case of queries or for ordering spare and/or wear parts and must always be stated.



NOTE!

Project-specific documents such as product description and test certificates are not an integral part of the CD contents.



Operating instructions

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Q. Quickstart

“Quickstart” is used to start-up the dry material feeder quickly without having read the operating instructions in detail.



The Quickstart does not claim to be complete and does not relieve the user from reading the complete instructions!

NOTE!

Q.1 Power connection

The sera dry material feeder is delivered ready for installation. Standard delivery includes a 2m power cable with Euro plug. The standard version is designed for an operating voltage range of 210 – 250 V, 50/60 Hz.



ATTENTION!

The operating voltage range is limited.
Observe the specifications on the type plate!

The following design is available:

- 210-250V, 50/60Hz



ATTENTION!

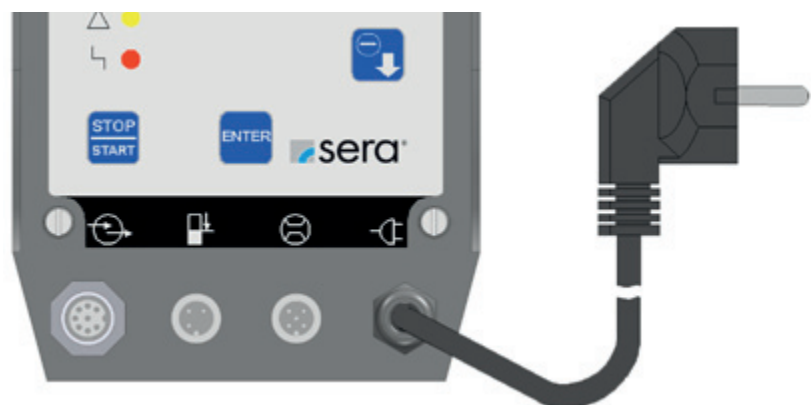
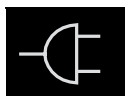
The dry material dosing feeder restarts in the selected operating mode after the power supply was switched on or a power supply recovery following a mains failure!



ATTENTION!

Momentary switching on and off of the power supply is to be avoided!
Minimum wait after switching off the power supply is 1 minute!

Symbol:



ATTENTION!

Operate the dry material feeder only on a grounded AC mains with a protective conductor!

Q.2 Control elements



1	STOP/START key
2	LED operation indications
3	LCD-display
4	UP key
5	DOWN key
6	ENTER key

Q.3 LED operation indicators

Three light-emitting diodes (LED) indicate the status of the dry material feeder:

Green: Operation and stroke indicator



When switching on the unit, the green LED is on permanently. The operation indication is combined with a process indication, i.e. the LED blinks during the operation.

Yellow: Warning indicator



The yellow LED indicates all warning messages (cp. table "Overview LED Operation Indicator" in chapter "LED Operation Indicator"). The warning is not only indicated by the LED but also as plain text in the LCD display.

Red: Fault indicator



The red LED indicates all occurring faults (cp. table "Overview LED Operation Indication" in chapter "LED Operation Indicator") The fault is not only indicated by the LED but also as plain text on the LCD display.

Q.4 Key operation

4 keys are available for the operation of the dry material feeder:

STOP/START key



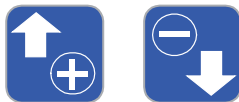
After the power plug has been plugged in, the dry material feeder can be switched on and off using the STOP/START button. The unit is "online" (green LED) in the running / dosing state. If the dosing feeder is stopped, however ready for operation (connected mains plug), the unit is in the "offline" state (green LED extinguished).

ENTER-key



You can use the ENTER key to open and confirm value input fields and to select menu items.

UP- / DOWN-key



Using the UP/DOWN key, you can scroll the different menu items / menu levels and select the display of various operating messages.
During the setting of parameters, the UP key is used to increase the parameter value and the DOWN key is used to decrease the parameter value.

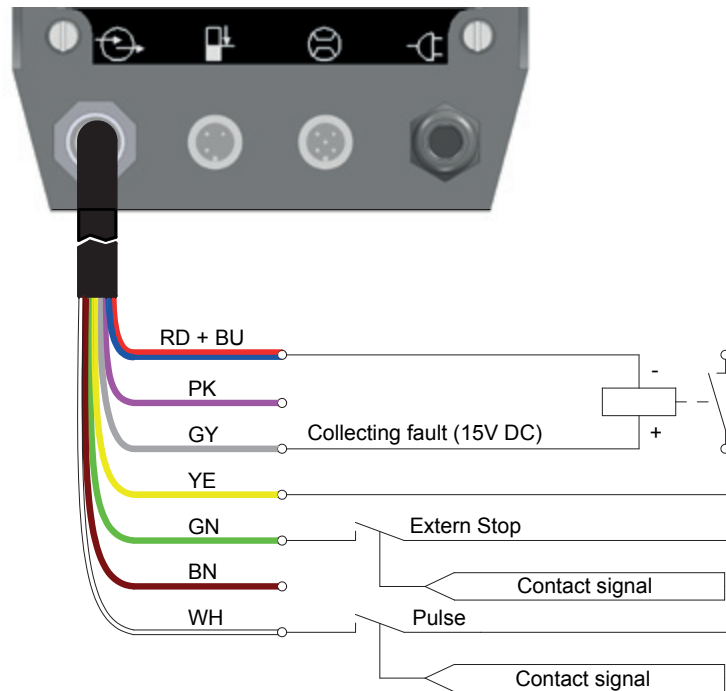
Q.5 Factory settings

You can find the factory setting of the control electronics under the subitem "Parameter Table".

Q.6 Control inputs and outputs

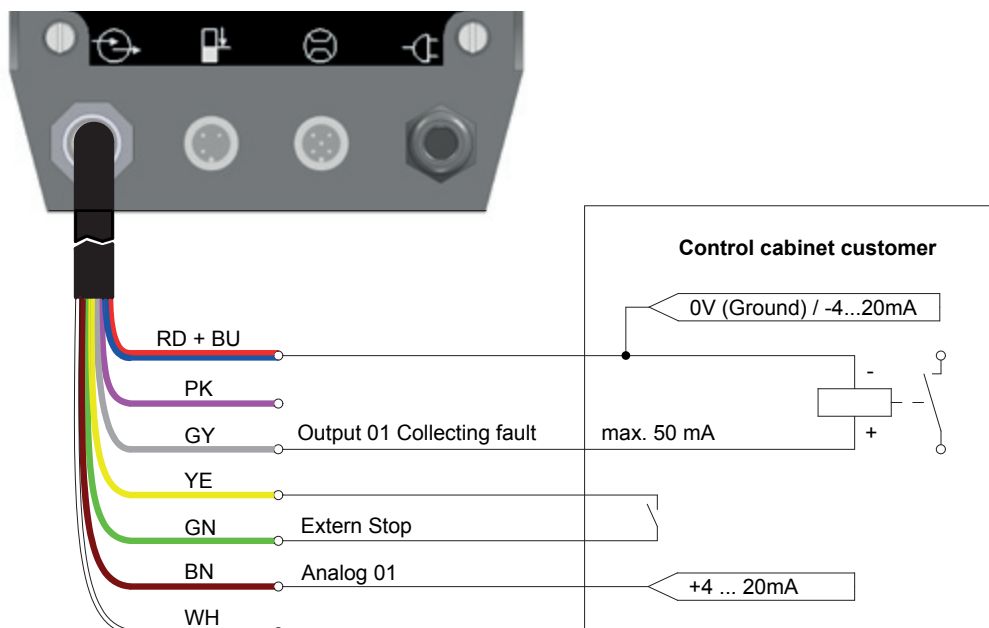
Q.6.1 Control via contact signal

Figure: "Control of digital inputs via a potential-free contact signal and control of a relay via an output of the unit"



Q.6.2 Control via analog signal

Figure: "Control of analog inputs via analog signal, potential-free contact signal as well as the control of a relay via an output of dry material unit"



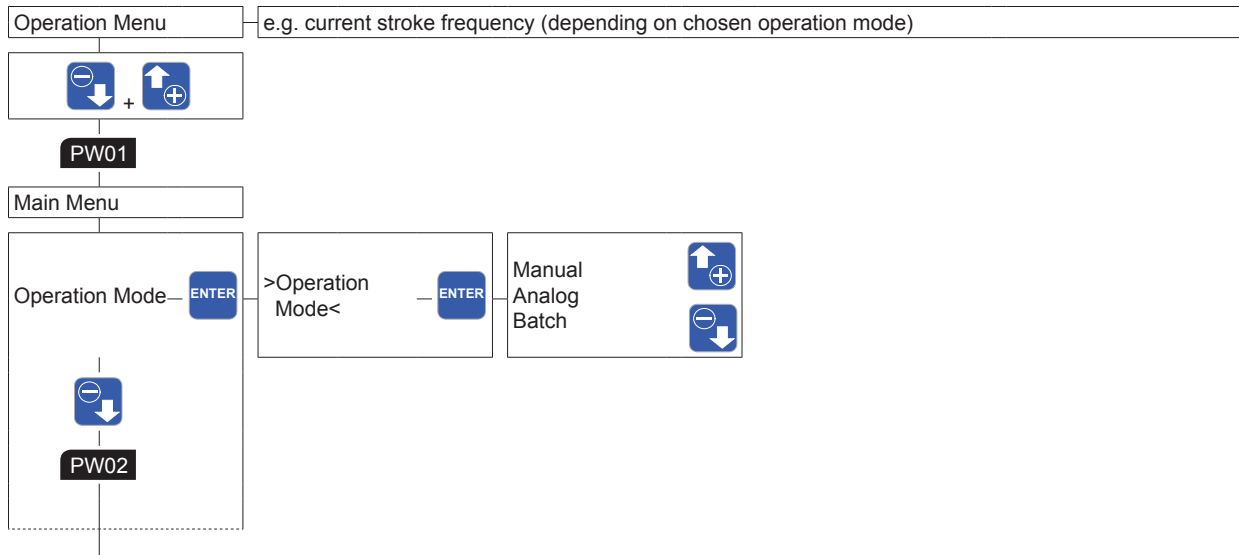
DMF-... EB.2

Operating instructions

Q.7 Selecting the operating mode

Proceed as follows to select the operating mode:

- Switch the unit “offline” by pressing the STOP/START button (green LED extinguishes).
- Input the password PW01 (factory setting 9990) to release the programming levels.
- Change the operating mode.



PW01 Locking by password 01 (pre setting ex work: 9990, not activated)

PW02 Locking by password 02 (pre setting ex work: 9021)

Operating instructions






1. General information

1.1 General user instructions

The applicable regulations for the installation site must be observed before the commissioning and during the operation of the dry material feeder from **sera**.
 The **sera** dry material feeder is delivered ready for connection. Always read these instructions and particularly the safety instructions before installation and commissioning.



1.2 Marking of notes in these operating instructions

Special notes in these operating instructions are marked with text and danger symbols.

Designation of the note (text and symbol)	Danger type			Definition of the note (in the operating instructions)
	Danger of fatal injury	Risk of injury	Damage to property	
DANGER! 	X	X	X	Identifies an imminent danger that results in fatal or severe injuries if not avoided.
WARNING! 	X	X	X	Designates a potentially dangerous situation. There might be danger to life or serious injury and damage to property if it is not avoided.
CAUTION! 		X	X	Designates a potentially dangerous situation. There might be slight or minor injury or damage to property if it is not avoided.
ATTENTION! 			X	Designates a potentially dangerous situation that could lead to damage to property if not avoided.
NOTE! 				Designates information which helps to make work easier and is useful for trouble-free operation

1.3 Marking of notes on the product

Symbols which are directly attached to the dry material feeder such as warning notices or rotation direction arrows on the drive motor must be strictly observed and kept in completely legible condition.

Designation of the note	Symbol	Definition of the note
DANGER OF INJURIES!		Warning about automatic start Never reach into the rotating feed screw!
DANGER OF BURNS!		Warning of hot surfaces. Never touch the ring heater during operation without suitable protective equipment!

1.4 Quality notes

Compliance with these operating instructions and, in particular, the safety instructions, helps to:

- prevent danger to people, machines and the environment
- increase the reliability and service life of the dry material feeder
- reduce repair costs and downtimes

The **sera** quality management and quality assurance system is certified in accordance with ISO 9001:2008. The **sera** dry material feeder complies with the applicable safety requirements and accident prevention regulations.



ATTENTION!

Always keep this operating manual accessible at the operating site of the dry material feeder.

2. Safety instructions

2.1 Personnel qualification and training

The personnel who operate, service, check and install the system must be suitably qualified. Area of responsibility and supervision of the personnel must be clearly defined by the owner. If the personnel do not have the required knowledge, appropriate training and instruction must be performed by the owner. If required, this can be carried out by the manufacturer / supplier upon order of the owner. The owner must also ensure that the personnel have understood the content of the operating manual.

2.2 Dangers in the case of non-observance of the safety instructions

Non-observance of the safety instructions can result in danger to persons, hazards to the environment and damage to the machine.

For example, non-observance can result in:

- Failure of important functions of the machine
- Failure of prescribed methods regarding maintenance and service
- Danger to people due to electrical, mechanical and chemical influences.
- Hazards to the environment by leaking dangerous substances.

2.3 Safety conscious working

The safety instructions specified in this operating manual, the existing national regulations for accident prevention, the applicable safety regulations for the conveyed medium for the respective country of use and any internal working, operating and safety regulations of the owner must be observed.

2.4 Safety instructions for the owner / operator

Hot or cold machine parts must be secured against contact by the customer if these result in hazards.

Protective devices against contact with moving parts must not be removed for machines in operation.

Leaks of dangerous conveyed media (e.g. explosive, toxic, hot) must be led away so that there is no danger to persons and the environment. Legal regulations must be observed.

Hazards from electric energy must be ruled out.

2.5 Safety instructions for maintenance, inspection and installation work

The owner must ensure that all maintenance, inspection and installation work is exclusively carried out by authorised and qualified skilled personnel who have been sufficiently informed by in-depth study of the operating instructions. Only work which is described in the operating manual is permitted to be carried out.

Only use spare parts which comply with the requirements of the specified operating conditions.

All safety and protective devices must be reinstalled and/ or made operative immediately after completion of the work.

The points in the "Start-up" section must be observed before the system is restarted.

2.6 Unauthorised modification

Conversion or modification of the dry material feeder requires the permission of the manufacturer. Original spare parts and accessories approved by the manufacturer increase safety.



CAUTION!

If non-approved parts are used or if the dry material feeder is modified arbitrarily, the manufacturer refuses any liability claims.

2.7 Improper operation

The operational reliability of the supplied dry material feeder is only guaranteed if the product is used as intended in accordance with the "Intended Use" chapter.

2.8 Intended use

The **sera** dry material feeders are used for dosing dry goods and must only be used for the intended purpose specified in the product description and the acceptance certificate.

If the dry material feeder is to be used for other applications, the suitability of the dry material feeder for the new operating conditions must be clarified with **sera**.

Criteria for intended use of the dry material feeder:

- Take account of characteristics of the dry material (see safety and product data sheet of the dry material used – the safety data sheet must be provided by the supplier / owner of the dry material).
- Stability of the materials which come into contact with the dry material.
- Operating conditions at the installation site.
- Power supply.
- Installation site (environmental conditions).

sera does not accept any liability if these criteria are not or are only partly specified or complied with by the purchaser / owner.

2.9 Personal protection equipment for maintenance and repair

The safety recommendations of the German Ordinance on Hazardous Substances (GefStoffV) (§14 Safety Data Sheet) and relevant national safety regulations for the medium must be observed.

In the case of a fault, pay attention to the following possible emissions:

- Discharge of dry material
- Noise emissions
- Discharge of operating materials

Emissions must be monitored by corresponding control systems of the complete plant.



Wear protective clothing, gloves and a suitable face protection and respirator.

ATTENTION!



Personal protective equipment must be provided by the owner of the dry material feeder!

HINWEIS!



NOTE!



2.10 Operating materials

The **sera** dry material feeders have been lubricated for life.

2.11 Foreseeable misuse

The following misuses are assigned to the life cycles of the machine.



DANGER!

Misuse can result in danger to the operating personnel.

2.11.1 Transport

- Tipping behaviour during transport, loading and unloading ignored.
- Weight underestimated during lifting.
- Pointed parts and sharp edges due to damage during transport not paid attention to when removing packaging material.
- Sufficient clearance from hot parts and ignition sources not paid attention to.
- Limits of the machine during transport not paid attention to.
- Insufficient or no protective equipment worn.

2.11.2 Assembly and installation

- Mains power supply not fuse protected (no fuse / fuse too large, mains power supply not compliant with standards).
- No or unsuitable fastening material of the machine.
- Dry material feeder not fixed sufficiently during installation.
- Base not suitable due to unevenness or insufficient load capacity.
- Non-observance of the centre of gravity of the machine during positioning and mounting.
- Non-observance that the unit can start up during connection of the power supply or during connection to a higher level system and non-observance of the resulting danger from rotating parts.
- Mains power supply connection without protective earth.
- Accessibility of fastening points for fixing and of the power supply for safe disconnection of the machine not paid attention to.
- Non-observance of the operating side of the machine and/or sufficient lighting during the complete assembly and installation.
- Non-observance of enabling of the mains power supply during assembly, connection of the power supply or connection to a higher level system.
- Insufficient or no protective equipment worn.
- Mains plug cut off and direct mains power connection whereby safe disconnection is not possible. Safe disconnection e.g. by 2-pole main switch.
- Incorrect connection cables for mains power supply (cross section too small, incorrect insulation)
- Damage of insulation during assembly.
- Short circuit of the internal power supply (15 V DC) at the control cable during installation.

2.11.3 Commissioning

- Non-observance of pointed parts during the commissioning.
- Insufficient / incorrect fastening of the machine while removing the transport lock / fixing.
- Access to the machine / operating side during commissioning is not ensured or insufficiently illuminated.
- Non-observance of the operating side of the machine and/or sufficient lighting / cleanliness / legibility during the commissioning.
- Removal of covers and protective caps (gear motor) and non-observance of rotating parts during the commissioning.
- Non-observance of the positioning conditions such as sufficient clearance from parts under high voltage or the operating limits such as temperature.
- Insufficient dimensioning of supply lines.
- Covers of ventilation openings (e.g. motor).
- Non-observance of the safety data sheets of the dry goods used and the compatibility of the dry goods with each other during the test run / test operation and during the transfer in normal operation.
- Operation of a damaged dry material feeder.
- Entry of impurities or solids into the machines which destroy these or react with the dry material.
- Insufficient or no protective equipment worn.

2.11.4 Operation

- Break of the metering screw, production of sharp and pointed places.
- Reaching into the metering screw or the hopper during operation (rotating parts).
- Unauthorised conversion of the unit or installation of parts by the customer or modification of the dry material feeder.
- Undoing the fastenings of the dry material feeder.
- Non-observance of stored energy from loosening, overloaded machine parts or relative height of container to the floor.
- Non-observance of the safety data sheets of the dry goods used and the compatibility of the dry goods with each other during the test run / test operation and during the transfer in normal operation.
- Non-observance of the positioning conditions / limits of the machine such as sufficient clearance from parts under high voltage or the operating limits such as temperature.
- Non-observance of destroyed insulation due to heat radiation or ageing.
- Non-observance of heat radiation emitted from the heater element.
Temperatures of more than 60 °C can be reached.
- Non-observance of the specified operating parameters, unbalance setting, vibration and interval time and sufficient damping of adjacent parts of the electric vibrator used.
- Non-observance of the safety data sheets of the dry goods used and the compatibility of the dry goods with each other during the test run / test operation and during the transfer in normal operation.
- Long standstill of the machine with filled hopper.
- Non-observance of the stability of the materials used as compared with the dry material.
- Storage of unauthorised materials on the machine.
- Non-observance of leaks or discharge of the dry material from the case of the machine ► "Danger for environment and operator" in the case of an error".
- Insufficient or no protective equipment worn.

2.11.5 Maintenance / repair

- Non-observance of pointed, sharp parts / places which occur due to opening of the machine or due to breakage / damage of parts.
- Use of incorrect spare parts / oils (e.g. not sera original spare parts, incorrect viscosity)
- Non-observance of stored energy in the form of the relative height of dry materials as compared with the floor ► dry material feeder empties completely when the discharge pipe is removed.
- Non-observance of wear parts / parts which lose their grip during removal of other parts, during replacement or during repair work.
- Removal of covers, protective cover of the gear motor without disconnection of the power supply.
- Non-observance of rotating parts during the inspection or stopping of the machine.
- Non-observance of the stability of the machine when undoing fastenings or due to the retrofitting or attachment of parts.
- Reduction of the stability by parts which work loose during the removal of other parts.
- Improper installation of spare / wear parts (e.g. incorrect tightening torque).
- Prescribed maintenance schedules ignored
- Temporary fixings and parts not belonging to the machine not removed before the restart ► Danger from ejected / flung out materials.
- No switching off and/or disconnection of the power supply of the machine before carrying out maintenance and repair work.
- Non-observance of minimum clearances from parts under high voltage.
- Non-observance of the cooling down time of at least 1 hour before removing the heater or adjacent components.
- Non-observance of the safety data sheet of the dry material used and the associated safety precautions ► suitable protective clothing, cleaning of the unit before the maintenance / repair.
- Replacement of wear parts before the complete emptying of the dry material feeder.
- Entry of impurities and/or foreign bodies into the feeder ► destruction or increased wear of seal (gamma ring) and metering screw.
- Carrying out work that is not described in the operating manual (work on the gearbox).
- Continued use of parts with damaged insulation.
- No shut down / no protection against a restart before maintenance and repair work.
- Mix-up of sensor cables.
- Damage of the seal and/or omission of the seal, ingress of soiling under the seal or defective lubrication of the contact surface ► dry material discharges.
- Start-up of an incomplete and/or incorrectly installed dry material feeder.

2.11.6 Cleaning

- Insufficient or no protective equipment worn.
- Incorrect or too hot rinsing medium or cleaning medium, non-observance of reactions with the used materials, seals, insulation, reaction with hot surfaces or reaction / incompatibility with the used dry material.
- Non-observance of the safety data sheets of the dry goods used and use of suitable protective clothing during the cleaning.
- No disconnection of the power supply before cleaning the interior of the case, the discharge pipe or the metering screw.
- Use of a high-pressure cleaner for cleaning the unit ► cleaning in accordance with the degree of protection.
- Cleaning without removing loose parts.
- Use of unsuitable cleaning utensils (material changed, mechanical damage due to high pressure cleaner).
- Entry of impurities and/or foreign bodies into the feeder ► destruction or increased wear of seal (gamma ring), metering screw and dry material feeder.
- Recognition of warnings is not ensured.
- Untrained and not instructed personnel

2.11.7 Dismantling

- Non-observance of pointed, sharp parts / places which occur during dismantling due to breakage / damage of parts.
- Non-observance of dangers arising from transport equipment used, disregard of the accident prevention regulations.
- Non-observance of parts which lose their grip during removal of other parts.
- Disregard of loose, falling objects due to brittle /corroded or no longer originally proper fastenings ► prevention by regular check of the connections.
- Change of the centre of gravity when removing parts without sufficient fixing.
- Insufficient standing area of the machine available for the removal.
- No shut down / no protection against a restart before undoing fastenings.
- Non-observance of minimum clearances from parts under high voltage.
- Non-observance of the cooling down time of at least 1 hour before removing the heater or adjacent components.
- Disregard of presence of dry goods and operating materials.
- Residues of conveyed medium and operating materials in the dry material feeder during the dismantling.
- Non-observance of the safety data sheet of the dry material used and the associated safety precautions ► provide suitable protective clothing.
- Non-observance of the limits of the machine during the dismantling.
- Use of incorrect dismantling tools.

2.11.8 Disposal

- Improper disposal of dry goods, consumables and materials.
- No identification of hazardous substances.

2.11.9 Decommissioning

- Non-observance of pointed, sharp parts / places which are difficult to detect in the other life cycle phases, are not accessible or occur due to breakage / damage of parts.
- Disregard of loose, falling objects due to brittle / corroded or no longer originally proper fastenings ► prevention by regular check of the connections.
- Non-observance of stored energy in the form of the relative height of dry materials as compared with the floor ► dry material feeder empties completely when the discharge pipe is removed.
- Undoing fastening without applying sufficient fixing ► tipping of the machine.
- Non-observance of the stability of the machine when undoing fastenings or due to the retrofitting or attachment of parts.
- Improper dismantling.
- Non-observance of minimum clearances from parts under high voltage.
- Non-observance of the cooling down time of at least 1 hour before removing the heater or adjacent components.
- Non-observance of the safety data sheet of the dry material used and the associated safety precautions for cleaning of the machine ► provide suitable protective clothing.
- Undoing the fastenings before the complete emptying of the dry material feeder.
- Entry of impurities and/or foreign bodies into the feeder ► destruction or increased wear of seal, metering screw and dry material feeder.
- Insufficient lighting of or access to the machine.
- Continued use of damaged parts.
- No shut down / no protection against a restart before undoing fastenings or before disconnection of the power supply.
- System not de-energised ► Electrical hazard.

3. Transport and storage

3.1 General

sera products are checked for faultless condition and function before shipment.

The products are packed according to the transport conditions.

The customer must check the product for transport damage immediately after receipt. Any damage detected must be reported immediately to the responsible carrier and the supplier.

The dry material feeder should only be transported using suitable means of transport and/or hoists. Take into account the weight of the dry material feeder and the load capacity of the means of transport.



The packaging material must be disposed of properly!

NOTE!

3.2 Transport

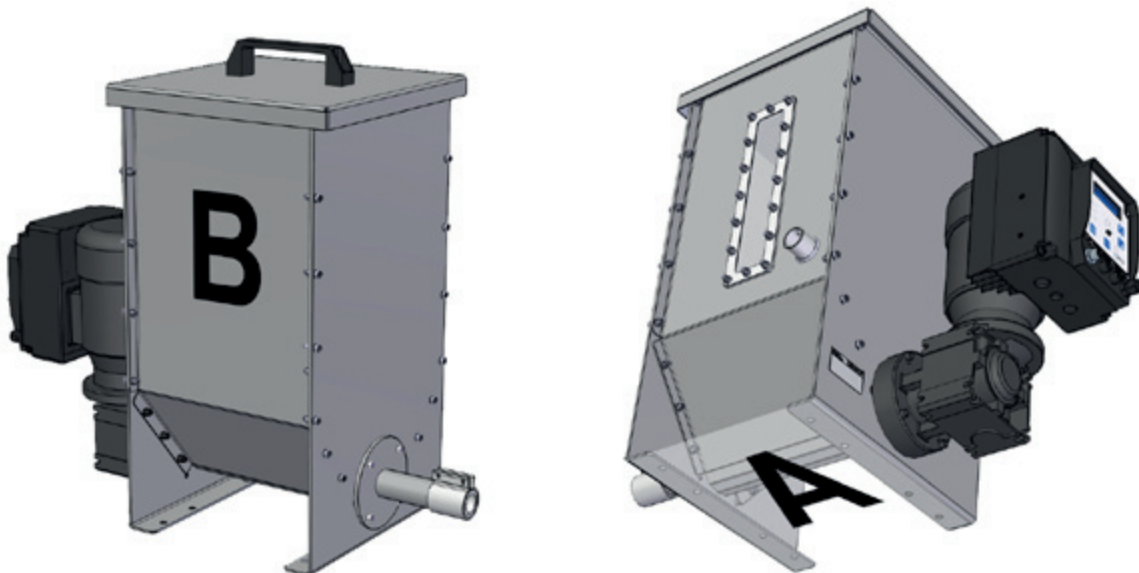


The accident prevention regulations must be observed for transport and shunting.

WARNING!

Pay attention to the following for transport:

- When removing packaging material, pay attention to pointed or sharp places which can be produced due to damage of the machine during the transport.
- Loose parts (covers) ► danger due to falling during the transport.
- Sufficient stability of the ground.
- Sufficient clearance from ignition sources or parts under high voltage.
- Observe the permitted transport surfaces ► danger due to tipping.
The preferred transport surface of the dry material feeder is the surface A (see illustration).
The surfaces B (see illustration) without the cover are also suitable.



The position of the centre of gravity can change due to attached options ► danger due to reduced stability or tipping of the machine. Attachment of components by the customer is always prohibited.

WARNING!

Operating instructions

3.3 Storage

Undamaged packaging guarantees protection during subsequent storage and it should only be opened when the dry material feeder is installed.

Proper storage increases the service life of the dry material feeder. Proper storage means keeping away from negative influences such as heat, humidity, dust, chemicals, etc.

The following storage instructions must be complied with:

- Storage location: cool, dry, dust-free, no exposure to direct sunlight, and slightly vented.
- Storage temperatures between +2° C and +40 °C.
- Relative air humidity not more than 85%.
- The maximum storage time for the standard system is 12 months.

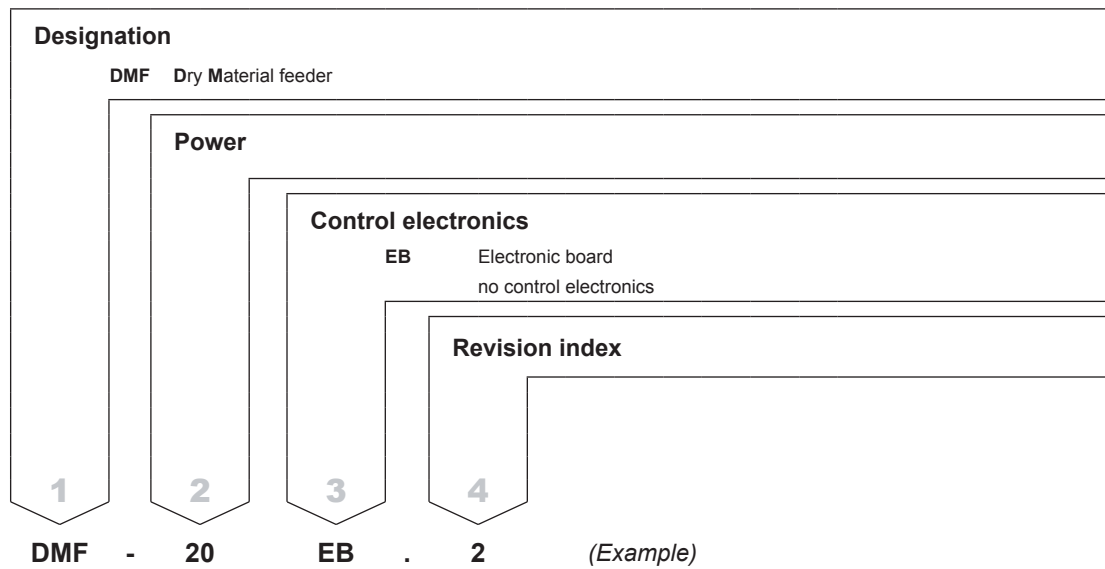
If these values are exceeded, metal products should be sealed air-tight in foil and protected from condensation water using a suitable desiccant.

Do not store solvents, fuels, lubricants, chemicals, acids, disinfectants and similar in the storage room.

4. Product description

4.1 Types

4.1.1 Type code

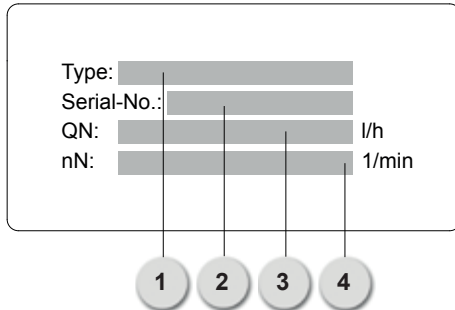


Example: DMF-20EB.2 Dry material feeder with Electronic Board and output of 20 l/h

Operating instructions

4.1.2 Type plate

All **sera** dry material feeders are provided with a type plate at the factory. The following data are indicated on the type plate:



1	Type of the dry material feeder
2	Works No. (serial number) of the dry material feeder
3	Rated delivery output of the dry material feeder for the specified reference medium
4	Rated speed The actual speed can differ by $\pm 10\%$

4.2 Materials

The materials used are stated in the product description in the Appendix. The suitability of the materials for the medium must be checked.

4.3 Dry goods

Boundary conditions and characteristics of the approved dry goods:

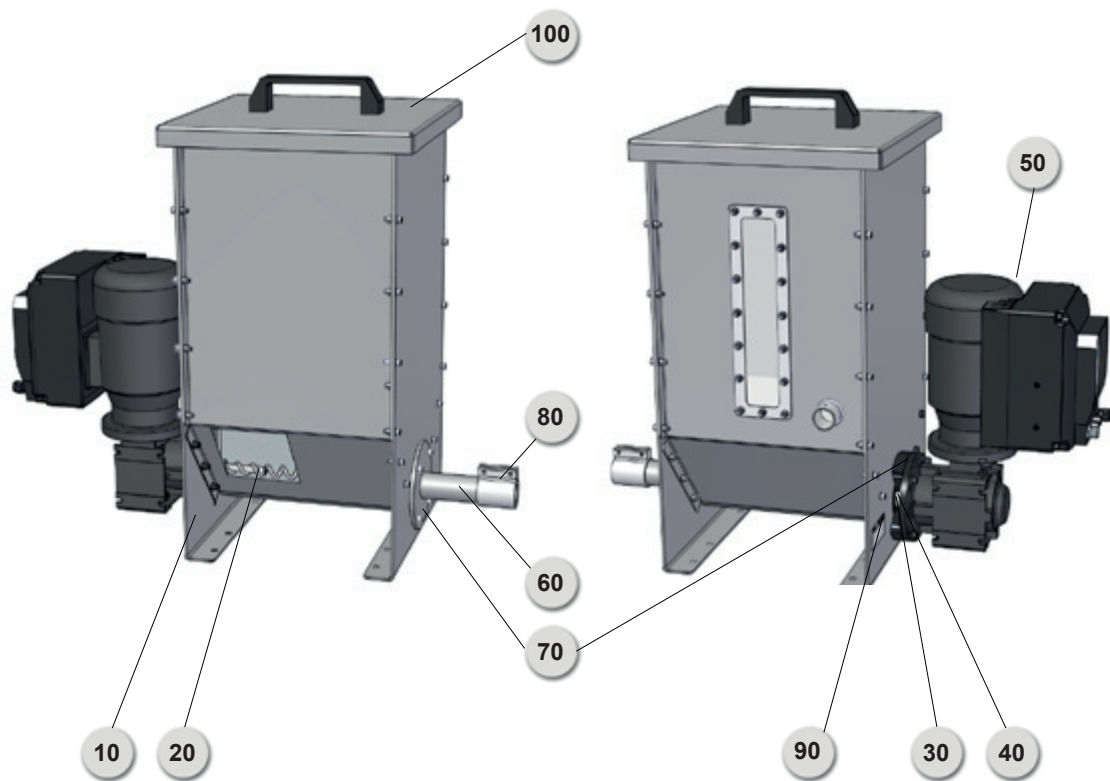
- Density ► 0.5 to max. 1.2 kg/l
- Grain size ► up to max. 1.5 mm
- Characteristics ► dry, powder to granulate, cohesionless, free-flowing
- Temperature ► maximum bulk material temperature of 40 °C

4.4 Functional description

4.4.1 General

The dry material feeder is suitable for the dosing of dry goods which do not tend to adhere. The dry material feeder is a volumetric feeder which delivers a reproducible portion from a container depending on the speed. In addition to the speed, the dry material characteristics, particularly the density of the dry good, also affects the delivery output. The dry material feeder consists of a basic unit which can be supplemented with different options (see Chapter "Options").



4.4.2 Basic unit





No.	Designation
10	Case
20	Metering screw
30	Seal
40	Bearing flange
50	Drive motor
60	Discharge pipe
70	Fastening set (with locking ring and feather key)
80	Ring for heater
90	Type plate
100	Cover

4.4.2.1 Metering screw

The metering screw which is driven by a gear motor takes up the material and feeds it continuously and dust-free to the discharge pipe.

 CAUTION!	<p>Moving machine parts! Never reach into the rotating metering screw! Risk of injury!</p>	
--	---	---

Different metering screws are used, depending on the type. The shaft material is 1.4571. The spirals are made of 1.4310.

Figure	Pitch p (mm)	External diameter da (mm)	DMF Type
	22	22	<ul style="list-style-type: none"> ■ DMF-5EB.2 ■ DMF-20EB.2
	50	50	<ul style="list-style-type: none"> ■ DMF-50EB.2 ■ DMF-200EB.2

4.4.2.2 Drive motor

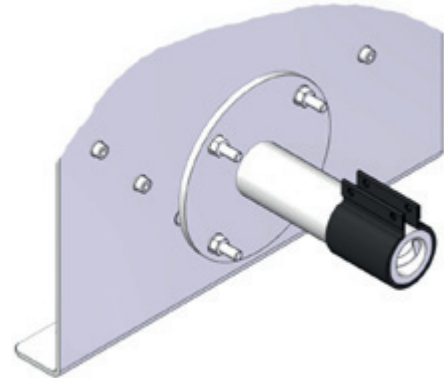
The unit is driven by a three-phase gear motor

(for information about how to connect the drive motor, see Chapter "Electrical Connections" and for motor data, see Chapter "Motor Data").

4.4.2.3 Ring heater

Heating the discharge pipe should prevent the entry of moisture into the feeder and thus the sticking together or caking of the dry material.

The ring heater material is temperature-resistant up to a maximum temperature of 450 °C. The heater is not temperature-regulated. The temperature is only limited by the output limitation.



Type	DMF Type	Internal diameter mm	Width	Voltage V	Rated current A	Power W
35/50	<ul style="list-style-type: none"> ■ DMF-5EB.2 ■ DMF-20EB.2 	35	50	24	0.2	5
60/50	<ul style="list-style-type: none"> ■ DMF-50EB.2 ■ DMF-200EB.2 	60				

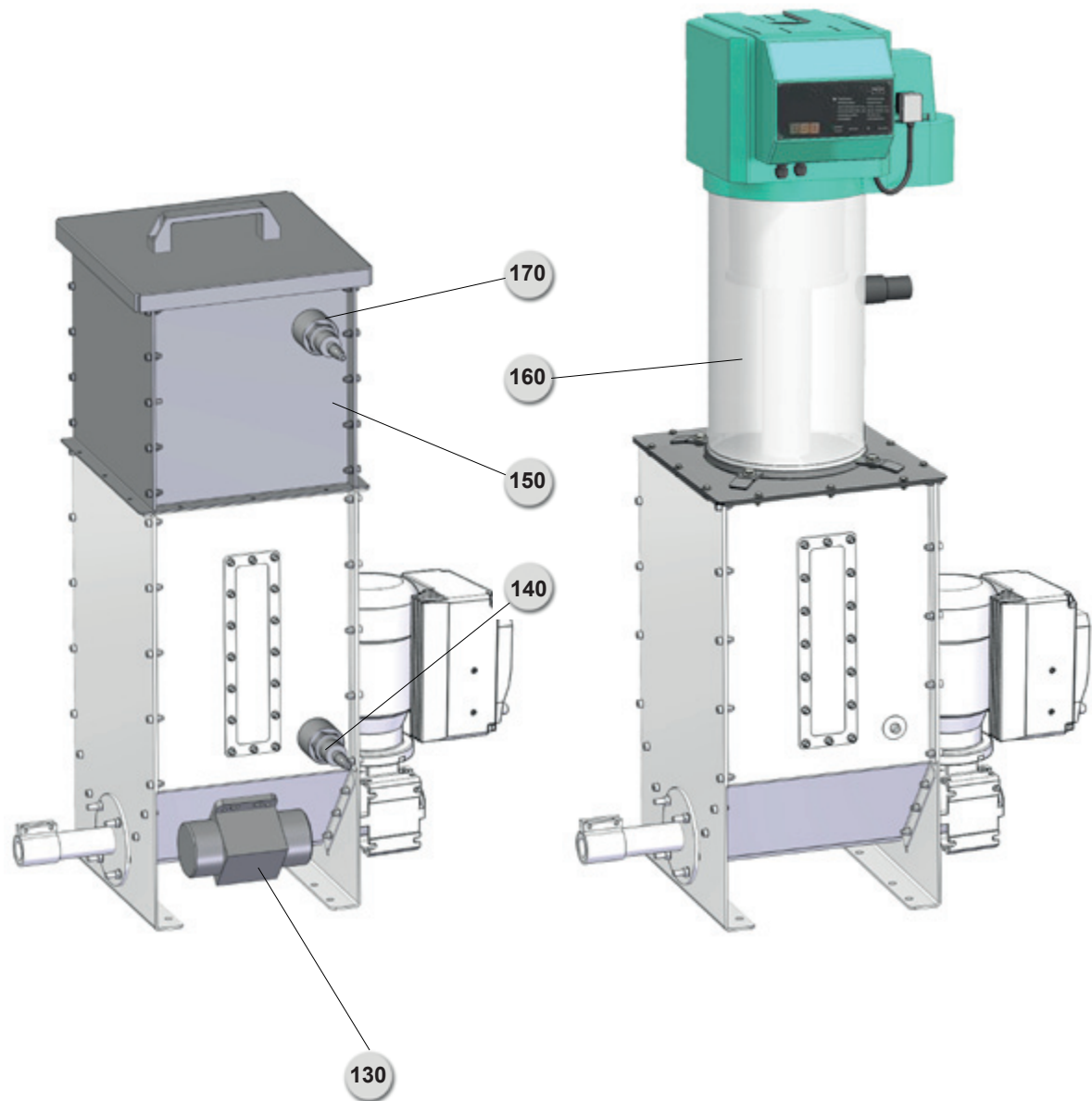


CAUTION!

**Never touch the ring heater during operation:
Danger of burns!**



4.4.3 Options

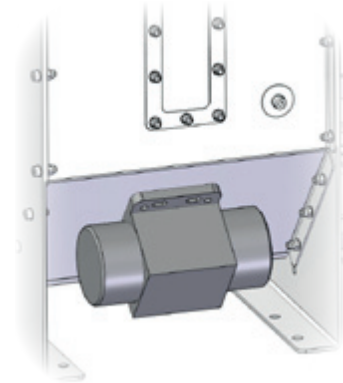


No.	Designation
130	Vibrator
140	Sensor empty signal for hopper
150	Hopper extension
160	Conveying system
170	Sensor full signal for hopper

4.4.3.1 Vibrator

Type	Rated power kW	Rated voltage V	Rated current A
NEG 5050	0.045	400/480 (50/60 Hz)	0.16

Under certain conditions the dry material can form bridges in the hopper which impede continuous conveyance. A vibrator can be used to destroy these bridges. The vibrator should only operate in cycle mode so that the dry material is not additionally compacted.



ATTENTION!

Cycle time: 3 seconds ► operation
 1 minute ► pause



NOTE!

Observe the operating instructions on the data carrier for the vibrator.



ATTENTION!

Do not touch the vibrator during operation.



ATTENTION!

The vibration level of the vibrator is set to 11% at the factory. This value must not be increased as this could damage the dry material feeder. The vibration level must only be adjusted by qualified personnel after interruption of the power supply and in consultation with sera.



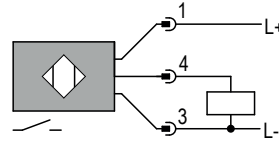
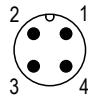
ATTENTION!

Vibration times exceeding 3 seconds can result in high compaction of the conveyed medium and thus damage of the metering screw.

4.4.3.2 Sensor

A sensor for empty hopper signal are available.

Pin assignment

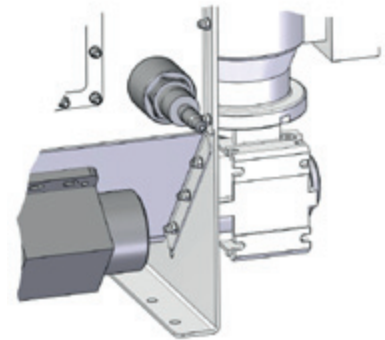


The connection is an M12 plug-in connection.

Empty signal for hopper

The sensor has a programmable output function (normally closed / normally open contact). It is recommended to use as normally open contact so that undercutting of the sensor is detected at a remaining volume of approx. 10 l. The sensor functions after successful setting during the commissioning.

See data carrier for the operating instructions.



Full signal for hopper

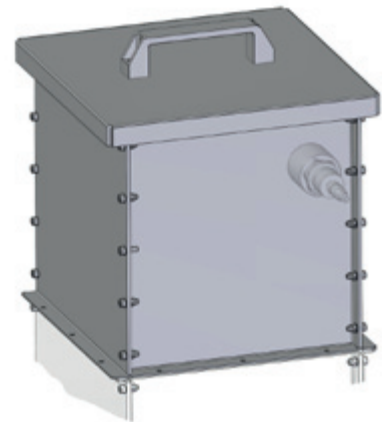
The sensor has a programmable output function (normally closed / normally open contact). It is recommended to use as normally open contact so that overcutting of the sensor is detected at a remaining volume of approx. 55 l. The sensor functions after successful setting during the commissioning.

See data carrier for the operating instructions.



4.4.3.3 Hopper extension

The storage capacity of the dry material feeder can be expanded using a hopper attachment.
Expansion of the capacity: ca. 23 litres.



4.4.3.4 Conveying system

The conveying system is used for automatic loading of the DMF case with the dry material.

The operating instructions of the conveying system on the data carrier must be observed.



Conveying distance (total) [m]	Suction height [m]	Conveying capacity [kg/h]	Remark
15	4	70	(Manufacturer indication)
4	1,4	~ 280	Polymer (0,8 kg/l); measured
4	0	~ 320	Polymer (0,8 kg/l); measured

5. Technical data

Type	Output l/h	Hopper volume Litre
DMF-5EB.2	5	35
DMF-20EB.2	20	35
DMF-50EB.2	50	35
DMF-200EB.2	200*	35

* a performance comparison is required using a dry material feeder (DMF) with conveying system (option) (> see operating instructions DMF)

Empty weight (kg)

Basic unit	Options		
	Hopper extension	Conveying system	Vibrator
28	3	34	2

Note the total weight ► the weight is increased when dry material is added.

5.1 Motor data

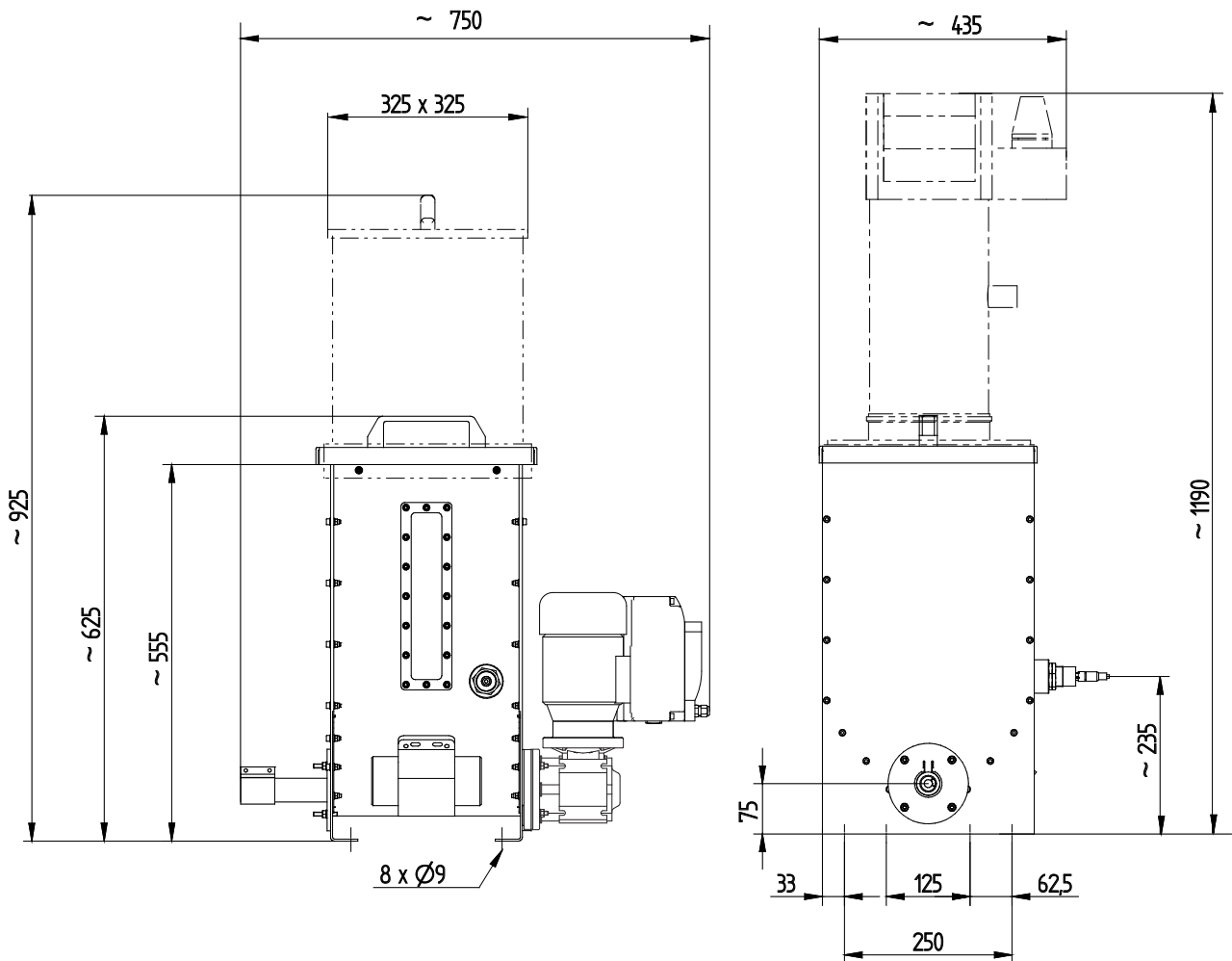
Three-phase gear motor (drive motor) DSGM

Type	Installation size	Power kW 50 Hz	Frequency Hz	Voltage V 50 Hz	Rated current A 50 Hz	Insulation class	Enclosure IP	Speed rpm
DMF-5EB.2 DMF-50EB.2	63 S/4	0.09	50	230 / 400	0.94 ¹⁾ 0.54 ²⁾	F	55	17
DMF-20EB.2 DMF-200EB.2	63 L/4	0.18	50	230 / 400	1.18 ¹⁾ 0.68 ²⁾	F	55	68

¹⁾ Δ delta connection

²⁾ Y star connection

5.2 Dimensions



Operating instructions

6. Assembly / Installation

The following points must be observed for the installation of the dry material feeder:

- Disconnect the power supply of the dry material feeder during the installation at the destination.



Danger from sudden starting of rotating and/or moving parts during connection of the power supply or connection to a higher level system.

WARNING!

- Check the complete dosing system for damage (e.g. transport damage).
- Check and tighten all screw connections:

Tightening torques

Gear motor	M6	7 Nm
Discharge pipe	M6	7 Nm
Vibrator	M6	10.4 Nm

- Fasten the dry material feeder at the installation location using the fixing holes (4xM8) (see Chapter "Dimensions").
- Pay attention to sufficient clearance from parts under high voltage during the installation.
- Pay attention to sufficient dimensioning of the power supply cable ► danger of electric shock in the case of use of damaged cables.
- Clearly mark danger points.
- Ensure access to the machine, particularly for operating, measurement and inspection points.
- Keep free of soiling.
- Ensure sufficient lighting.

6.1 Installation location

- The dry material feeder is only approved for installation in dry areas with non-aggressive atmosphere at temperatures between 2° and 45 °C and air humidity of up to 90%.
- No exposure to direct sunlight.
- Maximum installation height is 2000 m (reduction in performance above 1000 m above sea level).
- The installation location must be equipped with proper lighting for all work (installation, operation, maintenance etc.).
- Place the dry material feeder so that operation and maintenance are possible at any time.



**The installation area must be level.
Height differences must be compensated for by appropriate measures.**

ATTENTION!

7. Electrical connections

7.1 Mains connection

The dry material feeder is delivered ready for installation and includes a 2m mains cable with SCHUKO plug. The operating voltage range of the 210–250V, 50/60Hz.



ATTENTION!

The operating voltage range is limited.
Observe the specifications on the type plate!

The following design is available:
■ 210-250V, 50/60Hz



ATTENTION!

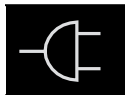
The dry material feeder will start with the set parameters in the selected operating mode after the power supply was switched on or following a power supply recovery.



ATTENTION!

Momentary switching on and off of the power supply is to be avoided!
Minimum wait after switching off the power supply is 1 minute!

Symbol:



ATTENTION!

Operate the dry material feeder only on a grounded AC mains with a protective conductor!

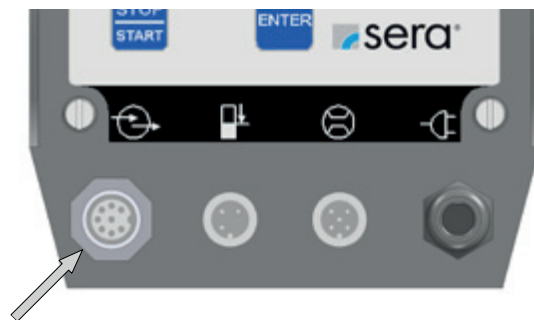
7.2 Electrical interfaces

The electrical connections are located below the operating panel.

7.2.1 Control inputs and outputs

The unit has three control inputs and two control outputs. They can be programmed with different functions. All three inputs can be used as digital inputs. Optionally, two can also be configured as an analog input (inputs 02 and 03, see chapter "Digital/Analog Inputs 02 and 03"). By default, the inputs and outputs are pre-set according to the table.

Symbol:



Connector socket for control inputs and outputs

Delivery of the unit includes a 5m control cable which is to be connected to the 8-pole socket of the control inputs and outputs. The table shows the assignment of the individual leads of the control cable.

Lead colour	Pin	Function (ex works setting)
WH (white)	1	Input 01 (pulse)
BN (brown)	2	Input 02 (analogue 01)
GN (green)	3	Input 03 (external STOP)
YE (yellow)	4	Output + / Signal + / 15V DC
GY (grey)	5	Output 01 (collective fault)
PK (pink)	6	Output 02 (run signal)
RD (red)	7	Ground
BU (blue)	8	Ground

The digital inputs can be operated both with a potential-free contact signal and directly via a control voltage signal (e.g. 24V DC) (cp. figure "Control of digital inputs via potential-free contact signal as well as the control of a relay via an output of the dry material feeder").

This enables, for example, the direct connection of a memory programmable control to the unit.



ATTENTION!

When connecting an external power supply (e.g. 24V DC) to the pin output + (colour of lead: yellow), please note the following:
A protective diode in the input lead of the external power supply is required in order to rule out a feeding back from the dry material feeder (see figure "Direct connection of a memory programmable control to the dry material feeder").
Connect the anode to 24V DC.
Connect the cathode to the yellow lead.
Use diode type 1N4007 or similar.

Operating instructions

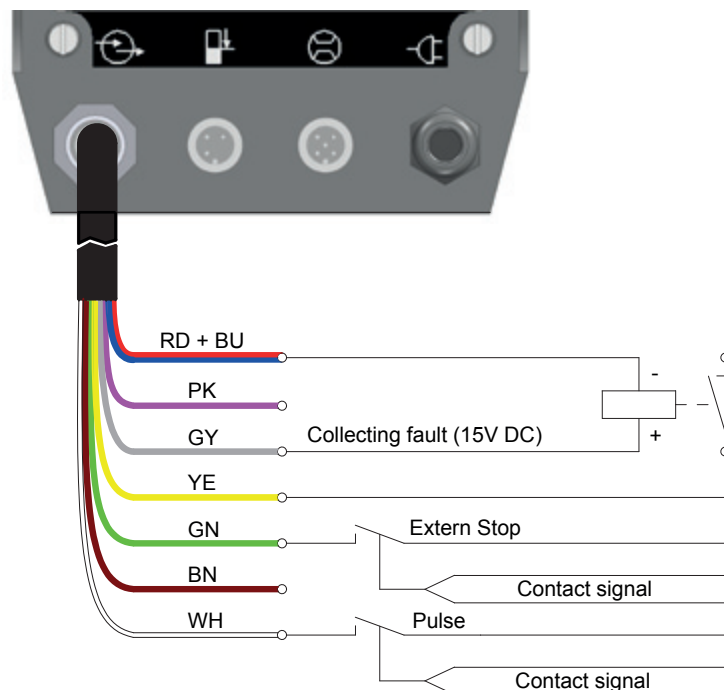
As an example, the following figure shows the control of the digital inputs 01 and 03 via a potential-free contact signal.



The outputs 01 and 02 are not potential-free! A relay is required to operate potential-free via the outputs.

ATTENTION!

Figure: "Control of digital inputs via potential-free contact signal as well as the control of a relay via an output of the unit"



ATTENTION!

The maximum rating for the control inputs and outputs is:

Inputs: 30V DC / 50mA
 Outputs: 15V DC / 50mA (internal supply)
 30V DC / 350mA (external supply)



ATTENTION!

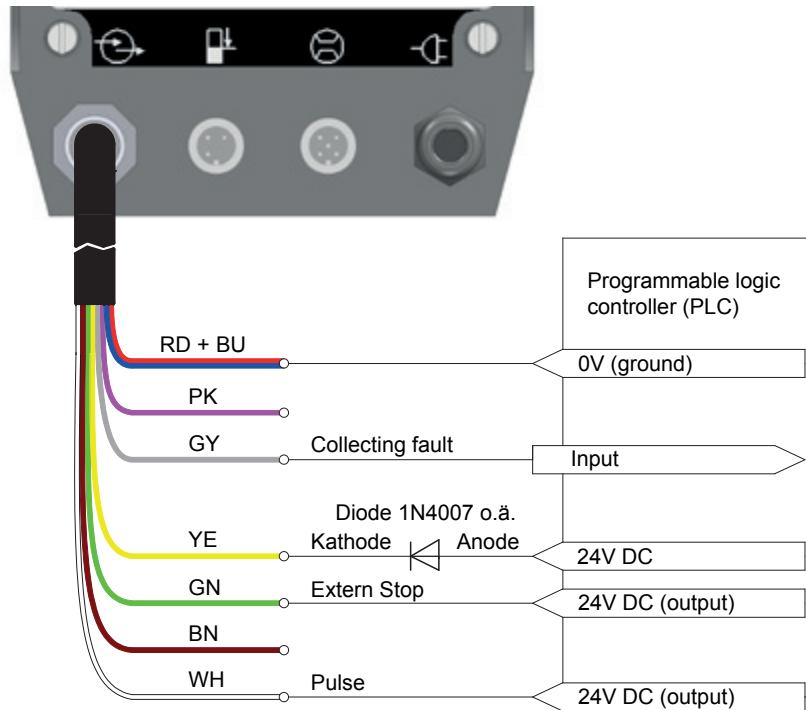
The output + / signal + connection pin (lead colour: yellow) is not short-circuit proof! In case of a short-circuit, the control electronics may get damaged! Therefore, please make absolutely sure that the signal + connection pin is not directly attached to the earth connections (strand colour: red and blue)!

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Operating instructions

As an example, the following figure shows the direct control of the digital inputs 01 and 03 via a control voltage signal (in this case: 24V DC) of a memory programmable control.

Figure: "Direct connection of a memory programmable control to the unit"



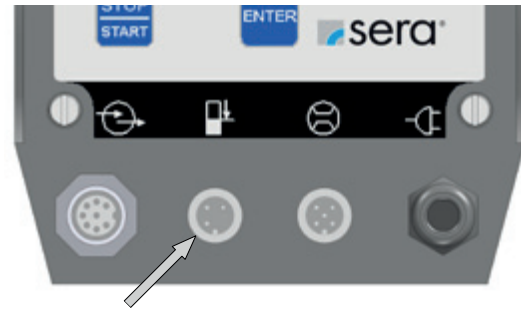
7.2.2 Level input with pre-alarm and dry run



NOTE!

Pre-alarm and dry run are connected to the same jack. When leaving the factory, both inputs are preset to “closing downwards”. However, if necessary, the inputs can be freely configured (cp. Chapter “Level monitoring tank”).

Symbol:



Jack for level input

7.2.3 Hopper empty signal and metering screw monitoring



ATTENTION!

Only sensors that have been approved by sera may be connected to the unit. If you use other than sera products, the electronics might get damaged.

Symbol:



Connection socket for the optional sensors

sera sensors are delivered complete with cable and connector. Electrical connection is made directly to the 5-pole socket.

8. Commissioning

- The dry material feeder must only be operated without pressure (level position, clear bulk material outlet and no unauthorised extension of the discharge pipe).
- Also pay attention to the load capacity of the metering screw and the permitted limits of the dry material.
- Before switching the system on for the first time, the following points should be checked:
 - Check of the electrical connections.
 - Check the electrical overcurrent protection devices for correct operation and correct setting.
 - Check whether the local supply voltage and frequency match the information on the rating plates.
 - Check the fastening and the screw connections.
 - Check the function of the level sensors.
- Pay attention to the rotation direction during connection of the dry material feeder: The metering screw must rotate clockwise, view direction on to the discharge pipe.
- It must be ensured that the materials are resistant to the dry good before using the dry material feeder.
- Pay attention to the compatibility of the dry goods with each other when replacing the dry material.



Observe the safety data sheet of the dry material.

ATTENTION!



Danger of electric shock in the case of use of damaged cables!

DANGER!



Danger from rotating and/or moving parts during the commissioning!

WARNING!



Opening the electronics is always prohibited.

WARNING!



Attached heater, neighbouring components (discharge pipe), gear motor and electric vibrator must not be touched during operation and for a short time after switching off as there is a danger of burn injuries.

CAUTION!



Impurities or lump formation (due to the ingress of moisture) can result in damage to the metering screw.

ATTENTION!

- Recalibration in the case of changing the dry material.
- For the vibrator option:
 - Tighten the screw connections of the adapter after 1 hour operating time after the commissioning (see Chapter "Placement / Installation" for tightening torques).
 - Provide damping in the event of unwanted vibration transfer to neighbouring components.
- Set all options / accessories in accordance with the accompanying product documentation.

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Operating instructions

- The “hopper empty signal” has already been preset at the factory for shipment. Full adjustment is necessary depending on the dry material (particularly for dry goods with low permittivity).



ATTENTION!

A start-up of the machine is possible while performing a full adjustment; switch the dry material feeder offline in doing so.

8.1 Drive motor

Requirements:

Make sure that voltage and frequency correspond with the indications on the rating plate of the motor.
Permissible voltage tolerance (DIN VDE 0530)

The specified rated motor power refers to an ambient temperature of max. 40 °C and an installation site below 1000 m above sea level. Motor output will be reduced if these values are exceeded (see VDE 0530).

Suitable for “moderate” climates according to IEC 721-2-1.



NOTE!

The operation of the dry material feeder results in heating of the drive motor.
Do not touch the motor during operation!

8.2 Initial commissioning / Recommissioning

Checks before every start-up

- Check whether the screw fastenings of the complete dry material feeder have been tightened with the specified torque (see Chapter "Placement / Installation") and tighten if necessary.
- Check whether all electrical connections are correct.

9. Operation

9.1 Control elements



1	STOP/START key
2	LED operation indications
3	LCD-display
4	UP key
5	DOWN key
6	ENTER key

9.2 LED operation display

Three light-emitting diodes (LED) indicate the status of the unit:

Green: Operation and stroke indicator



When switching on the unit, the green LED is on permanently. The operation indication is combined with a process indication, i.e. the LED blinks during the operation.

Yellow: Warning indicator









The yellow LED indicates all occurring warning messages (cp. following table). The warning is not only indicated by the LED but also as plain text in the LCD display.

Red: Fault indicator



The yellow LED indicates all occurring faults (cp. following table). The fault is not only indicated by the LED but also as plain text on the LCD display.

Overview LED operation indicators			
	Green LED  	Yellow LED  	Red LED  
Ready	On		
Running...	Flashing		
Internal error			On
Mains voltage too low / too high			On
No mains			
Level monitoring:			
Pre-alarm level		Flashing	
Dry run		(flashing)*	Flashing*
Speed monitoring option			
No rotation detection			On
Speed too low - with warning message		On	
Speed too low - with cut-out			On
Mixing unit overflow monitoring option			
Mixing unit overflow			On
Vibrator option			
Operating mode continues to be displayed	Flashing	On	
Analogue mode:			
mA signal < 3.5 mA			On
mA signal < 20 mA			On
Hopper empty signal option			
Hopper empty		Flashing	(flashing)*

* depending on the setting, the red (for cut-out) or yellow (for signal) LED flashes.



NOTE!

The "dry run" error message suppresses the "pre-alarm" warning. This means that if the pump runs dry while 2-stage level monitoring is activated, only the red LED will flash.

9.3 Button operation

4 buttons are available for operating the dry material feeder:

STOP/START button



After connection to the power supply, the unit can be switched on and off using the STOP/START button.

ENTER button



The ENTER button is used to open and confirm value input fields and to select menu items.

UP / DOWN button



Using the UP/DOWN button, you can scroll the different menu items / menu levels and select the display of various operating messages. During parameter setting, the UP button is used to increase the parameter value and the DOWN button is used to decrease the parameter value.

Operating instructions

9.4 Parameter table

The following table shows the factory settings for the controllable unit. With these defaults, the user can start standard applications such as manual mode, analogue mode with 4-20 mA, batch mode without having to make further adjustments. It is only necessary to select the operating mode from the respective menu (see Chapter “Selecting the operating mode”) and, in the case of external control, to connect the respective input (according to Chapter “Control inputs and outputs”).

The references to the respective Chapters facilitate the adjustment of the settings to special applications and tasks. In addition, the parameter table provides the possibility to document the changes that have been made in the settings. The current settings of the unit can therefore be viewed quickly at any time.

Overview of set parameters					
	Factory settings	Chapter	Setting range	Change 1	Change 2
Operating mode					
Operating mode	Manual	10.7			
Batch mode					
Control	Manual	10.7.2			
Speed	100%	10.7.2	10...100%		
Pulse mode ⁵⁾	1/1	10.7.2			
Pulse factor ⁵⁾	1	10.7.2	1...999		
Pulse memory ⁵⁾	OFF	10.7.2			
Running time ⁵⁾	1 s	10.7.2	1...65535 s		
Max. running time ⁵⁾	1 s	10.7.2	1...65535 s		
Analogue signal ⁵⁾	4-20 mA	10.7.2			
Adjustment: Analogue I1	4 mA	10.7.2	0...20 mA		
Adjustment: Frequency P1	0%	10.7.2	0...100%		
Adjustment: Analogue I2	20 mA	10.7.2	0...20 mA		
Adjustment: Frequency P2	100%	10.7.2	0...100%		
Analogue mode					
Analogue signal	4-20 mA	10.7.1			
Adjustment: Analogue I1	4 mA	10.7.1	0...20 mA		
Adjustment: Frequency P1	0%	10.7.1	0...100%		
Adjustment: Analogue I2	20 mA	10.7.1	0...20 mA		
Adjustment: Frequency P2	100%	10.7.1	0...100%		
Input 01					
Function E1	Pulse	10.8.1			
Contact E1	NO	10.8.1			
Input 02					
Function E2	Analogue 01	10.8.2			
Contact E2	NO	10.8.2			
Input 03					
Function E3	External Stop	10.8.2			
Contact E3	NO	10.8.2			
Output 01					
Function A1	Group fault	10.8.3			
Contact A1	NC	10.8.3			
Output 02					
Function A2	dosed	10.8.3			
Contact A2	NO	10.8.3			
Level tank					
Pre-alarm	NO	10.13.1			
Dry run	NO	10.13.1			
Function dry run	Stop	10.13.1			

Operating instructions

Overview of set parameters					
	Factory settings	Chapter	Setting range	Change 1	Change 2
System					
Language	Deutsch	10.9			
Calibration (only DMF)	OFF	10.9			
Restart	last status	10.9			
Password					
PW01 mode	OFF	10.11			
Password 01	9990	10.11			
Password 02	9021	10.11			
Monitoring of screw					
Function	OFF ¹⁾	10.16.1			
Alarm limit	80%	10.16.1	0...100%		
Monitoring of mixing unit ²⁾					
Function	OFF	10.16.2			
Sensitivity	50%	10.16.2	0...100%		
Hopper level					
Input signal	NO ³⁾	10.16.4			
Function	Alarm	10.16.4			
Vibrator ⁴⁾					
Control	OFF	10.16.5			
Vibration time	1 s	10.16.5	1...3 s		
Interval time ⁵⁾	15 min	10.16.5	1...999 min		
Cycles until vibration ⁵⁾	1	10.16.5	1...200		

¹⁾ "Alarm" when delivered with option sensor speed monitoring

²⁾ only for mixing unit monitoring option

³⁾ "NC" when delivered with option sensor hopper empty signal

⁴⁾ only for vibrator option

⁵⁾ hidden depending on the parameter settings

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Operating instructions

9.5 Menu

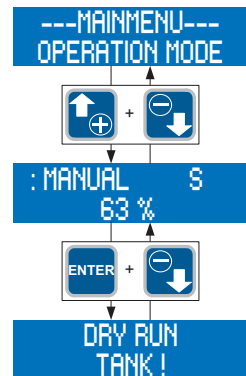
You can switch between the following three views:

- Operating messages
- Main menu and
- Fault and warning messages

A change to the view “Fault and warning messages” is only possible when a fault or warning is present.

A change between the “Operating messages” and “Main menu” views is done by simultaneously pressing the UP and DOWN buttons.

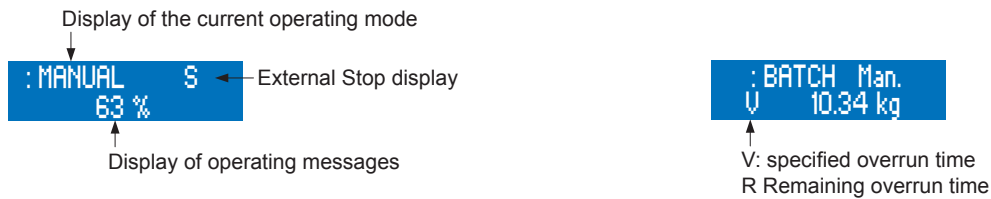
A change between the “Operating messages” and “Fault and warning messages” views is done by simultaneously pressing the ENTER and DOWN buttons.



NOTE!

If no button has been pressed for 3 minutes in the main menu, the system automatically changes to the operating messages view.

9.5.1 View operating messages



Display of the current operating mode

The first line in the "Operating messages" view shows the currently set operating mode.

Display of operating messages

The second line of the display shows, depending on the set operating mode, a variety of operating messages (e.g. current speed, total number of strokes – see following table). The operating messages can be scrolled using the UP and DOWN buttons.

The ENTER button is used to open the value input fields of the adjustable operating messages (see following table). The value input is described in Chapter "Value input".

Operating messages	Operating mode		
	Manual	Analogue	Batch
Current speed	<input type="radio"/> ¹⁾	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Current dosing performance ²⁾	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Total running time	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Total dosing quantity ²⁾	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Vibrator ON/OFF ³⁾	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Current control current	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Pulse factor	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Memory	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Dosing quantity / running time ⁴⁾	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Remaining dosing quantity / remaining running time	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Manual start	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

= Display

= Display and adjustment

¹⁾ not for calibrated unit

²⁾ only for calibrated DMF unit

³⁾ only for DMF with vibrator option

⁴⁾ only for manual batch

9.5.2 Fault and warning messages

When a fault or warning has occurred, the unit shows a message in plain text format on the LCD display.



The message disappears automatically when the cause of the fault or warning has been removed.

NOTE!

Operating instructions

9.5.3 View main menu

The upper line shows the superordinate menu items or editable parameters. The lower line shows the subordinate menu items or selectable values and settings.

Superordinate menu item shown as “---” Superordinated means that no values or settings can be assigned to this item. For example, in the menu ---PARAMETER--- you can select several subordinate menu items (e.g. ANALOGUE MODE) but not assign them as a fixed value to the higher level menu.

Parameters which can be assigned different values or settings are marked with “>” and “<”. Such parameters are, for example, the operating mode, the analogue signal or the pulse mode. Each parameter should be assigned a definitive value or setting.

For example, the parameter >OPERATING MODE< can be assigned the setting ANALOGUE.

Examples for the display of superordinated menu items

---MAINMENU---
OPERATION MODE

---PARAMETER---
ANALOG MODE

Examples for the display of parameters

>OPERATION MODE<
ANALOG

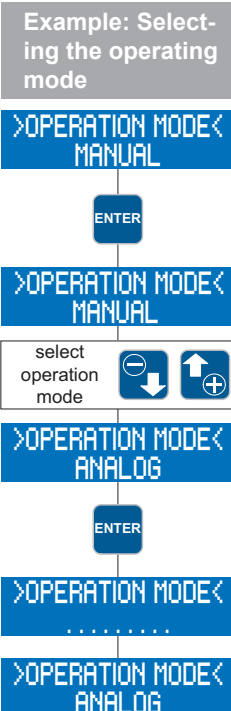
>ANALOG SIGNAL<
4-20mA

9.5.4 Value input

The assignment of values and settings to a parameter is described in the following, using two examples.

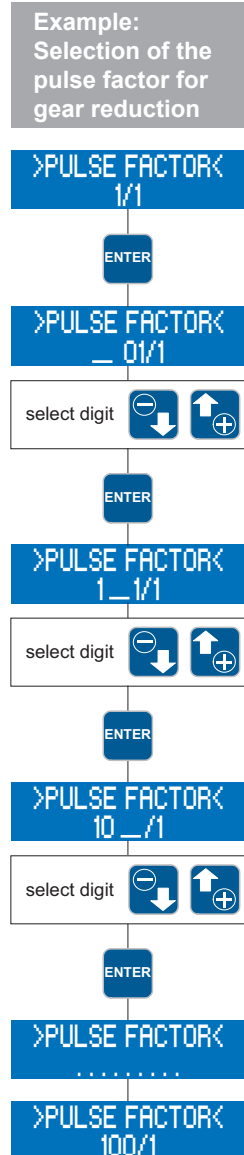
Assignment of settings

- Display of the current setting (here: MANUAL operating mode).
- Value entry is enabled after pressing the ENTER button.
- Then, the operating mode indicator flashes and a setting can be selected (here: operating modes) using the UP and DOWN buttons.
- After a setting has been selected (here: ANALOGUE operating mode),
- pressing the ENTER button will confirm and save the choice.
- Display of the current setting (here: ANALOGUE operating mode),



Assignment of values

- Display of the current value (here: pulse factor 1/1).
- Value entry is enabled after pressing the ENTER button.
- Then, the first digit of the pulse factor flashes.
- The desired number can be set using the UP and DOWN buttons (here: 1).
- After selection of the number, pressing the ENTER button will confirm the choice.
- Then, the second digit of the pulse factor starts to flash.
- The desired number can be set using the UP and DOWN buttons (here: 0).
- After selection of the number, pressing the ENTER button will confirm the choice.
- Then, the third digit of the pulse factor starts to flash.
- The desired number can be set using the UP and DOWN buttons (here: 0).
- After selection of the number, pressing the ENTER button will confirm the choice.
- Afterwards, the entered value will be saved.
- Display of the current value (here: pulse factor 100/1).



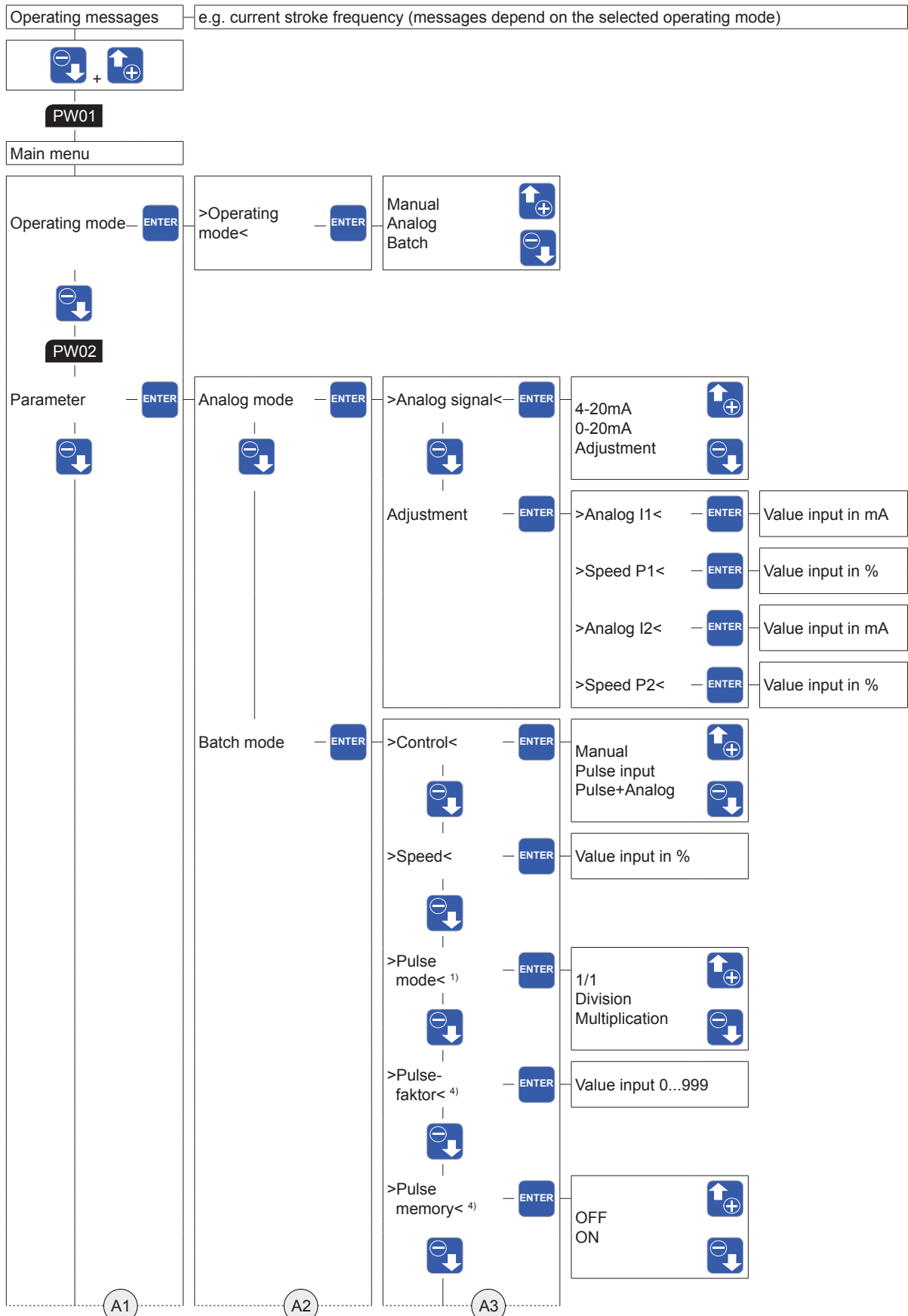
The value entry (flashing display) can be exited by simultaneously pressing the UP and DOWN buttons. In this case, the previous value / previous setting will be maintained.



NOTE!

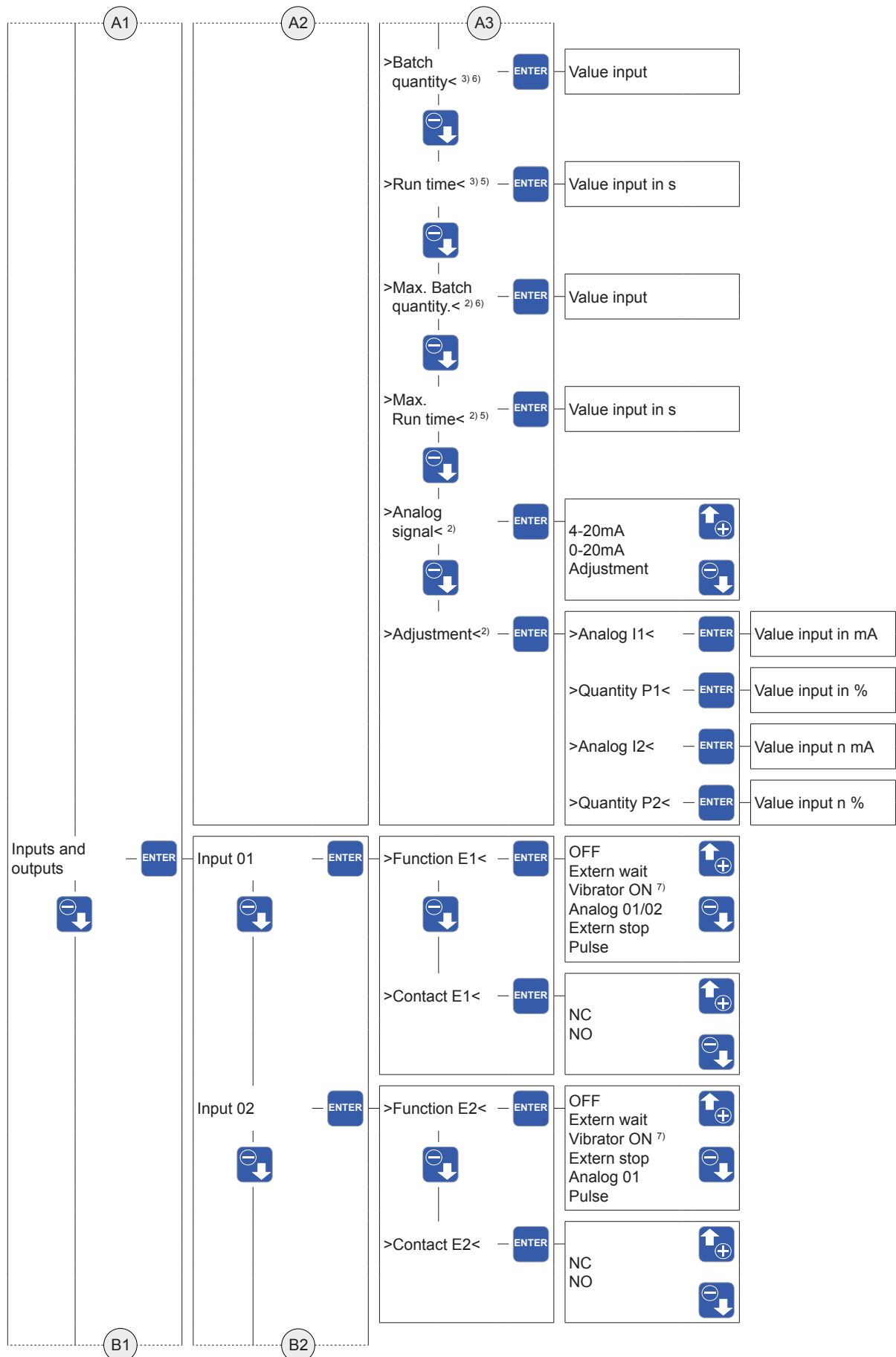
If no button has been pressed for 30 sec. during the value entry (flashing display), the input mode is exited automatically and the previous value / previous setting is not changed.

9.5.5 Menu navigation

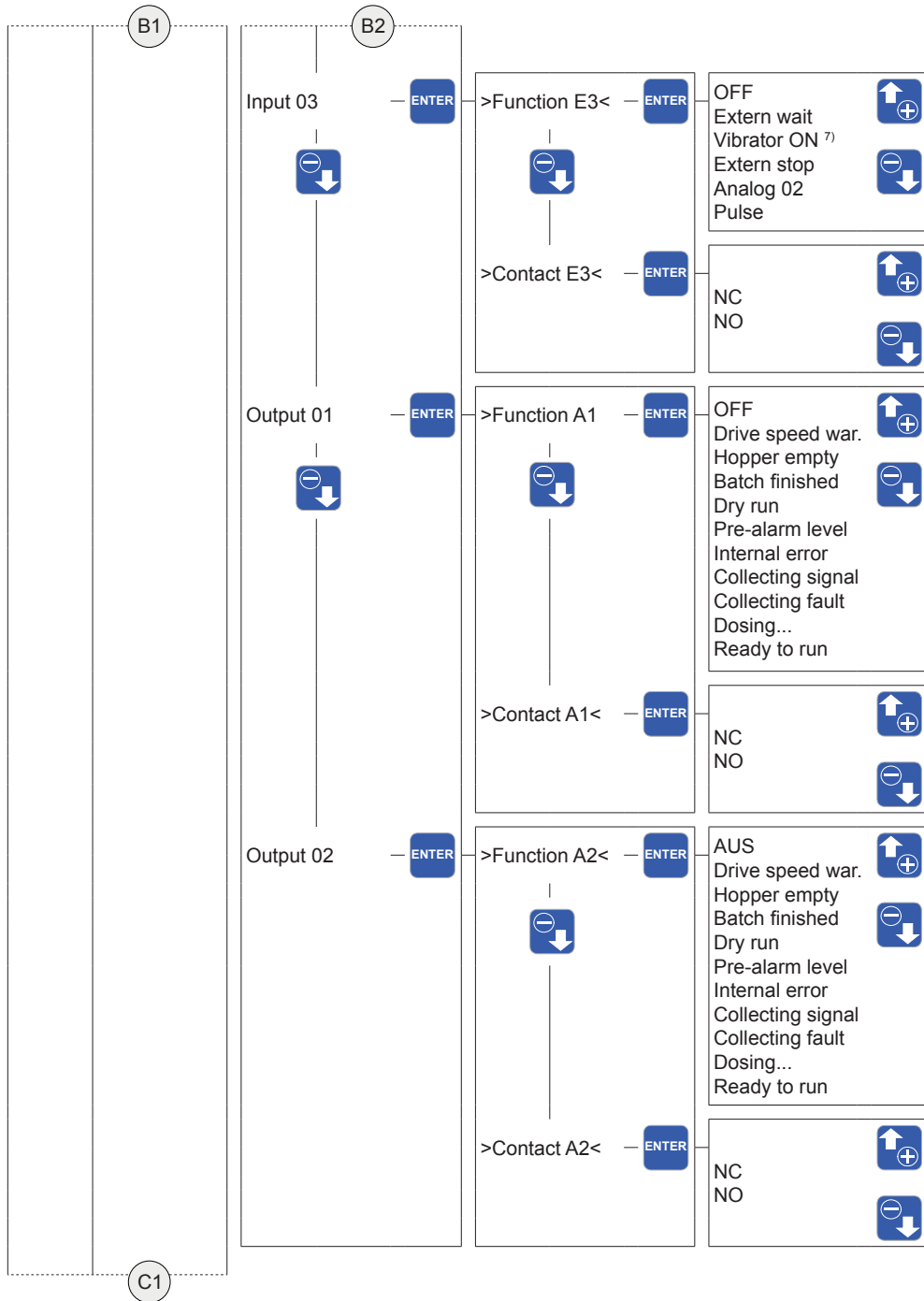


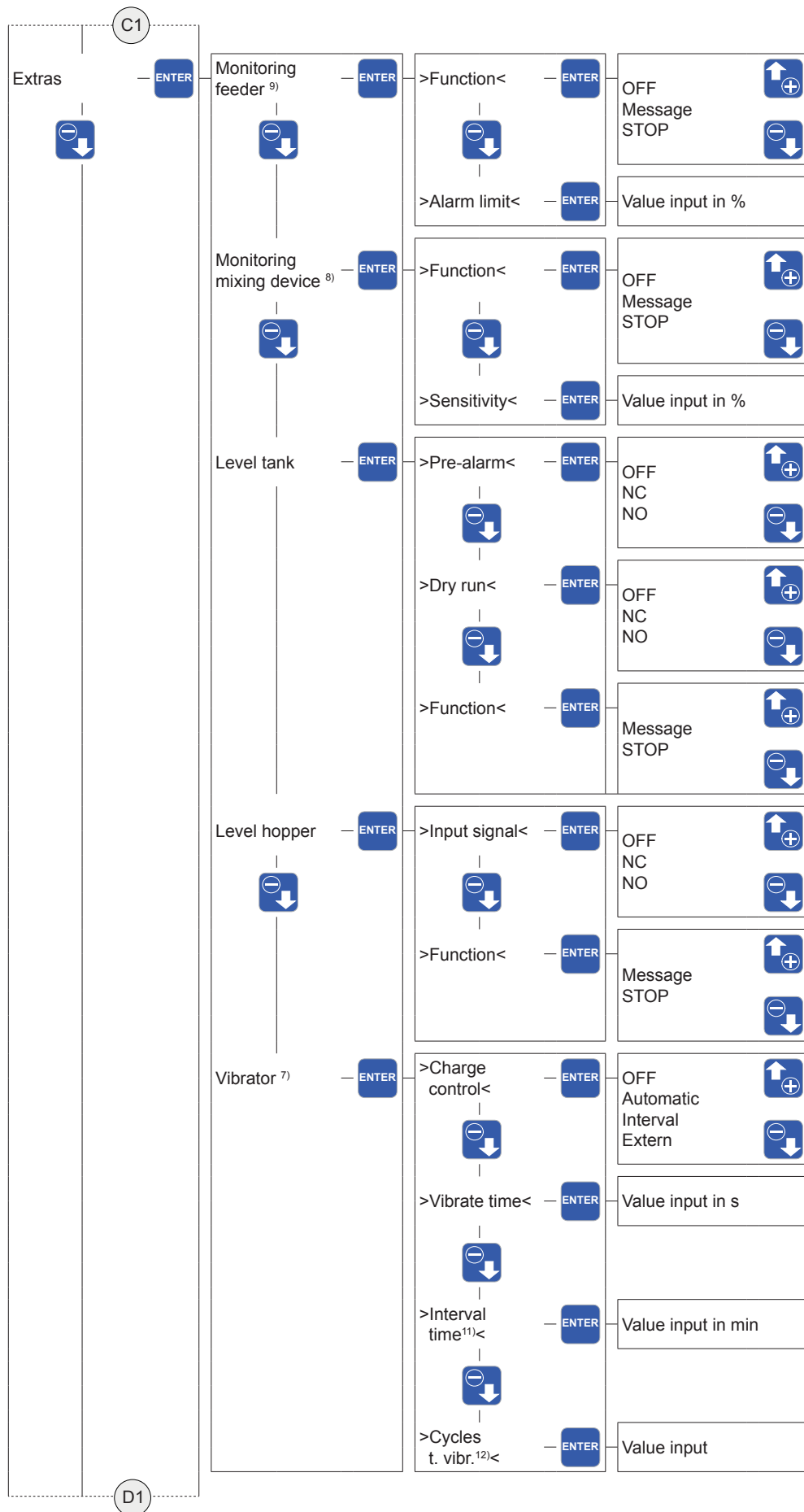
PW01 Blocked by password 01 (factory setting: 9990, not activated)

PW02 Blocked by password 02 (factory setting: 9021)



Operating instructions





9.6 Selecting the operating mode

You can select between five different operating modes:

- MANUAL
- ANALOGUE
- BATCH

On-site operation and on-site control of the unit without external control. The speed / delivery rate can be set manually. For the calibrated unit, the delivery rate is in kg/h. For the uncalibrated unit, the speed can be adjusted in %.



The speed of the unit is controlled via the received analogue signal. The unit can optionally be controlled with 0...20 mA or 4...20 mA. In addition, there is the option to normalise the incoming analogue signal according to the application (see chapter "Settings for the ANALOGUE operating mode").

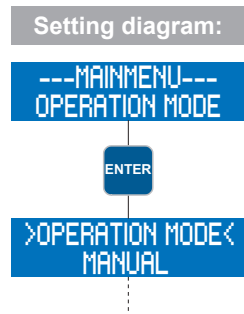


Batch dosing that can be started manually or via an external pulse signal. The batch quantity / running time can be input in kg (only for calibrated unit) or in seconds (see Chapter "Settings for BATCH operating mode").




There are three pulse modes available for starting the batch via an external pulse signal. The DMF can be operated in 1/1 mode or with multiplication or division of the input pulses (see Chapter "Settings for BATCH operating mode").

- Go to the ---MAIN MENU--- and select the menu item OPERATING MODE (if necessary, use the UP / DOWN buttons).
- Pressing the ENTER button will open the >OPERATING MODE< submenu.
- Here, the currently set operating mode is indicated (here: MANUAL).



It is possible for the batch dosing to specify the batch quantity using an analogue signal. The batch only starts here via a pulse signal at the pulse input. A maximum batch quantity / running time must be specified. This corresponds to the maximum analogue signal.



NOTE! After the batch start with the analogue signal, the batch quantity cannot be changed.



NOTE! The batch dosing can be aborted by pressing the "START/STOP" button or via the "External Stop" signal.



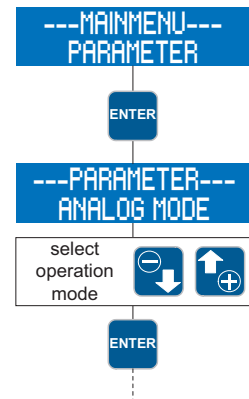
NOTE! The batch dosing can be paused by a "dry run" or "empty" signal or via the "External Wait" signal. The dosing continues after this signal is no longer present.

The setting of an operating mode is done according to the description in Chapter "Value input".

9.7 Settings for the operating mode

Depending on the selected operating mode, specific settings can be made.

- Go to the ---MAIN MENU--- and select the menu item PARAMETER (if necessary, use the UP / DOWN buttons).
- Pressing the ENTER button will open the --- PARAMETER --- submenu.
- Here, the currently set operating mode is indicated (here: ANALOGUE MODE).
- The DOWN button is used to move to the next operating mode.
The UP button is used to move to the previous operating mode.
When in the PULSE MODE, the UP button is used to move back to the --- MAIN MENU ---.



After the operating mode has been selected, the ENTER button can be used to move to the specific settings for the selected operating mode.



NOTE!

In the ---PARAMETER--- menu, there is no adjustment possibility for the MANUAL operating mode.

9.7.1 Settings for the ANALOGUE operating mode



NOTE!

In order to be able to use the ANALOGUE operating mode, the ANALOGUE 01 or ANALOGUE 02 function must be assigned to at least one input (see Chapter "Digital/analogue inputs 02 and 03").
Input 02 (see Chapter "Control inputs and outputs) is preset at the factory as analogue input (ANALOGUE 01).



NOTE!

The motor speed is adjusted according to the specifications. The drive is switched off when speed is less than 10%.

Selecting the ANALOGUE SIGNAL

You can select between three different analogue signals:

- 4-20 mA
- 0-20 mA
- ADJUSTMENT

DMF-... EB.2

Operating instructions

A signal with a control current of 4 mA corresponds to 0% speed / delivery rate; a signal with 20 mA corresponds to 100% speed / delivery rate. In this range, the speed / delivery rate behaves proportionally to the control current (see following figure).

If the input signal is < 3.5 mA, the unit outputs the error message "Analogue signal < 4 mA". Thus, a wire break (control current = 0 mA) can be detected.

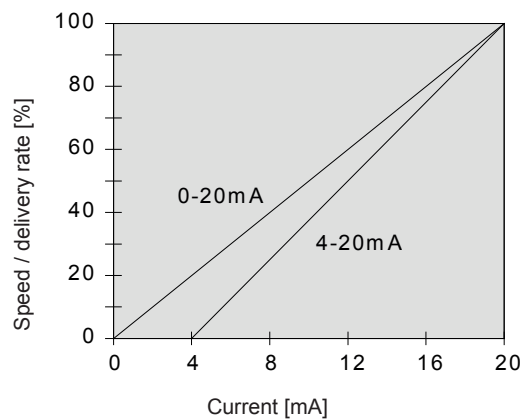
If the input signal is > 20.5 mA, the unit stops and the error message "Analogue signal > 20 mA" will be output.

>ANALOGSIGNAL<
4-20mA

A signal with a control current of 0 mA corresponds to 0% speed / delivery rate; a signal with 20 mA corresponds to 100% speed / delivery rate.

In this range, the speed / delivery rate behaves proportionally to the control current (see following figure).

>ANALOGSIGNAL<
0-20mA



The analogue control signal can be adjusted specifically for the application. For example, this is necessary if a connected regulator provides a limited output signal.

>ANALOGSIGNAL<
NORMIERUNG

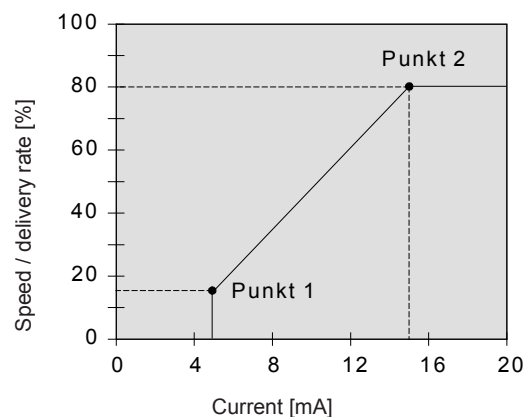
Two points are specified that reflect a proportional relation between control current and speed / delivery rate of the unit. In addition, these two points restrict the speed / delivery rate range of the unit as shown in the following figure.

Example: Adjustment of the analogue signal

- Point 1: 15% speed / delivery rate with 5 mA
- Point 2: 80% speed / delivery rate with 15 mA

If the control current is < 5 mA, the speed / delivery rate of the unit is 0%.

If the control current is > 15 mA, the speed / delivery rate of the unit is 80%..



DMF-... EB.2

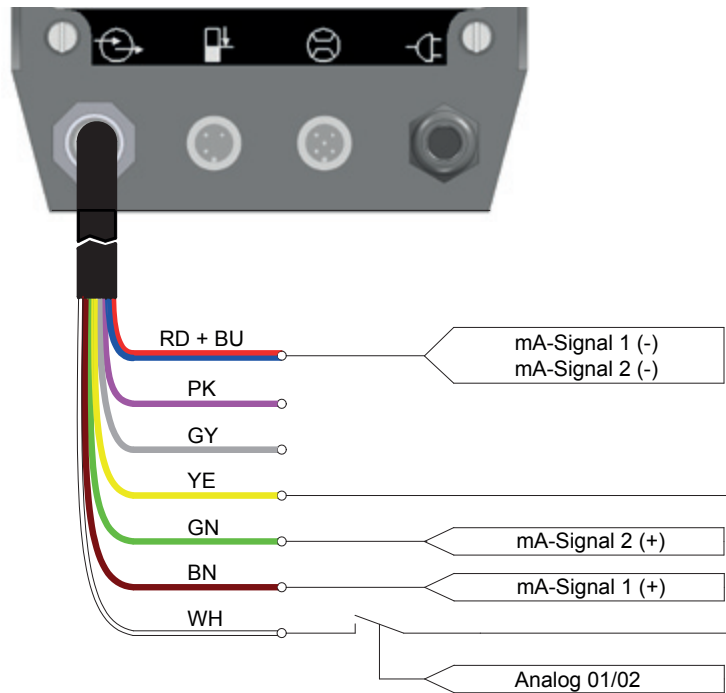
Operating instructions



ATTENTION!

If the input signal is > 25 mA, the unit stops and the error message "Analogue signal > 25 mA" will be output. In this case, the corresponding input is also switched off as a protective measure. The reactivation of the input takes place by the complete removal of the analogue signal.

Figure: "Connecting two analogue signals with switching"



Operating instructions

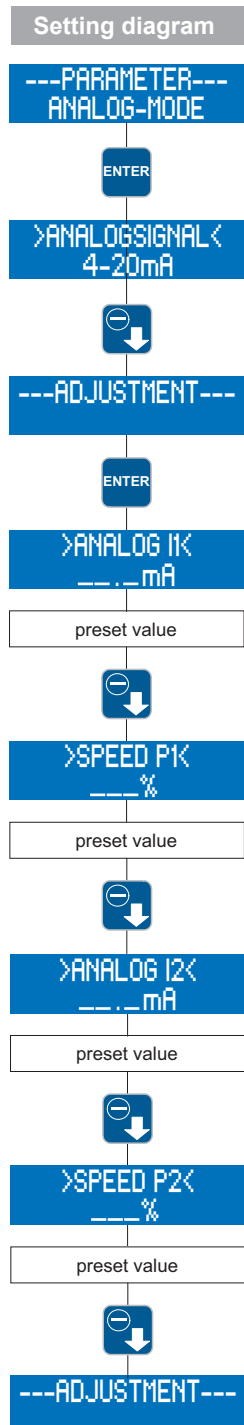
ADJUSTMENT of the analogue signal

The adjustment of the analogue signal is done under consideration of two default points. These two points are two pairs which assign control currents to speed or volume:

- Point 1 (I1, f1)
- Point 2 (I2, f2)

The following diagram shows the procedure to determine the points.

- Go to the ---PARAMETER--- menu and select the ANALOGUE MODE menu item using the ENTER button.
- Use the DOWN button to skip the selection of the ANALOGUE SIGNAL.
- Select the --ADJUSTMENT-- submenu using the ENTER button.
- Enter the value for current I1.
Value input according to Chapter "Value input".
- Enter the value for speed P1 which is assigned to the current I1.
Value input according to Chapter "Value input".
- Enter the value for current I2.
Value input according to Chapter "Value input".
- Enter the value for speed P2 which is assigned to the current I2.
Value input according to Chapter "Value input".
- The adjustment is then completed.



The adjustment for the batch dosing is performed analogously to that described above. A batch quantity in kg / running time in seconds is assigned here instead of the speed / delivery rate.

9.7.2 Settings for the BATCH operating mode

Selecting the type of CONTROL

You can select between three different types of control:

- MANUAL
- PULSE INPUT
- PULSE + ANALOGUE

With this type of control, the batch is started manually in the “operating messages” view by pressing the ENTER button.

>CHARGE CONTROL<
MANUAL

With this type of control, the batch is started via an external pulse at the pulse input.

>CHARGE CONTROL<
PULSE INPUT



NOTE!

When using PULSE INPUT as the type of control, the PULSE function must be assigned to at least one input (see Chapter "Configuration of the inputs and outputs").



NOTE!

In order to be able to use the PULSE operating mode, the PULSE function must be assigned to at least one input (see Chapter "Configuration of inputs and outputs").
Input 01 (see Chapter "Control inputs and outputs) is set as pulse input at the factory.

Selecting the PULSE MODE

You can select between three different pulse modes:

- 1/1
- REDUCTION
- TRANSMISSION

In this mode, the unit performs exactly one batch for each received pulse.

>PULSE MODE<
1/1

In this mode, a reduction of the received pulses is performed. This means that a batch will only be performed after an adjustable number of pulses (reduction factor) has been received.

>PULSE MODE<
DIVISION

In this mode, a transmission of the received pulses is performed. This means that the unit will perform an adjustable number of batches (transmission factor) after each received pulse.

>PULSE MODE<
MULTIPLICATION

Operating instructions

Selecting the PULSE FACTOR

This menu item is only visible if "transmission" or "reduction" has been set for pulse mode. Depending on the selected pulse mode, the pulse factor corresponds either to the reduction factor or the transmission factor.

The reduction factor can be selected between 1 and 999. For example, if the reduction factor is 50, the unit will only perform a batch after every 50th received pulse.

>PULSE FACTOR<
50/1

The transmission factor can be selected between 1 and 999. For example, if the transmission factor is 50, the unit will perform 50 batches with every received pulse.

>PULSE FACTOR<
1/50

The pulse factor is set according to the description in Chapter "Value input" (assignment of values).

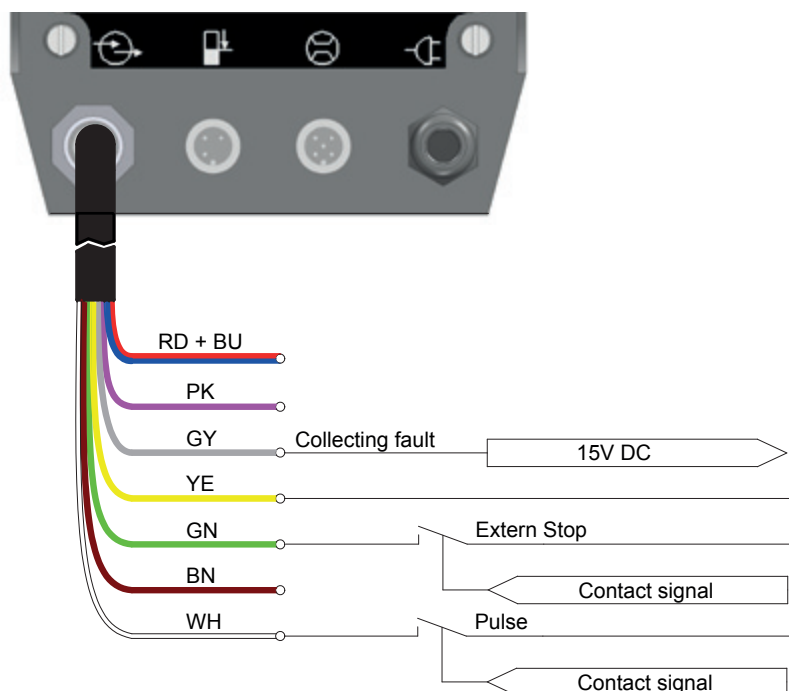
Switching the PULSE MEMORY ON/OFF

The unit is equipped with a pulse memory which can optionally be switched ON and OFF. A maximum of 999 pulses can be saved.

If the number of received pulses exceeds the number that can be handled by the unit, the pulses will be buffered and the pulses will be processed later.

Example: For the setting 1:50, there are 5 pulses in the memory ► processing of $5 \times 50 = 250$ batches.

Figure: "Connection of a pulse signal with External Stop and feedback of the dosing signal"



Operating instructions

Specifying BATCH QUANTITY / RUNNING TIME

The entry for the batch quantity / running time depends on the calibration (see Chapter "Calibration"):

- Input in seconds if the unit is not calibrated
- Input in kg for calibrated unit

If "pulse + analogue" is set for the actuation, the maximum batch quantity / running time is specified here; this corresponds to 100% of the analogue signal.



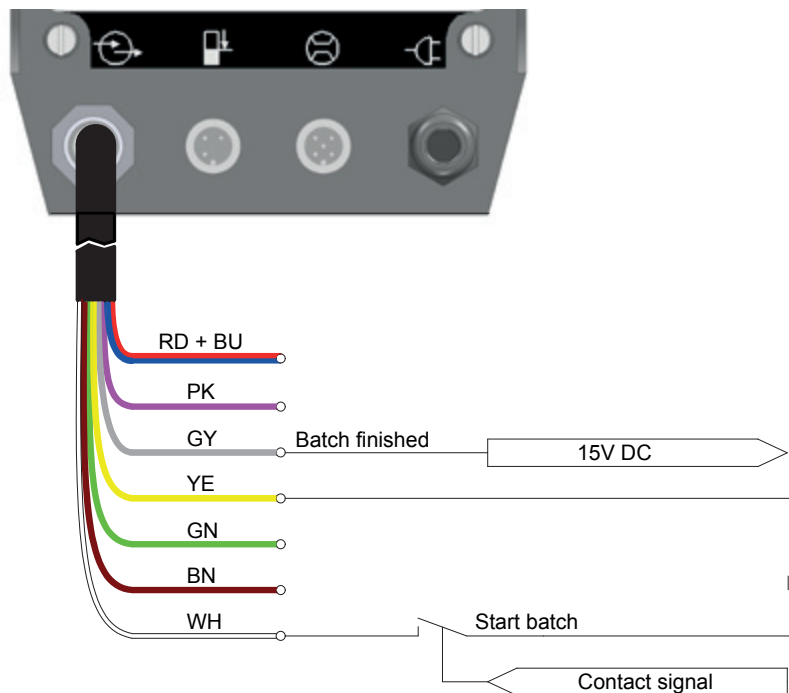
NOTE!

The batch quantity can also be adjusted in the operating messages if "Manual" is set as actuation and the batch is not running.

Setting the SPEED

The speed with which the unit operates during the batch dosing can be adjusted. The value input is performed as described in Chapter "Value input".

Figure: "Possible connection assignment for batch mode"



9.8 Configuring the inputs and outputs

The unit is equipped with three inputs and two outputs which can be configured via a menu and thus be adapted to the given operating conditions.

It is possible to assign the same functions to all three inputs.

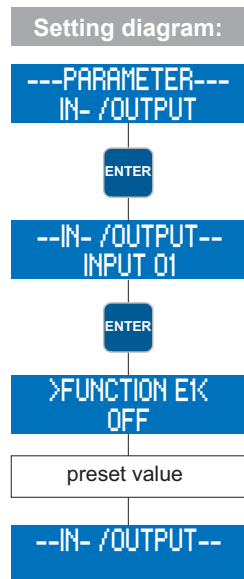


NOTE!

If several inputs are configured identically, the input signals will be evaluated via OR operation. This means that the function will be performed as soon as any of the inputs fulfils the condition.

Exception: Pulse input with pulse memory. If the pulse memory is switched on, the received pulses will be summed up.

- Go to the ---MAIN MENU--- and select the menu item INPUT/OUTPUT (if necessary, use the UP / DOWN buttons).
- Pressing the ENTER button will open the submenu.
- Here, you can select between the individual inputs and outputs.
- Press the ENTER button to access the menu level for setting the individual inputs and outputs.



9.8.1 Digital input 01

Input 01 can be assigned one of six different functions. Optionally, a circuit breaking is possible.

- Pulse
- External Stop
- Analogue 01/02
- Vibrator On
- External Wait
- OFF

It is also possible to configure the contact signal of the input as NC or NO.

Configuration of the respective input as pulse input.

>FUNCTION E1<
PULSE


Function for externally pausing the unit via the respective input (independent of the operating mode).

>FUNCTION E1<
EXTERN WAIT

Function for externally switching off the unit via the respective input (independent of the operating mode).


>FUNCTION E1<
EXTERN STOP


Operating instructions



NOTE!


If the unit is switched off via External Stop, the first line of the display shows an “S” on the right side:





NOTE!

If the unit is paused via External Wait, the first line of the display shows a “W” on the right side:



Function for externally actuating the vibrator (optional) via the respective input.



Function for externally starting the batch via the respective input:



This function is used to switch over between the two analogue inputs Analogue 01 and Analogue 02 (input 02 and 03) via input 01. The analogue input is selected according to the following table.



Switching analogue input		
Configuration contact E1	Applied signal	Selected analogue input
NC	High	Analogue 01 (Input 02)
NC	Low	Analogue 02 (Input 03)
NO	High	Analogue 02 (Input 03)
NO	Low	Analogue 01 (Input 02)

No function is assigned to the respective input.



9.8.2 Digital/analogue inputs 02 and 03

The inputs 02 and input 03 always have the same functions as input 01 (see Chapter “Digital input 01”). They can also be used as analogue inputs. However, the function “Analogue 01/02” which is used to switch over between the analogue inputs is not available.

In addition, it is possible to configure the contact signals of the inputs as NC or NO.

The respective input is configured as an analogue input.



bzw.



9.8.3 Outputs 01 and 02

Each of the outputs 01 and 02 can be assigned one of nine different functions. Optionally, a switch off is possible.

- Operational
- Dosing...
- Group fault
- Group signal
- Internal error
- Pre-alarm level
- Dry run
- Batch finished
- Hopper empty (only for the hopper empty signal option)
- Speed warning (only for the speed monitoring option)
- Mixing unit overflow (only for mixing unit monitoring option)
- OFF

It is also possible to configure the contact signals of the outputs as NC or NO.

Indication of operational readiness of the unit via the corresponding output.

>FUNCTION A1<
READY TO RUN

Indicator for the occurrence of a group fault whereby the group fault can be a matter of the following errors:

>FUNCTION A1<
COLLECTING FAULT

- Mixing unit overflow (for STOP function)
- Dry run tank (for STOP function)
- Hopper empty (for STOP function)
- Drive fault
- Speed is too low (for STOP function)
- No rotation detection
- Exceeding or undercutting the input current in the case of analogue mode.

Indication of a group fault for the occurrence of any of the messages shown below:

>FUNCTION A1<
COLLECTING SIGNAL

- Group fault
- Tank level pre-alarm
- Speed is too low (for MESSAGE function)
- Mixing unit overflow (for MESSAGE function)
- Hopper empty (for MESSAGE function)

Message for activity of the unit "Running...") via the corresponding output.

>FUNCTION A1<
RUN ...

Message for activity of the unit "Dosing...") via the corresponding output.

>FUNCTION A1<
DOSING ...

With activated 2-stage level monitoring, message from the respective output indicating a pre-alarm.

>FUNCTION A1<
PRE-ALARM LEVEL

With activated level monitoring, message from the respective output indicating the dry run.
(only for mixing unit overflow monitoring option)

>FUNCTION A1<
DRY RUN

Overflow signal via the corresponding output in the case of activated mixing unit overflow monitoring.

>FUNCTION A1<
UEBERL. MISCHER

With activated BATCH operation mode, signal via the respective output indicating that the batch is finished.

>FUNCTION A1<
CHARGE BEENDET

Operating instructions

Indication of overrunning during overrun operating mode via the respective output.

>FUNCTION A1<
RUN AFTER FINISH

Indication in the case of any of the following faults (see Chapter "Analysis of plain text error messages" for fault descriptions):

- Fault drive
- Grid overvoltage
- Power supply undervoltage

>FUNCTION A1<
INTERNAL ERROR

9.9 Delivery rate indicator



If the unit has not been calibrated, the delivery rate indicator will not be activated.

NOTE!

The delivery rate indicator is activated via the calibration of the unit (see Chapter "Calibration"). The indication depends on the operating mode.

MANUAL operating mode

After calibration of the unit, the delivery rate will be entered directly as setpoint in kg/h instead of via speed adjustment (%). In the "operating messages" view (see Chapter "Operating messages view"), the speed indicator is replaced by the flow rate indicator. In addition, the total dosing quantity is shown in kg.

: MANUAL
7.2 kg/h

: MANUAL
10.34 kg

ANALOGUE operating mode

The calibration of the unit activates the flow rate indicator and the speed indicator also remains visible. In addition, the total dosing quantity is indicated in litres.

: ANALOG
7.2 kg/h

: ANALOG
10.34 kg

BATCH operating mode

After calibration of the unit, the dosing quantity and the remaining dosing quantity are shown in kg.

: BATCH Man.
U 7.2 kg/h

: BATCH Man.
U 10.34 kg

9.10 Standard flow rate indicator

With the standard flow rate indicator, the entered setpoint is converted to the corresponding speed. The maximum specifiable setpoint is limited by the data from the calibration.

Example:

The calibration produces a delivery rate of 20 kg/h (speed = 100%).
If a setpoint of 16 kg/h is entered, the speed is reduced accordingly to 80%.
The maximum setpoint in this case is 20 kg/h.
Internal calculation: 100% speed ► Measured: 20 kg/h
 Setpoint: 16 kg/h ► 80% speed



The setpoint in kg/h can be specified manually (operating mode: MANUELL) or by an analogue signal (ANALOGUE) as soon as the unit has been calibrated.

NOTE!

9.11 Calibration

The calibration is used to activate the flow rate indicator. Calibration is always done in the same way, no matter whether a flow meter is connected or not.

Sequence of calibration:



Observe the safety data sheet of the dry material.

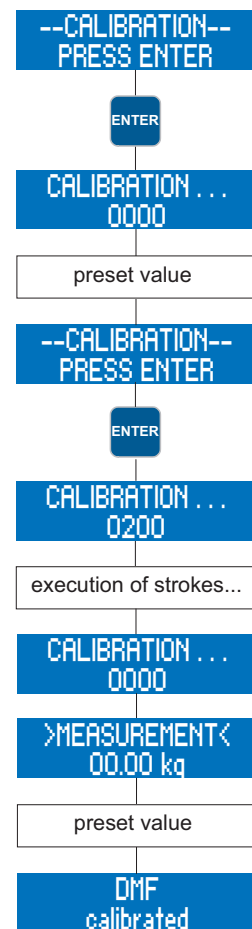
ATTENTION!

- Fill hopper with sufficient dry material.
- Ensure discharge pipe is filled with dry material before starting the calibration. For this, let the DMF run in MANUAL mode until the discharge pipe is filled and even discharge is recognisable.
- Place a weighing machine with collecting container under the discharge pipe and set the machine to zero.

DMF-... EB.2

Operating instructions

- Select --CALIBRATION-- in the main menu view:
- Press the ENTER button to continue for entering the running time.
- First, enter the required running time (at least 10 s) ► the higher the running time the more accurate the calibration!
- Press the ENTER button to start the calibration.
- The DMF pauses briefly after 1/3 of the running time. This procedure is repeated twice.
- Determination of the delivery quantity on the scales.
- Input the determined delivery quantity.
- The DMF is calibrated!



NOTE!

After the unit has been calibrated, the calibration flag (see Chapter "System") is automatically set to ON.



ATTENTION!

A new calibration of the unit is required in the case of changing the dry material. Otherwise, the flow rate indicator might be inaccurate!

9.12 System

The system settings do not depend on the operating mode. These include:

- Language
- Calibration
- Factory settings
- Restart

>LANGUAGE<

You can select between GERMAN, ENGLISH and SPANISH as menu language.

>CALIBRATION<

The calibration of the unit (see Chapter "Calibration") can be switched on and off. If the calibration is set to ON and the unit has been calibrated, the flow rate indicator is activated.

If the calibration is set to OFF and/or the unit has not been calibrated, the flow rate indicator is not activated.

>FACTORY SETTINGS<

The factory settings (see table "Overview of set parameters", chapter "Parameter table") can be loaded. To do so, set YES.



ATTENTION!

After loading the factory default settings, all previous user-defined settings are irrevocably overwritten.

>RESTART<

The state that the unit should adopt after power recovery can be defined using the Restart function.

It can be set to "Last status" or "No".

If "Last status" is selected, the unit is switched to the previously set status before the power failure (online or offline) after the power is restored.

If "No" is set, the unit will always be switched to "offline" after a power recovery.



ATTENTION!

The unit can run after power recovery if the setting "Last status" has been selected. It must be ensured that there is no hazard from this setting!

9.13 Summation counter

The totaliser indicates the total volume conveyed and the operating hours of the unit. These values are for information purposes and cannot be reset.

9.14 Password

Two password levels are provided to increase the operating safety. The passwords for these levels consist of a four-digit number code and are freely selectable.

Password 01 (PW01) is used to protect the setting of the operating mode (Level 01). This password can be activated and deactivated (when leaving the factory, it is deactivated).

Password 02 (PW02) protects all further setting options of the main menu (Level 02, see "Menu guide"). This password protection cannot be deactivated.



If, during the first password request (Level 01), password 02 is been entered, Level 02 is also automatically activated.

NOTE!

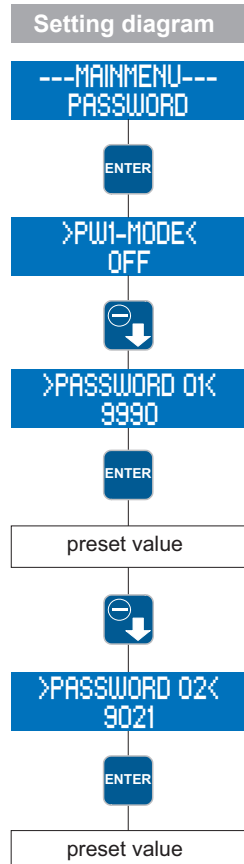


The passwords are set at the factory as follows:

- Password 01: 9990 (deactivated)
- Password 02: 9021 (cannot be deactivated!)

ATTENTION!

- In the ---MAIN MENU--- select the menu item PASSWORD.
- Pressing the ENTER button opens the setting menu for the PW01 mode.
- Press the DOWN button to access the setting for Password 01.
- Value entry for Password 01 is enabled after pressing the ENTER button.
- After entry of Password 01, press the DOWN button to access the setting for Password 02.
- Value entry for Password 02 is enabled after pressing the ENTER button.





ATTENTION!

There is an automatic “Logout” after 5 min of inactivity in the “Operating messages” view. Afterwards, the password must be entered again.



ATTENTION!

You should note down the passwords and keep them in a safe place. If the passwords get lost, the unit can no longer be reconfigured on-site. It must be returned to the manufacturer for configuration.

9.15 Info

The Info menu item contains information about the hardware and software version of the unit.

9.16 Extras

9.16.1 Speed monitoring (option)

The connection of a **sera** speed sensor to the DMF enables monitoring of the metering screw of the DMF (e.g. for breakage of the metering screw, drive defect,...).

--EXTRAS--
WORM MONITOR.

The following items can be adjusted:

- Function
- Alarm limit

>FUNCTION<

Selection of the monitoring function. It can be selected whether the monitoring should trigger a warning message (MESSAGE) or a shutdown of the unit (STOP) or deactivation of the sensor.

>ALARM LIMIT<

Alarm limit at which a connected speed sensor triggers the speed monitor. The entered value corresponds to the percentage part of the setpoint speed.

The factory setting is 80%. This means that the speed monitor will trip if a connected speed sensor measures a speed which is lower than 80% of the specified setpoint speed.

9.16.2 Mixing unit overflow detection (option)

The overflow detection for the mixing unit (see also Chapter 8.2.10) is an optional expansion of the DMF. It is used for monitoring the mixing unit for clogging of the discharge.

--EXTRAS--
BLENDER-MONITOR.

The following items can be adjusted:

- Function
- Sensitivity

>FUNCTION<

Selection of the overflow monitoring for the mixing unit function. It can be selected whether the monitoring should trigger a warning message (MESSAGE) or a shutdown of the unit (STOP).

>SENSITIVITY<

Input of the sensitivity of the overflow sensor electrode in percent. This enables an adaptation to the conductivity of the conveyed medium. In the case of poorly conductive media, the sensitivity must be set to a high value (e.g. 100% at approx. 4 $\mu\text{S/cm}$); in the case of highly conductive media, the sensitivity must be set to a lower value (e.g. 10% at approx. 50 $\mu\text{S/cm}$).



NOTE!

When leaving the factory, the sensitivity is preset to 50%. This corresponds to a minimum conductivity of the mixing medium of approx. 10 $\mu\text{S/cm}$. The minimum conductivity at 100% sensitivity is 4 $\mu\text{S/cm}$.

9.16.3 Level monitoring tank

The connection of a sera suction lance enables the monitoring of the filling level in the preparation tank.

---EXTRAS---
LEVEL TANK

The following items can be adjusted:

- Pre-alarm
- Dry run

>PRE-ALARM< and >DRY RUN< respectively

Configuration of the two level inputs. You can select between either the switch off (OFF) of the input and a configuration as NC (opening downwards) or NO (closing downwards).

When leaving the factory, both level inputs are configured as NO.

Configuration of the level input

Configuration	Pre-alarm	Dry run
1	NO	NO
2	NO	NC
3	NC	NC

Operating instructions

Configuration 1

When leaving the factory, this configuration is preset. A 1-stage or 2-stage level monitor with floating normally open contacts (pre-alarm + dry run or only dry run only) can be connected.

Configuration 2

This configuration must be selected if a 1-stage level monitor (dry run only) with floating normally closed contact is connected.

Configuration 3

This configuration must be selected if a 2-stage level monitor with floating normally closed contacts (pre-alarm + dry run) is connected.

9.16.4 Hopper level monitoring (option)

A capacitive sera sensor, which triggers a pre-alarm at a remaining volume of approx. 20 l, enables monitoring of the fill level.

---EXTRAS---
LEVEL HOPPER

Configuration of the level input

You can select between either the switch off (OFF) of the input and a configuration as NC or NO.

Error message "hopper empty" by configuration of the input as

- NC at opened sensor contact (Sensor must be set as NO).
- NO at closed sensor contact (Sensor must be set as NC).

9.16.5 Vibrator (option)



ATTENTION!

**Vibration hazard from rotating eccentric weights.
Ensure sufficient damping.
Observe operating manual of the electric vibrator.**

An optionally attached electric vibrator which is actuated directly by the control electronics of the unit provides the possibility to prevent mechanical bridging in the hopper.

--EXTRAS--
VIBRATOR

The following items can be adjusted:

- Control
- Vibration time
- Interval time

Operating instructions

>CONTROL<

Selection of the type of control for triggering the vibrator. The vibration can optionally either be triggered via an external signal (EXTERNAL), after a preset interval time (INTERVAL) or automatically after a configurable number of dosing starts when (re) starting the unit (AUTOMATIC). Optionally, it can also be switched off (OFF).




ATTENTION!

In addition to the adjustable type of control, manual vibration is also possible at any time:
Go to the operating message "VIBRATOR: OFF" and press the ENTER button – the vibrator is then active ("VIBRATOR: ON") until the ENTER button is pressed again or the maximum vibration time of 3 s is reached.



ATTENTION!

The maximum permissible vibration time is 3 s. The minimum permissible interval time before the vibrator can be started again is 1 minute.



NOTE!

In the case of actuation via external signals, the specified time limits must be complied with. External signals which result in exceeding the maximum vibration time or undercutting the minimum interval time will not be executed or saved.



NOTE!

While the vibrator is active, the first line of the display shows a "V" (for "vibrate") on the right side:



>VIBRATION TIME<

Input of the vibration time in seconds only for the control types INTERVAL and AUTOMATIC. The vibrator is switched on for this time for each vibration. The factory setting is 1 s (value range: 1 to 3 s).

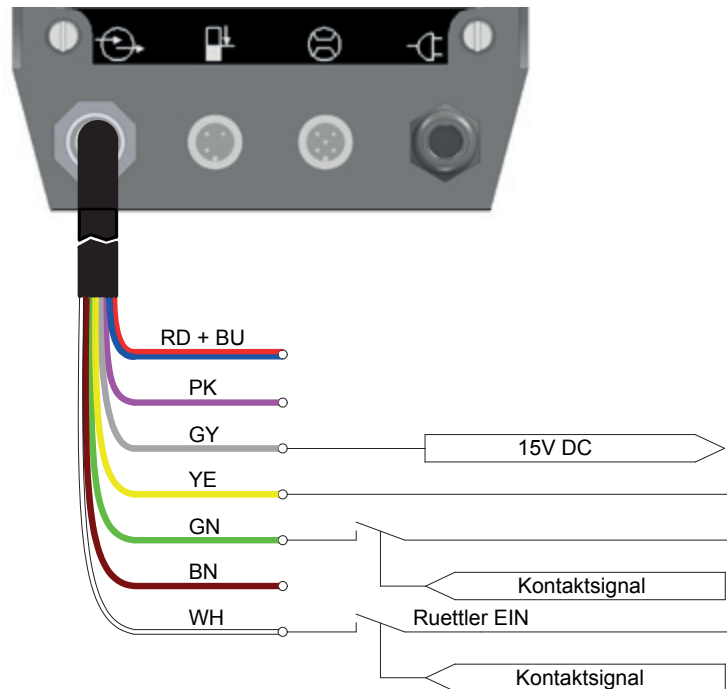
DMF-... EB.2

Operating instructions

>CYCLE TIME<

Input of the interval time in minutes at which the vibration is repeated (with INTERVAL control). The factory setting is 15 min. (value range: 1 to 999 min.).

Figure: "Possible connection assignment for external control of the electric vibrator"



10. Maintenance

10.1 General



DANGER!

Disconnect the dry material feeder from the power supply and protect it against a sudden start by taking appropriate measures. Strictly consult a qualified electrician for this.



DANGER!

Always switch off the dry materials dosing feeder before disconnecting the main power supply ► danger from arcing.



CAUTION!

Attached heater, neighbouring components (discharge pipe), gear motor and electric vibrator must not be touched after switching off as there is a danger of burn injuries.

The following checks should be performed regularly:

- Monthly check of all screw fastenings for tightness (see Chapter “Placement / Installation” for tightening torques).
- When using the vibrator, weekly check of all screw fastenings for tightness (see Chapter “Placement / Installation” for tightening torques).
- Check of the electrical connections / cables / insulation for proper condition.
- When using a mixing unit:
Weekly check of the mixing unit and the discharge pipe for adhesion of dry material.
If necessary, remove adhesions with suitable cleaner.

Pay attention to the following for maintenance work:

- Pointed parts (metering screw, screw connections, broken parts ► wear gloves.
- Accessibility of the dry material feeder, particularly the operating, measurement and inspection points.
- Visibility of danger points.
- Adequate lighting.
- Keep clear of soiling.



ATTENTION!

Observe the safety data sheet of the dry material.



ATTENTION!

It is not permitted to remove the fan blade cover.



CAUTION!

Pay attention to the unstable parts when undoing screw connections. Danger from falling parts and the reduction of stability of the dry material feeder.



WARNING!

Live parts! Pay attention to the protection class during maintenance work.

Pay attention to sufficient clearance from parts under high voltage.



ATTENTION!

Opening the electronics is always prohibited.

10.2 Cleaning

Cleaning the interior of the dry material feeder can be necessary when changing the dry material or replacing the seal:

- Empty the dry material feeder by removing the discharge pipe.
- Remove residues using a vacuum cleaner or a dry cloth.
- If necessary, remove adhering dry material residues using a moist cloth.



ATTENTION!

Do not clean the dry material feeder with a high-pressure cleaner or rinse the hopper with water!

In the case of difficult to remove dry material residues:

- Remove metering screw, gear motor, bearing flange and discharge pipe.
- Stored energy in the form of dry material. When the metering screw, discharge pipe or the gear motor is removed, the dry material feeder partially or completely empties itself. Provide a container to collect the dry material during the dismantling.
- Rinse out container.



WARNING!

Stored energy in the form of dry material.

When the metering screw, discharge pipe or the gear motor is removed, the dry material feeder partially or completely empties itself. Provide a container to collect the dry material during the dismantling.



ATTENTION!

Prevent bending of the metering screw during assembly.



ATTENTION!

For the cleaning, pay attention to the compatibility of the materials and dry material with the cleaning materials.

10.3 Drive motor

The three-phase gear motor must always be kept clean so that neither dust, dirt, oil nor other contaminants can disrupt the correct operation.

In addition, we recommend checking that:

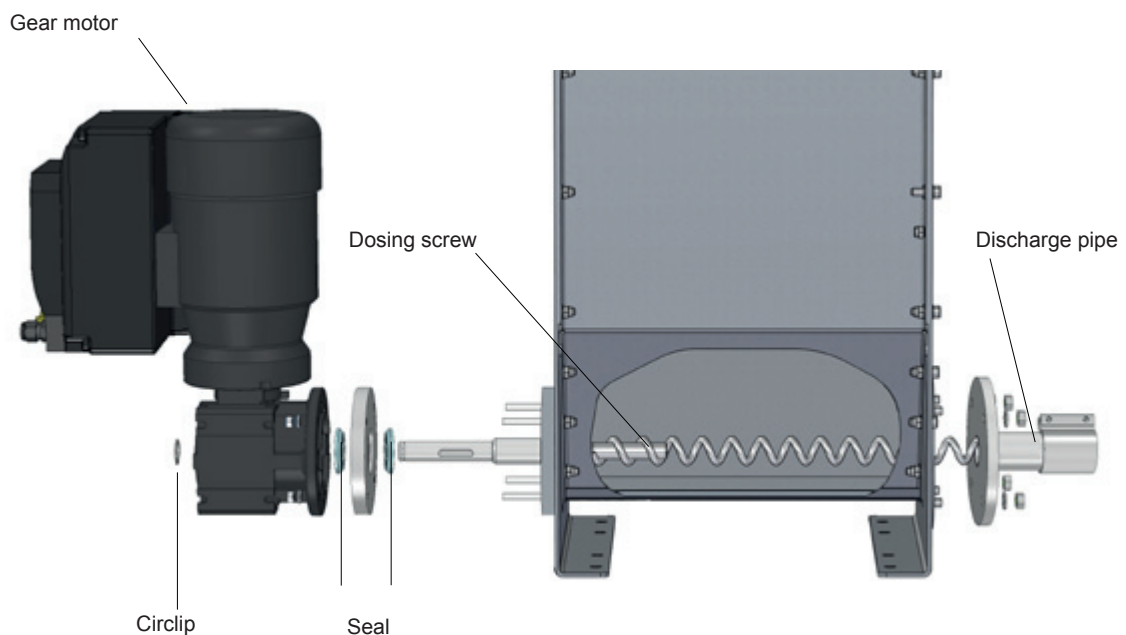
- the motor operates without strong vibrations.
- suction and blowing openings for the supply of cooling air are not closed or restricted (can result in unnecessary high temperatures in the windings).

The ball bearings used in the motor are lubricated for life.

10.4 Spare parts

Replacement of the metering screw and seal (gamma ring):

- Completely empty and clean dry material feeder (see Chapter "Cleaning").
- Detach discharge pipe and heater.
- Remove protective cover of the gear motor.
- Remove locking ring on the shaft of the metering screw.
- The metering screw can be pushed out or pulled out.



- Installation in reverse order. Grease seal (gamma ring) of the metering screw on the contact surface before installation.
- Only press the gamma ring onto the shaft of the metering screw using a suitable mounting tool. The sealing lip of the gamma ring faces the direction of the shaft journal.



ATTENTION!

The contact surface of the seal must be free from dust and soiling.

11. Fault analysis and fault correction

sera products are sophisticated technical products which are only shipped after having been thoroughly tested and checked at our factory.

Nevertheless, should any faults occur, these can be detected and rectified easily and quickly on the basis of the instructions in the table.

Kind of trouble								Possible cause	Corrective action
Unit does not deliver	Delivery output is not reached	Delivery output fluctuates	Drive motor does not start	Unit vibrates heavily	High noise development	Drive is overloaded	Discharge of dry material		
■	■							No dry material in storage hopper	Fill storage hopper
			■			■		Electrical data of the electronics do not match mains data.	Check order data. Electrical installation.
							■	Leak at attached components	Check screw connections and tighten if necessary.
■	■							Temperature too low or too high.	Observe characteristics of the dry material. Observe temperature range of the feeder.
■	■	■						Mixing unit overflowed.	Clean the mixing unit.
				■	■			Gearbox / drive damaged.	Contact the manufacturer.
■	■	■						Bridging in the area of the metering screw.	Adjust setting of the vibrator. Pay attention to intended use of the dry material feeder (see application range).
■								Discharge pipe clogged.	Clean discharge pipe.
■	■							Dry material sticks to metering screw or discharge pipe.	Clean discharge pipe, switch on heater and check for function.

11.1 Analysis of the plain text error messages

Fault type								Possible cause	Corrective action
Analogue signal < 4 mA!	Analogue signal < 20 mA!	Analogue signal > 25 mA!	Speed too low!	Pulse memory full!	No rotation detection!	Mixing unit overflow	Drive fault! (internal error)		
■								Broken wire in the analogue signal line.	Check the analogue signal line and repair if necessary.
■								Type of the specified analogue signal (e.g. 4-20 mA) does not match the actual analogue signal (e.g. 0-20 mA).	Check the specified analogue signal and adjust to the actual analogue signal if necessary.
■	■	■						Analogue signal transmitter (sensor, regulator) has a fault.	Check the analogue signal transmitter and correct fault.
			■		■			Sticking, clumping, caking of the dry material.	Remove dry material and clean unit.
			■		■			Metering screw torn off / broken off.	Replace metering screw.
			■		■			Drive does not run.	Increase speed.
			■		■			Drive/ gearbox defective.	Contact the manufacturer.
				■				Frequency of the incoming pulses is (constantly) higher than the executable batches of the unit.	Check the process parameters.
				■				Pulse factor too high.	Check the process parameters.
					■			Sensor for speed monitoring incorrectly positioned.	Check position of the speed sensor; realign if necessary.
					■			Sensor defective.	Contact the manufacturer.
						■		Mixing unit overflowed.	Clean the mixing unit; adjust water feed in the mixing unit if necessary.
							■	Integrated overtemperature protection (PTC thermistor) of the drive motor has tripped.	Let the drive motor cool down. Check ambient temperature.

Fault type					Possible cause	Corrective action
Mains voltage too low	Mains voltage too high	Pre-alarm level!	Dry run!	Hopper empty signal		
■	■				Unstable mains.	Check power supply.
■	■				Electric data of the unit do not match mains data.	Check order data Check electric installation
		■	■		Medium level in storage tank too low or no medium.	Fill storage tank.
				■	Dry material level in hopper too low or no dry material.	Fill hopper.
				■	Sensor defective.	Contact the manufacturer.

12. Decommissioning

- Switch off dry material feeder.
- Remove the dry material from the unit by vacuuming or brushing out whereby the aids must be suitable for the dry material and the dry material feeder.

13. Disposal

- Shut down dry material feeder. See "Decommissioning".

13.1 Removal and transport

- Shut down dry material feeder. See "Decommissioning".
- Clean thoroughly, neutralise and decontaminate.
- Package unit and ship.



NOTE!

A clearance certificate must be filled in when systems are returned to the manufacturer (see Chapter "Clearance certificate").

13.2 Complete disposal

- Remove all dry material residues from the unit.
- Remove materials according to type and send them to a suitable recycling centre.



WARNING!

The sender is responsible for damage caused by dry material residues!

14. Clearance certificate



NOTE!

Inspection / repair of machines and machine parts is only carried out after the opposite clearance certificate was filled in correctly and completely by authorized and qualified personnel.



NOTE!

Acceptance will be refused if parts are returned to the manufacturer without a proper clearance certificate.

All industrial companies are obligated by the legal provisions for occupational health, e.g. the workplaces ordinances, the Ordinance on Hazardous Substances, the regulations for prevention of accidents and the environmental protection regulations such as the Waste Management Act and the German Household Water Act to protect their employees or man and the environment from detrimental effects when handling hazardous substances.

Should special safety precautions be necessary despite careful draining and cleaning of the product the necessary information are to be provided.

Machines which are operated with radioactive media shall only be inspected and/or repaired in the safety area of the owner by a sera specialized fitter.

The clearance certificate is part of the inspection-/repair order.
sera reserves the right to refuse acceptance of the order for other reasons.




































NOTE!

Please make a copy and leave the original with the operating instructions!
(can also be downloaded from: www.sera-web.com)

Clearance Certificate



Product	
Type <input style="width: 90%;" type="text"/>	Serial-No. <input style="width: 90%;" type="text"/>
the product was carefully emptied before shipping / delivery, and cleaned inside and outside. <input type="checkbox"/> YES	

Conveying medium													
Designation <input style="width: 95%;" type="text"/>	Concentration <input style="width: 80%;" type="text"/> %												
Properties Please tick! If either of the listed properties, then enclose the appropriate safety and handling instructions.	<table style="width: 100%; text-align: center;"> <tr> <td><input type="checkbox"/>  Harmless</td> <td><input type="checkbox"/>  Toxic</td> <td><input type="checkbox"/>  Corrosive</td> <td><input type="checkbox"/>  Flammable</td> <td><input type="checkbox"/>  Oxidising</td> <td><input type="checkbox"/>  Unhealthy</td> </tr> <tr> <td></td> <td><input type="checkbox"/>  Explosive</td> <td><input type="checkbox"/>  Dangerous for the environment</td> <td><input type="checkbox"/>  Irritant</td> <td><input type="checkbox"/>  Bio-hazardous</td> <td><input type="checkbox"/>  Radioactive</td> </tr> </table>	<input type="checkbox"/>  Harmless	<input type="checkbox"/>  Toxic	<input type="checkbox"/>  Corrosive	<input type="checkbox"/>  Flammable	<input type="checkbox"/>  Oxidising	<input type="checkbox"/>  Unhealthy		<input type="checkbox"/>  Explosive	<input type="checkbox"/>  Dangerous for the environment	<input type="checkbox"/>  Irritant	<input type="checkbox"/>  Bio-hazardous	<input type="checkbox"/>  Radioactive
<input type="checkbox"/>  Harmless	<input type="checkbox"/>  Toxic	<input type="checkbox"/>  Corrosive	<input type="checkbox"/>  Flammable	<input type="checkbox"/>  Oxidising	<input type="checkbox"/>  Unhealthy								
	<input type="checkbox"/>  Explosive	<input type="checkbox"/>  Dangerous for the environment	<input type="checkbox"/>  Irritant	<input type="checkbox"/>  Bio-hazardous	<input type="checkbox"/>  Radioactive								
The product was used with health or water-polluting substances and came up with labeling requirements and pollution prone media in contact. <input type="checkbox"/> YES <input type="checkbox"/> NO													
Special security arrangements with respect to health or water-hazardous media are in the further handling <input type="checkbox"/> not required <input type="checkbox"/> required													
The following safety precautions regarding rinsing, residual liquids and waste disposal are required: <div style="border: 1px solid black; height: 40px; width: 100%; margin-top: 5px;"></div>													

Process data	
The product was used with the following operating conditions described conveying medium:	
Temperature <input style="width: 80%;" type="text"/> °C	Pressure <input style="width: 80%;" type="text"/> bar

Sender	
Company: <input style="width: 95%;" type="text"/>	Telephone: <input style="width: 95%;" type="text"/>
Contact person: <input style="width: 95%;" type="text"/>	FAX: <input style="width: 95%;" type="text"/>
Address: <input style="width: 95%;" type="text"/>	E-mail: <input style="width: 95%;" type="text"/>
Zip code, City: <input style="width: 95%;" type="text"/>	Your order No: <input style="width: 95%;" type="text"/>
We confirm that we have the information in this safety certificate (Clearance Certificate) have been correctly and completely and that the returned parts were carefully cleaned.	
The parts are sent free of residues of dangerous amount.	
<input style="width: 100%;" type="text"/> Place, Date	<input style="width: 100%;" type="text"/> Department
<input style="width: 100%;" type="text"/> Signature (and company stamp)	

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