ALEBRO
Dosier- und Umwelttechnik

Full-automatic preparation system for dry and liquid chemicals

MixLine MX7300

Operation and Service Manual

Read this manual completely and keep it!
No warranty in case of damages caused by incorrect operation!

Imprint

Full-automatic
preparation system for dry and liquid chemicals
MixLine MX7300

Operation and Service Manual

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Editor:
ALEBRO Dosier- und Umwelttechnik e. K.
Heinkelstr. 20A • 76461 Muggensturm (Germany)
Tel. +49 (0) 7222 / 406 7291
Fax +49 (0) 7222 / 406 7934
E-mail: info@alebro.com
Internet: www.alebro.com

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1. Of General Interest

1.1 Using this Paper

In this Operation and Service Manual you get all information necessary for safe operation of the device being described here.
If you require further information or if any problems arise which are not reflected in detail in this manual, please contact ALEBRO Dosier- und Umwelttechnik e. K directly for the information needed.

All descriptions are written as plain text.
The headings **WARNING**, **CAUTION** and **NOTE** have the following meaning:

WARNING
Danger of injuries or accidents!

CAUTION
Danger of incorrect operation or damage to the product!

NOTE
There is an exceptional feature.

1.2 Warranty

Warranty in accordance with our general terms of sale and delivery shall only be valid, if

- the product is used according to the information within this paper,
- the product is not being opened or used improperly,
- maintenance and repair is implemented exclusively by authorized and qualified personnel,
- original spare parts are used for repair.

NOTE
In case of changes of hardware or software warranty will not longer be valid.
The software stays properties of ALEBRO Dosier- und Umwelttechnik e. K.. Copies and distribution are not allowed.

2. Safety Instructions

- MixLine MX7300 serves for preparing a ready-to-use solution of dry or liquid chemicals (flocculant, aluminium sulphate, bentonite etc.) which are not aggressive to the device being described here. For each product it is necessary to make a corresponding calculation and to prepare every unit of the device accordingly. Therefore the use of those or other products is only possible after arranging with the manufacturer and getting his permission.
- Do not use the device for other applications that are not described in this operation and service manual.
- Maintenance and repair is implemented exclusively by authorized and qualified personnel
- Make sure that valves between the first and second chambers and the drain valve (if available) are closed before starting the device.
- Be convinced about the presence and correct installation of the pipeline between the withdrawel line and the station dosing the chemicals.
- When filling the dosing chamber of dry materials manually it is necessary to wear protective clothing and use protecting equipment, the floor and work surfaces have to be dry and safe for personnel.
- Spillage dry material or leaked chemical solution has to eliminate on the spot.
- In any case do not open the inspection holes and touch the agitators when the device is running and during cases of malfunctions. Danger of injuries!
- Do not touch the dosing screws. Danger of injuries!
- Switch off main switch before doing maintenance work! Interlock the main switch before start the maintenance work!
- Make sure that the device is de-energized before opening the switchboard.
- Follow the accident prevention regulations and other general accepted safety regulations of the country you live when using dangerous chemical substances.

CAUTION

The delivered unit is built acc. the general accepted standard of the techniques and it is saved in the operation.

Rebuildings and changes on the unit without authority are not allowed and exlude the liability of manufacturer for possible damages.

3. Storage and installation

3.1 Transport and storage

This unit may only be transported, when the unit is empty and with suitable lifting and transportation devices.

Strong impact loads are absolutely to avoid.

When using the crane eyes: fix all crane eyes! The ropes have to be fixed in a way that no superstructures can be damaged!

During the transport and storage of the unit the ambient air temperature has to be between – 5°C and +50°C.

The unit has to be stored in dry area and protected against direct sunlight.
Direct sunlight brokes the tank material.

CAUTION

Do not transport the preparation unit, if the ambient air temperature is lower as 0°C. The material of the tank and the weld seams can broke because of the instability of plastic towards frost.

3.2 Mounting

Erect the system on a horizontal foundation. Maximum slope: 1:200

CAUTION

The foundation must lead to good bearing soil. Observe maximum floor load!

MX7300 -	**1000**	**2000**	**4000**	**6000**	**8000**	**10000**
Dimensions of the foundation (mm)	1100x2100	1100x2100	1100x3100	1600x3100	1600x4200	1600x4200
Maximum load (kg)	1300	2400	4600	6800	8900	11000

In addition to that the unit should be installed in a way, that it is free accessible for operating, maintenance and loading of dry materials every time.

The ambient air temperature for the operation has to be from +5°C up to +40°C.

3.3 Pipe Installation and electrical connection

For trouble-free operation check the adequate dimensions of the pipes: connection of the water line, overflow and withdrawal lines.

CAUTION

Observe local rules for the disposal of the used chemical!

- Connect the operating water line to the operating water device.

CAUTION

Quality of water used for dissolution should correspond to quality of drinking water. The water has to be free from contamination and particulate materials.
The input water pressure is in range from min. 1,5 bar up to max. 10 bar.

- If the dosing pump presents, connect the intake pipe with the suction lance of the dosing pump.
- Connect the discharge dosing pump to the withdrawal line.
- Connect the discharge and overflow line and lead it to an appropriate discharge.

Electrical connection:

WARNING

In case of working with electrical parts switch off the main switch and interlock it.
Electrical connection only by authorized qualified personnel!
Observe local safety regulations!

- Establish electrical connections according to the enclosed connection chart.
- Lead the mains line to the control panel and connect it according to the enclosed connection chart
- Cable cross-section: min. 2.5 mm
- Provide a back-up fuse with corresponding capacity or an automat on the part of the power supply.

4. Construction and Function

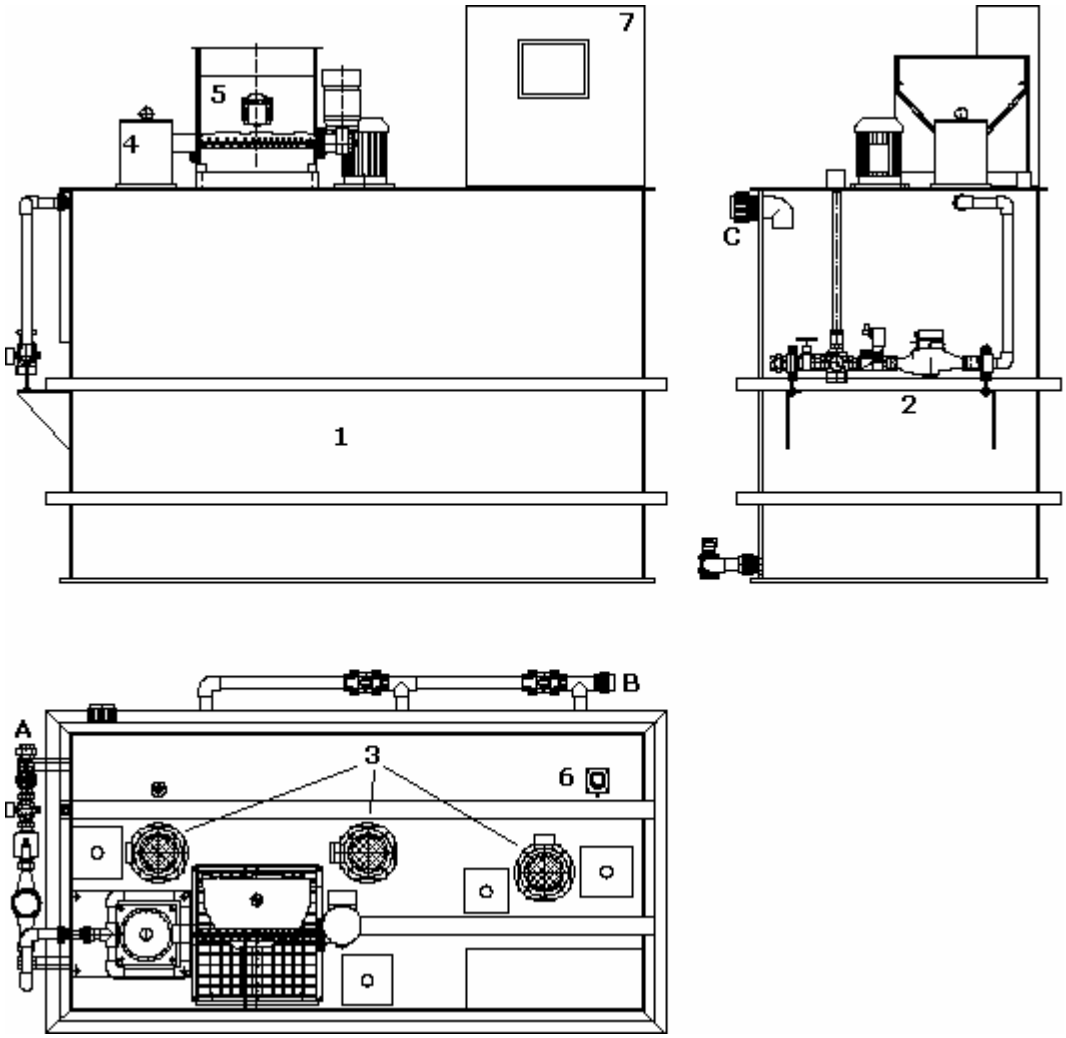

Fig. 1
Exterior view of the Preparation System

4.1 Components

The compact unit for preparation of dry and liquid products is composed of:

1. 3-Chamber-Tank for preparation, ripening and withdrawel of reagents.
2. Water unit with shut-off valve, pressure reducing valve, solenoid valve and water meter
3. Agitators
4. Jet Mixer
5. Dry material feeder
6. Ultra-sonic level sensor
7. Control panel

A: Water line
B: Withdrawel line
C: Overflow line

4.2 Function of unit

The 3-Chamber preparation system works fully automatically and prepares the chemical solution continue and discontinuously or discontinuously according to the three - chamber – stream – principle.

Stream-principle
According to this principle MixLine MX7300 prepares the chemical solution in a tank which is devided in three chambers. The preparation, repining and withdrawal occur in the continue process.
The mixed solution streams between two walls from the first in the second chamber. In the second chamber the solution ripens and is being replaced from the repining chamber in the third chamber, the withdrawal chamber.
Through the replacing and streaming process from one chamber to another marginal amalgamation is possible in the boundary layer.
In the same way it is not excluded that the unriped solution from the first chamber (e.g. flocculant) admixes with the solution in the thrd chamber. The amalgamation is unattended small, but it must be account by using some applications: e. g. reverse osmosis.

Principle of function in automatic mode

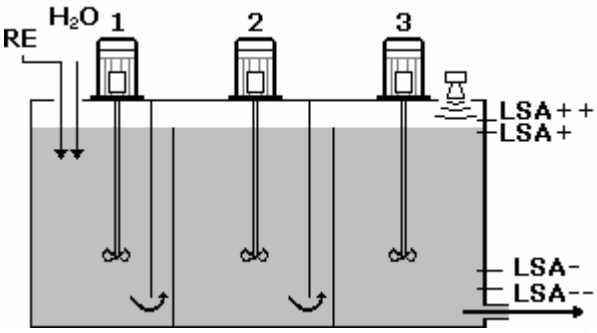

Fig. 2
Basic scheme of function

LSA--: limit value "dry run"
LSA-: limit value "min"
LSA+: limit value "max"
LSA++: limit value "overflow"

RE: Input of dry materials
H_2O: Water input

An ultra-sonic level sensor is installed on chamber 3. It controls the solution level in the chamber and the preparation process.

- **When the min. level LSA- is reached,**
  the solenoid valve opens and the water streams in the first chamber. The contact water meter measures the water flow. If the water flow is higher than the min. level, then either the dry material feeder or the dosing pump for liquid concentrates switches on. The dry material feeder or the liquid chemical pump does not work continuously during the preparation procedure, but with a certain cycle time depending on productivity of the dosing unit, defined concentration and water consumption.
  When water starts to flow in, the feeder waits until a water amount has been reached which corresponds to a dosing time of 10 seconds (factory setting). Then it starts running until the dosing rate corresponds to the water amount that has flown in so far, and then it switches off. Now it waits again until a water amount has flown in which corresponds to the preset dosing time and so on.
  The dosing time depends heavily on flowing water amount per time unit and ranges from 10 to 60 seconds.

Agitators I and III start to run.

- The product will be dosed in the first chamber where it will be mixed up intensely with the main stream of water. The mixed solution streams from the first in the second chamber where it ripens. After a certain ripening time the solution reach the withdrawel chamber. Thanks to the construction of the unit the mixing of ripened and new solution do not happen. The measures of the unit are choosen in such way that the solution stays approx. 60 min. in the unit from the moment when it admixes until it streams in the withdrawal chamber. This lead to a complete dissolution and if necessary a ripening of the most reagents (e.g. flocculants).

- **When the "max" level LSA+ is reached,**
  dry material feeder switched off, solenoid valve closes with a time delay of 5 seconds, second agitator starts working.

- The vibrator on the dosing chamber of dry materials prevents crusting on material surface. The heater in the dosing pipe of dry material feeder stops the intrusion of the humidity in the dry material and agglutination of it.

- **When the "dry run" level LSA— is reached,**
  preparation process starts.
  "Stop" signal is actvated for the following dosing pumps.

- **When the "overflow" level LSA++ is reached,**
  preparation process and automatic workflow stopp.

4.3 Operation mode of control

The control, a SIMATIC S7-200, is mounted into the control panel. It has two operation modes. After delivery it is in the RUN mode, which requires no intervention for commissioning.

Operation mode STOP
The program will not be executed.
The values of times, flags, counters and texts relevant when STOP was selected will be kept.
The outputs of the compact control and those of the output module are being locked (signal state 0).
When changing from STOP to RUN, the times and the non-remanent flags and counter will be set to zero resp. to their default values.

The touch panel is not active.
The operation of the unit is not possible. All functions are interlocked.

If the operation mode is STOP or the supply for PLC is switched off or the communication between PLC and display is disconnected, a message with show of the code will be indicated on the display:

E.g.: *RHAA131: Target Node Not Found (PLC1)*

Operation mode RUN
The program will be executed cyclically.
Actions will be executed at the programmed times.
The signal states of the inputs and of the input module will be read.
The outputs of the compact control and of the output module will be activated corresponding to programmed functions.
Operator terminal is in use.

Changing the operation mode
Changing the operation mode is possible
- by using the operation mode switch

- in consequence of failures switching the compact control to STOP. These are failures of the control itself, no process-caused faults like e. g. a fault message.

The program is stored in the internal program memory (Flash-ROM).
It stays resident even in case of power failure.
For loading the program (e. g. in case of changes or improvement) a programming device or a memory module has to be connected.

NOTE

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5. Operator panel elements and basic functions

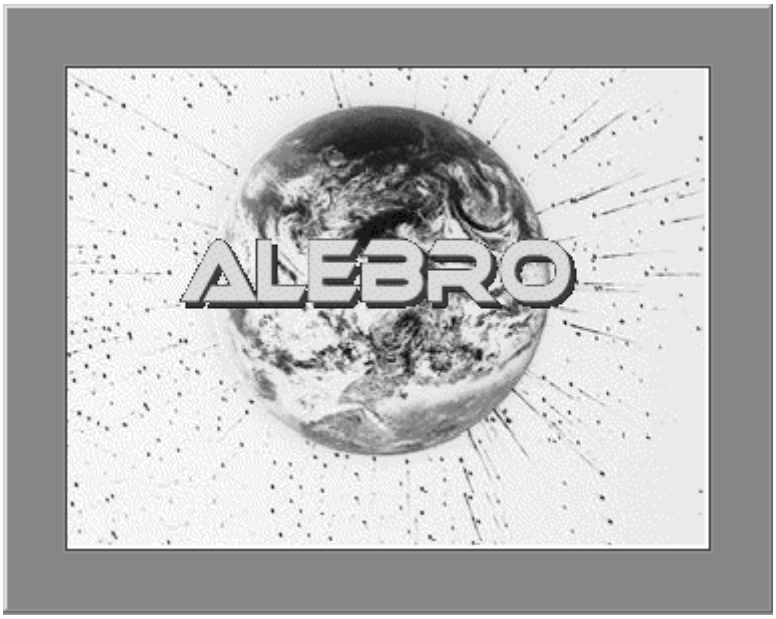


Fig. 3
Sensor operator panel

Control of the preparation unit occurs via touch screen operator panel.
On the display are shown all groups of the unit, operation and faults messages.
All parameters are input via operator panel.

5.1 Operator panel elements

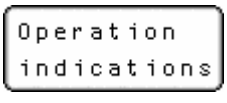
Functional keys
The functional keys of the operator panel are made for turning the pages, exit active screens, switching and configuration. They have rectangular form.

Example:

Exit key

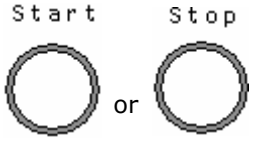
Informational key

Start / Stop automatic operation



Selection of operation display

Keys for switching on and off of separate units, e.g. in manual operation,



Display and indication
Status indication of seperate units is shown as symbols and textual descriptions.

Example:


motor operates


Operation signal


Off status

Input and identification of digital values

All values in the frame field are input parameters. Press on an input field, the numeric keyboard will be shown on the display.
Information fields are represented without a frame.

5.2 Basic operation function

5.2.1 Exit from the active screen

Press the key 

for exit the operation display and return to the previous.

5.2.2 Open the numeric keyboard

Press on an input field, the numeric keyboard will be shown on the display and the parameter will be marked.

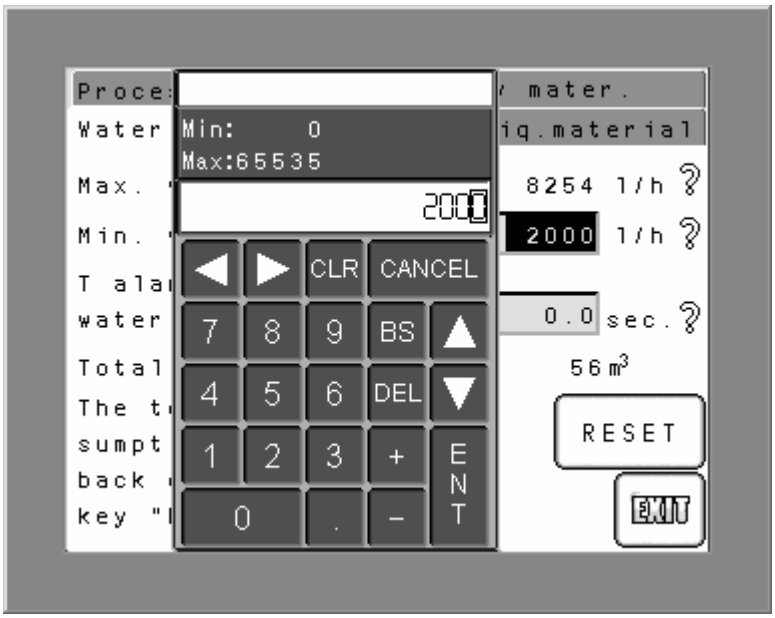


Fig. 4
Input field and numeric keyboard

Put in the desired value of the parameter and confirm it with the **ENT** key.

CANCEL: continue without the confirmation of the value.
DEL: delete the last input sign.
CLR: delete the complete input field.

5.2.3 Reset the warning signal

In case of an alarm the warning sign is flashing on the main screen (fig.10), the type of fault and its site are shown as blinking symbol on the screen "operation display". In addition to that the acoustic signal is switched on.

Reset the warning signal:

- Press on the flashing warning sign.

- The alarm side will be called-in where you find all alarms and their descriptions.
- The horn key  is flashing.
- Press on the flashing horn key, the acoustic signal will be switched off.

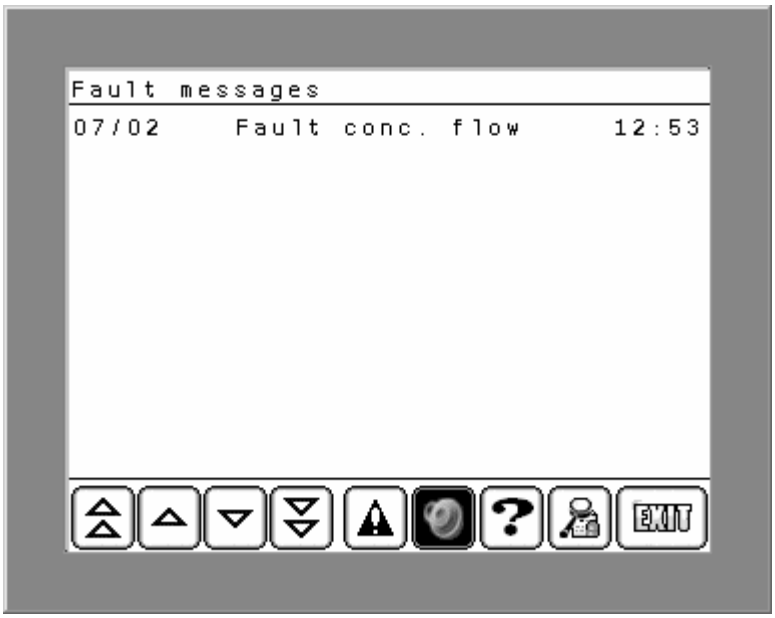


Fig. 5
Reset the warning signal

5.2.4 Login in the system

When touching on one of the fields on the main screen (fig. 10) the system called-in the login window and asks about the valid password, in case if you are not login yet.

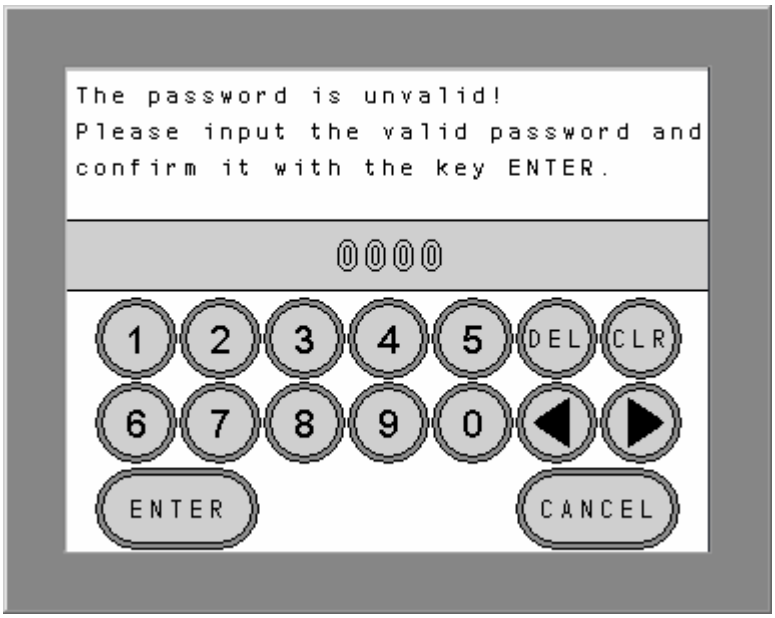


Fig. 6
Login window

Type in please the valid password and confirm it with the "ENTER"– key.

Factory-set passwords:

251 **Operator password**
This password is necessary for starting and switching off the unit and adding the needed concentration.

252 **Parameter password**
This password is required for commissioning process, configuration and input of the parameters.

253 **Administrator password**
By using this password all functions and parameters are accessible exept input and changing the factory-made configuration

5.2.5 Time and Date Setting

To open the time and date setting window please touch the field on the main screen (fig. 10) showing time and date (left upper corner).

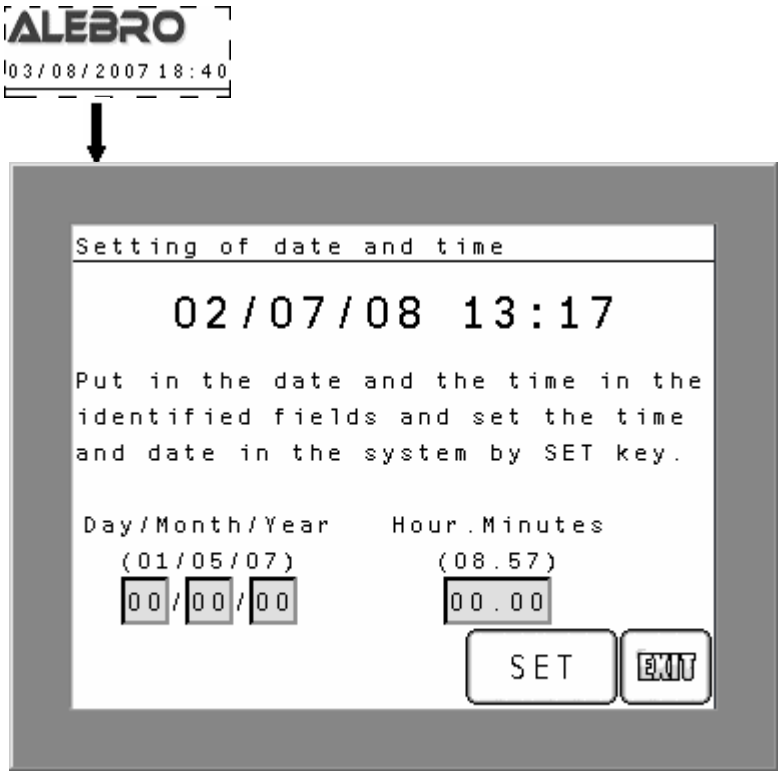


Fig. 7
Time and date setting window

In the upper part current time and date are shown. For change of data press the field for day. The numeric keyboard will be shown.
Put in the number of the day and confirm it with the key “ENT”. Repeat the input for month, year and time.
The time should be input as decimal number with a sharp between hours and minutes, e.g. for 12:45 put in please 12.45.

Please confirm the transfer of the time and date in the memory by pressing the key “SET”.

NOTE

To transfer the current time in the control panel it is necessary to type in the current date too. Otherwise the tranfer will be cancelled. Both datas have to transfer together in one packet.

5.2.6 Lighting of the display

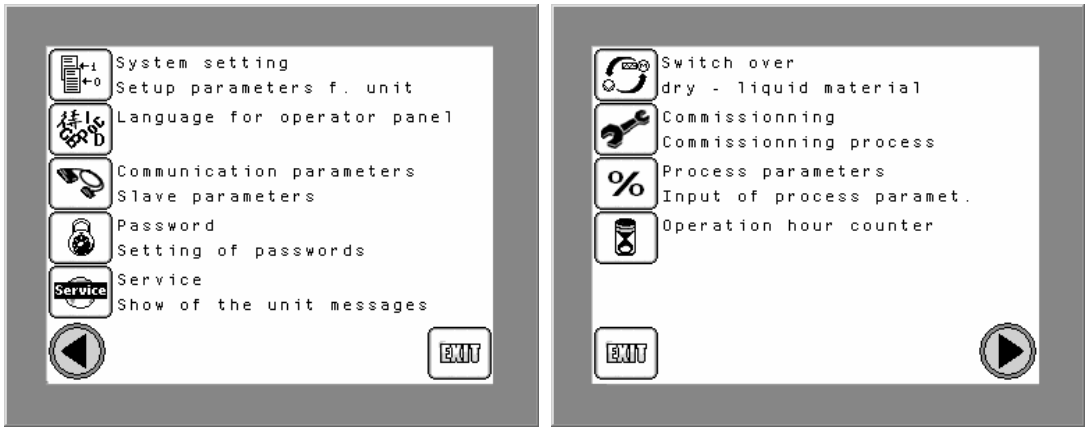
If non key is touched within 20 minutes, the PLC system switches off the lightning of the screen.
For relighting of the display please touch the display.

5.2.7 Informational windows

More information to each parameter or key can be received on the informational sites. For getting more information about control keys there are two buttons: one of them is in the configuration menu, the other one is in the service menu. They are signified by:

Press this key and the help window will open.

Configuration menu



Service menu

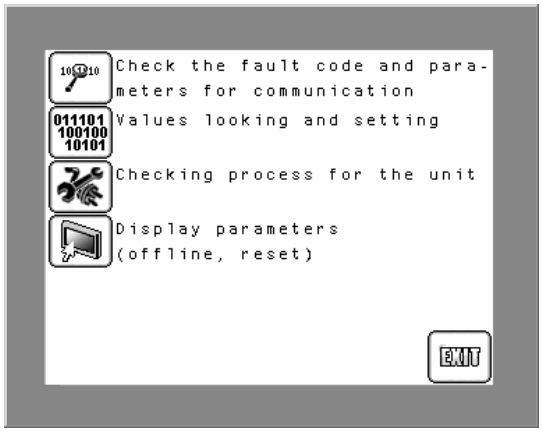


Fig. 8
Help windows

By pressing the keys in the help windows it is possible to open adequate menues or windows.

Help for parameters is shown as a question mark behind the accordant parameters. Press the key and the help window for the accordant parameter will open.

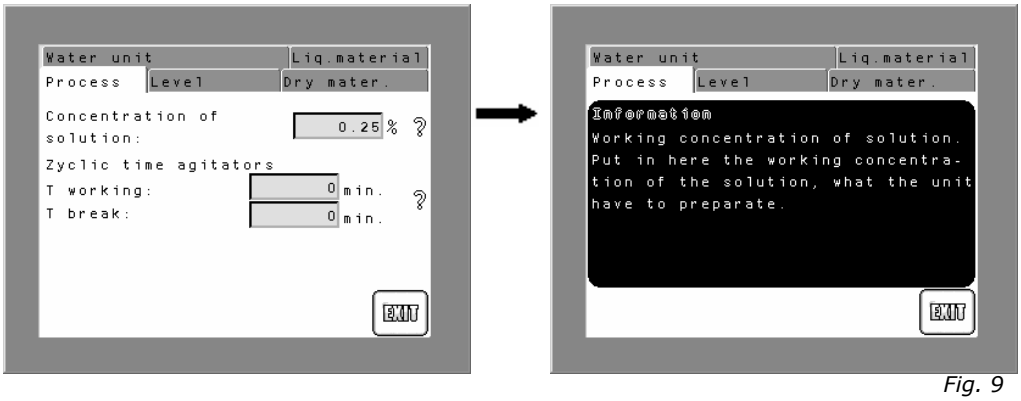


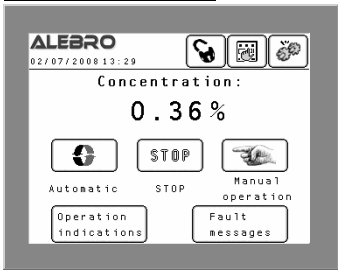
Fig. 9
Help windows to parameters

5.3 Structure of the operator panel

Main Window

Fig. 10
Main window

MAIN WINDOW



Configuration menu

2

Service menu

Configuration menu
(Login on the main window by entering the parameter password)

Service menu
(Login on the configuration menu by entering the administrator password)

3

Configuration menu

(Login on the main window by entering the parameter password)

Factory configuration
(Login by entering the operator password)
Basic settings. The right unit configuration is put in from manufacturer while checking it.

Selection of the language
(Login by entering the administrator password)
Language settings

Communication parameters
(Login by entering the administrator password)
Choice of the type of communication and communication parameter settings

Password editor
(Login by entering the administrator password)
Password settings and changing

Unit operation mode
(Login by entering the parameter password)
Adjustment of the unit operation mode: dry / liquid product

Commissioning
(Login by entering the parameter password)
Commissioning instructions

Parameter menu
(Login by entering the parameter password)
Process parameters

Working hour meter
(Login by entering the parameter password)
Display of the unit working hours

Service menu

(Login from the configuration menu by entering the administrator password)

Fault code
(Login by entering the administrator password)
Fault code for configuration and communication parameters

Indication and control of variables
(Login by entering the administrator password)
Indication and changing of variables in PLC memory

Test and simulation menu
(Login by entering the administrator password)
Final check after the unit manufacture, simulation of fill level and water consumption

Display parameters
(Login by entering the administrator password)
Contrast adjusting, changing of the factory-set display parameters

6. Unit operation

Requirements for fault free operation of the unit
For fault free operation of the unit it is neccessery to comply with some basic requirements:

1. The unit have to install acc. to local regulations.
2. The process parameter and calibration of the dosing unit have to be adjusted conscientiously.

NOTE

Operation of the unit is permitted only for instructed persons. Primerily they have to refil the dry material hopper or to replace the transport tanks for liquid concentrates, eliminate the faults and maintanance of the preparation unit.

Furthermore the maintenance personnel have to control regularly the preparation proccess and the functions of all units.

CAUTION

Look out for safe stand when loading dry material in the unit or replacing the transport tanks.
Spillage dry material or leaked chemical *solution has to eliminate on the spot because some materials (e.g. flocculant) became slippery in case of contact with humidity. Danger of injuries!*

If the charging do not accomplish automatically by the pneumatic hopper loader, the dry material hopper has to be refilled manually. The refilling can occur during the preparation process.

Switching-off / switching-on of the power supply
After turning the main switch off and on the system restarts and the unit begins to work in following way:

1. If the device has been in manual operation mode when it switches off, after the restart all units stop working in order to avoid an uncontrolled operation.

2. If the device has been in automatic operation mode when it switches off, then it continues all operations from that moment when the automatic process was interrupted.

CAUTION

After switching-off the main switch and restarting of the system the agitators begin to work automatically.

Operation of the unit (switching-on/-off) and identification of the current status occur on the main screen.

All unit parameters have to be set in the configuration menu.

Test and correction of basic datas are possible in the service menu.

6.1 Operation of the unit

6.1.1 Factory-set configuration
6.1.2 Operation mode dry – liquid product
6.1.3 Commissioning of the unit for preparation of dry materials
6.1.4 Commissioning of the unit for preparation of liquid materials
6.1.5 Adjusting the water consumption
6.1.6 Manual operation
6.1.7 Automatic operation
6.1.8 Remote control

6.2 Display and changing of parameters

6.2.1 Language
6.2.2 Parameters menu
6.2.3 Password setting
6.2.4 Work hours meter
6.2.5 Communication with the main level

6.3 Service menu

6.3.1 Fault code
6.3.2 Indication and control of variables
6.3.3 Test and simulation menu
6.3.4 Display parameters

Main screen

Fig. 11
Main screen

Locking of the unit
to avoid unautorised login and its control.

Local Control
After klicking on this key controlling of the device via touch screen display is not possible any more. The unit can be remote-controlled (by Profibus, Modbus, Ethernet or potential free contact).

Remote control
After klicking on this key the remote control is not possible any more. The unit can be local-controlled via touch screen display.

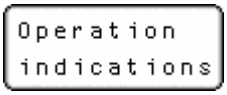
Manual operation
enabled.

disabled

Automatic operation
enabled.

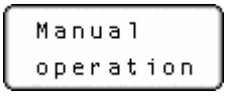
disabled.

Switch-off of either the automatic or manual operation.

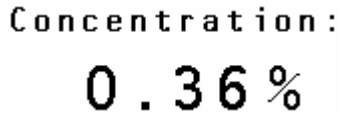


Operation display: display of the states of the device and of every unit

Alarm signal / Alarm signal window



Manual operation: In this mode it is possible to switch-on/-off every electrical part of the device.



Input of required concentration

Fig. 12
Configuration menu

Here are shown the address and phone number of the manufacturer, type of the device and the software version.

The type of the device was set by manufacturer:
MixLine MX7300 – 1000 / 2000 / 4000 / 6000 / 8000 / 10000.

Fig. 13
Service menu

6.1 Operation system

6.1.1 Factory-set configuration

For fault-free and correct unit operation all basic parameters are set by the manufacturer. The parameters are described on the following pages.
The menu "Unit Configuration" is interlocked for the customer. Only the manufacturer is allowed to access with the manufacturer password for configurating the unit.

Access: Configuration menu
Password: Manufacturer password

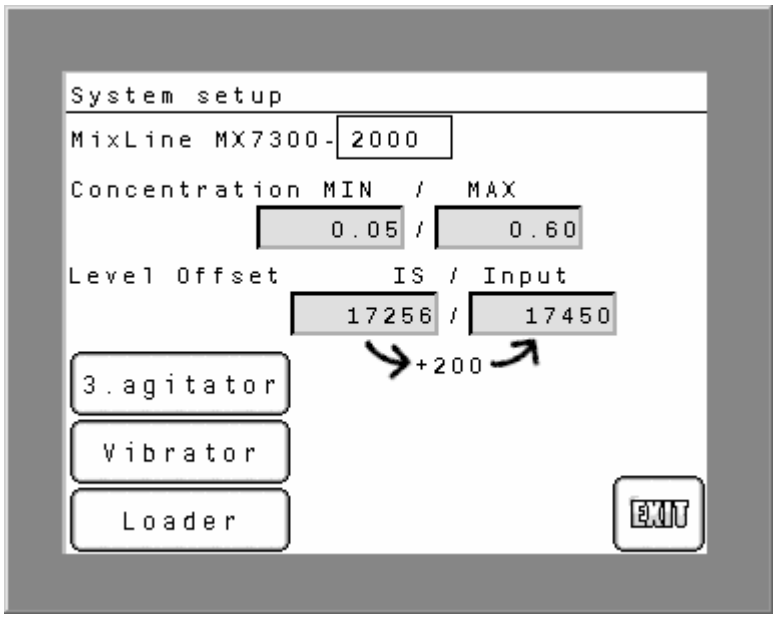
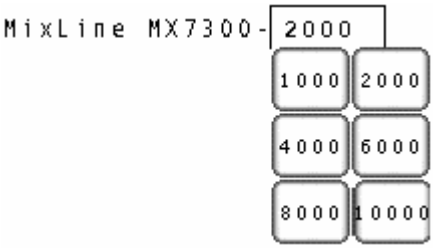
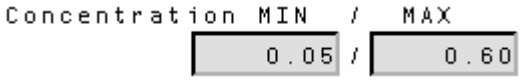


Fig. 14
Factory-set configuration

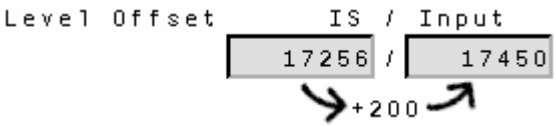


Touch the field type of the device (here: 2000) to call unit datas. Then choose the type of your device.
The basic parameters of the chosen device will be automatically loaded in the system as operation parameters. The type of the device conforms to the nominal and ordered preparation capacity.



The limit values of the operation concentration define the input area for the operation concentration.

Factory-set min. concentration: 0,05%
Factory-set max. concentration: 0,5%



Offset for the level sensor.

Level offset: offset distance between the measuring head and the unit bottom in digital format
Level offset input: factory input
Input = Current level offset + 200

3.agitator	Option: Agitator in the third chamber
Vibrator	Option: vibrator for the dry material feeder
Loader	Option: pneumatic hopper loader for automatic loading of dry materials

6.1.2 Operation mode: DRY – LIQUID product

Select the commissioning program for dry material feeder or liquid dosing pump.

Access: Configuration menu
Password: Parameter password

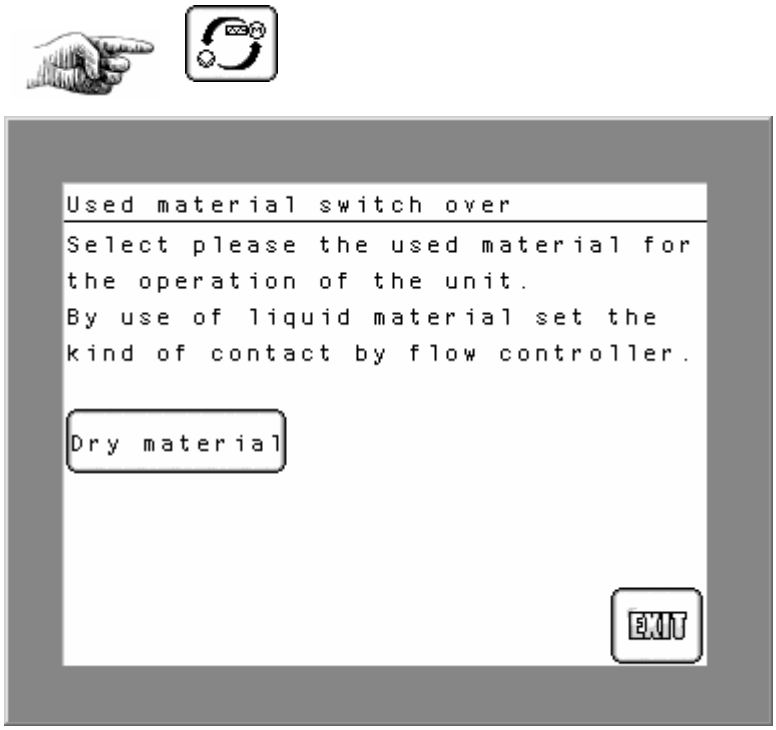


Fig. 15
Operation mode: dry material

This window shows the operation mode "dry material".

Press the following key Dry material for changing the operation mode from dry to liquid materials.

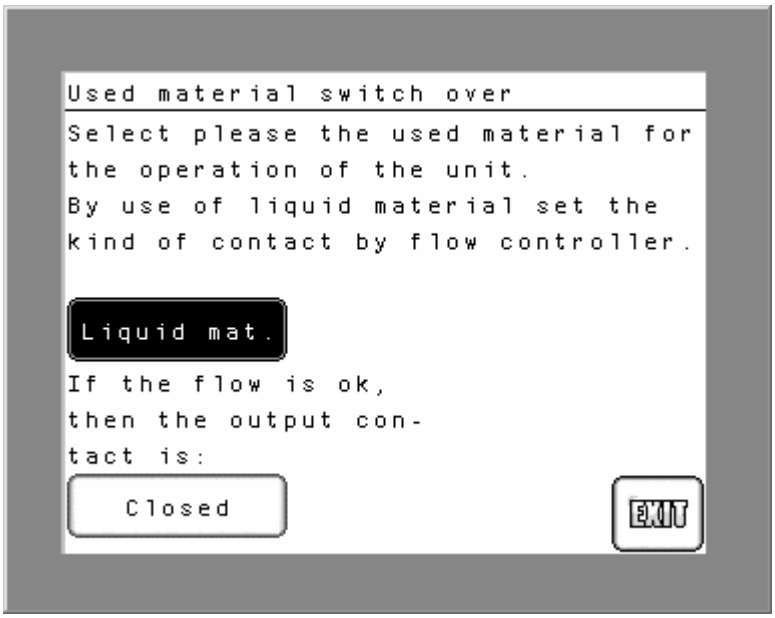


Fig. 16
Operation mode: liquid material

This window shows the operation mode "liquid material".

Press the key 

for changing the operation mode from preparation of liquid materials to preparation of dry materials.

There are different uses of the control contact dependent on the type of the flow controller. It can be used as closed or opened contact.

- the contact is closed during the nom. flow of fluid

- the contact is open during the nom. flow of fluid

6.1.3 Commissioning of the unit for preparation of dry materials

Required steps before commissioning:

- Connect the water and power supply to the device
- Switch on all safety units of the control panel
- Switch on the main switch.
  After a self-test the PLC and display are ready for start and the main screen (fig. 10) is shown.
- Open the shut-of valve.
- Adjust the operation concentration on the main screen (fig. 17)
- Open the configuration menu and start commissioning.

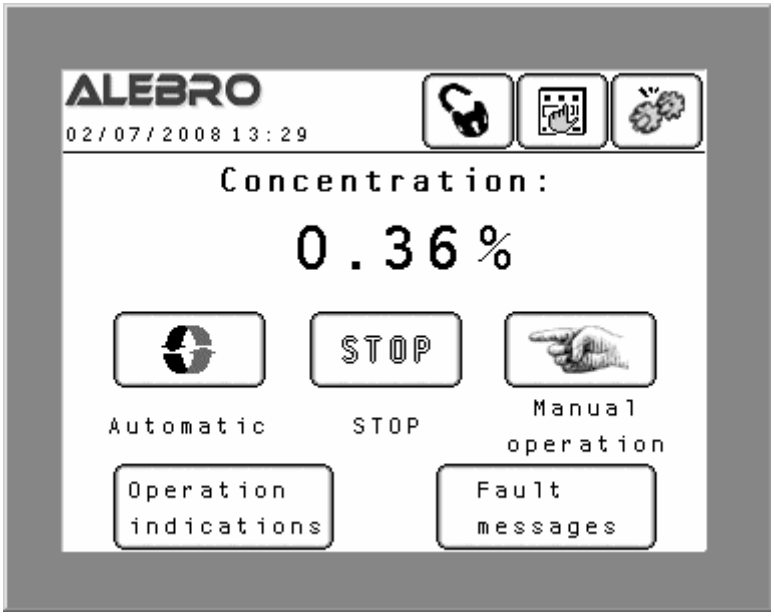


Fig. 17
Adjusting the solution concentration

Touch the input field for concentration and type in the required solution concentration. The allowable input area is shown on the numeric keyboard.

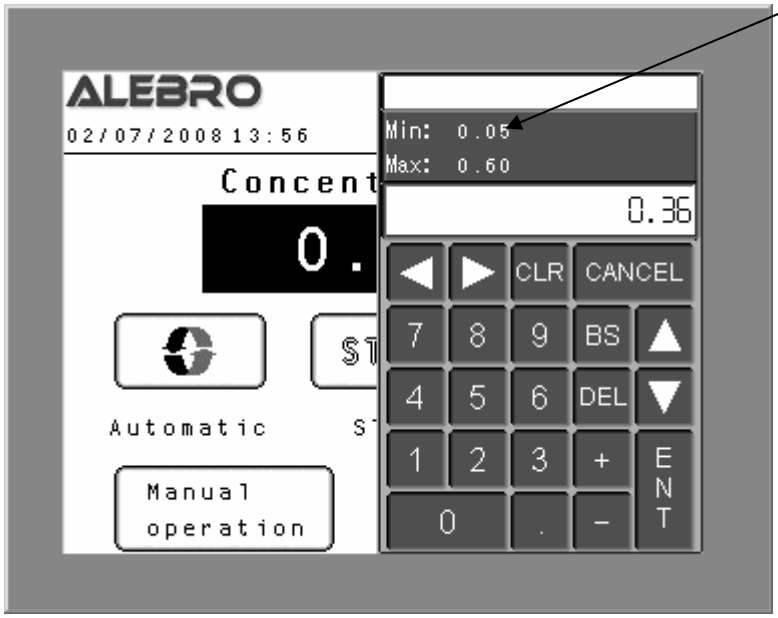


Fig. 18
Adjusting the solution concentration

Access: configuration menu
Password: parameter password

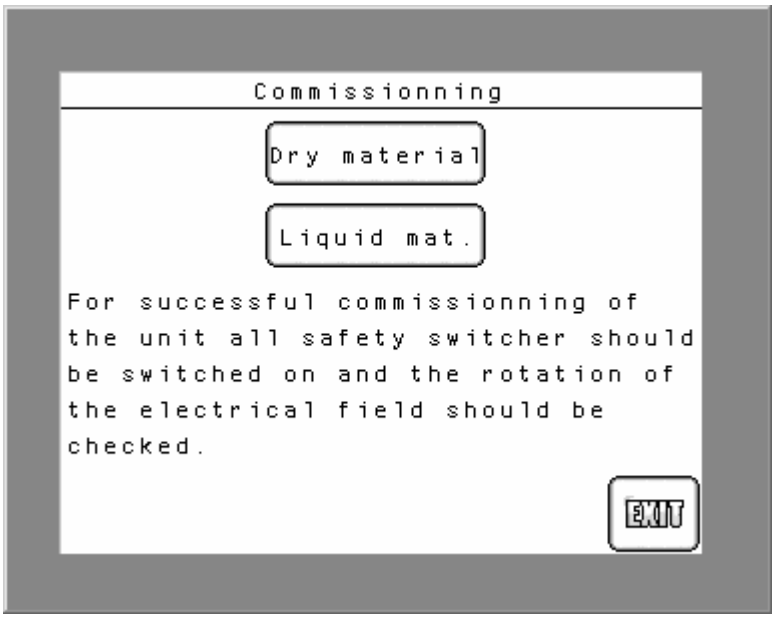


Fig. 19
Commissioning of the unit

Depending on which product should be prepared select the commissioning program either for dry material feeder by touching the key Dry material or for liquid dosing pump by pressing the key Liquid mat. .

In this case press the key Dry material .

6.1.3.1 Check the direction of rotation

Check always the right rotating direction of the agitators and all motors before commissioning.

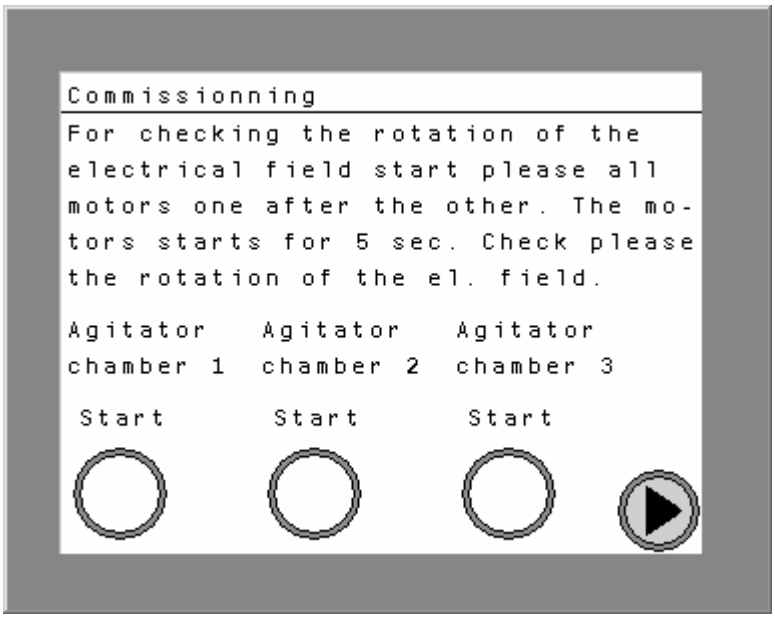


Fig. 20
Commissioning: Check of the rotating direction

After switching-on of the device all units operate for 10 seconds. This time is destined for checking the rotating directions of all motors.
In case of wrong rotating directions of one or several motors switch off the corresponding circuit breaker / mains switch and interlock it against unintended switching-on. Exchange the phase sequence of the respective unit.

 to the next window

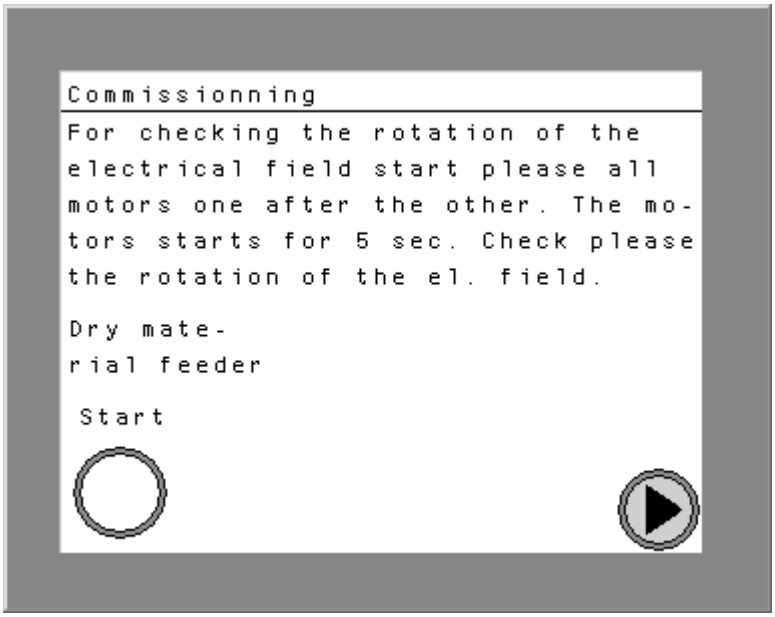


Fig. 21
Commissioning: Checking of the rotating direction of the dry material feeder

 to the next window

6.1.3.2 Check of dry material sensor

The level sensor for dry materials controls the level of the chemicals in the hopper.
Please check if the level sensor is mounted.
A lighting green LED at the level sensor indicates that there is power supply.

The adjusting of the sensor occurs in two steps.

1. The hopper has to be empty!
The yellow LED at the level sensor is lighting. The optical message **"EMPTY"** is flashing on the display. The setting of the sensor "EMPTY" is correct.
Otherwise reduce the sensitivity of the sensor as described in screen 22.

2. Fill the hopper with dry material.
The yellow LED at the level sensor is not lighting. The optical message **"FULL"** is flashing on the display. The setting of the sensor "FULL"is correct.
Otherwise reduce the sensitivity of the sensor as described in screen 22.

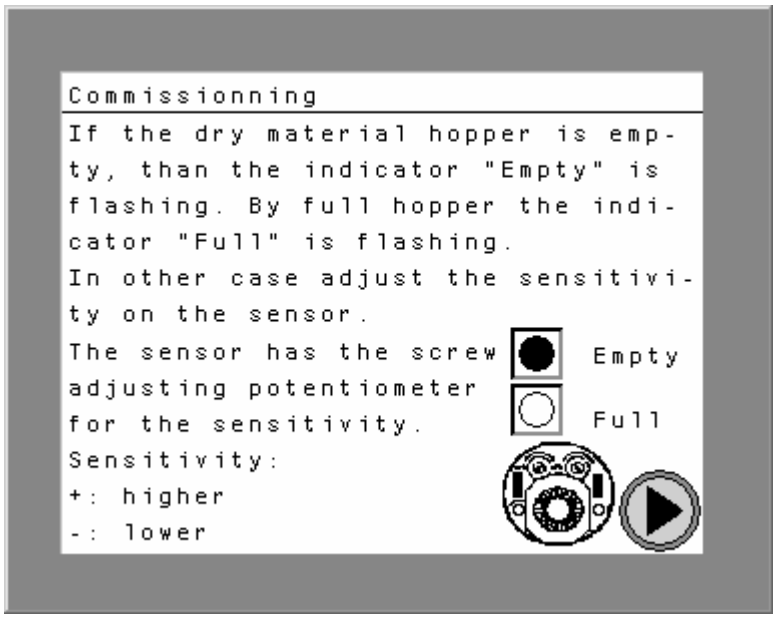


Fig. 22
Commissioning: Check of dry material sensor

 To the next window

6.1.3.3 Calibration of the dry material feeder

Required accessories:
- Scale (e. g. a household scale)
- Scale pan

Calibration is only possible if both operation modes, automatic and manual operation, are switched-off.
The operation mode **"Dry Material"** has to be selected.

Procedure
- Fill in dry material into the hopper.
- Loosen the wing screws and take off the water injection funnel of the jet mixer.
- Place the scale pan under the ejection pipe of the dry material feeder.

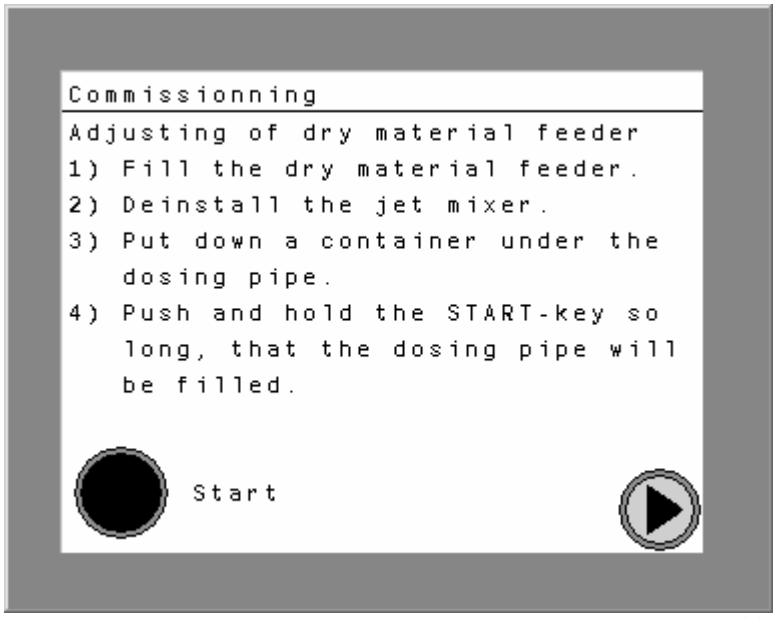


Fig. 23
Commissioning: Calibration of the dry material feeder

- Press the start key

  and keep it until the dry material feeder fills the ejection pipe with the chemical completely.
- Switch-off the dry material feeder.
- Empty the scale pan and replace it under the ejection pipe.

To the next window

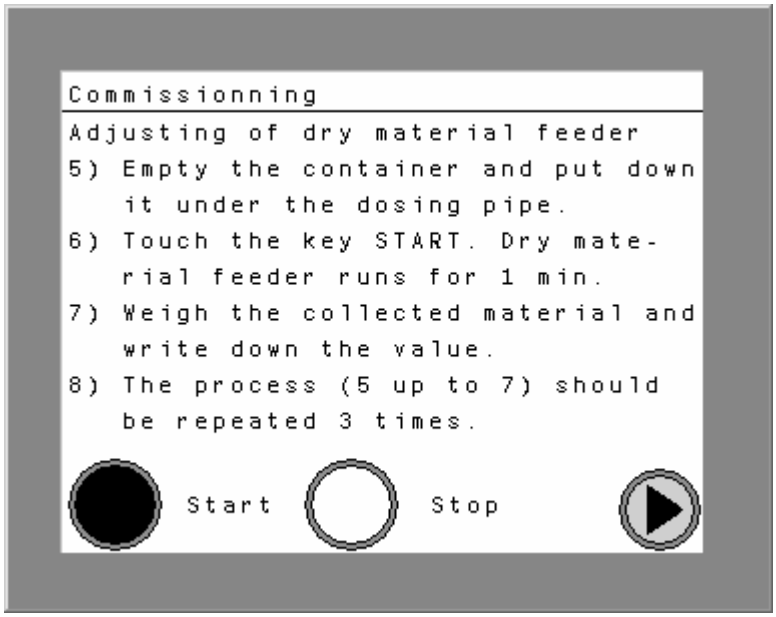


Fig. 24
Commissioning: Calibration of the dry material feeder

- Press the start key

- The dry material feeder starts working for 60 seconds and stops after the expiration of the preset time.
- Determine the weight of the dosed dry material, multiply it by 60 and keep it in mind.
- Repeat this procedure twice.
- Calculate the average of the three results.

$$\frac{result\ 1 + result\ 2 + result\ 3}{3}$$

- Remount the injection funnel and tighten it by means of wing screws.
- If existing, observe correct position of the gasket!

 To the next window

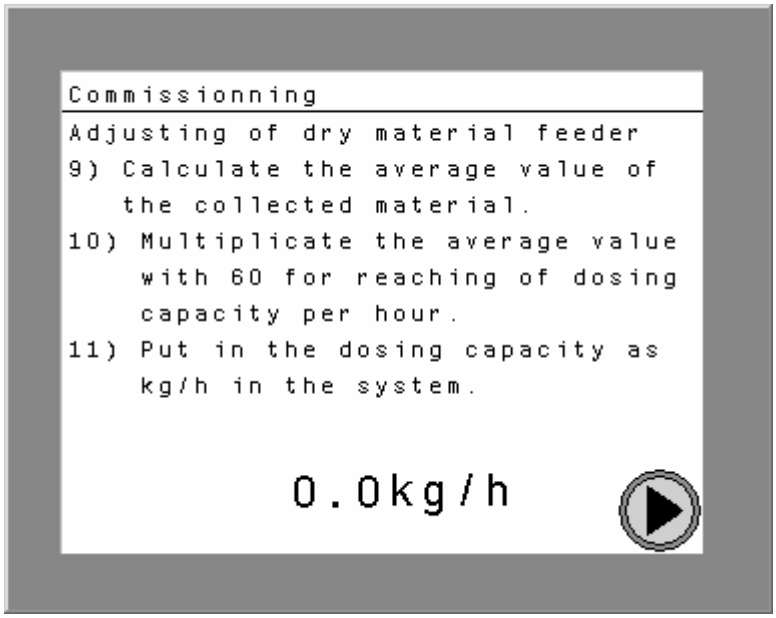


Fig. 25
Commissioning: Calibration of the dry material feeder

- Touch the input field for capacity of the dry material feeder. The numeric keyboard appears. Enter the calculated value.

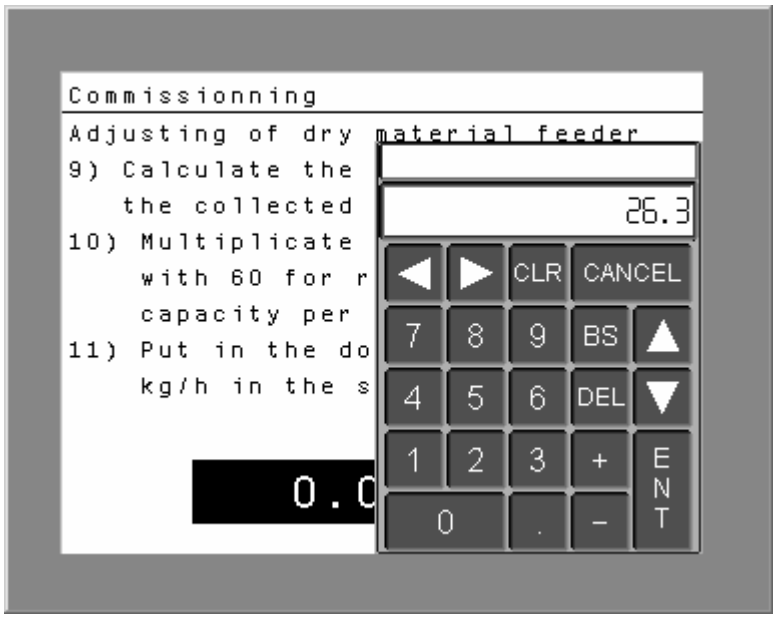


Fig. 26
Commissioning: Calibration of the dry material feeder

To the next window

6.1.4 Adjusting of the flow controller for preparation of liquid materials

Required steps bevor commissioning:

- Connect the water and power supply to the device
- Switch on all safety units of the control panel
- Switch on the main switch.
  After a self-test the PLC and display are ready for start and the main screen (fig. 10) is shown.
- Open the shut-of valve.
- Adjust the operation concentration on the main screen (fig. 27)
- Open the configuration menu and start commissioning.

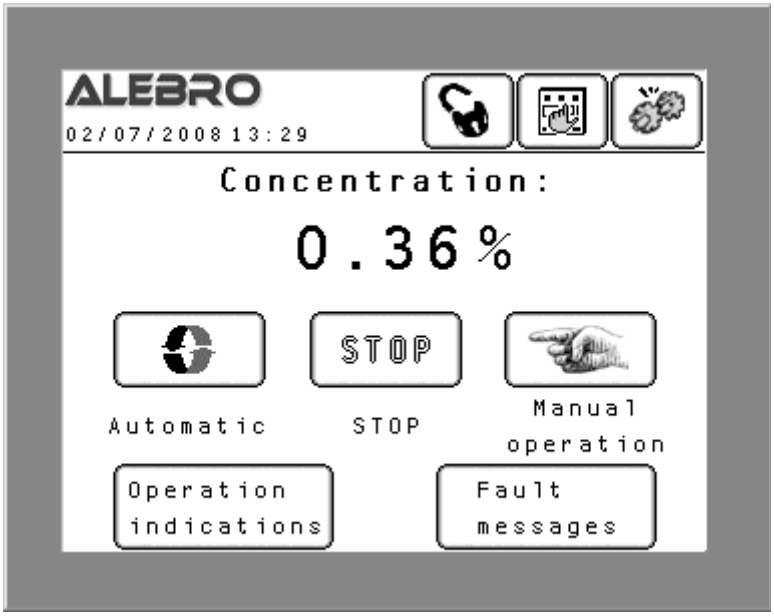


Fig. 27
Entering the solution concentration

Touch the input field for concentration and type in the required solution concentration. The allowable input area is shown on the numeric keyboard.

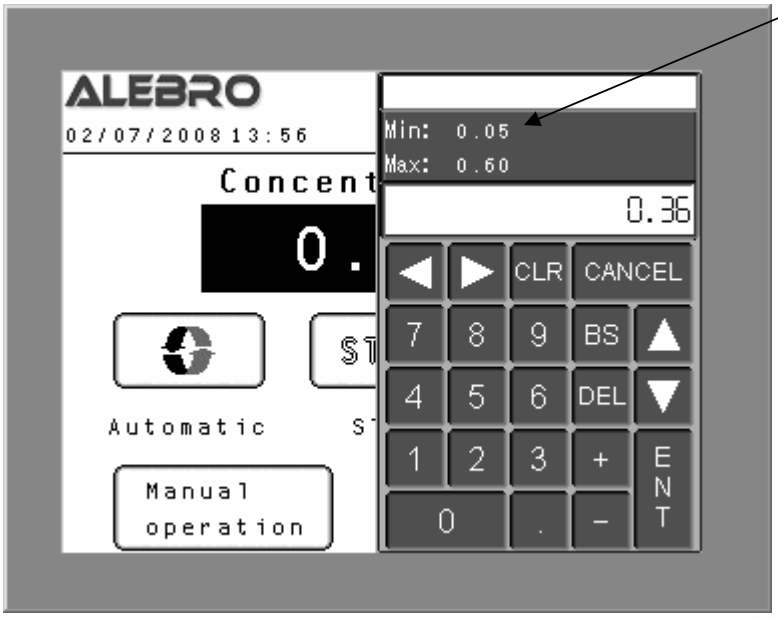


Fig. 28
Entering the solution concentration

Access: configuration menu
Password: parameter password

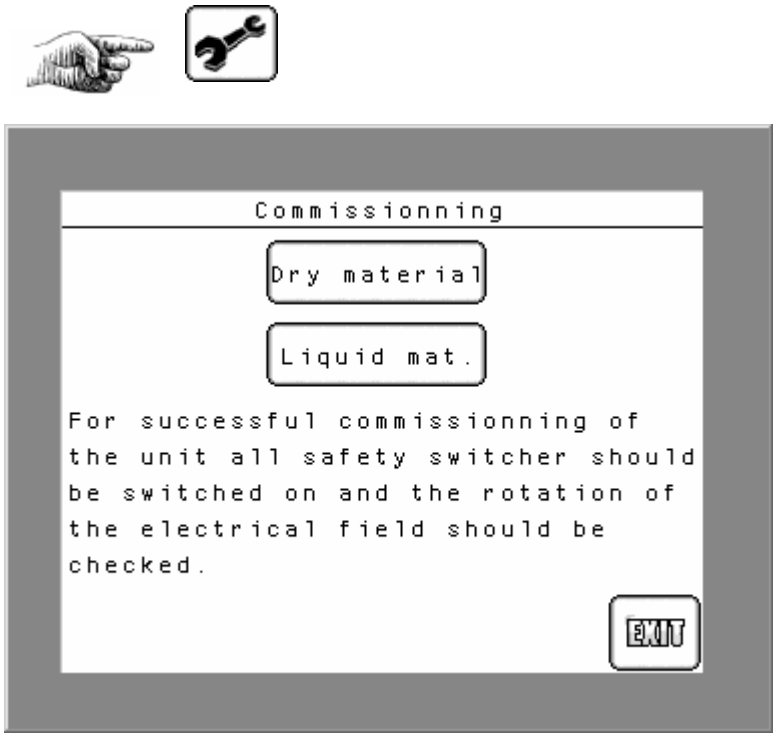


Fig. 29
Commissioning

Depending on which product should be prepared select the commissioning program either for dry material feeder by touching the key Dry material or for liquid dosing pump by pressing the key Liquid mat. .

In this case press the key Liquid mat. .

6.1.4.1 Check the direction of rotation

Check always the right rotating direction of the agitators and all motors before commissioning.

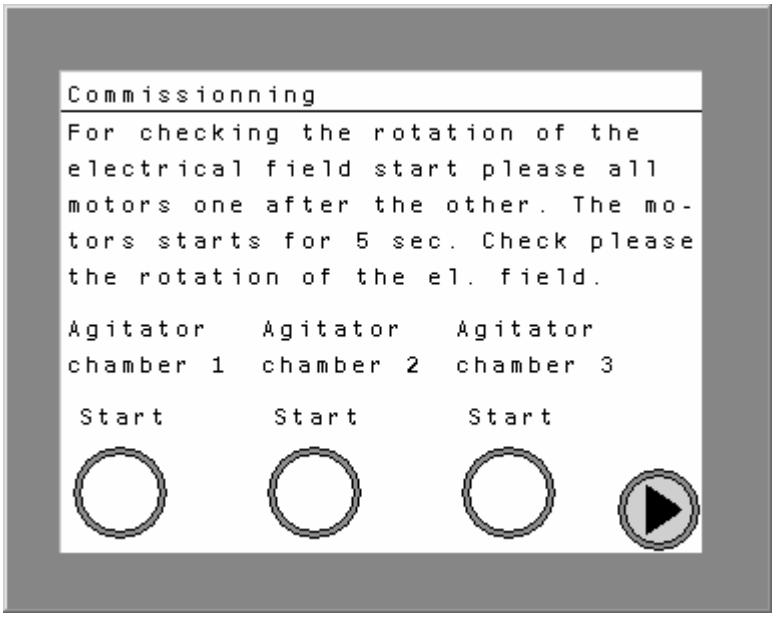


Fig. 30
Commissioning: Check of the rotating direction

After switching-on of the device all units operate for 10 seconds. This time is destined for checking the rotating directions of all motors.
In case of wrong rotating directions of one or several motors switch off the corresponding circuit breaker / mains switch and interlock it against unintended switching-on. Exchange the phase sequence of the respective unit.

 To the next window

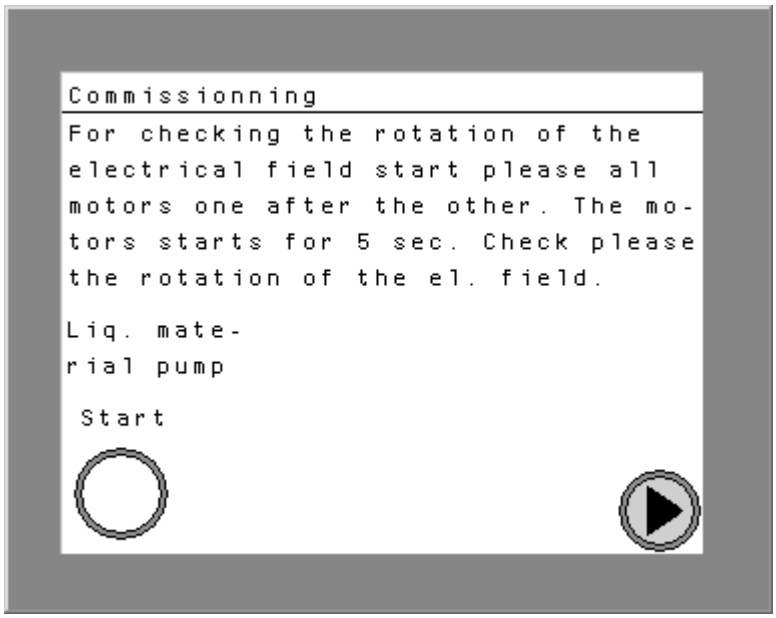


Fig. 31
Commissioning: Checking the rotating direction of the flow controller

To the next window

6.1.4.2 Calibration of the liquid chemical pump

Required accessoires
- Container with liquid chemical
- Collecting basin

NOTE

The volume of the collecting basin has to be enough for a dosing time of 60 seconds.

Calibration is only possible if both operation modes, automatic and manual operation, are switched-off.

Procedure:
- Put the suction line of the liquid chemical pump into the container with liquid chemical.
- Take the liquid chemical connection at the tank off and put it into the collecting basin.

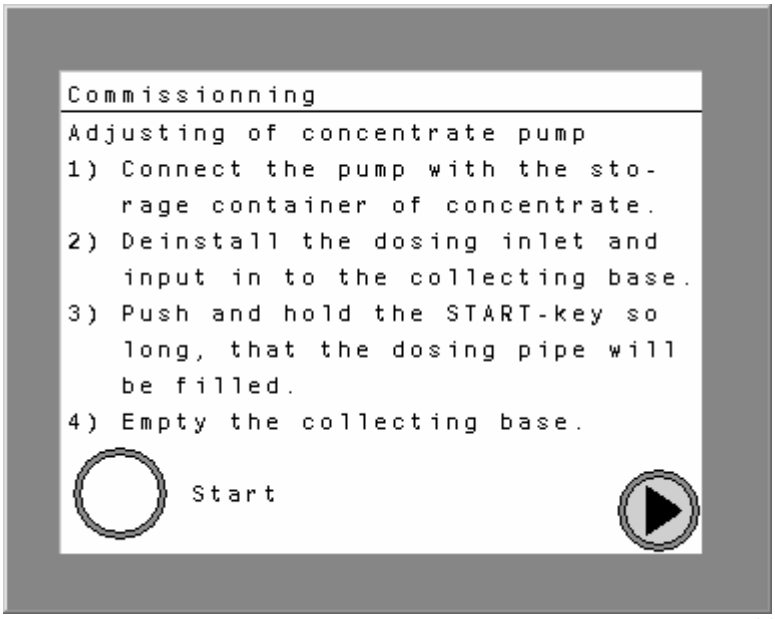


Fig. 32
Commissioning: Calibration of the liquid chemical pump

- Press the start key

and keep it until the pressure line is completely filled with the liquid material. The liquid chemical pump is switched-on as long as the start key is pressed.
- Switch off the liquid chemical pump.
- Empty the collecting basin and replace it under the ejection pipe.

To the next window

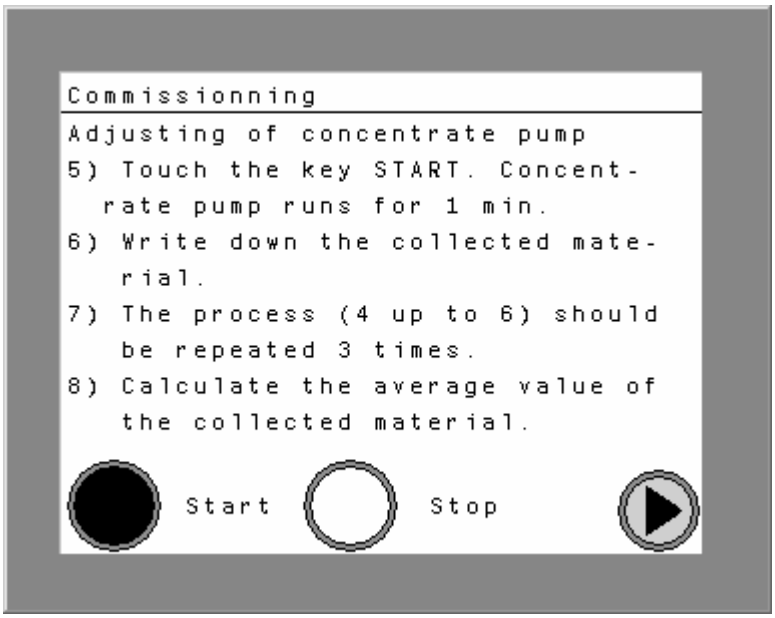


Fig. 33
Commissioning: Calibration of the liquid chemical pump

- Press the start key

Start

- The liquid chemical pump starts working for 60 seconds.
- Determine the volume of the dosed liquid material and calculate the dosing output of the pump in **l/h.** Keep the value in mind.
- Repeat this procedure twice.
- Calculate the average of the three results.

$$\frac{\textit{result 1} + \textit{result 2} + \textit{result 3}}{3}$$

to the next window

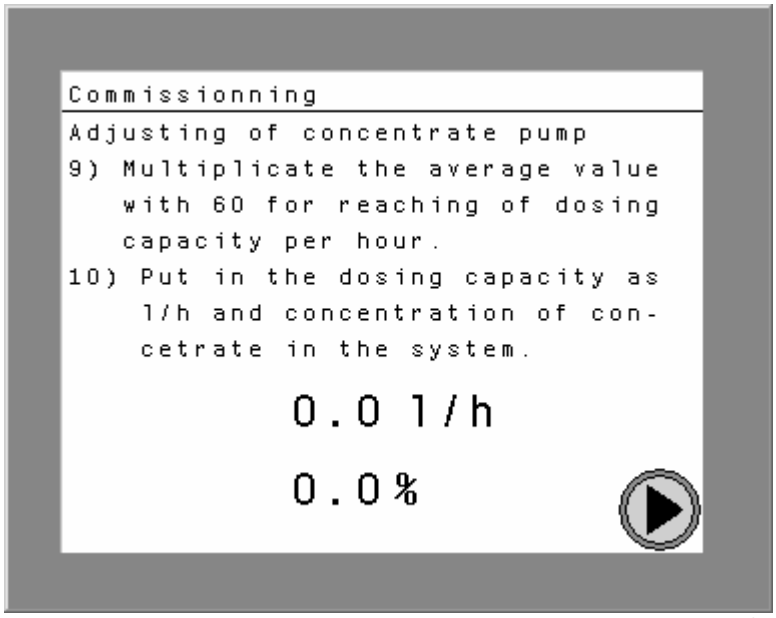


Fig. 34
Commissioning: Calibration of the liquid chemical pump

- Enter the calculated dosing value and the liquid chemical concentration in in the control panel.

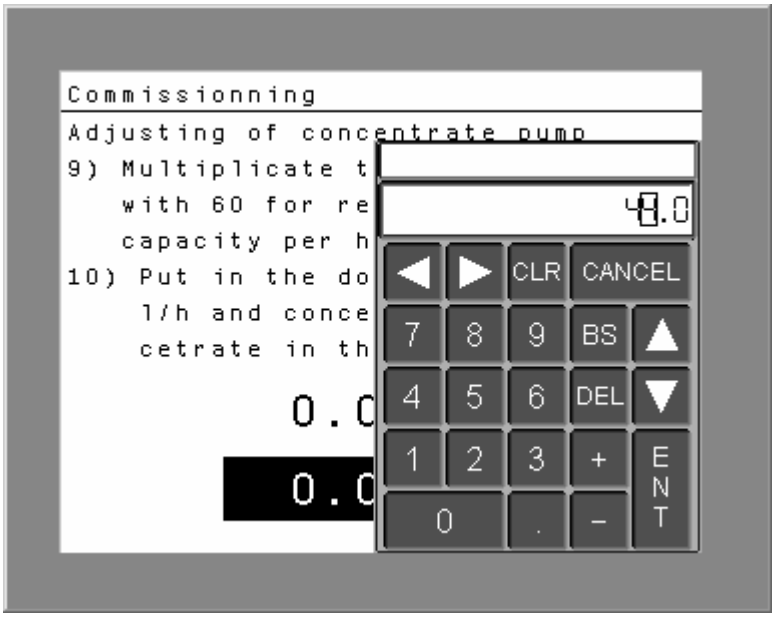


Fig. 35
Commissioning: Calibration of the liquid chemical pump

To the next window

6.1.4.3 Check of the flow controller

To protect the liquid chemical pump against dry run it is necessary to control the flow. Therefore a flow controller is installed. During commissioning the flow controller should be correctly adjusted to guarantee a fault-free operation.

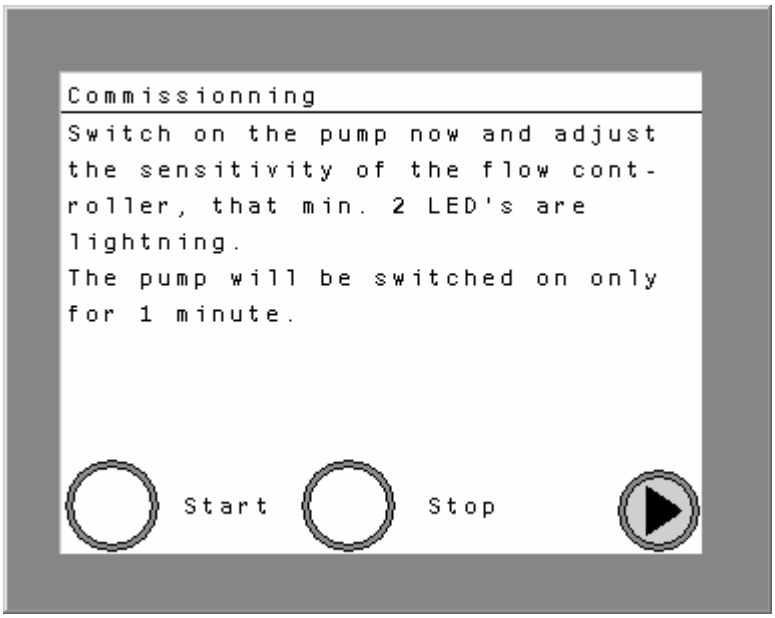


Fig. 36
Commissioning: checkof the flow controller

- Press the start key

- The liquid chemical pump starts working for 60 seconds.

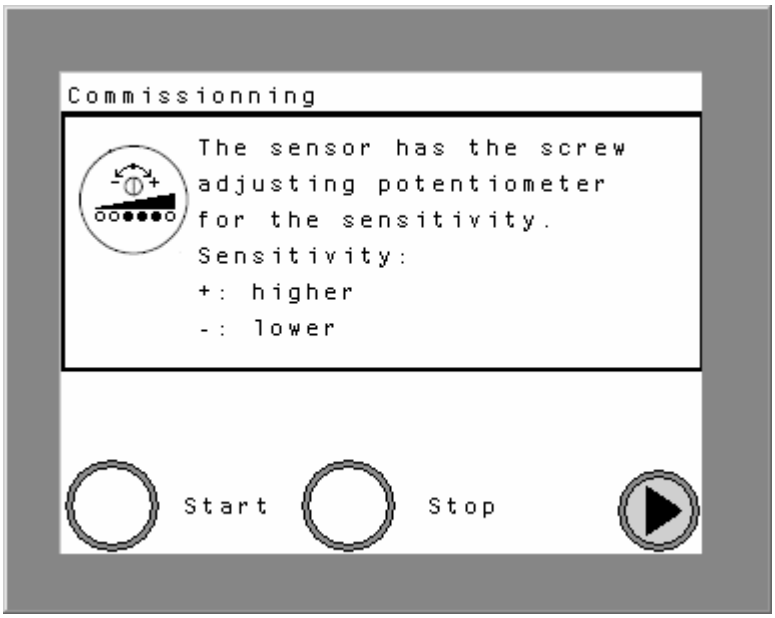


Fig. 37
Commissioning: checkof the flow controller

- Please start the pump now and adjust the sensitivity of the sensor in that way that min. 2 or 3 green LEDs light when the liquid chemical is flowing. The readout potentiometer is under the "FLOW" screw.
- Having finished the adjusting of the liquid chemical pump switch off the pump.

6.1.5 Adjusting the operating water device

The flow rate must be twice up to three times higher than preparation capacity (e. g. for a system with a preparation capacity of 1000 l/h it should be 2000 to 3000 l/h).
The flow rate of the operating water device is being adjusted at the pressure reducing valve.

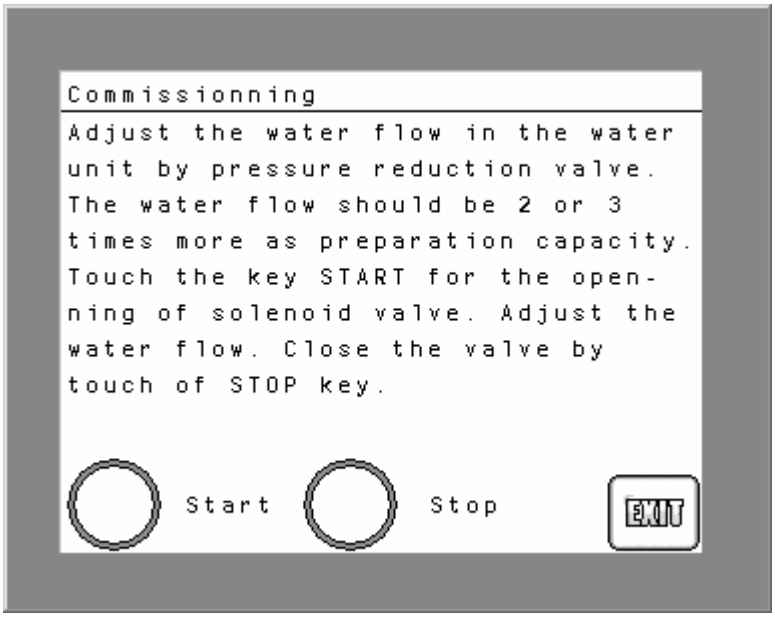


Fig. 38
Commissioning: Adjusting the operating water device

- Press the start key

- The solenoid valve opens and the limit values of the water flow to be maintained are shown on the display.

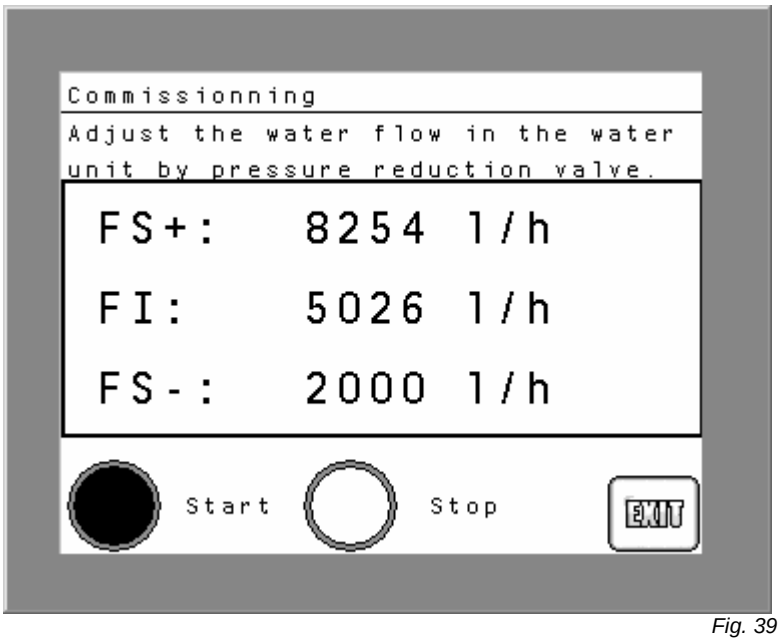


Fig. 39
Commissioning: Adjusting the operating water device

- The minimum limit (FS-) can be equivalent to zero. But it is recommended to equalize this value with the unit capacity (i.e. the device MX7300-2000 with a capacity of 2000l/h should have a minimum limit value of 2000l/h).
  The maximum limit (FS+) is calculated by the control system from concentration and dosing rate of the dosing unit.
  The water flow (FI) is shown on the display.
- Loosen the fixing screw at the adjusting wheel of the pressure reducing valve and adjust the desired water flow.

NOTE

Change the flow slowly, as the display is updated each 10 seconds!

- Tighten the fixing screw at the adjusting wheel of the pressure reducing valve.

Press the stop key

- The solenoid valve closes.

6.1.6 Manual operation

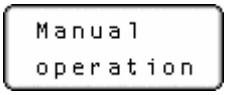
CAUTION
In this mode there is no protection against misoperation!

Manual operation can be started on the main window.

Fig. 40
Main window

Press the following key to start manual operation

The key changes its colour. Then press the following key:



Manual operation mask opens.

To switch-off manual operation press the stop key on the main window.

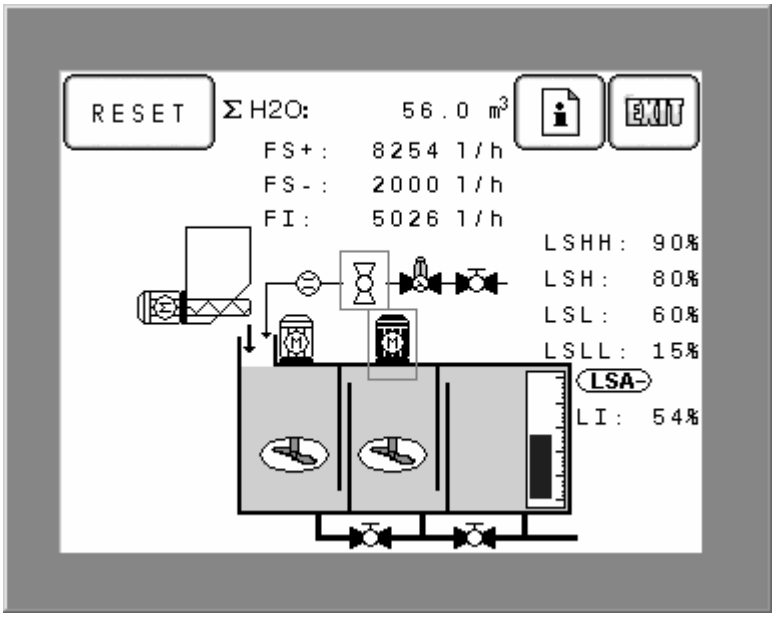


Fig. 41
Manual operation

In manual operation mode it is possible to switch on/off each electrical component of the device. After having selcted the manual operation mode klick on the electrical part that you want to switch on/off. See figure 41, all fields that can be clicked on are framed (e. g. agitator 2 and solenoid valve).
After a klick on a field the mask for switching-on /-off opens.

Example: Operation mask for agitator No.2

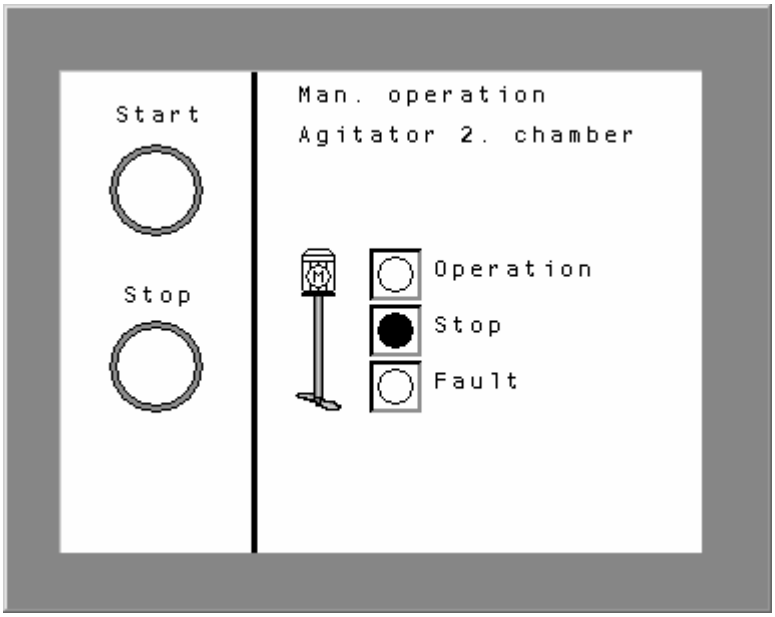


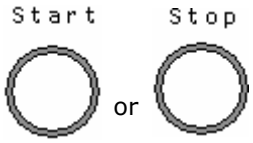
Fig. 42
Mask for switching-on /-off of agitator No. 2

The mask contains the name of the electrical part you want to switch on/off and coloured keys that show the status of the unit: Operating, Stop, Fault

ON – black colour, **OFF** – white colour.

Keys for switching-on/-off
Press the start or the stop key for switching-on or switching-off the corresponding unit. Consequently, the manual operation mask opens.

Display and indication



For going back to main screen press the EXIT key:

Utilisation of the manual operation

It is recommended to use the manual operation only for decommissioning and cleaning.

Use automatic operation mode for normal operation.

6.1.7 Automatic operation

- Unlock the mains switch at the control panel.
- Load dry material or pour in liquid chemical.
- Open the shut-off valve of the operating water device.
- Eliminate all faults.

The automatic operation can be started on the main screen.

Fig. 43
Main window

Press the following key on the main screen for starting automatic operation:

The key is dark if the automatic operation is switched-on.

Press the key for switching-off the current operation mode.

You get all information about general condition of the device and each unit on the operation display. Press the following key for it:

After the switching-on of the automatic operation the solution process starts as described under point 4.2.

Operation display

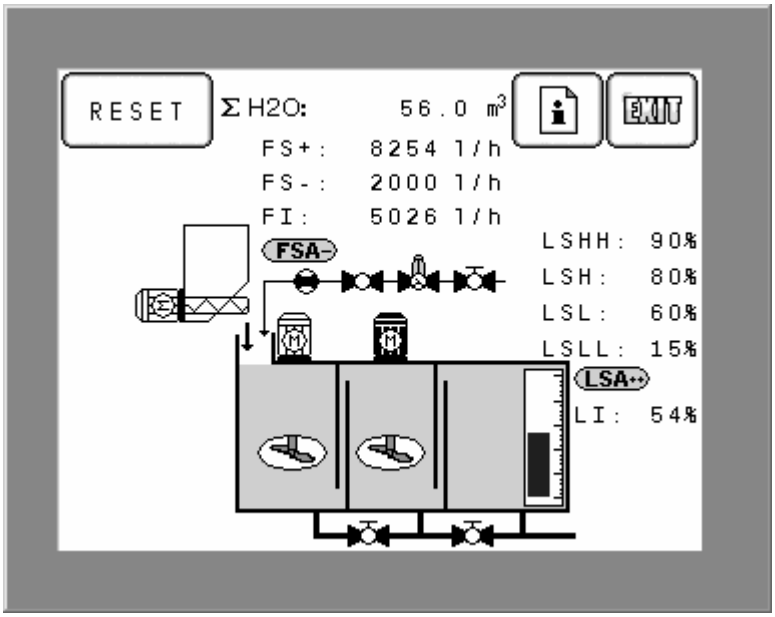


Fig. 44
Operation display

RESET

Flashing alarm symbols remain in the memory of the alarm buffer although the causes of malfunction have been already eliminated.
For further operation of the system it is neccessary to press the RESET key in order to acknowledge all faults.

Faults that have to be acknowledged:

FSA- The flow rate at the operating water device is too low (under the minimum limit).
The automatic operation switches off.

FSA- The flow rate at the operating water device is too high (above the maximum limit).
The automatic operation switches off.

LSA↔ Tank overflow
The automatic operation switches off.

Open the information window for the current screen

EXIT Back to previous window

Motor is switched-off

Motor is switched-on

Motor fault

Solenoid valve is open

Solenoid valve is closed

LSA-	Minimum level
LSA+	Maximum level
LSA--	Dry run / empty tank

Σ H2O: total water consumption
FS+: maximum limit of water flow rate
FS-: minimum level of water flow rate
FI: current water flow rate

LSHH: limit value "overflow"
LSH: limit value "max"
LSL: limit value "min"
LSLL: limit value "dry run"
LI: actual fill level

6.1.8 Remote control

Press the following key on the main window to activate the remote control:

Fig. 45
Remote control

This key signalizes that remote control mode is active. The device can be controlled by Profibus-DP, Modbus, Ethernet or potential free contact.

6.2 Display and changing of parameters

6.2.1 Language

Access: configuration menu
Password: "administrator password"

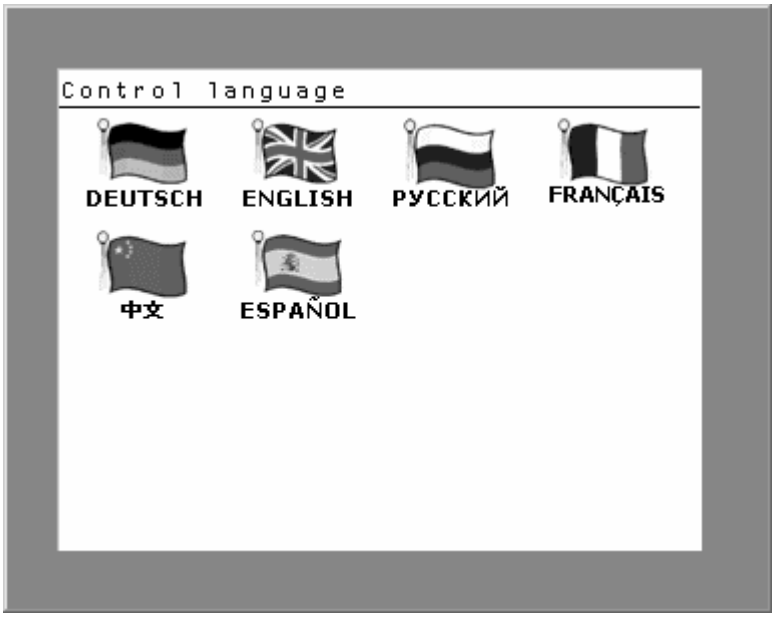


Fig. 46
Selection of language

Select the desired language in the language menu.
Five languages are available at the moment:

German
Russian
English
French
Spanish
Chinese (in process)

6.2.2 Parameter menu

Access: configuration menu
Password: ”parameter password”

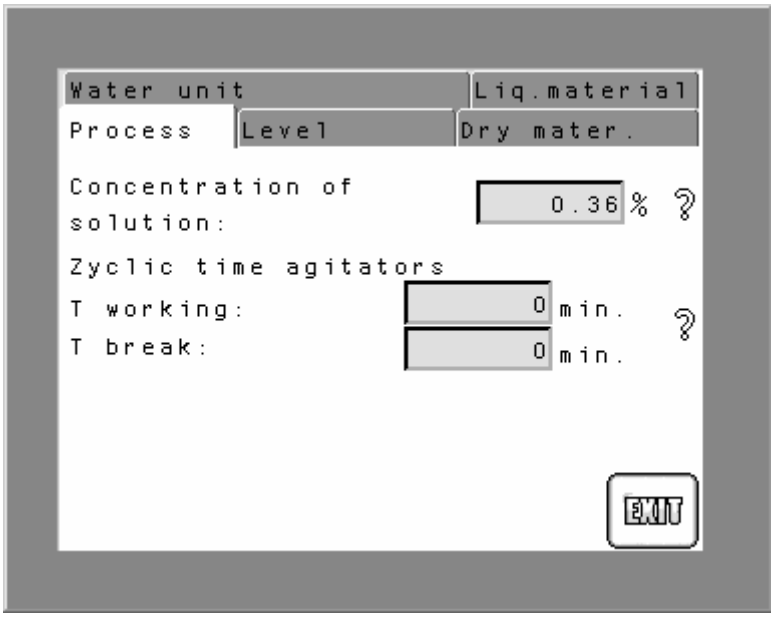
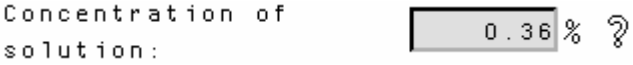


Fig. 47
Parameter menu

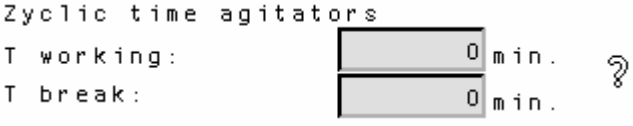
Click on the respective tab in the upper area of the site in order to choose a certain parameter site.

6.2.2.1 Parameter menu: Precess parameters

In this menu you find the operating concentration and cycle of the agitators (see fig. 47).



Desired solution concentration:
The concentration is adjusted according to the process conditions.
Заводская уставка: 0.0%



The agitators operate cyclically to save energy.
If the used solution allows switching-off the agitators during the mix and ripening process, the times for operating and breaks should be entered.
The agitators switches on and off according to this cycle.
The agitatores operates in such way only after the preparation process!

T operation: Operating time of agitators after the preparation process has finished.
Factory configuration: 0 min.

If the agitators have to be always in operation zero the value **T operation.** Then the agitators work continuously.

T break: Pause time of agitators after the preparation process has finished.
Factory configuration: 0 min.

6.2.2.2 Parameter menu: Level parameter

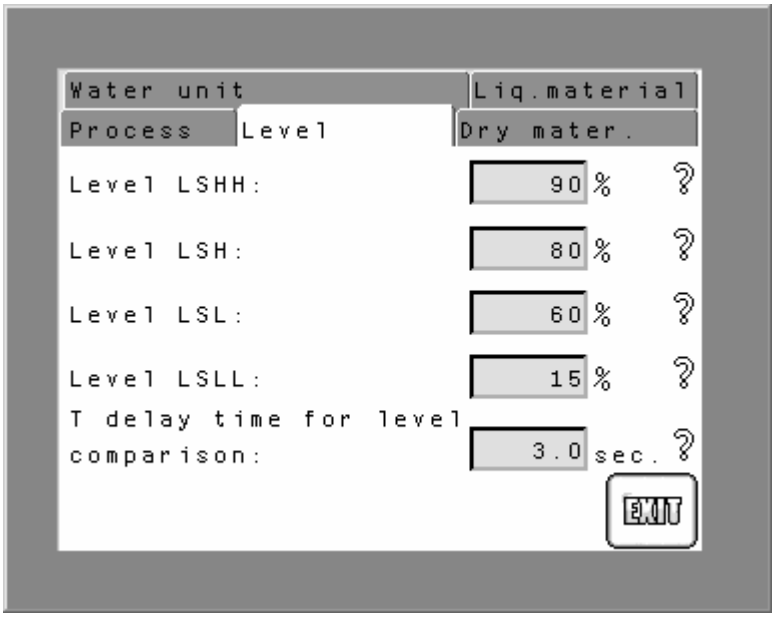


Fig. 48
Parameter menu

Change the level limits only if the system don't works correctly with factory-set values. (i.e. in case of too high water flow rate. The inflowing water amount causes "overflow" after it has reached the "MAX" level the valve has closed.

Level LSHH: 90 %

As soon as the limit value has been reached the system deactivates the automatic operation and signalizes a fault.
This fault can be acknowledged not until the fill level is falling below the limit value.
Factory-set configuration: depending on type of the device

Level LSH: 80 %

When the max. level has been reached the preparation process is being switched-off.
Factory-set configuration: depending on type of the device

Level LSL: 60 %

When the min. level has been reached the preparation process is being switched-on.
Factory-set configuration: depending on type of the device

Level LSLL: 15 %

If the fill level is over this limit value the operation control switches-off the preparation process, stops the subsequent dosing pumps and shows the fault on the display.

The acknowledgement of the fault happens automatically as soon as the fill level is higher than the limit value.

Factory-set configuration: depending on type of the device

T delay time for level comparison: 3.0 sec.

The surface of solution isn't flat during the filling process. Waves appear on the surface. These can cause an immediate switching-off of the preparation process as the ultra-sonic sensor do not measures the distance from the non flat surface to the measuring head correctly.
To avoid the incorrect measuring of the level a delay time is necessary.
Factory-set delay time: ***3 seconds*.**

6.2.2.3 Parameter menu: parameters of dry material feeder

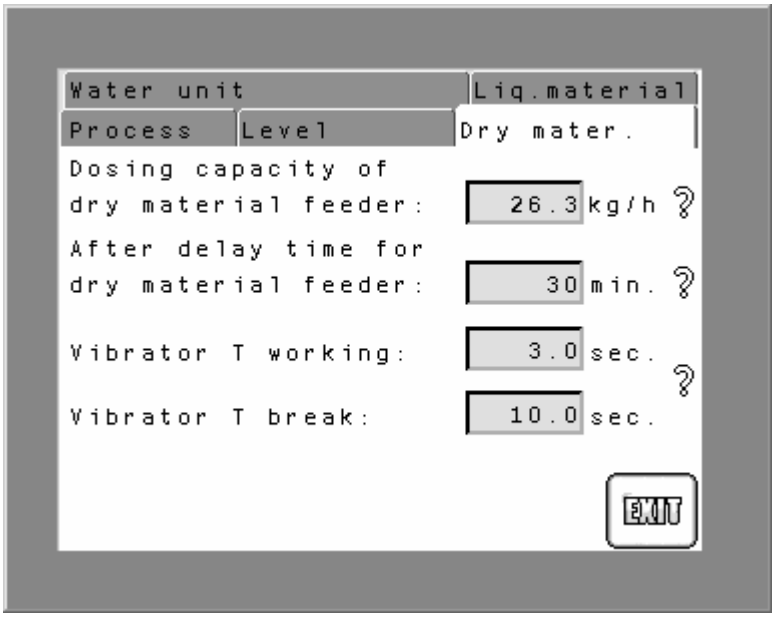


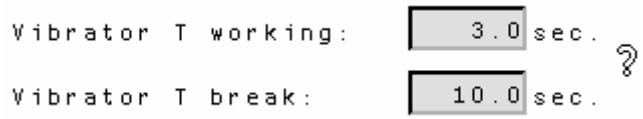
Fig. 49
Parameter menu

Dosing capacity of dry material feeder: 26.3 kg/h

The dosing capacity of the dry material feeder is calculated during the commissioning process.

After delay time for dry material feeder: 30 min.

Switch-off delay time of the feeder when the level sensor determines a lack of dry material:
When the sensor signalizes the lack, there is still a residual amount of chemicals in the hopper. The time for dosing this remaining quantity (experimental value) should be put in as switch-off delay time.
Factory-set dely-time: 30 minutes



For optimal function of the dry material feeder, there is a vibrator on the side wall. Following times are recommended in order to guarantee a correct operation of the feeder and to avoid Brückenbildung

- Shorter operation times (less than 3 sec.)
- Longer pause times (minimum 10 sec.)

Factory-set: T operation: 3.0 sec.
Factory-set: T pause: 10.0 sec.

6.2.2.4 Parameter menu: Parameters of flow controller

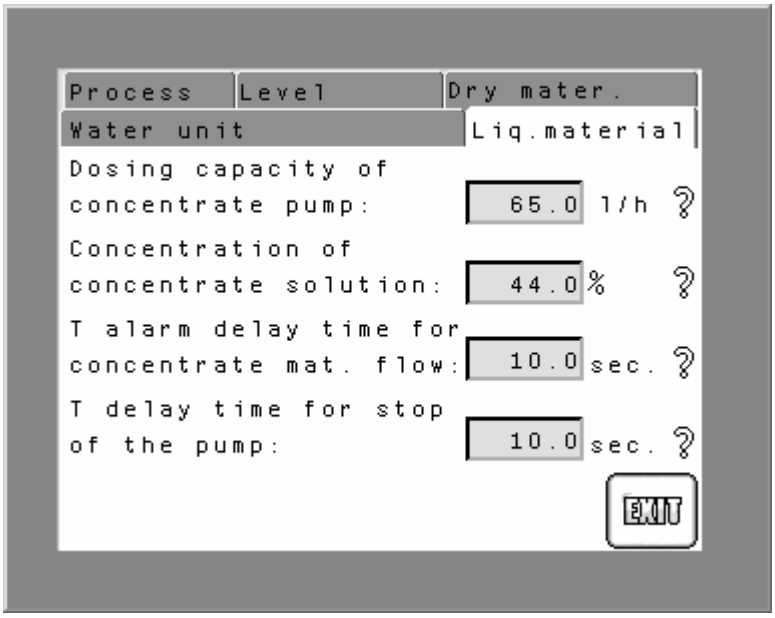
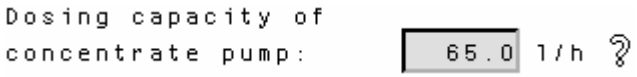
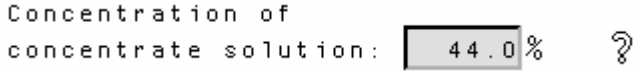


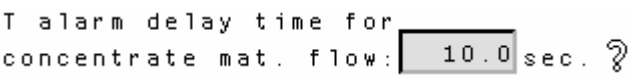
Fig. 50
Parameter menu



The dosing capacity of the flow controller is calculated during the commissioning process.



The concentration of the solution can be seen in the data specification or requsted from the manufacturer.



A certain time is necessary until the fluid is set in motion. In this time the inertia of the material has to be overcome. The fluid does not begin to flow until then.

Therefore there is an alarm delay time which prevents an immediate flow alarm. The alarm is displayed not until the delay time is elapsed.
The flow alarm switches off the operation and signalizes a fault.
The fault has to be acknowledged.
Factory-set alarm delay time: 10.0 сек.

T delay time for stop of the pump: 10.0 sec.

Switch-off delay time of the pump after the flow fault has been appeared.
Factory-set configuration: 10.0 sec.

6.2.2.5 Parameter menu: parameters of the water unit

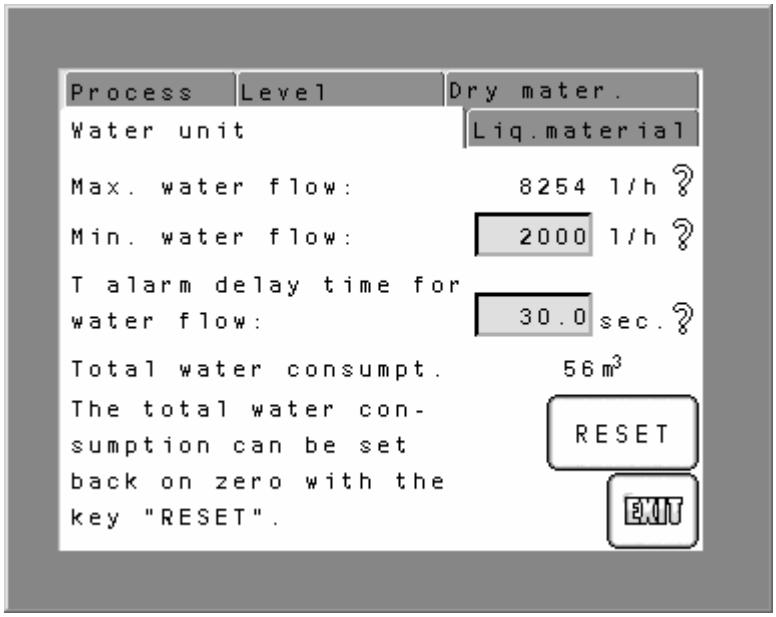


Fig. 51
Parameter menu

Max. water flow: 8254 l/h

The PLC calculates the maximal water flow rate from dosing capacity and adjusted concentration. In the preparation process of liquid materials the concentration of stock solution is accounted too.

Min. water flow: 2000 l/h

The minimum water flow is adjusted according to the type of unit.
It is recommended to adjust the minimum water flow rate like the dosing capacity, e.g. the "MIN" level should be 1000 l/h for the type MX7300-1000 with a dosing capacity of 1000 h/l.

Factory-set configuration: depending on type of the device

T alarm delay time for water flow: 30.0 sec.

If the flow rate is out of range "MIN"-"MAX" the PLC switches-off the automatic operation with a delay time stated below.

For restarting the device the fault has to be acknowledged.

Factory-set configuration: 30.0 sec.

6.2.3 Password settings

Access: Configuration menu
Password: Administrator password

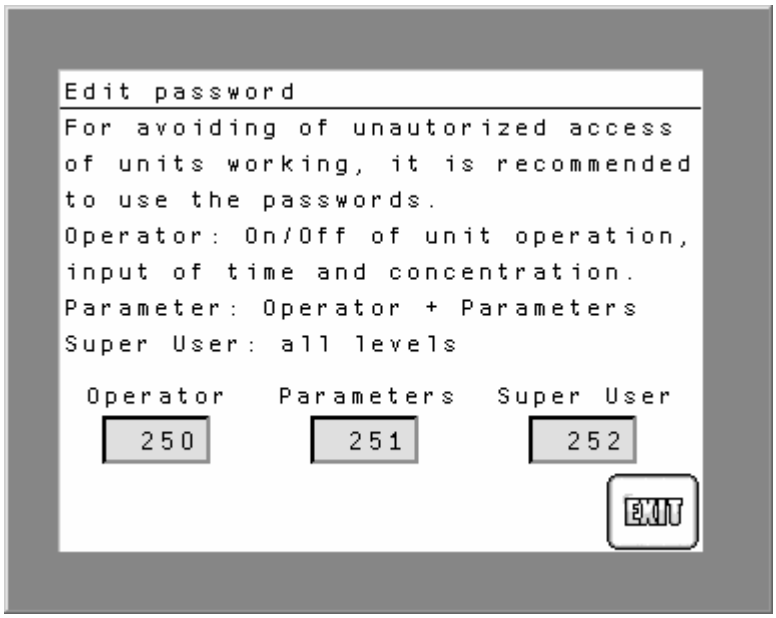


Fig. 52
Password settings

The unit should be protected against unauthorized accesses via passwords.
For changing the password touch the input field to open the numeric keyboard. Type in the desired password and confim it by pressing the key ENT.

NOTE

The operator password has lowest priority.
It allows to switch-on / -off both operation modes (automatic or manual operation, local and remote control) and to input of the operating concentration.

The parameter password has middle priority.
This password allows to input and to change operating parameters and times and to display operation settings. The parameter password includes the operator password.

Administrator password has highest priority.
It allows the access to all operation windows and screens of the device (factory-settings excluded).

Factory-set passwords
Operator password: **251**
Parameter password: **252**
Administrator password: **253**

The operator and parameter passwords can be deactivated. Set the passwords to zero.

The administrator password is always active, even if the value of the passwort is zero.

CAUTION

The device is open for the unauthorized access, if the protection is switched off!

Write down the passwords or keep them in mind, especially the administrator password. It is not possible to operate the device without a valid password.

In case of problems with the passwords, please call the staff of ALEBRO Dosier- und Umwelttechnik e.K..

NOTE

Press on the LOGOUT – key  *,if you want to switch on the protection of the device. It is possible, only if the passwords are edited and higher as zero.*

In case no key is touched within 15 minutes, the PLC system will switch on the protection of the device automatically and the main process screen will be selected.

6.2.4 Working hour meter

Access: configuration menu
Password: parameter password

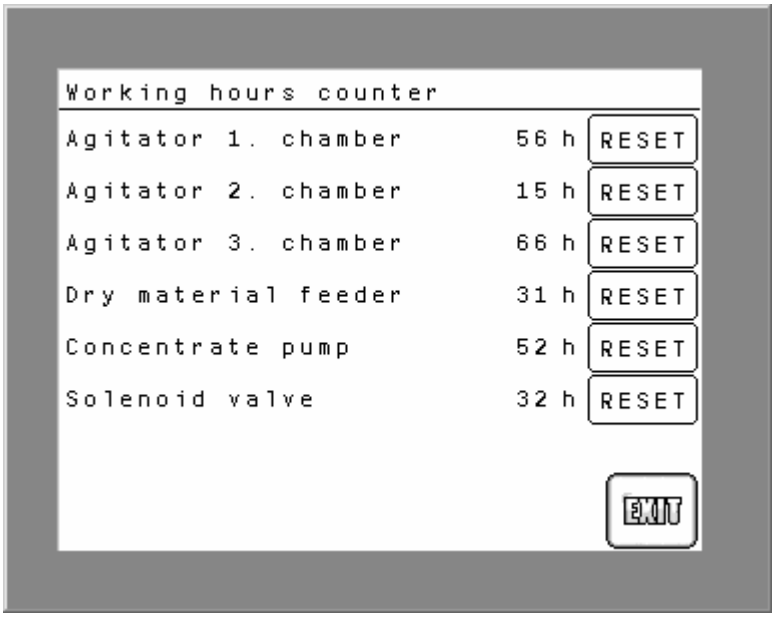


Fig. 53
Working hour meter

Indication of the working time of each el. part of the system.

The reset key is used to zero the working hours (i.e. after exchanging a motor).

6.2.5 Communication with the main level

Access: configuration menu
Password: administrator password

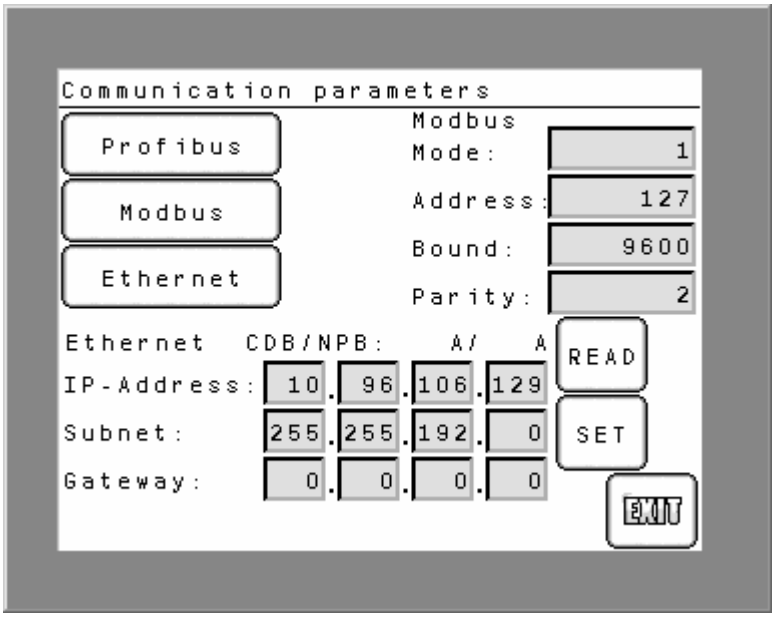


Fig. 54
Communication parameters

Optional communication groups:
Profibus-DP
Modbus
Ethernet

The operation of the device can only occur via remote control. Data can be read out every time.

The communication to the main level can be selected in the window showing above. Press on keys to choose the desired communication group.

Parameters for Modbus and Ethernet communication are entered here.

6.2.5.1 Profibus-DP

The Key is dark-coloured.

- Select the communication group Profibus-DP.
- Input the slave address using the turn-switch.
- Restart the PLC for loading the new datas.

The communication area in PLC memory is between the addresses VB3800 and VB4000.

- Baudrate: 9600 Baud - 12 Mbaud, the Slave arranges to the Master configuration.
- Slave address: see communication group EM277
- I/O Offset in V-Memory: 3810 (VB3810)

Recommended adjusting for Simatic S7:
- Configuration Module (GSD): 15 dez. / 0F h (32 Bytes Input, 32 Bytes Output, byte
- consistent)
- Hex-Parameter: 0F,0E,E2

If you use non Siemens-Master for communication, then please utilize the GSD-file "siem089d" for the EM277. You find it under: http://www4.ad.siemens.de

Input address: 32 Bytes
Output address: 32 Bytes

Configure the Profibus-DP group EM277 according to the network building.

Input addresses
(Addresses are arbitrary selected by the manufacturer)

Address	***Description***	***State***	***Type of signal***
V3810.0	Switch off remote control from control room (disactivate manual operation and commissioning process)	1	Impulse (1 sec.)
V3810.1	Switch on automatic operation	1	Impulse (1 sec.)
V3810.2	Switch off automatic operation	1	Impulse (1 sec.)
V3810.3	Operation mode: "Dry material"	1	Impulse (1 sec.)
V3810.4	Operation mode: "Liquid chemical"	1	Impulse (1 sec.)
V3810.5	enable of concentration	1	Impulse (1 sec.)
V3810.6	Reset of faults	1	Impulse (1 sec.)
V3810.7	Reserve		
VD3812	Setting of solution concentration (real number X,XX)	0,05 – 0,60%	REAL

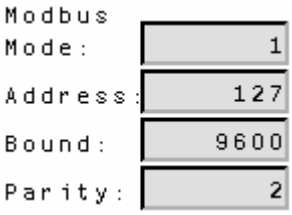
Output addresses
(Addresses are arbitrary selected by the manufacturer)

Address	***Description***	***State***	***Type of signal***
V3842.0	Agitator 1 in operation	1	Permanent
V3842.1	Agitator 2 in operation	1	Permanent
V3842.2	Agitator 3 in operation	1	Permanent
V3842.3	Dry material feeder in operation	1	Permanent
V3842.4	Liquid chemical pump in operation	1	Permanent
V3842.5	Solenoid valve is open	1	Permanent
V3842.6	Vibrator in operation	1	Permanent
V3842.7	Collecting fault	0	Permanent
V3843.0	Operation mode "Dry Material" (0) Operation mode "Liquid chemical" (1)	0/1	Permanent
V3843.1	Kind of control local (0) / remote (1)	0/1	Permanent
V3843.2	Operation message "Unit in automatic operation"	1	Permanent
V3844.0	Motor failure Agitator 1	1	Permanent
V3844.1	Motor failure Agitator 2	1	Permanent
V3844.2	Motor failure Agitator 3	1	Permanent
V3844.3	Motor failure dry material feeder	1	Permanent
V3844.4	Motor failure liquid chemical pump	1	Permanent
V3844.5	Reserve		Permanent
V3844.6	Reserve		Permanent
V3844.7	Circuit breaker failure	1	Permanent
V3845.0	Water flow too low	1	Permanent
V3845.1	Water low too high.	1	Permanent
V3845.2	Lack of dry material	1	Permanent
V3845.3	Lack of liquid chemical	1	Permanent
V3845.4	Wrong input of parameter	1	Permanent
VW3846	Water flow	XXXXX л/ч	Word/Integer
VD3848	Set point of solution concentration	0,05 – 0,50%	REAL
VW3852	Level	0 – 100%	Word/Integer
V3854.0	Dry run (third chamber)	1	Permanent
V3854.1	Min. level in the third chamber	1	Permanent
V3854.2	Max. level in the third chamber	1	Permanent
V3854.3	Overflow in the third chamber	1	Permanent

6.2.5.2 Modbus

The key is dark-coloured.

- Select the communication group Modbus.

- 

Input right parameters for for Modbus communication.

Mode: 1; connection via Modbus
Address: address for communication
0 ... 127
Bound: 9600 / 19200 / 38400 / 57600 / 115200
according to Master
Parity: 0 without parity
1 odd
2 even

Restart the PLC for loading the new datas.

Recommended adjusting for Master PLC:

- Modbus function: **16** for "send the datas to slave"
  Address: 0 or 40001
  Range: 8 registers

- Modbus function: **3** for "receive the datas from slave"
  Address: 50 or 40051
  Range: 8 registers

The communication area in PLC memory is between the addresses VB3500 and VB3699.

Input addresses:

6 bytes
VB3500/VB3501 = 040001
VB3502/VB3503 = 040002
VB3504/VB3505 = 040003

Output addresses:

16 bytes
VB3600/VB3601 = 040051
VB3602/VB3603 = 040052
VB3604/VB3605 = 040053
VB3606/VB3607 = 040054
VB3608/VB3609 = 040055
VB3610/VB3611 = 040056
VB3612/VB3613 = 040057
VB3614/VB3615 = 040058

Input

Address	***Description***	***State***	***Type of signal***
V3500.0	Switch off remote control from control room (disactivate manual operation and commissioning process)	1	Impulse (1 sec.)
V3500.1	Switch on automatic operation	1	Impulse (1 sec.)
V3500.2	Switch off automatic operation	1	Impulse (1 sec.)
V3500.3	Operation mode: "Dry Material"	1	Impulse (1 sec.)
V3500.4	Operation mode: "Liquid chemical"	1	Impulse (1 sec.)
V3500.5	enable of concentration	1	Impulse (1 sec.)

V3500.6	Reset of faults	1	Impulse (1 sec.)
V3500.7	Reserve		
VD3502	Setting of solution concentration (real number X,XX)	0,05 – 0,60%	REAL

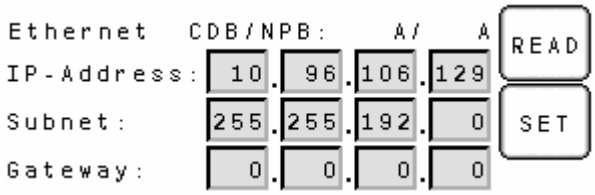
Output

Address	***Description***	***State***	***Type of signal***
V3600.0	Agitator 1 in operation	1	Permanent
V3600.1	Agitator 2 in operation	1	Permanent
V3600.2	Agitator 3 in operation	1	Permanent
V3600.3	Dry material feeder in operation	1	Permanent
V3600.4	Liquid chemical pump in operation	1	Permanent
V3600.5	Solenoid valve is open	1	Permanent
V3600.6	Vibrator in operation	1	Permanent
V3600.7	Collecting fault	0	Permanent
V3601.0	Operation mode "Dry Material" (0) Operation mode "Liquid chemical" (1)	0/1	Permanent
V3601.1	Kind of control local (0) / remote (1)	0/1	Permanent
V3601.2	Operation message "Unit in automatic operation"	1	Permanent
V3602.0	Motor failure Agitator 1	1	Permanent
V3602.1	Motor failure Agitator 2	1	Permanent
V3602.2	Motor failure Agitator 3	1	Permanent
V3602.3	Motor failure dry material feeder	1	Permanent
V3602.4	Motor failure liquid chemical pump	1	Permanent
V3602.5	Reserve		Permanent
V3602.6	Reserve		Permanent
V3602.7	Circuit breaker failure	1	Permanent
V3603.0	Water flow too low	1	Permanent
V3603.1	Water low too high.	1	Permanent
V3603.2	Lack of dry material	1	Permanent
V3603.3	Lack of liquid chemicals	1	Permanent
V3603.4	Wrong input of parameter	1	Permanent
VW3604	Water flow	XXXXX л/ч	Word/Integer
VD3606	Set point of solution concentration	0,05 – 0,50%	REAL
VW3610	Level	0 – 100%	Word/Integer
V3612.0	Dry run (third chamber)	1	Permanent
V3612.1	Min. level in the third chamber	1	Permanent
V3612.2	Max. level in the third chamber	1	Permanent
V3612.3	Overflow in the third chamber	1	Permanent

6.2.5.3 Ethernet

The key is dark-coloured.

- Select the communication group Ethernet.



- For reading the communication parameters press the key "READ".

- Set the communication parameters.
  ATTENTION: Your parameters can be adjusted during the device check in the factory. Press the key "SET" for adding the adjusted parameters into the modul.
- Restart the PLC for loading the new datas.

Input addresses

Address	***Description***	***State***	***Type of signal***
V3500.0	Switch off remote control from control room (disactivate manual operation and commissioning process)	1	Impulse (1 sec.)
V3500.1	Switch on automatic operation	1	Impulse (1 sec.)
V3500.2	Switch off automatic operation	1	Impulse (1 sec.)
V3500.3	Operation mode: "Dry Material"	1	Impulse (1 sec.)
V3500.4	Operation mode: "Liquid chemicals"	1	Impulse (1 sec.)
V3500.5	enable of concentration	1	Impulse (1 sec.)
V3500.6	Reset of faults	1	Impulse (1 sec.)
V3500.7	Reserve		
VD3502	Setting of solution concentration (real number X,XX)	0,05 – 0,60%	REAL

Передача данных на верхний уровень

Address	***Description***	***State***	***Type of signal***
V3600.0	Agitator 1 in operation	1	Permanent
V3600.1	Agitator 2 in operation	1	Permanent
V3600.2	Agitator 3 in operation	1	Permanent
V3600.3	Dry material feeder in operation	1	Permanent
V3600.4	Liquid chemical pump in operation	1	Permanent
V3600.5	Solenoid valve is open	1	Permanent
V3600.6	Vibrator in operation	1	Permanent
V3600.7	Collecting fault	0	Permanent
V3601.0	Operation mode "Dry Material" (0) Operation mode "Liquid chemicals" (1)	0/1	Permanent
V3601.1	Kind of control local (0) / remote (1)	0/1	Permanent
V3601.2	Operation message "Unit in automatic operation"	1	Permanent
V3602.0	Motor failure Agitator 1	1	Permanent
V3602.1	Motor failure Agitator 2	1	Permanent
V3602.2	Motor failure Agitator 3	1	Permanent

V3602.3	Motor failure dry material feeder	1	Permanent
V3602.4	Motor failure liquid chemical pump	1	Permanent
V3602.5	Reserve		Permanent
V3602.6	Reserve		Permanent
V3602.7	Circuit breaker failure	1	Permanent
V3603.0	Water flow too low	1	Permanent
V3603.1	Water low too high.	1	Permanent
V3603.2	Lack of dry material	1	Permanent
V3603.3	Lack of liquid chemicals	1	Permanent
V3603.4	Wrong input of parameter	1	Permanent
VW3604	Water flow	XXXXX л/ч	Word/Integer
VD3606	Set point of solution concentration	0,05 – 0,50%	REAL
VW3610	Level	0 – 100%	Word/Integer
V3612.0	Dry run (third chamber)	1	Permanent
V3612.1	Min. level in the third chamber	1	Permanent
V612.2	Max. level in the third chamber	1	Permanent
V3612.3	Overflow in the third chamber	1	Permanent

6.3 Service menu

Fig. 55
Service menu

6.3.1 Fault code

Access: Service menu
Password: Administrator password

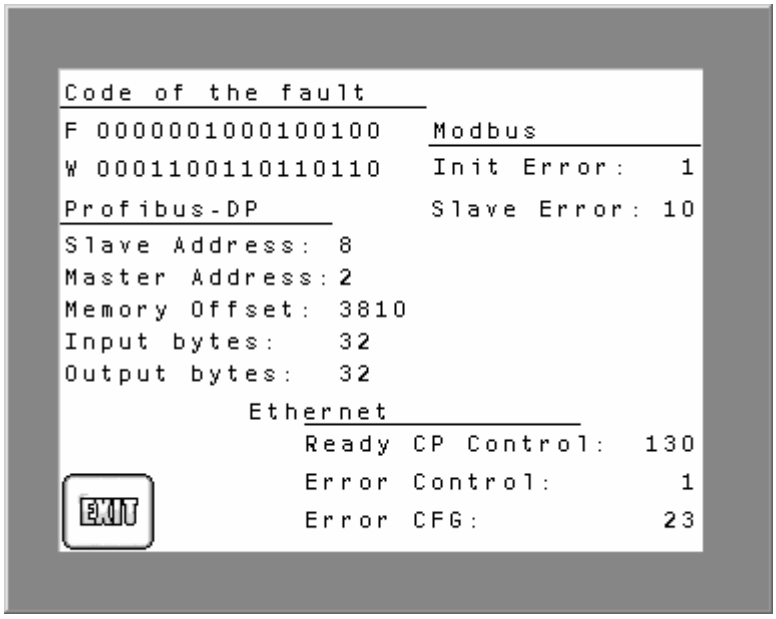


Fig. 56
Fault code

This window gives service information about potential faults and adjusted parameters concerning the communication that are really activated in the control.

Fault code

Position	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**
F	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**0**

Position	**Fault = 1**
1	Empty third chamber /dry run (LSLL)
2	Circuit breaker failure –F41
3	Failure liquid chemical pump
4	Failure dry material feeder
5	Failure agitator No. 3
6	Failure agitator No. 2
7	Failure agitator No. 1
8	Wrong input of parameter
9	free
10	free
11	Lack of liquid chemicals (FSL)
12	Water flow too high (FSH)
13	Water flow too low (FSL)
14	Empty hopper after expiration of time delay Tn
15	Lack of dry material (LSL)
16	Overflow in third chamber (LSHH)

Warnings

Position	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**
W	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**1**

Position	**Warning**
1	free
2	free
3	1: Modbus configuration all right
4	1: Modbus Slave in operation
5	0: Ethernet in operation 1: configuration
6	1: Ethernet controller ready
7	free
8	1: Level simulation on
9	1: Simulation of water flow on
10	1: Communication Ethernet
11	1: Communication Modbus
12	1: Communication Profibus-DP
13	0: Operation mode with dry material 1: Operation mode with liquid chemicals
14	0: Remote control off 1: Remote control on
15	0: external signal off 1: external signal on
16	0: Local control 1: Remote control

Profibus-DP:	Information parameter for Profibus-DP
Modbus:	Fault code Modbus 0 No faults 1 Memory fault 2 Wrong bound rate or parity 3 Wrong address Slave 4 Wrong characters for Modbus 5 Register intersection 6 Reception Fault Parity 7 Reception Fault CRC 8 Wrong function 9 Wrong address in memory 10 Function Slave deactivated
Ethernet	Fault code Ethernet Please contact the staff of ALEBRO Dosier- und Umwelttechnik e. K. if Ethernet faults appear.

6.3.2 Monitoring and input of variables

Access: Service menu
Password: Administrator password

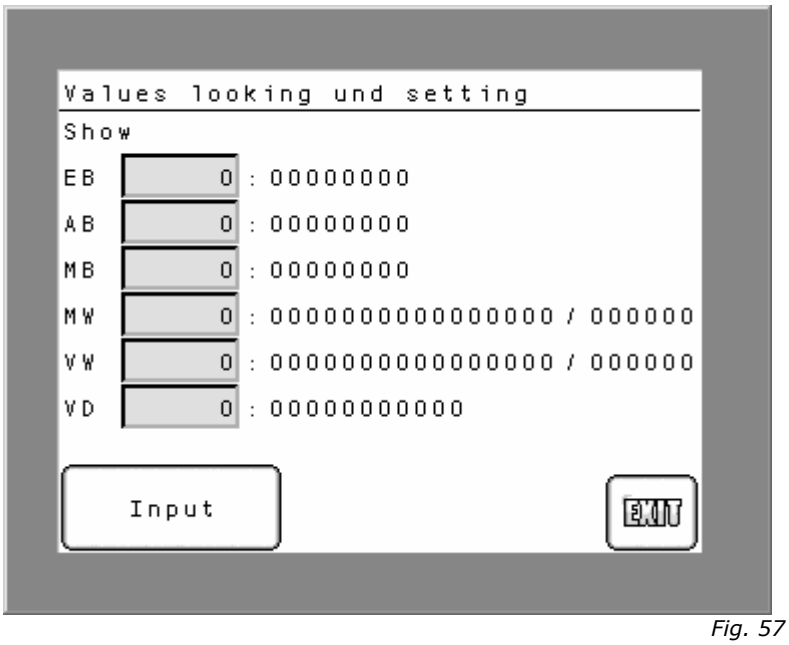
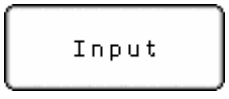


Fig. 57
Monitoring of variables

Enter the memory area in the fields which you want to see.



to the window "Monitor variables"

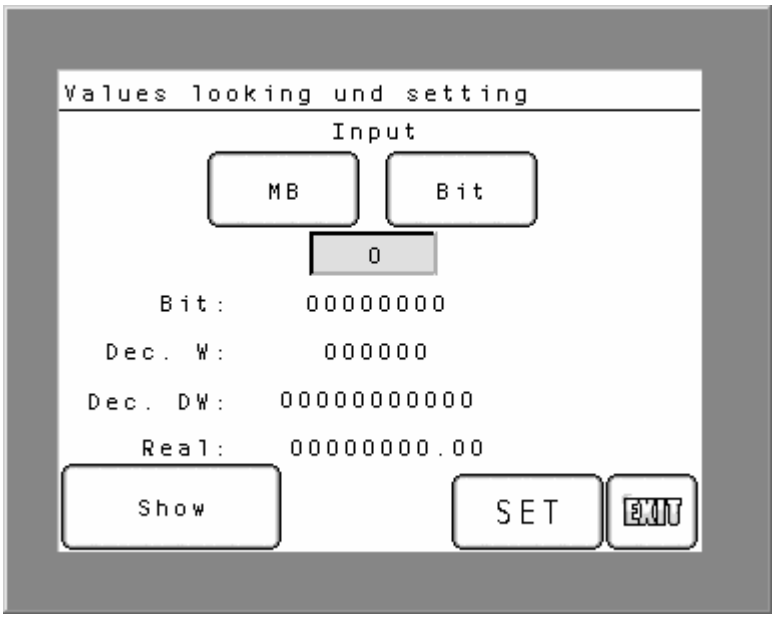


Рис. 58
Input of the variables

CAUTION

Only skilled persons and such who have a written approval by the manufacturer are permitted to use this menu.

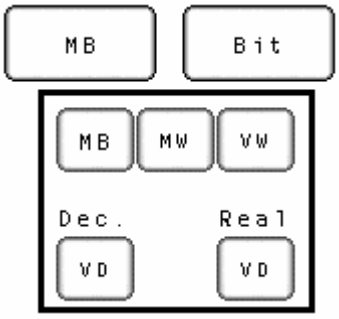
The CPL can be damaged if wrong values are entered in the memory.

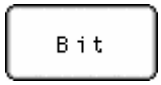
It is allowed to enter only such values which are approved by the manufacturer ALEBRO Dosier- und Umwelttechnik e. K.

In case of misuse of this menu ALEBRO Dosier- und Umwelttechnik e. K. assumes no liability for material and personal demages.

Choose memory area by pressing this key 

.



The type of variable can be chosen by this key 

.
The inscription on the key changes accoording to the selected type.

Bit: Transfer of digital values in the form of 0 and 1.
Touch the key "Set" and the adjusted value will be transferred in the memory.

Use for MB area.

Dec.: Transfer of digital values in the form of integer. Touch the key "Set" and the adjusted value will be transferred as Dec. W or Dec. DW in the memory.
Dec. W is used for the areas MW, VW
Dec. DW is used for the area VD.

Real: Transfer of digital values in the form of real number.
Touch the key "Set" and the adjusted value will be transferred in the memory.
Use for VD area.

Enter the memory arean in this field.

6.3.3 Check and simulation routine

Access: Service menu
Password: administrator password

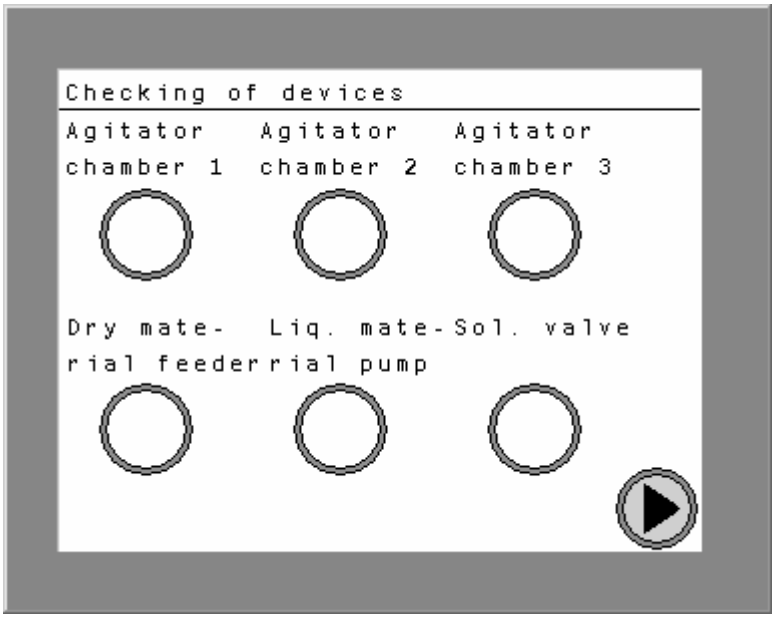


Fig. 59
Check of electrical units

This window is only used by the manufacturer during the final check.

To the next window

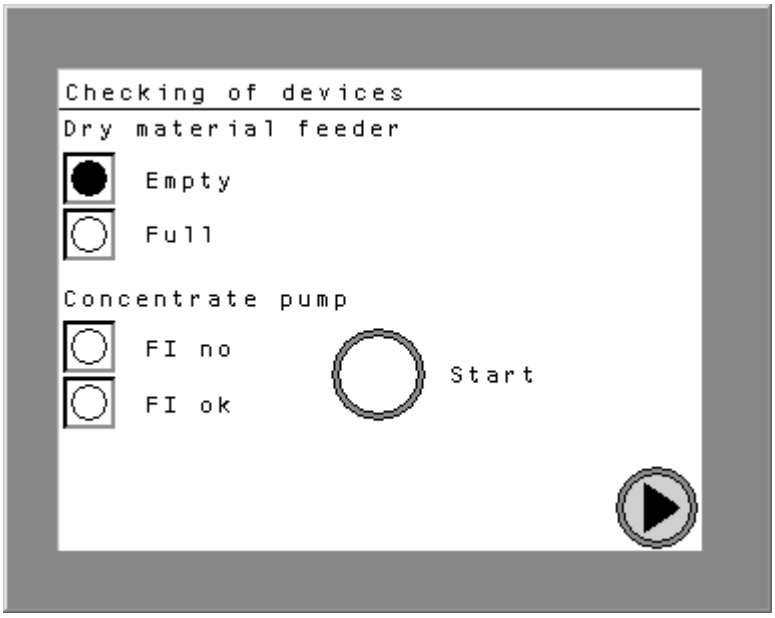


Fig. *60*
Sensor check

This window is only used by the manufacturer during the final check.

To the next window

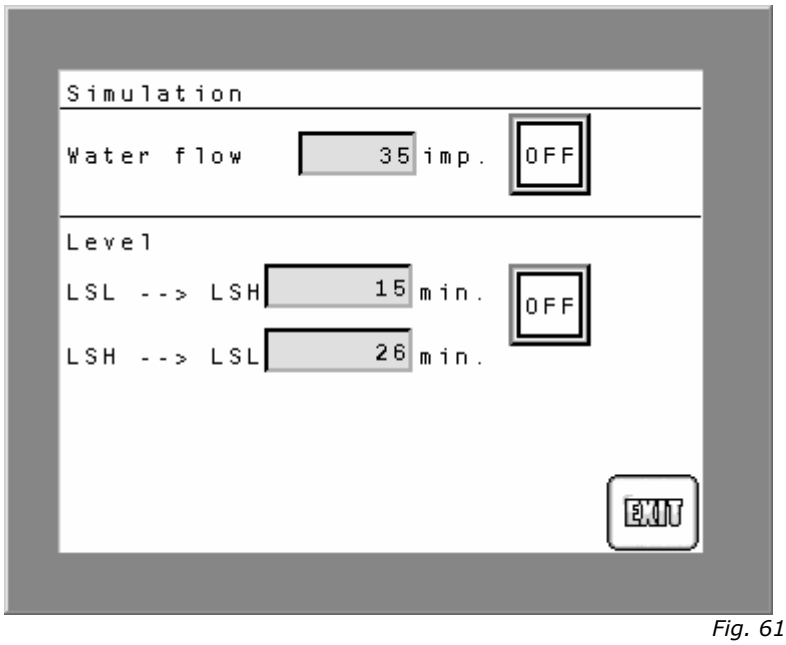


Fig. 61
Process simulation

The keys

OFF ON

switches off or on the simulation process and shows the current state of the device. The simulation process is necessary if the sensors are defective and the device operates half-automatically until the screens are exchanged.

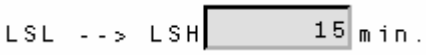
The simulation of water consumption is used to simulate the contact impulses of the water flow meter. At first the water flow rate should be adjusted to a constant value which corresponds to the set input impulse.
The water flow rate is calculated in the following way:

Water flow (l/h) = number of impulses x 100

Here: 35 impulses x 100 = 3500 l/h

The simulation of MAX and MIN levels in a certain elapsed time:
If the ultra-sonic level sensor is defective the device can operates in an automatic average operation. Therefor loading and withrawel times are adjusted.

LSLL → LSH – Loading time from MIN to MAX



And withdrawel time from MAX to MIN, LSH → LSL

In this case the loading process lasts 15 min. and the withdrawel process 26 min. Both, loading and withdrawel process, are executed in rotation according to adjusted time.

CAUTION

Although the loading and withdrawel process happen automatically, it is essential to control the operation all the time.

As the actual water flow and the actual withdrawel process can not correspond to adjusted values, overflow of the tank or dry run of the downstream pumps are possible if the device operates without control.

In this operation mode permanent control of the device has to be guaranteed.

6.3.4 Display parameters

Access: Service menu
Password: administrator password

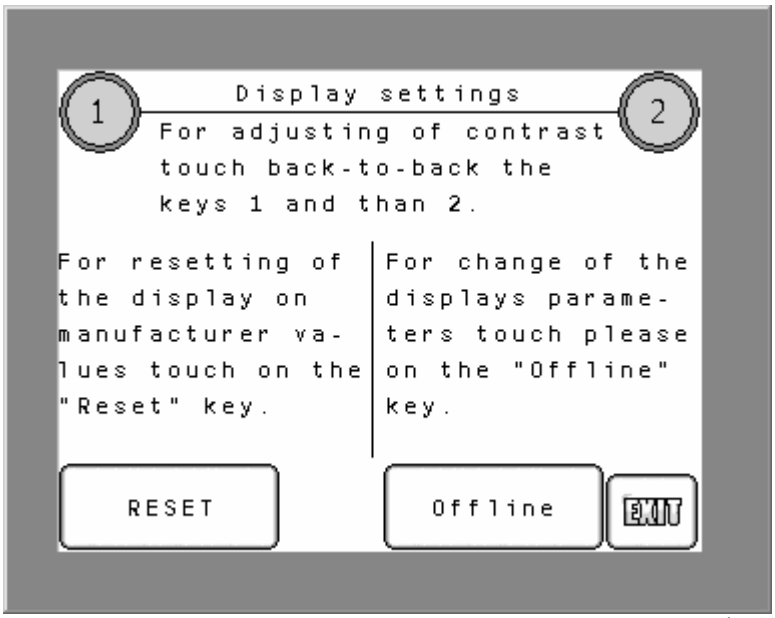


Fig. 62
Display parameters

Switching over to offline mode and changing of the system parameters of the display. Needed password: administrator passwort.

Reset to factory-set configuration.

<u>Contrast adjusting</u>
For changing the contrast of the display both keys 1 and 2 has to be pressed within 0.5 sec. one after the other.
The adjustment “bright” is shown in the lower part of the display.

Press the key 

to go to the screen “contrast”.
The contrast can be adjusted ba using the keys + and –.

Press the key  in order to leave the window for contrast adjusting.

7. Possible faults

In case of an alarm the system shows the type of the fault and the warning sign

"Fault messages" is flashing on the display. As the case may be the acoustic signal will be switched on.

Press on the flashing warning sign. The alarm side opens and shows the text indicator, date and time of the fault.
Press on the flashing horn key, the acoustic signal will be switched off.

Flashing alarm symbols remain on the display although the causes of malfunction have been already eliminated. For further operation or restart of the automatic operation it is neccessary to press the RESET or the flashing key

in order to acknowledge all faults.

Alarm window

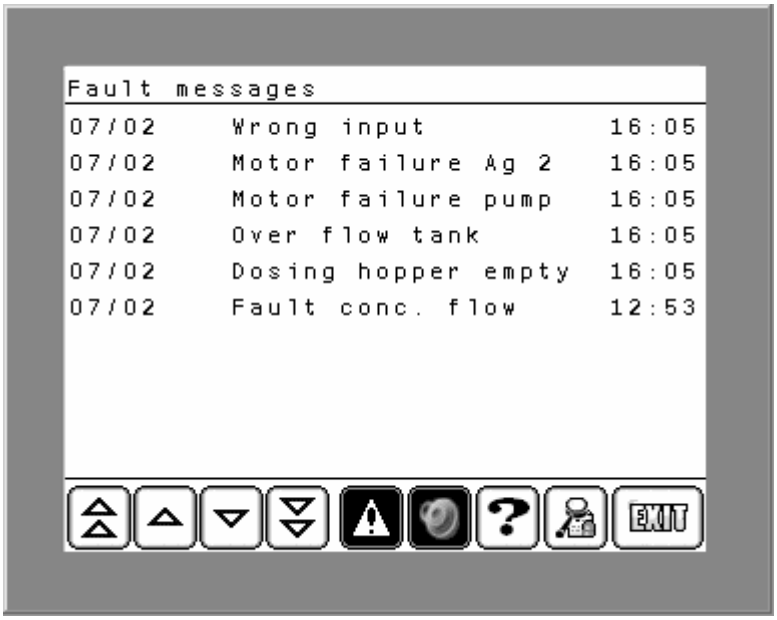


Fig. 63
Alarm window

Scroll up (next 10 signals above)

Go to the next signal above and highlight it

Go to the next signal below and highlight it

Scroll down (next 10 signals below)

RESET / Acknowledgement of alarm signals
Key is active after the entry of password.

Switching-off the acoustic signal

The key opens the help window of the accordant fault. The help window can be also opened by touching the fault directly.

It opens the chronological listing of faults.

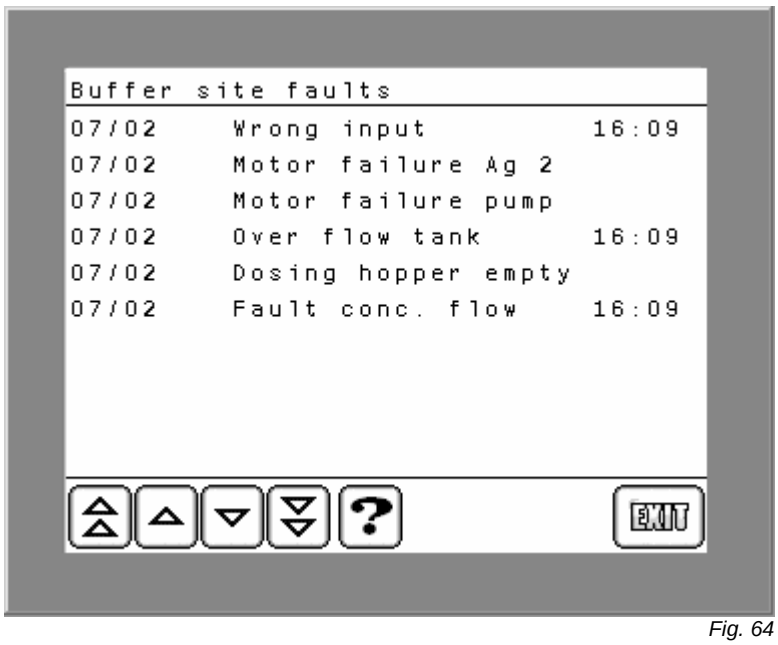


Fig. 64
Alarm buffer

The last 40 faults are saved in the alarm buffer. These can be called, if necessary. Each fault will be indicated with following add information: time and date of coming and time of going.

Description of possible faults

Wrong input of parameter

The input parameters are contradictory or missing, so that the device is not able to operates with them.

Check following settings:
- dosing capacity of the dry material feeder
- dosing capacity of the liquid chemical pump
- solution concentration
- consentration of the stock solution

These parameters do not have to equal 0.

Motor fault ag1
Motor fault ag2
Motor fault ag3
Motor fault DMF
Motor fault LPP

ag: agitator
DMF: dry material feeder
LPP: liquid chemical pump

In the PLC several motor-circuit switchs are build-in which protect the motors against overcharge and short-circuit. If one of these faults appears the motor is being switched-off.

- Check motor and cabling for overload and short-circuit.
- Check the nominal current at the motor protector.
- If necessary, restart automatic operation.

Circuit breaker

An over current release in the control panel has responded (-F41).

- Search and eliminate the cause.
- Switch on the over current release.
- If necessary, restart automatic operation.

Dry run chamber 3

Dosing chamber is empty.

- Check the water amount.
- Check the amount of chemicals and fill level of dry material
- Check the dosing capacity of downstream dosing pumps. Perhaps the withdrawal is higher than preparation of solution.
- If necessary, restart automatic operation.

Tank Overflow

Overflow of the dosing chamber

- Check the solenoid valve; eliminate dirty accumulations, if necessary.
- Check the level sensors and the corresponding relays, repair them if necessary.
- This fault can be acknowledged, as soon as the level fills lower the limit LSA++.
- **Acknowledge the fault.**
- If necessary, start automatic operation.

– Remove the overflown solution, if necessary.

Minimum level of dry material

Minimum level of dry material in the dosing chamber

The level sensor in the hopper of the dry material feeder indicates a possible lack of chemicals. Automatic operation stopps after the adjusted off-delay time Tn has expired.

– Refill dry material.
– If necessary, restart automatic operation.

Empty dosing tank

The dosing tank is empty.

Automatic operation stopps after the adjusted off-delay time Tn has expired. The dosing tank is completely empty.

– Refill dry material.
– If necessary, restart automatic operation.

Minimum water flow

The flow rate in the operating water device is under the minimum allowable level.

– Check the limit value that has been put in.
– Check shut-off valves and the pressure reducing valve.
– Eliminate pressure fluctuations or dirty accumulations.
– **Acknowledge the error message.**
– If necessary, restart automatic operation.

Maximum water flow

The flow rate in the operating water device is above the maximum allowable level.

– Check the limit value that has been put in.
– Check shut-off valves and the pressure reducing valve.
– Eliminate pressure fluctuations.
– Reduce the water supply.
– **Acknowledge the error message.**
– If necessary, restart automatic operation.

Fault flow rate

Flow rate is too low.

– Refill the liquid chemicals if there is a lack of liquid chemicals.
– Check the liquid chemical pump and the lines
– Eliminate faults or dirty accumulations, if necessary.
– **Acknowledge the error message.**
– If necessary, restart automatic operation.

8. Maintenance

WARNING

Work on the control panel and on electrical devices may only be executed by authorized qualified personnel.

Before doing work on the control panel and on electrical devices, switch off the mains power or disconnect the control panel from the mains!

Before doing work on mechanical parts, switch off mains switch at the control panel!!

Cleaning and maintenance rates:

Checking the drip trap	daily clean it if necessary
Checking the injection funnel	weekly clean it if necessary
Checking the metering worm	weekly clean it if necessary
Cleaning of the tank	clean it when required

8.1 Cleaning the drip trap

The degree of pollution of the drip trap in the pressure reduction valve shows if it is necessary to clean it. If the drip trap is polluted to two-thirds, it is time for the cleaning process.

- Switch off the system.
- Close the shut-off valve.
- Unscrew the cap at the lower side of the pressure reducing valve.
- Take out the drip trap and clean it.
- Remount the drip trap and the cap.
- Switch on the system.

8.2 Cleaning injection funnel

Clean the injection funnel with water and dry it before assembling.

8.3 Cleaning or replacing the metering worm

The dosing worm has to be controlled in fix intervals. If the dosing worm is clotted with dry material, clean it direct in the jet mixer
If the degree of the pollution is very high, the dosing worm has to be demounted and cleaned.

8.4 Cleaning of the tank

Spillaged dry material has to remove immediately, because it becomes slippery when contacting humidity. To avoid accidents the covering of the tank should be cleaned in certain intervals.

8.5 Decommissioning of the unit

For decommissioning do following works:
1. empty all three chambers;
2. empty the dry material hopper;
3. clean the tank with water;
4. switch off the main switch
If necessary, interlock the main switch to avoid an unauthorized switching-on.

9. Technical Data

MixLine MX7300 is a fully-automatic system for continuous preparation of solutions of dry and liquid materials.

The device is made for preparation of solutions which need a certain ripening time, i.e. polyelectrolytes / flocculants.

In according to that the device can be used for preparation of salt and coagulant solutions which are not very polluted.

Stock solution as well as used solutions with determined concentrations can be prepared (standard presetting: range of viscosity from 0.05% - 0.6% for focculants).
The maximum permitted viscosity of the solution has to be observed and must not be higher than 2500 mPas.
The data for viscosity can be seen in application data sheets from the chamicals supplier.

The ripening time within the preparation of the chemical solution is dependent on issue quantity and the volume of the tank. The time is approx. 60 min, if the unit works with max. capacity. The unit capacities vary from 1000 l/h to 10.000 l/h.

The unit is suited for many applications: for drinking water preparation, for waste water treatment, etc.

Type of the unit MixLine 7300 -	**1000**	**2000**	**4000**	**6000**	**8000**	**10000**
*Max. preparation capacity (l/h) (at a ripening time of 60 min) **	1000	2000	4000	6000	8000	10000
*Power consumption (kW)***	2,65	2,65	3,50	5,50	6,30	6,30
Operating water connection (")	3/4	1	1 ¼	1 ½	1 ½	2
Withdrawal line connection (DN)	50	50	50	65	65	65
Discharge line connection (DN))	50	50	50	50	50	50
Connection of liquid chemicals (di) mm	19	19	19	19	19	19
Nominal flow of the operating water (l/h))	2000-3000	3500-6000	6000-10000	8000-15000	10000-15000	15000-25000
Dosing capacity of dry material (kg/h)	approx. 22,0	approx. 45,0	approx. 55,0	approx. 100,0	approx. 150,0	approx. 240,0
Dosing capacity of liquid chemicals (l/h))	30 – 100	30 – 100	50 – 250	50 - 250	200-450	200-450
Empty weight (kg)	225	275	550	750	890	980

* In case of lower preparation capacity the ripening time is longer. In case of shorter ripening time the preparation capacity is higher.

** The electrical power consumption is applied for a unit with 3 agitators

Water quality: process water has the quality of drinking water without contamination
Ideal: use of drinking water
When using the water of the cleaning process or other liquid waste without satisfactory cleaning, flakes accumulates in the third chamber. That can cause a higher degree of pollution and an oftener cleaning necessity.

Pressure of process water: in the range from 1.5 up to 10 bar

Solution concentration: 0.05% - 0.60% (factory-set configuration)
Flocculant 0.01% - 1%
Other chemicals as ordered

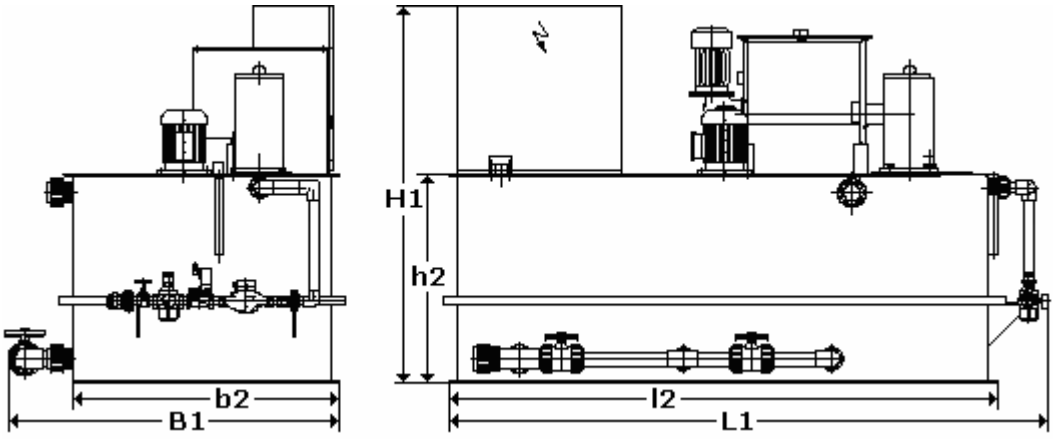
Max. allowable viscosity: 2500 mPas (standard configuration)
5000 mPas (configuration with gear- agitators)

Motor brands:
Agitators AC Motore (Germany)
Dry material feeder NORD (Germany)
Liquid chemical pump NORD (Germany)

If requested it is possible to use another motor brand, such as Siemens, ABB etc.

Materials contacting the medium:
Tank Polypropylene
Connections and lines *PVC und EPDM*
Water line unit *Бронза/ПВХ*
Dry material feeder *1.4301*
Shaft and propeller of agitator *1.4571*

Device dimensions



Type of the unit MixLine 7300 – *dimensions (mm)*	**1000**	**2000**	**4000**	**6000**	**8000**	**10000**
L1	2200	2200	3300	3300	4300	4300
l2	2000	2000	3000	3000	4000	4000
B1	1200	1200	1350	1900	1900	2300
b2	1000	1000	1000	1500	1500	2000
H1	1370	1940	2250	2250	2250	2250
h2	770	1340	1720	1720	1720	1520

Control panel Rittal, RAL 7035, 600x600x210mm
CPL Siemens S7-224XP
Touch Screen Display Proface AGP3302

10. Spare parts

10.1 Agitators

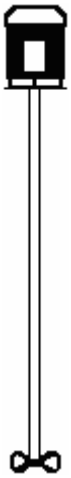
Agitator in the first chamber (Preparation chamber)
Amount of propellers: 2
Material of shaft and propeller: 1.4571

MX7300-1000
Motor: 0,55kW, 220-240/380-420V, 50-60Hz, IP55/F, cos φ 0.72, 900/1200 Upm
Shaft length: 620mm
Part number: ***47.7000-101***

MX7300-2000
Motor: 0,55kW, 220-240/380-420V, 50-60Hz, IP55/F, cos φ 0.72, 900/1200 Upm
Shaft length: 1000mm
Part number: ***47.7000-201***

MX7300-4000 / MX7300-6000
Motor: 1,5kW, 220-240/380-420V, 50-60Hz, IP55/F, cos φ 0.72, 900/1200 Upm
Shaft length: 1290mm
Part number: ***47.7000-401***

MX7300-8000 / MX7300-10000
Motor: 2,2kW, 220-240/380-420V, 50-60Hz, IP55/F, cos φ 0.72, 900/1200 Upm Shaft length: 1290mm
Part number: ***47.7000-801***



Agitators in second and third chamer (ripening and dosing chamber)
Amount of propellers: 1
Material of shaft and propeller: 1.4571

MX7300-1000
Motor: 0,55kW, 220-240/380-420V, 50-60Hz, IP55/F, cos φ 0.72, 900/1200 Upm
Shaft length: 620mm
Part number: ***47.7000-102***

MX7300-2000
Motor: 0,55kW, 220-240/380-420V, 50-60Hz, IP55/F, cos φ 0.72, 900/1200 Upm
Shaft length: 1000mm
Part number: ***47.7000-202***

MX7300-4000
Motor: 0,55kW, 220-240/380-420V, 50-60Hz, IP55/F, cos φ 0.72, 900/1200 Upm
Shaft length: 1290mm
Part number: ***47.7000-402***

MX7300-6000 / MX7300-8000 / MX7300-10000
Motor: 1,5kW, 220-240/380-420V, 50-60Hz, IP55/F, cos φ 0.72, 900/1200 Upm
Shaft lenght: 1290mm
Part number: ***47.7000-802***

10.2 Dry material feeder

Dosing worm
Material: stainless steel 1.4301

MX7300-1000 / MX7300-2000
Worm diameter 30mm
Part number: **79.008-30**

MX7300-4000 / MX7300-6000
Worm diameter 40mm
Part number: **79.0008-*40***

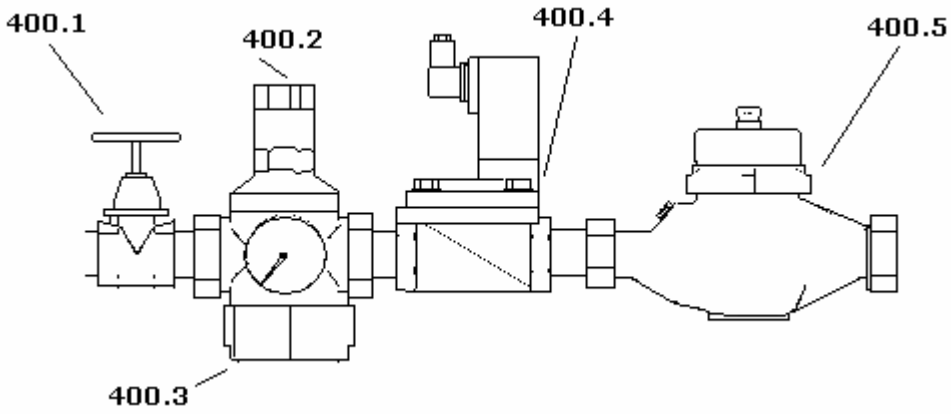
MX7300-8000 / MX7300-10000
Worm diameter 60mm
Part number: **79.0008-*60***

Spiral pin
Part number: **32.9001-1**

Heater band
Part number: **45.9503-01**

Capacitive level sensor
Part number: **46.0005**

10.3 Water line unit



Spare strainer for pressure reduction valve (Pos. 400.3)

MX7300-1000 / MX7300-2000
Part number: **31.103-1**

MX7300-4000 / MX7300-6000 / MX7300-8000
Part number: **31.103-11/2**

Solenoid valve (pos. 400.4)

MX7300-1000
Part number: **31.701-3/4**

MX7300-2000
Part number: **31.701-1**

MX7300-4000
Part number: **31.701-11/4**

MX7300-6000 / MX7300-8000
Part number: **31.701-11/2**

MX7300-10000
Part number: **31.701-2**

Water flow counter (400.5)

MX7300-1000
Part number: **31.702-3/4**

MX7300-2000
Part number: **31.702-1**

MX7300-4000
Part number: **31.702-11/4**

MX7300-6000 / MX7300-8000 / MX7300-10000
Part number: **31.702-11/2**

Water flow counter spare contact
Part number: **31.702-100**

10.4 Set of spare parts

Set of spare parts for

Type	2 years	5 years
MX7300-1000	**73.7301-2**	**73.7301-5**
MX7300-2000	**73.7302-2**	**73.7302-5**
MX7300-4000	**73.7304-2**	**73.7304-5**
MX7300-6000	**73.7306-2**	**73.7306-5**
MX7300-8000	**73.7308-2**	**73.7308-5**
MX7300-10000	**73.7310-2**	**73.7310-5**

11. Declaration of conformity

CE

EC declaration of conformity

In the sense of EC Directive engines 98/37/EG

Construction of product series

Preparation system for solutions of organic and non-organic chemicals

MixLine 7300 – 1000
MixLine 7300 – 2000
MixLine 7300 – 4000
MixLine 7300 – 6000
MixLine 7300 – 8000
MixLine 7300 – 10000

These were developed, constructed and produced in agreement with the EC Directive 98/37/EG. The sole responsibility is beared by

ALEBRO Dosier- und Umwelttechnik e. K.
Heinkelstr. 20A
D-76461 Muggensturm

The following consorted norms were applied:

- DIN EN 292: Plant safety Part 1 and 2
- DIN EN 60204-1: Electrical construction of engines and units

Technical documentation and operation manual are existent.

- In original.

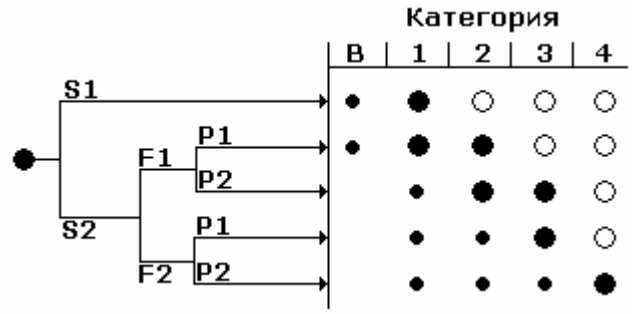
Muggensturm, 10.08.2007

General manager / constructor

Alexander Brot

In case of changes on the unit that are not arranged with us this declaration loses its validity.

12. Risk analysis



S **Severity of injuries**
S1 light injuries (generally reversible)
S2 severe injuries (generally irreversible), death included

F **Frequency and / or duration of danger exposition**
F1 rare up to often and / or short duration of exposition
F2 frequent up to permanent and / or long duration of exposition

P **Possibility to avoid dangers**
P1 possible under certain conditions
P2 little possible

Selection of category

B, 1 to 4	Category for safety control parts
●	Prefered categories for reference points
•	Possible categories that require measures
○	Measures which can be overdimensioned concerning the appropriate risk

Unit of the type MixLine 7300

S1 In case of careless appliance of rules for accident prevention light bruises and bulge capabilities are possible.

Selection of category

Category 1 The safety of the unit is achieved by applying of approved components and safety principles.
Electrocution is minimized and nearly impossible.
According to EC Directive the use of emergency-stop is not necessary.
The main switch has a red-yellow handhold (emergency-stop).