BigFarmNet manager

MillAndMix*pro*

Code No. 99-94-0805 GB

Edition: 11/2025 V 6.0

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1 System description

The **MillAndMix*pro*** control software is an application of the computer-based BigFarmNet Manager and executed on a **510*pro* control computer**.

The **MillAndMix*pro*** control software is used to control **MillAndMix** systems. **MillAndMix** systems process grains to produce mixed feed. The functions that need to be controlled are

- drying,
- weighing,
- milling,
- mixing,
- conveying.

1.1 Software version

Software version 5.0

1.2 Licenses

The following software licenses are **required**:

Code no.	BigFarmNet Manager license	Use
91-02-6500	BigFarmNet Manager – basic installation software	1 per BigFarmNet network
91-02-6617	License 510 – BigFarmNet Mill&Mix	

1.3 System limits

0 - 2	Mixing towers with optional pre- and post-bins
1 – ∞	Mill pre-bins
3	Mills per mill pre-bin
2	Inline mills
10	Liquid silos / liquid tanks
1 – ∞	Dosing silos
0 – ∞	Mineral dosing units
1 – ∞	Micromineral dosing units
0 – ∞	Target silos
5	Truck pits
5	Silo groups with max. 30 silos per group

2 Setting up the BFN Manager PC and 510pro control computer

NOTICE!

Only service technicians may install and configure the control computer.

Figure 2-1: Control computer 510*pro*

To set up the 501*pro* control computer and the BFN Manager PC,

1. connect the 501*pro* control computer to the network,
2. check the communication between the 501*pro* control computer and the BFN Manager PC,
3. register the 501*pro* control computer in BFN Manager,
4. install the BFN software on the 501*pro* control computer,
5. assign the MillAndMix application to the 501*pro* control computer and the farm structure in BFN Manager,
6. assign the electrical parts of the MillAndMix system to the IO cards in the IO Manager.

NOTICE!

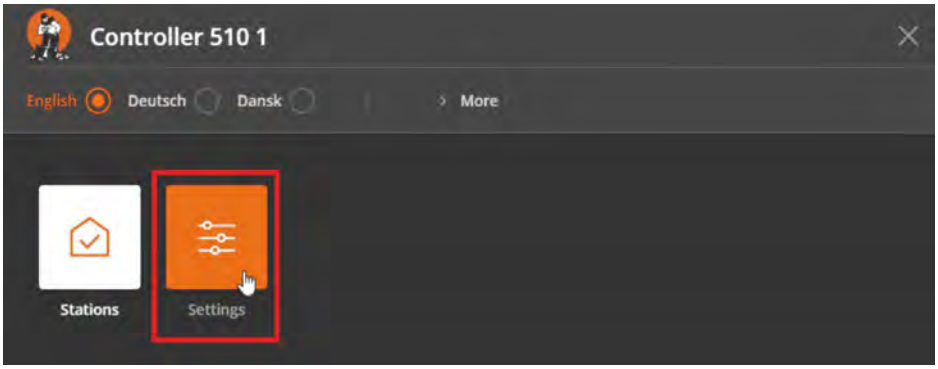
The operator's IT administrator is responsible for defining the static IP addresses.

NOTICE!

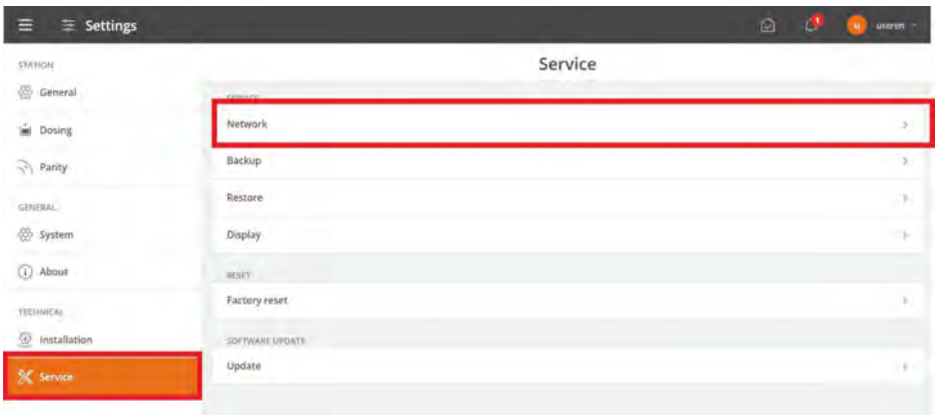
Please contact the customer's IT administrator to determine the IP addresses in the network.

2.1 Connecting the 510pro control computer to the network (assigning a static IP address)

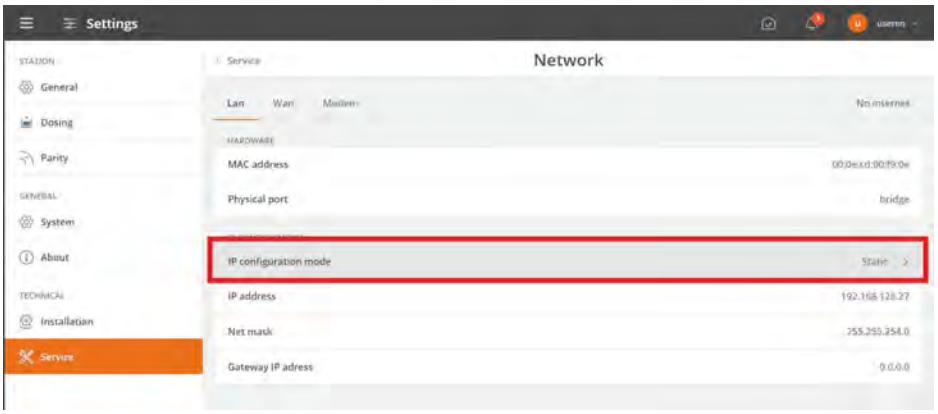
1. On the start screen, tap on **Settings**.



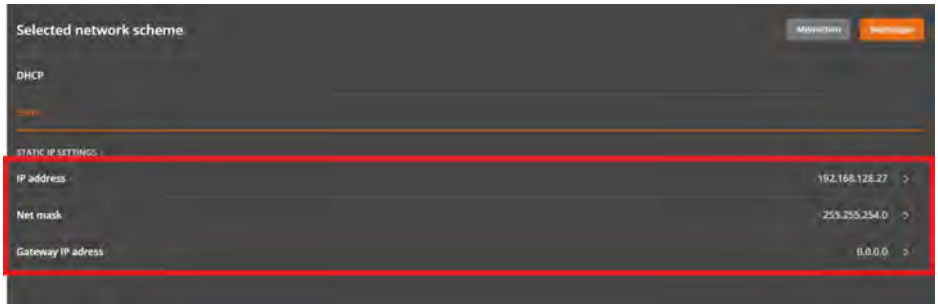
2. Tap on **Service** and then on **Network**.



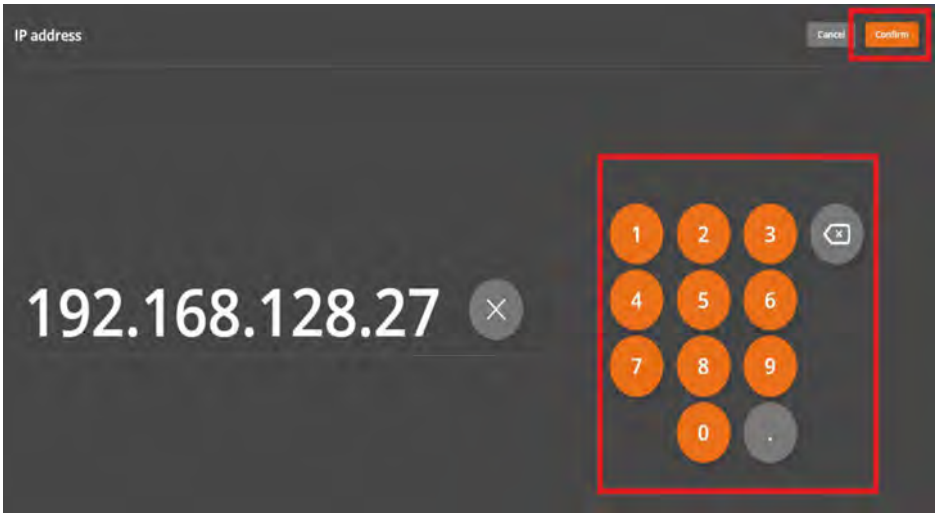
3. Tap on **IP configuration mode**.


Settings
Network
General
Dosing
Parity
System
About
Installation
Service
Lan
MAC address
Physical port
bridge
IP configuration mode
Static
IP address
192.168.128.27
Net mask
255.255.254.0
Gateway IP adress
0.0.0.0

4. Under "Selected network scheme", make sure that **Static** is selected.
5. Tap on **IP address**.



6. Enter the IP address defined for this control computer. Complete your input by tapping on **Confirm**.



7. Continue in this manner to enter the values for **Net mask** and **Gateway IP address**.

2.2 Manager PC: assigning a static IP address

NOTICE!

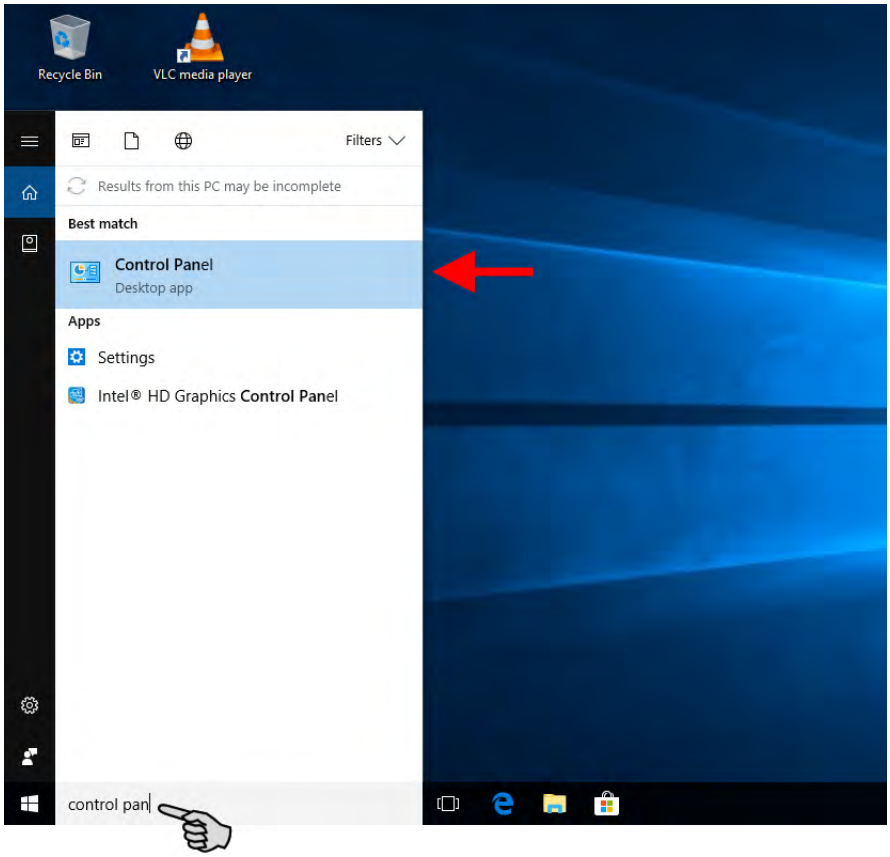
A static IP address must be assigned to the BFN Manager PC.

If necessary, assign this address via the network settings in the Windows control panel before setting up the 501*pro* control computer.

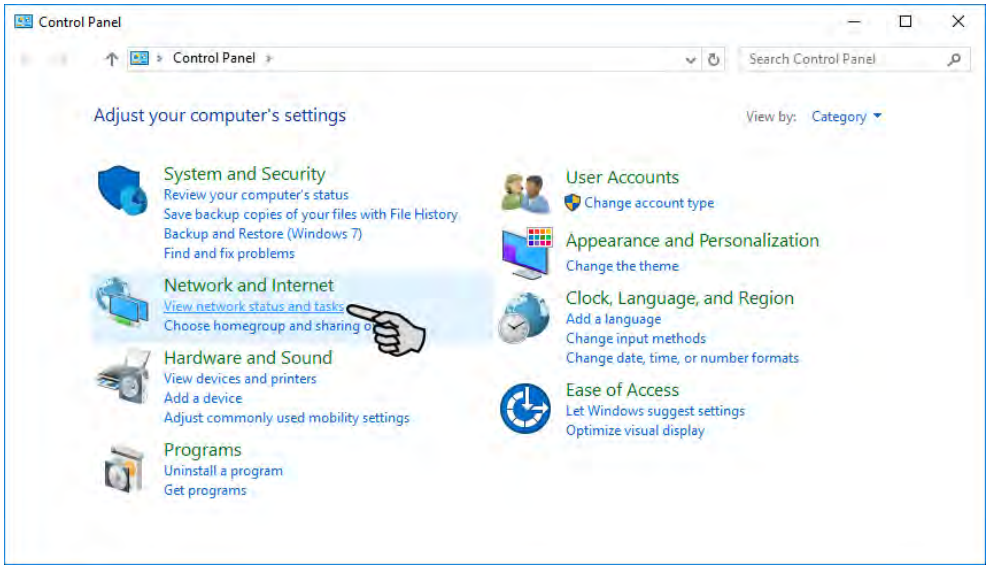
Assign a static IP address to the PC on which BigFarmNet Manager is installed or will be installed. The following steps correspond to the Windows 10 operating system.

Windows 10 operating system

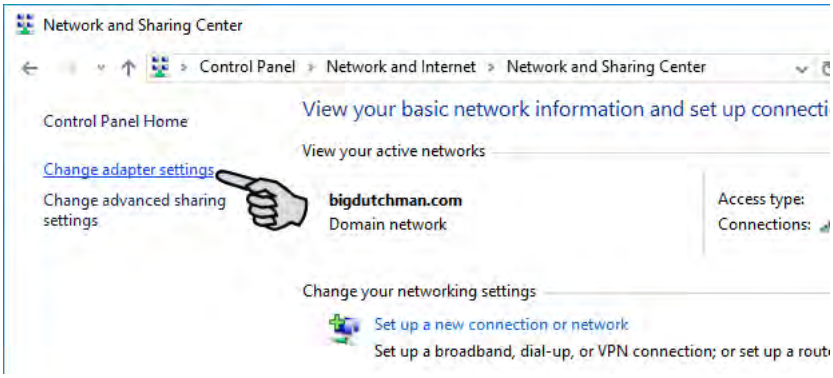
1. Open the **Control Panel** using the search field in the task bar.



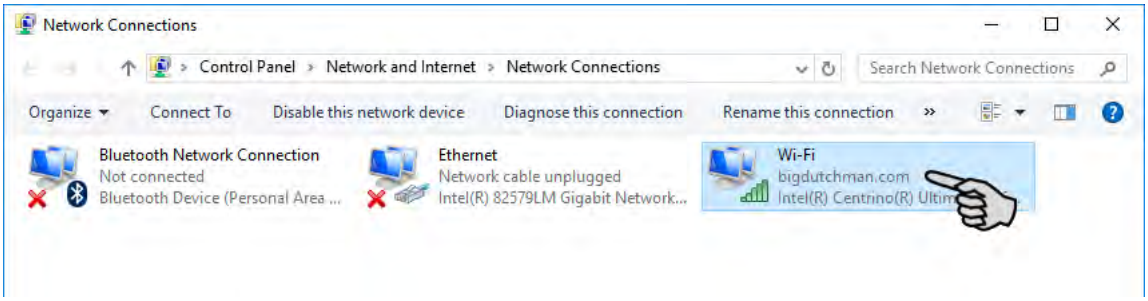
2. Click on **View network status and tasks** under **Network and Internet**.



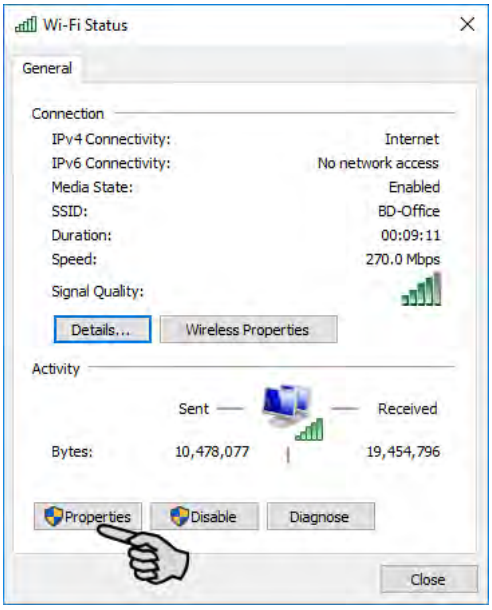
3. Click on **Change adapter settings**.



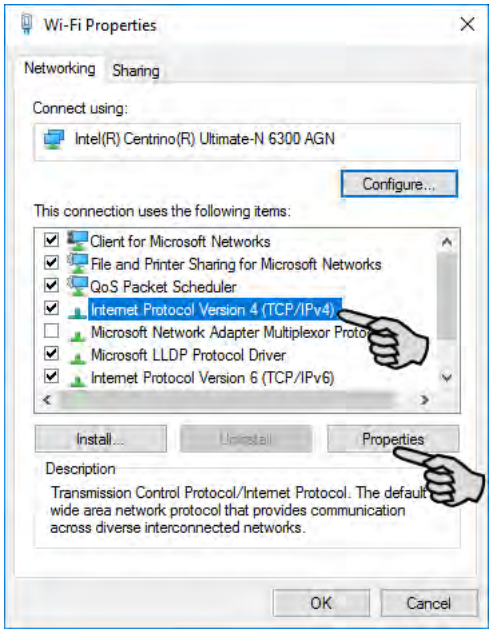
4. Double-click on **Wi-Fi**.



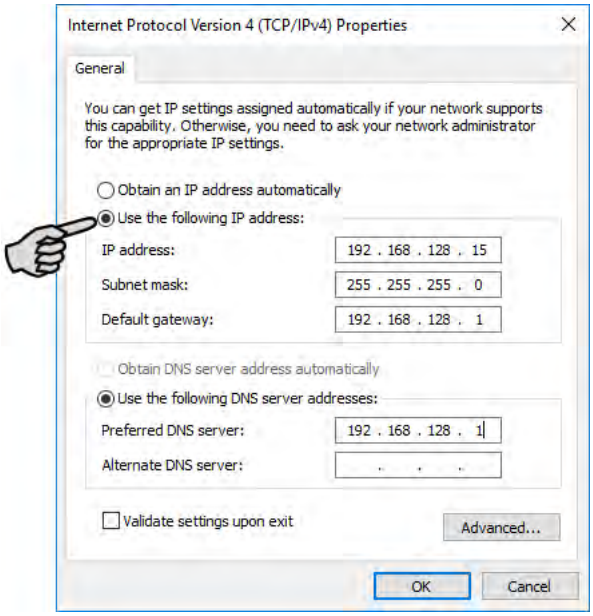
5. Click on **Properties**.



6. Select **Internet Protocol Version 4 (TCP/IPv4)** and click on **Properties**.



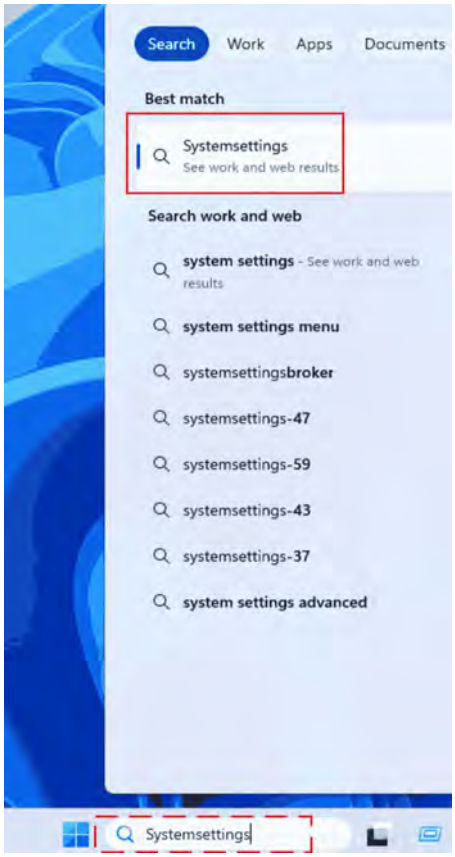
7. Enter a static IP address.



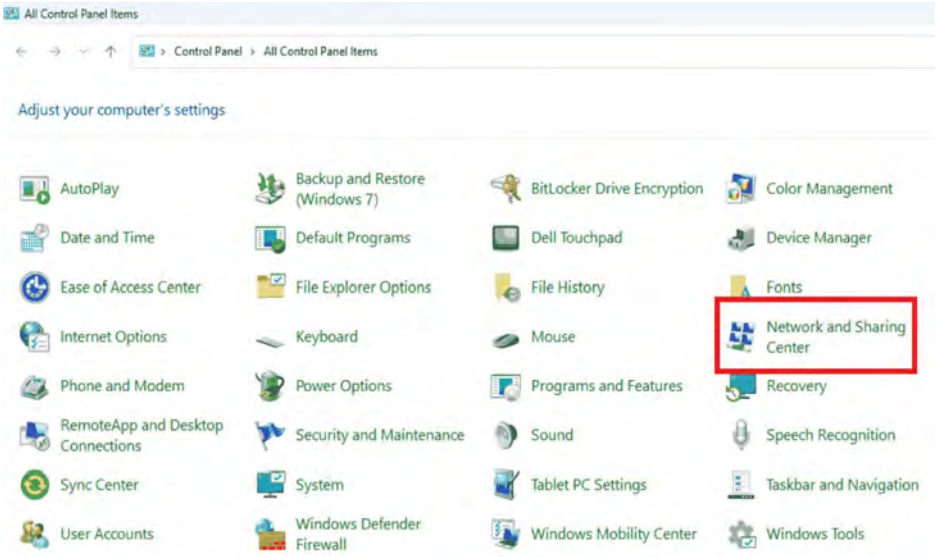
8. Confirm these inputs by clicking on **OK**.

Windows 11 operating system

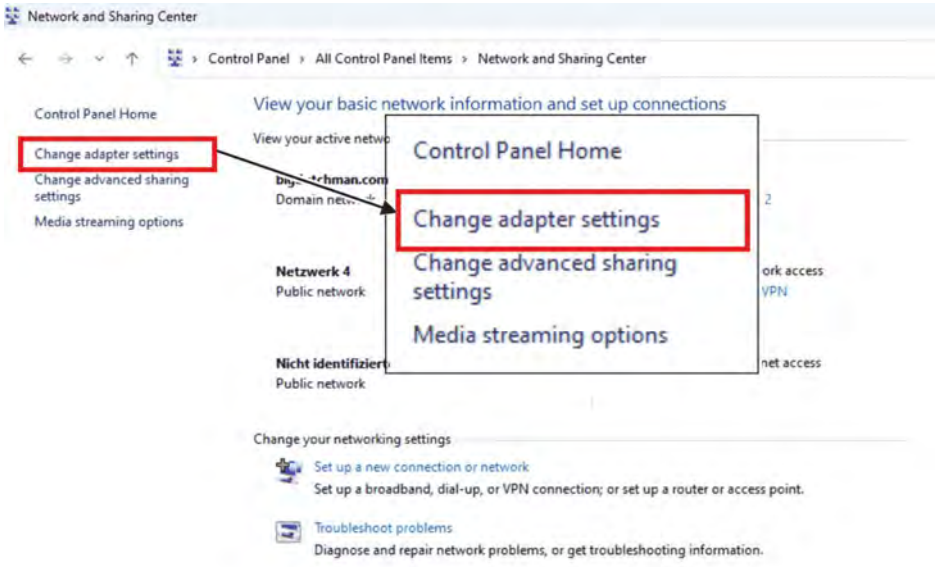
1. Open the **Control Panel** using the search field in the task bar.



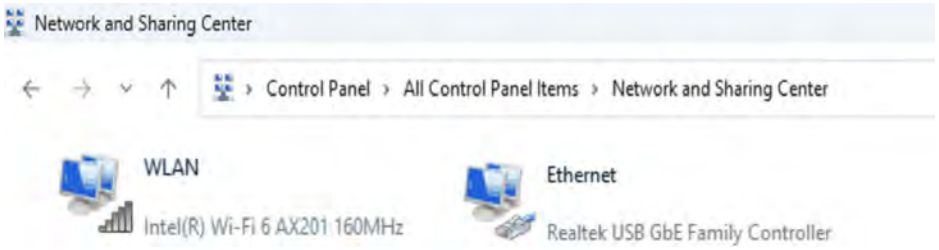
2. Click on **Network and Sharing Center**.



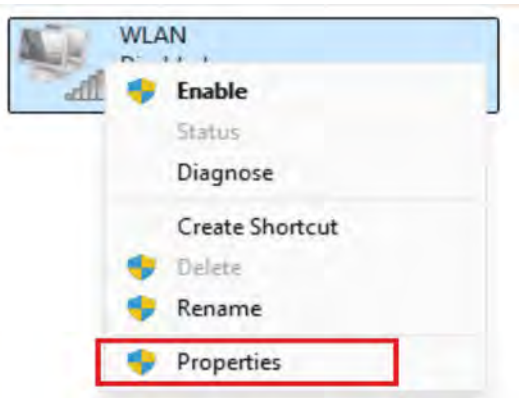
3. Click on **Change adapter settings**.



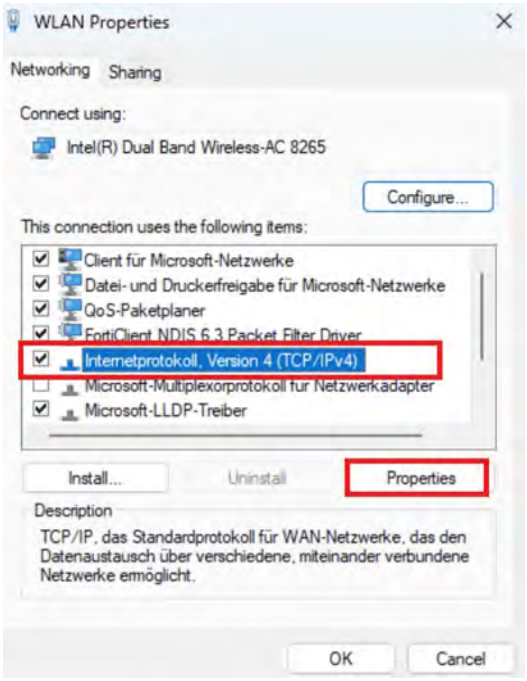
4. Select the correct adapter.



5. Click on **Properties**.



6. Select **Internet Protocol Version 4 (TCP/IPv4)** and click on **Properties**.

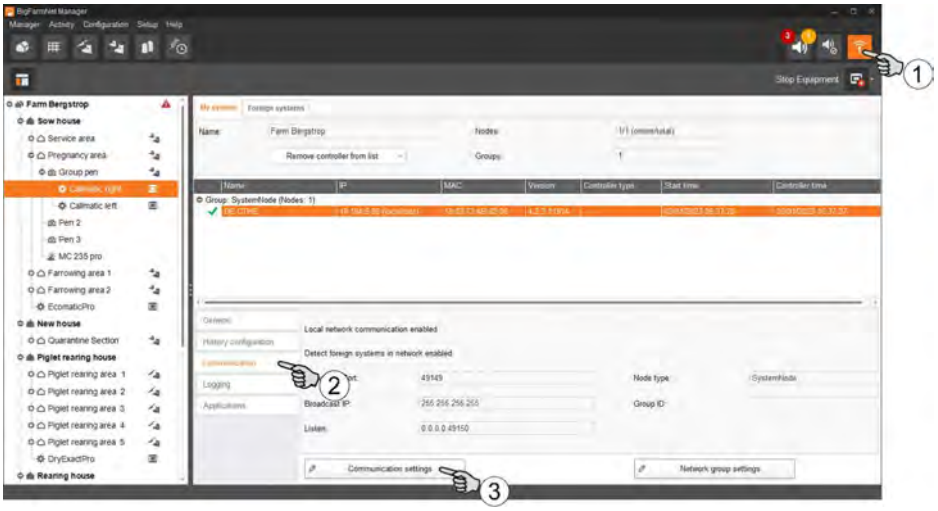


7. Enter the values for **IP address** and **Subnet mask**.

8. Confirm these inputs by clicking on **OK**.

2.3 Assigning a network card

The network card is read during the first start of BigFarmNet Manager. Its assignment can be changed later on as follows:



1. Click on the network icon.
2. Click on "Communication".
3. Click on "Communication settings".
4. Select the correct network interface. The first three octets of the IP address must match those you have entered for the Manager PC beforehand.

5. Click on "OK" to accept these settings.

2.4 Testing the communication between control computer and BFN Manager PC

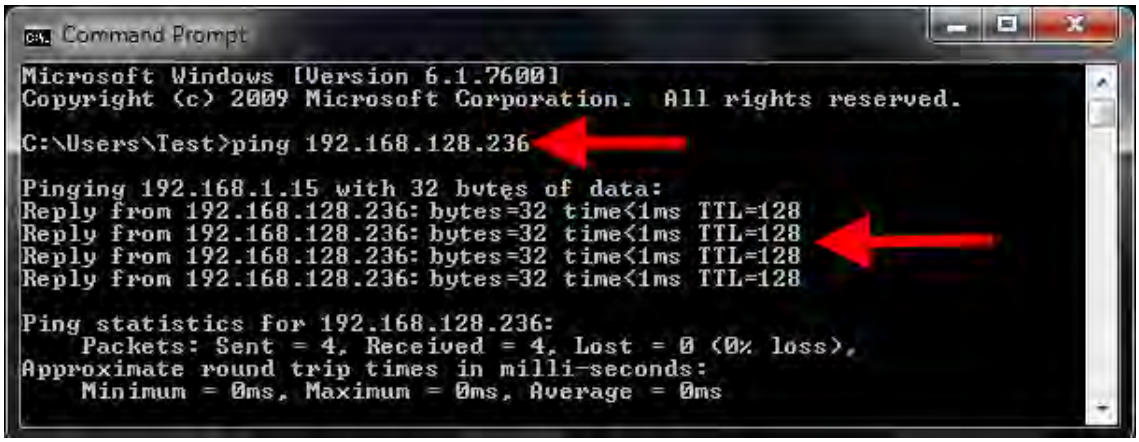
Use the "ping" command to check whether the control computer is available in the network.

Enter the command into the console as follows: ping <IP address>

Example in the screenshot: ping 192.168.128.236

If the control computer replies, four lines with the following information will appear:

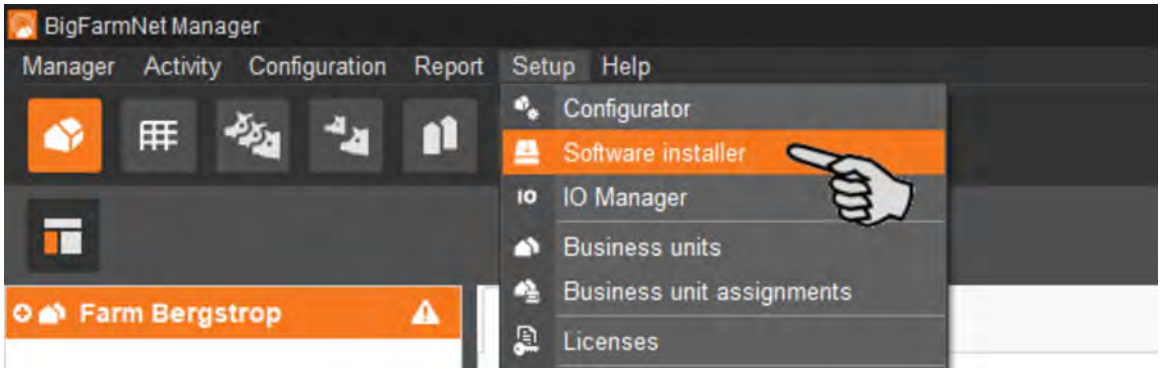
- IP address;
- packet size;
- required time;
- TTL (time to live).



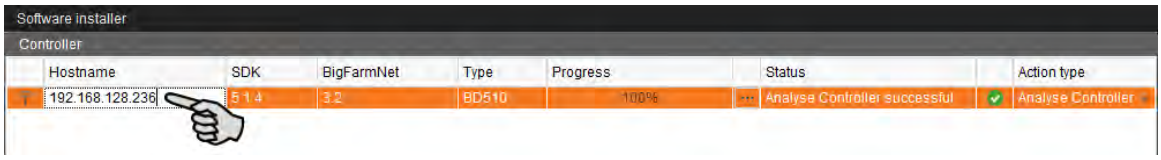
2.5 Installing the BFN software on the 510pro control computer

Upon delivery, the control computer has an operating system pre-installed. The corresponding BigFarmNet software must be installed additionally.

1. Click on "Software installer" in the "Setup" menu.

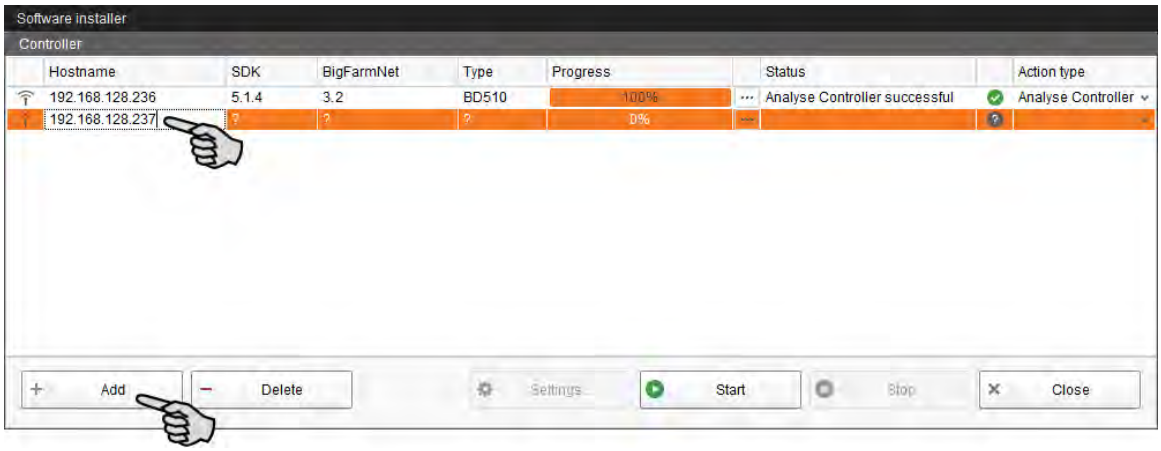


2. Enter the IP address of the control computer on which you want to install the software.



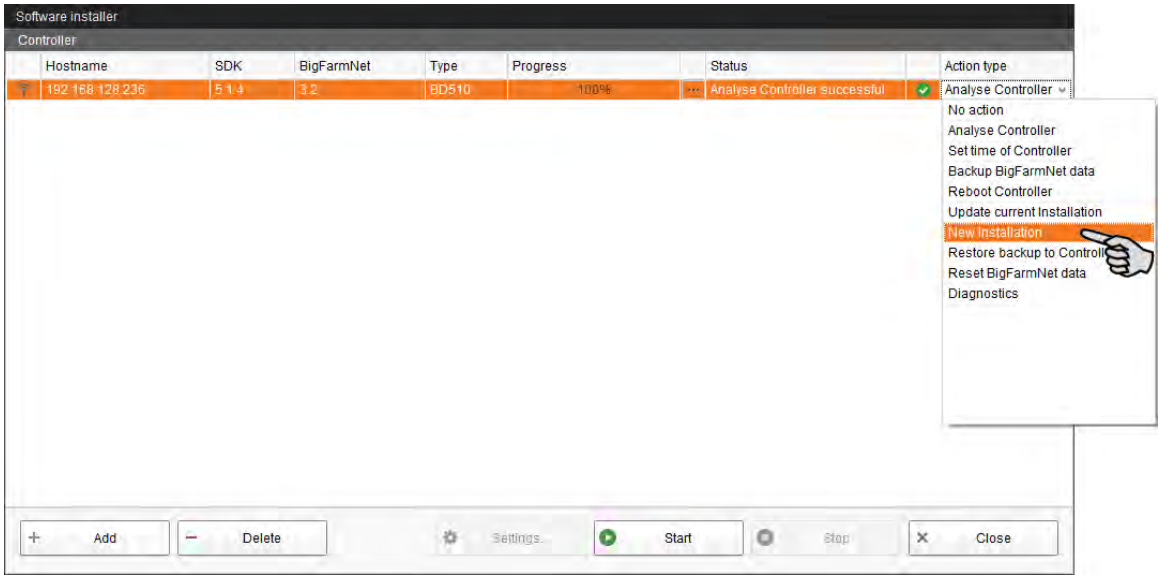
3. If necessary, add the desired number of control computers by clicking on "Add".

   This feature allows you to install the software simultaneously on multiple control computers. Each click on "Add" adds another control computer and the IP address increases by 1. However, you may change the IP address according to your wishes.



4. Click on a control computer to select it.

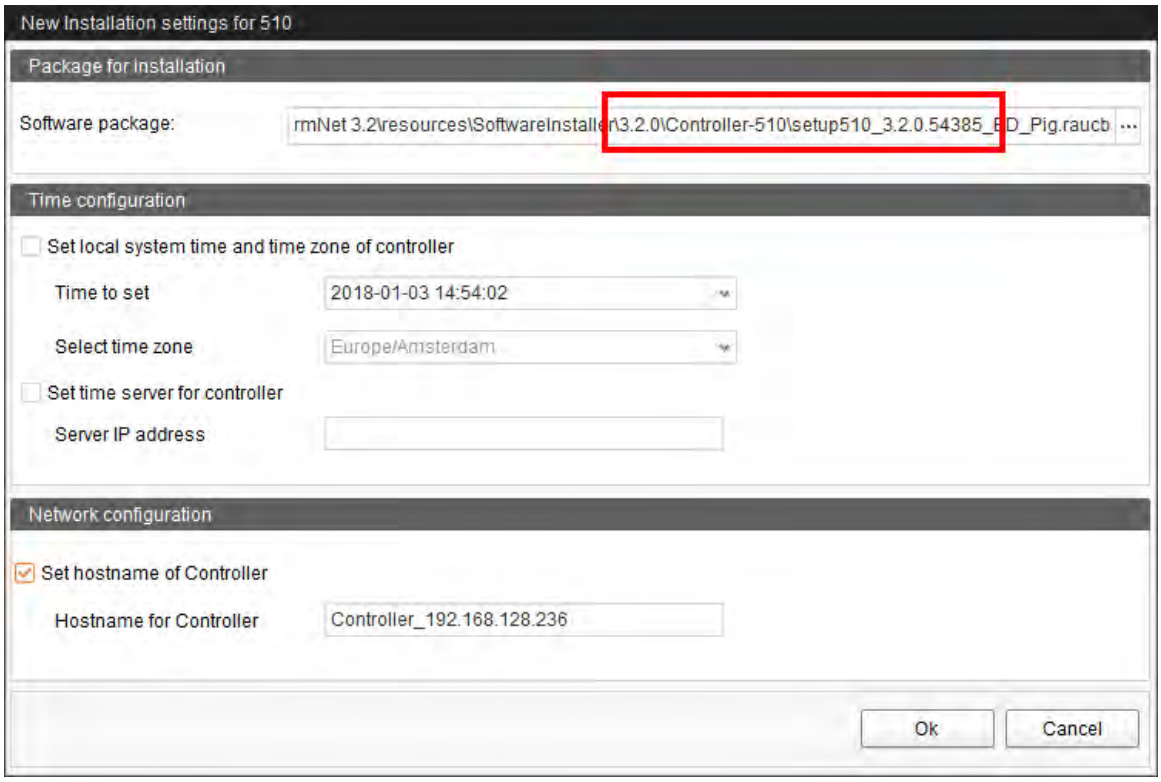
5. Click into the respective input field under "Action type" and select "New Installation".



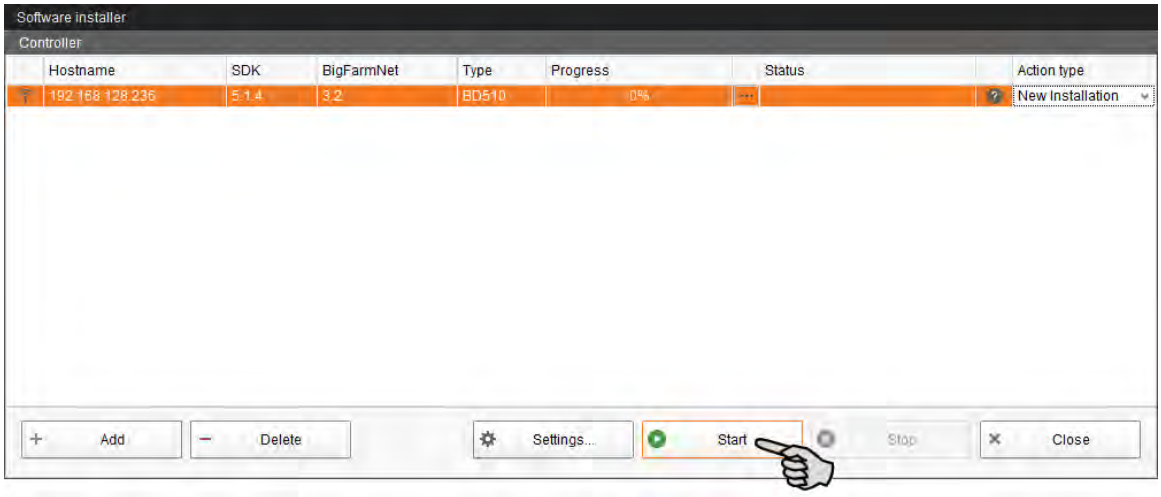
6. Click on "Settings" in the lower command bar of the dialog window.
7. Under "Software package", check whether the setup for the 510*pro* control computer is stored under the indicated path.

NOTICE!

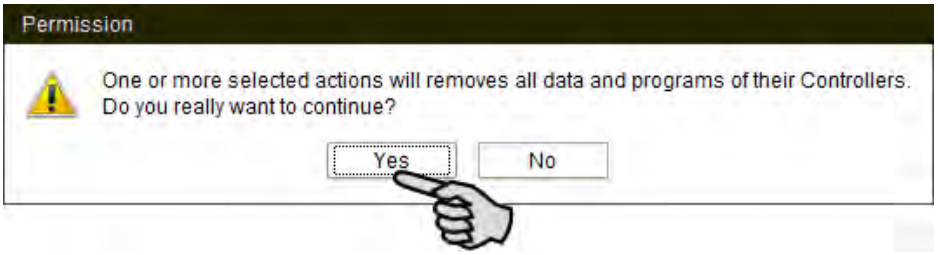
When updating, check whether the update's version number in the software package corresponds to the version you want to install.



8. Confirm the dialog by clicking on "OK".
9. Click on "Start".

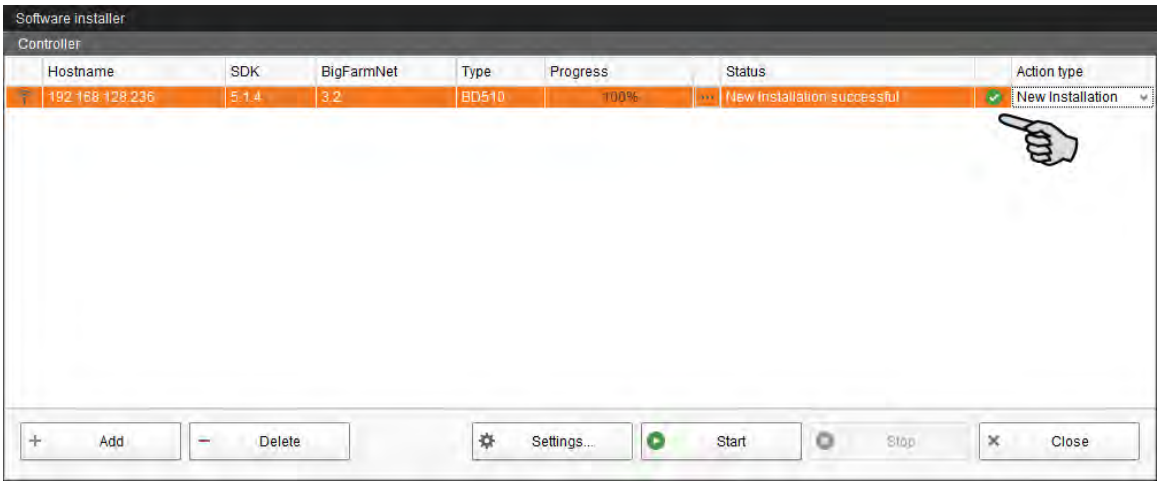


10. Confirm the prompt for confirmation.



The installation process may take a few minutes. Click on ··· to receive more information on the progress.

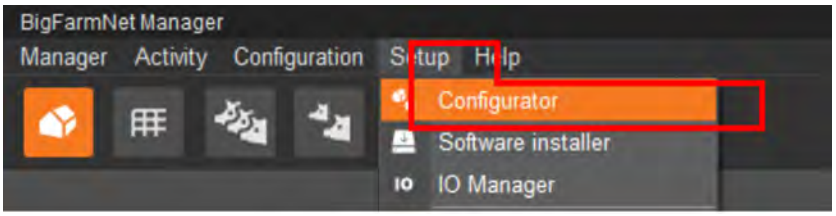
Successful installation is indicated by a checkmark in the "Status" column.



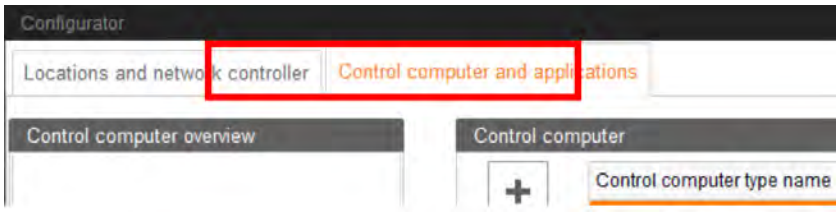
2.6 Assigning the control computer and application to the farm structure

1. Click on "Configurator" in the "Setup" menu.

   This opens the "Configurator" window.

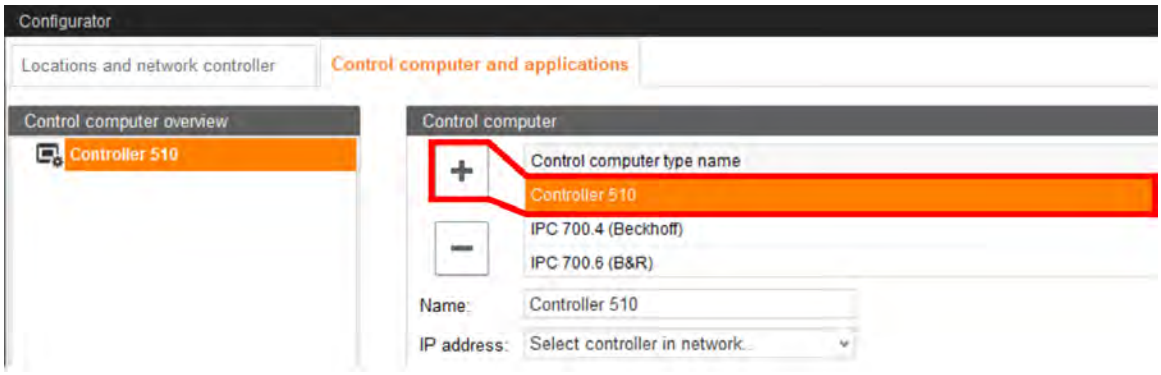


2. Click on the "Control computer and applications" tab.

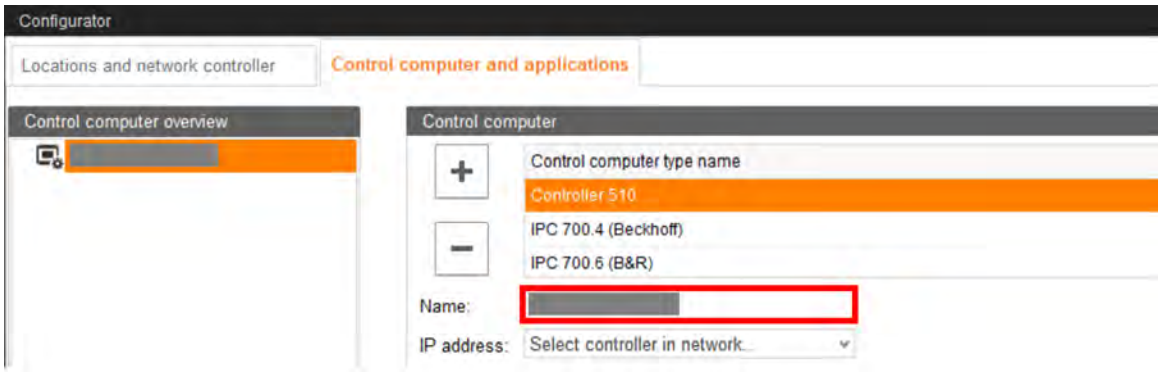


3. Select the correct control computer in the upper part of the window under "Control computer" and click on the plus button.

   The control computer is now added on the left under "Control computer overview".



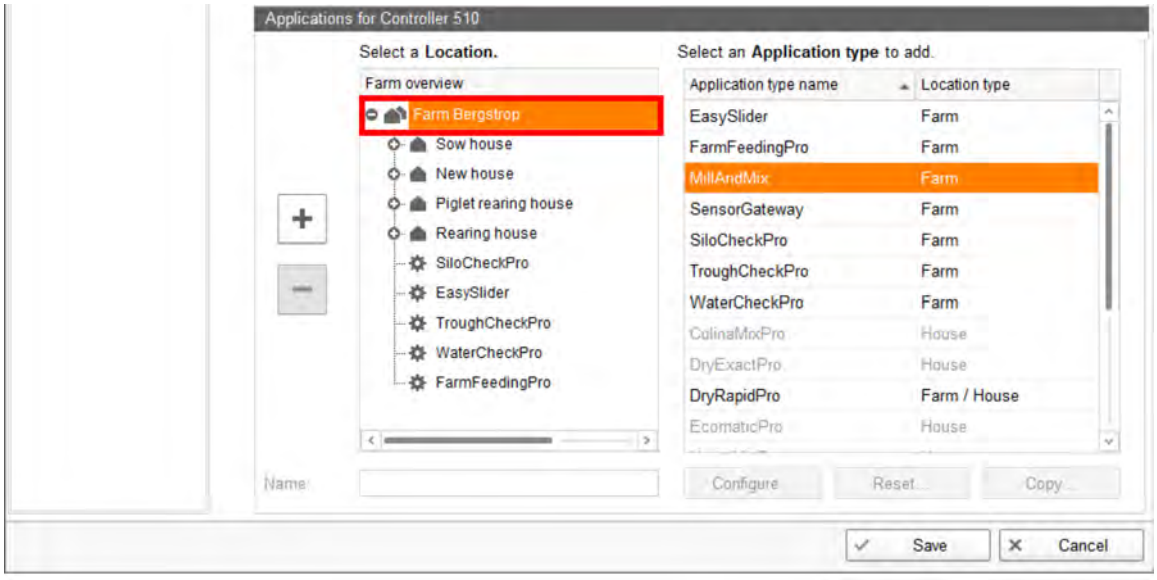
4. Enter a name for the control computer.



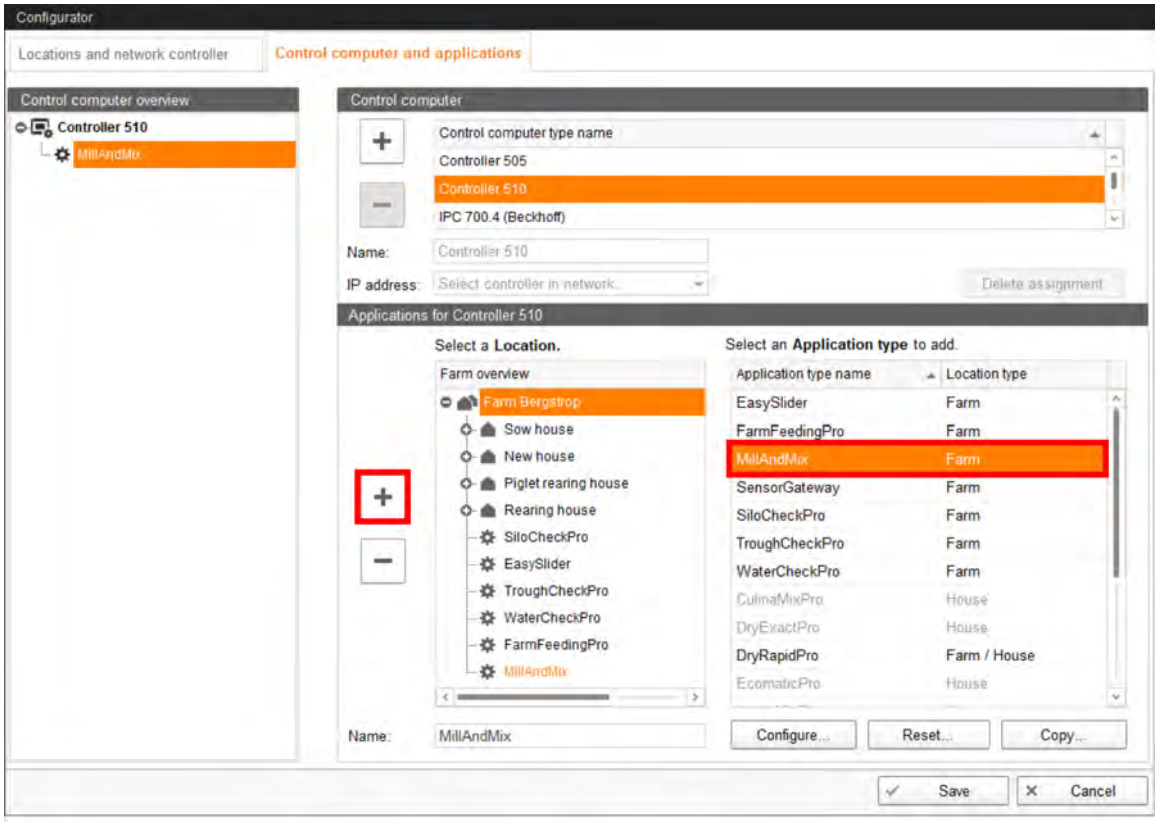
5. From the lower part of the window under "Applications for...", select the location where the system is to be operated.

   The applications available for selection depend on the selected location.

   The MillAndMix*pro* application can only be added to the "Farm" level.

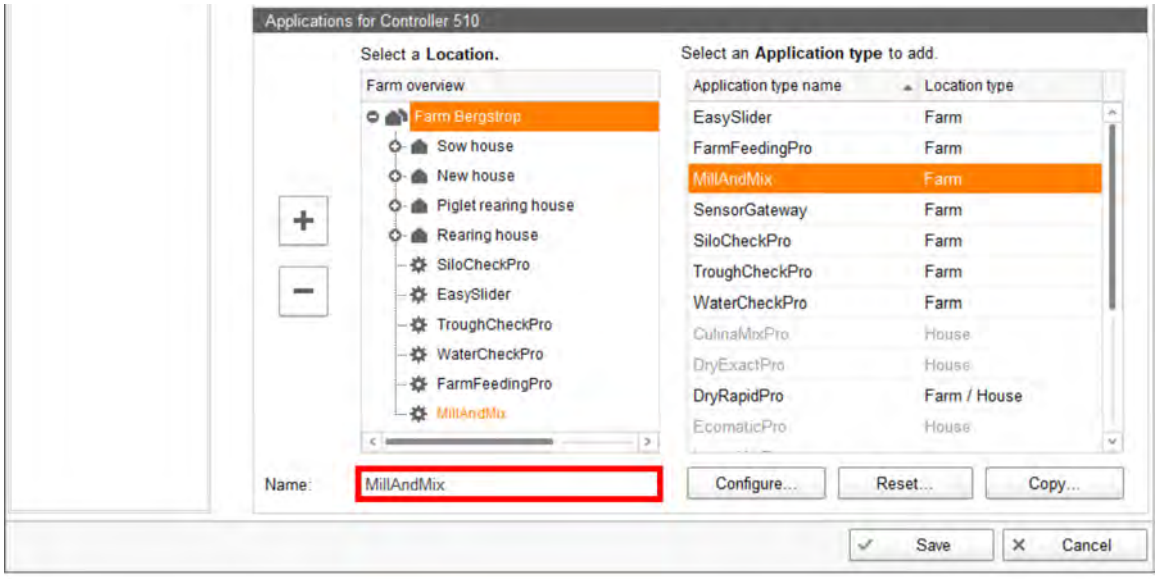


6. Select the correct application in the table on the right and click on the plus button to the left.



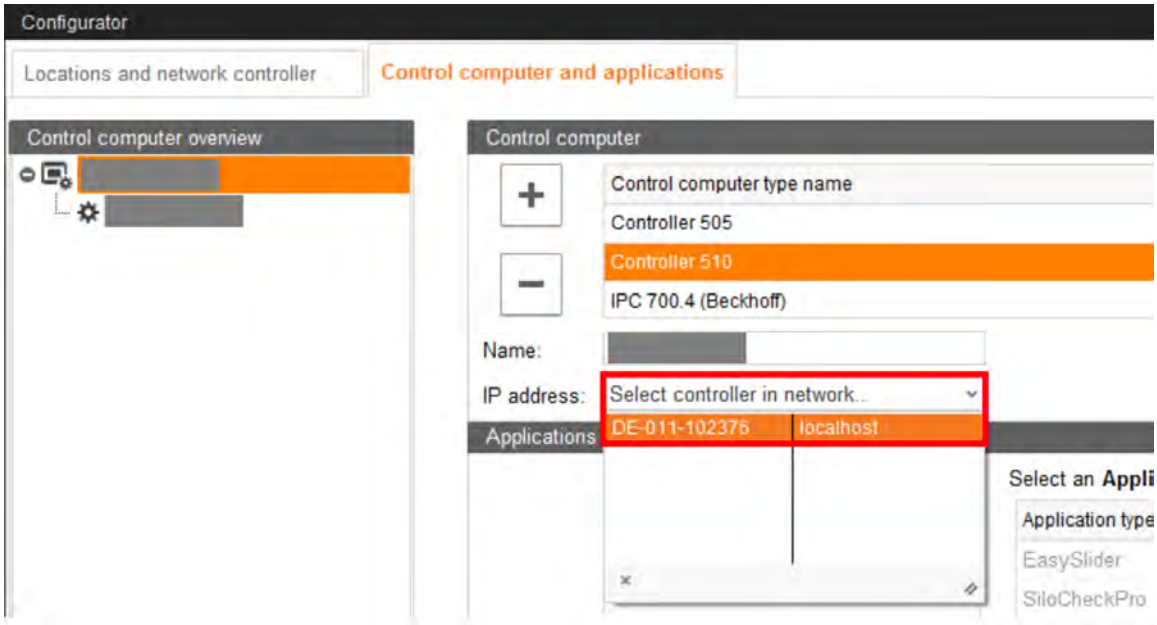
The selected application is assigned to the control computer on the left under "Control computer overview". In the structure, the control computer is displayed on the upper level and the respective application on the lower level.

7. Enter a name for the application.



8. Click on the level of the control computer in the left-hand part of the window under "Control computer overview".
9. Assign the corresponding IP address to the control computer, if known.

   If the IP address has not been set up yet, you will need to add it later on.



10. Save your settings by clicking on "Save" and confirm the next dialogs with "OK".

3 Mapping the MillAndMix system's configuration in BFN Manager

The configuration of the MillAndMix*pro* system with all system components and functionalities is mapped in BigFarmNet Manager using the **Composer** and the **FeedMove Editor**.

Composer

All possible system components of a MillAndMix*pro* system are listed in the Composer.

Select the correct component quantities of the system to be controlled.

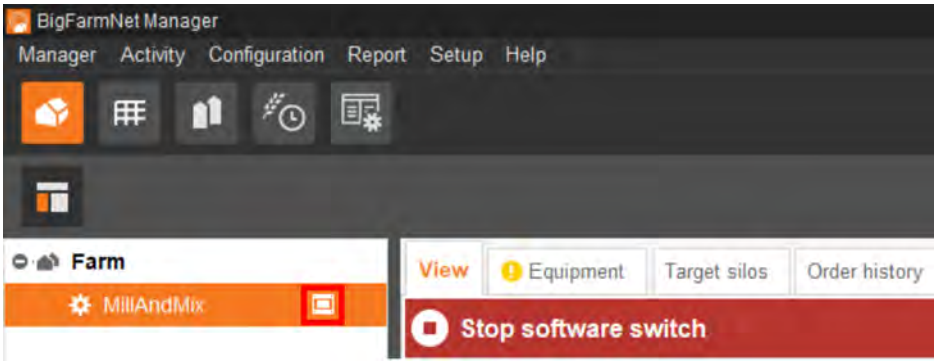
FeedMove Editor

The system components selected in the Composer are displayed graphically in the FeedMove Editor. The feed move connections between the system components are also mapped.

3.1 Configuring settings in the Composer

Define the functional range and configure settings according to the system's structure in the Composer. These settings are usually configured once.

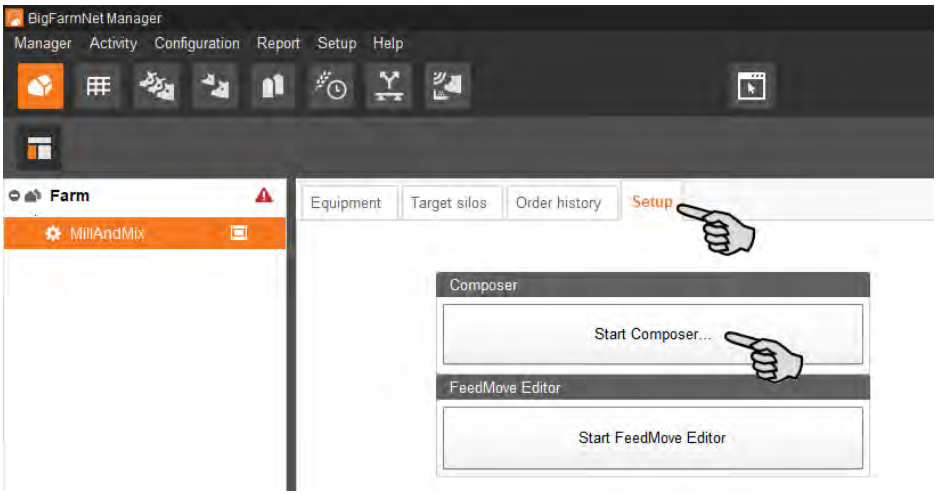
1. Click on the controller icon of the respective system application in the farm structure.



NOTICE!

Check whether the system is running. Stop the system by clicking on Stop in the upper bar.

2. Under "Setup", click on "Start Composer...".

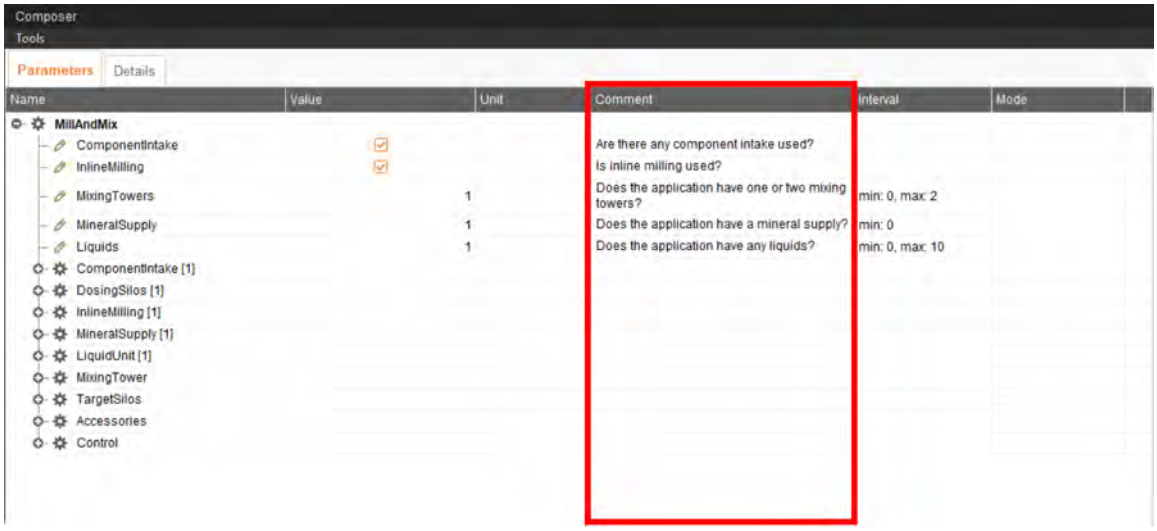


3. Click on the plus icon to show hidden parameters.

   Also open subordinate parameters by clicking on the respective plus icon.

4. Configure the settings in accordance with the structure of the system. Change preset values, if necessary.

   The column "Comment" contains information for setting of the values.

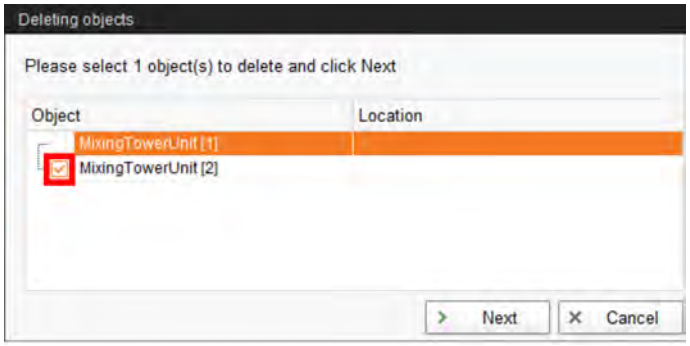


5. Proceed as follows to delete system components:

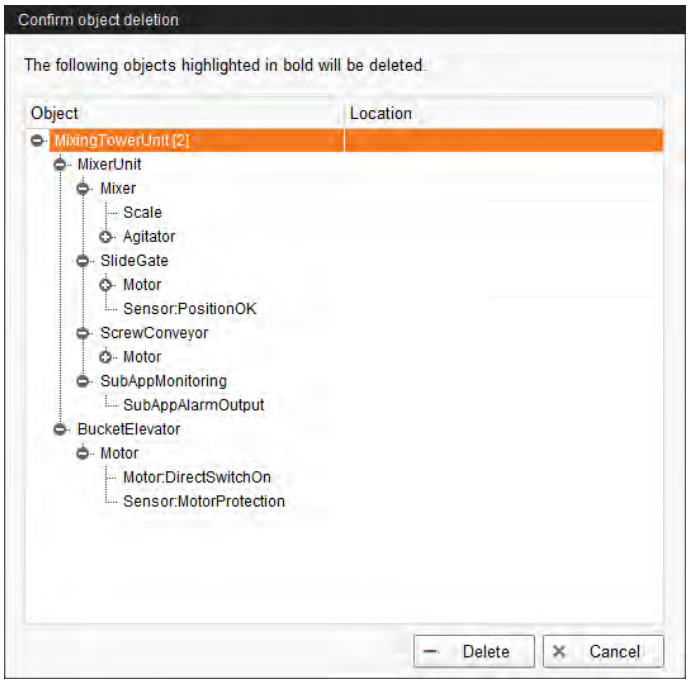
   a) Enter the new quantity (a lower number or 0) and press Enter.

      This opens a new dialog window that shows the system components with their assigned locations.

b) Select the object(s) you wish to delete and click on "Next".



c) In the next window, confirm that you want to delete the object(s) shown by clicking on "Delete".



Click on "Save" to accept all settings for the Composer.

Confirm the dialog by clicking on "OK".

The FeedMove Editor opens.

The following section explains the parameters:

Component intake The software can control the component supply from one or more truck pits to the silos. Where automatic silo filling is possible, silo groups can be added. Component supply can be controlled by both physical buttons and BigFarmNet Manager. Similarly, humidity and temperature sensors can be used to control the drying and cooling processes of components which are located in outdoor silos equipped with stirring systems and fans.

Post-milling / Inline milling: The MillAndMix*pro* application can operate the system either with a post-milling process or an inline milling process. In post-milling, the component is weighed directly before it enters the mill. In inline milling, the component is weighed directly while being milled in the mixing tower.

Mixing towers: Number of mixing tower units. Up to two mixing towers can be used in a MillAndMix system. Each tower can have both a pre-bin and a post-bin. Use of the pre- and post-bins is optional.

Mineral supply: Number of mineral supply units. Mineral supply can contain minerals and microminerals.

Liquids: Number of liquid units. Liquid components are stored in liquid silos and can be added to the mix in the mixer during agitation.

Dosing silos: Dosing silos are the main silos and used both for dispensing larger components such as wheat and barley and for the system's milling process. For post-milling, the dosing silos weigh the components and then transfer them to the mill pre-bins for milling in the mixing towers. For inline milling, the dosing silos dispense directly into the mixing towers via a mill.

Target silos: Target silos are the target for the components milled and mixed in the system. The components are transferred into the target silos from the mixing towers, i.e. either directly from the mixer or from the mixer post-bin. Additionally, a buffer silo can be part of the feed move.

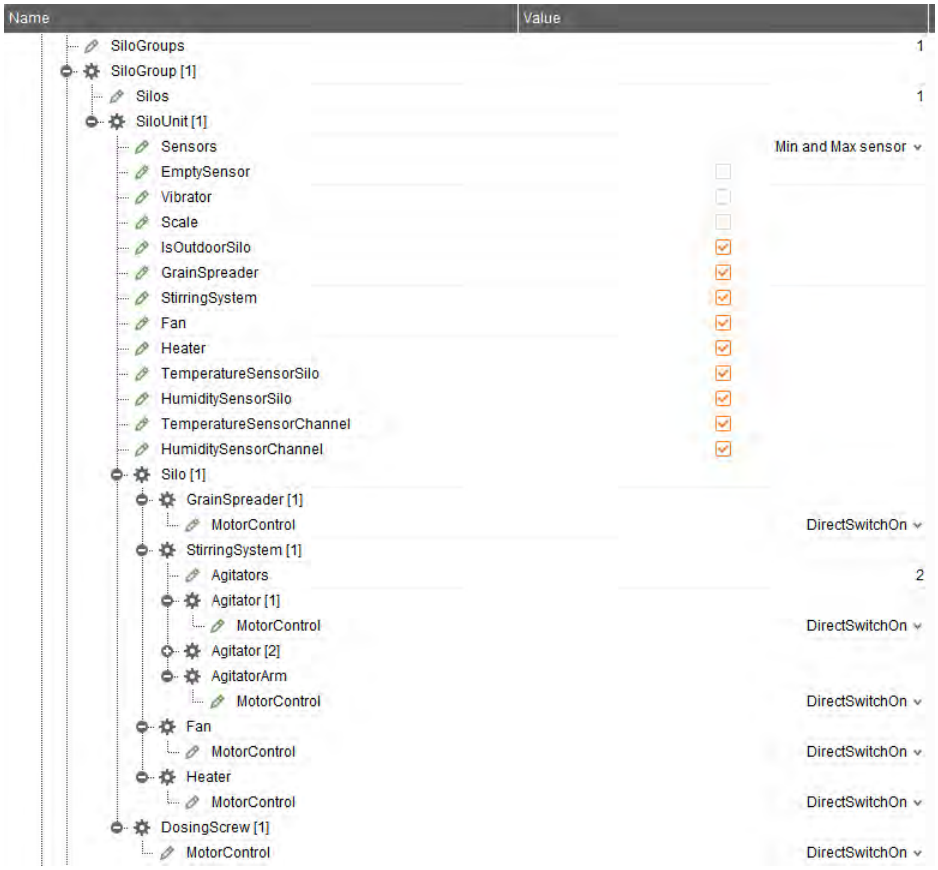
Accessories: Additional system components such as chain conveyors, screw conveyors, bucket elevators, etc. can be added as accessories.

Control unit: Connection boxes, the frequency inverters used to control the motors and different IO cards, among other components, are defined here.

3.1.1 Component supply

Truck pits: Number of truck pits in use.

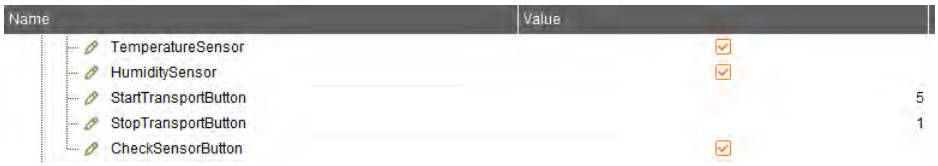
- **Overflow sensor:** The chain conveyor has an overflow sensor.
- **Blockage sensor:** The chain conveyor has a blockage sensor.
- **Pulse sensor:** The chain conveyor has a pulse sensor.
- **Slide gate:** Number of slide gates of the chain conveyor.
  - **Sensors:** Type of sensors for the slide gate ("None", "Position OK", "Open", "Close", "Open and close").
- **Motor control:** Type of control of the motor ("Direct switch-on", "Frequency inverter", "Shared frequency inverter").
- **Constant signal sensor:** The pulse sensor provides a constant signal instead of pulses.



Silo groups: Number of silo groups in use.

- **Silos:** Number of silos in the silo group.
- **Sensors:** Sensor type for the fill level monitoring of the silo.
  - "None" = no sensors for fill level monitoring of the silo.
  - "Min sensor" monitors the minimum fill level in the silo.
  - "Max sensor" prevents overfilling of the silo.
  - "Min and max sensors" = "Min sensor" + "Max sensor".
- **Empty sensor:** The silo has an empty sensor.
- **Vibrator:** The silo has a vibrator.
- **Scale:** The silo has a scale.
- **Is outdoor silo:** The silo is an outdoor silo with advanced control options.
- **Grain spreader:** The silo has a grain spreader.
- **Stirring system:** The silo has a stirring system.
- **Fan:** The silo uses a fan.
- **Heater:** The silo has a heater.
- **Temperature sensor silo:** A temperature sensor is installed in the silo.
- **Humidity sensor silo:** A humidity sensor is installed in the silo.

- **Temperature sensor channel:** A temperature sensor is installed in the channel.
- **Humidity sensor channel:** A humidity sensor is installed in the channel.
- **Silo**
  - **Motor control:** Type of control of the grain spreader motor ("Direct switch-on", "Frequency inverter", "Shared frequency inverter").
  - **Agitators:** Number of agitators attached to the agitator arm.
  - **Motor control:** Type of control of the agitator motor ("Direct switch-on", "Frequency inverter", "Shared frequency inverter").
  - **Motor control:** Type of control of the agitator arm motor ("Direct switch-on", "Frequency inverter", "Shared frequency inverter").
  - **Motor control:** Type of control of the fan motor ("Direct switch-on", "Frequency inverter", "Shared frequency inverter").
  - **Motor control:** Type of control of the heater motor ("Direct switch-on", "Frequency inverter", "Shared frequency inverter").
- **Motor control:** Type of control of the dosing screw motor ("Direct switch-on", "Frequency inverter", "Shared frequency inverter").



Temperature sensor: The component intake uses outside temperature sensors.

Humidity sensor: The component intake uses outside humidity sensors.

Start transport button: Number of "Start transport" buttons used by the component intake.

Stop transport button: Number of "Stop transport" buttons used by the component intake.

Check sensor button: The component intake uses a "Check sensor" button.

3.1.2 Dosing silos

Dosing silos: Number of dosing silo units.

- **Vibrator:** The dosing silo has a vibrator.
- **Scale:** The dosing silo has a scale.
- **Empty sensor:** The dosing silo has an empty sensor.
- **Sensors:** Sensor type for the fill level monitoring of the dosing silo.
  - "None" = no sensors for fill level monitoring of the dosing silo.
  - "Min sensor" monitors the minimum fill level in the dosing silo.
  - "Max sensor" prevents overfilling of the dosing silo.
  - "Min and max sensors" = "Min sensor" + "Max sensor".
- **Motor control:** Type of control of the dosing screw motor ("Direct switch-on", "Frequency inverter", "Shared frequency inverter").

Hopper scale

- **Overflow sensor:** The hopper scale has an overflow sensor.
- **Distribution screw:** The hopper scale has a distribution auger to distribute the dispensed components.
- **Pulse sensor:** The hopper scale has a pulse sensor.
- **Motor control:** Type of control of the motor ("Direct switch-on", "Frequency inverter", "Shared frequency inverter").
- **Constant signal sensor:** The pulse sensor provides a constant signal instead of pulses.
- **Distribution auger**
  - **Motor control:** Type of control of the distribution auger motor ("Direct switch-on", "Frequency inverter", "Shared frequency inverter").

Bucket elevator

- **Pulse sensor:** The bucket elevator has a pulse sensor.
- **Explosion sensor:** The bucket elevator has an explosion sensor.
- **Belt sensor:** The bucket elevator has a belt sensor.
- **Blockage sensor:** The bucket elevator has a blockage sensor.
- **Load sensor:** The bucket elevator has a load sensor.
- **Motor control:** Type of control of the bucket elevator motor ("Direct switch-on", "Frequency inverter", "Shared frequency inverter").
- **Constant signal sensor:** The pulse sensor provides a constant signal instead of pulses.

3.1.3 Inline milling

Number of mills: Number of mills in use.

Cleaner: A cleaner is used.

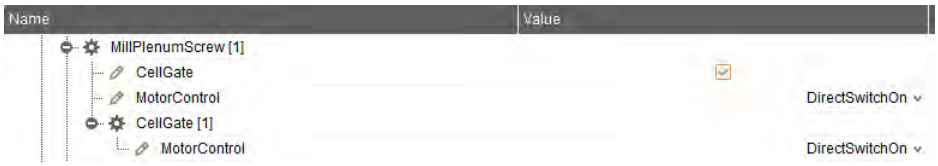
Flap box

- **Sensors:** Type of sensors in the flap box ("None", "Position OK", "Left", "Right", "Left and right").

Mill

- **Mill door switch sensor:** The mill has a sensor to detect an open mill door.
- **Mill type:** Type of the mill ("Hammer mill", "Disc mill", "Roller", "Structurizer").

- **Motor control:** Type of control of the mill motor ("Direct switch-on", "Frequency inverter").
- **Load sensor:** The mill has a load sensor.
- **Overflow sensor:** The mill has an overflow sensor.



Mill plenum screw

- **Cell gate:** The mill plenum screw uses a cell gate.
- **Motor control:** Type of control of the mill plenum screw's motor ("Direct switch-on", "Frequency inverter", "Shared frequency inverter").
- **Cell gate**
  - **Motor control:** Type of control of the cell gate motor ("Direct switch-on", "Frequency inverter", "Shared frequency inverter").

Bucket elevator

- **Pulse sensor:** The bucket elevator has a pulse sensor.
- **Explosion sensor:** The bucket elevator has an explosion sensor.
- **Belt sensor:** The bucket elevator has a belt sensor.
- **Blockage sensor:** The bucket elevator has a blockage sensor.
- **Load sensor:** The bucket elevator has a load sensor.
- **Motor control:** Type of control of the bucket elevator motor ("Direct switch-on", "Frequency inverter", "Shared frequency inverter").
- **Constant signal sensor:** The pulse sensor provides a constant signal instead of pulses.

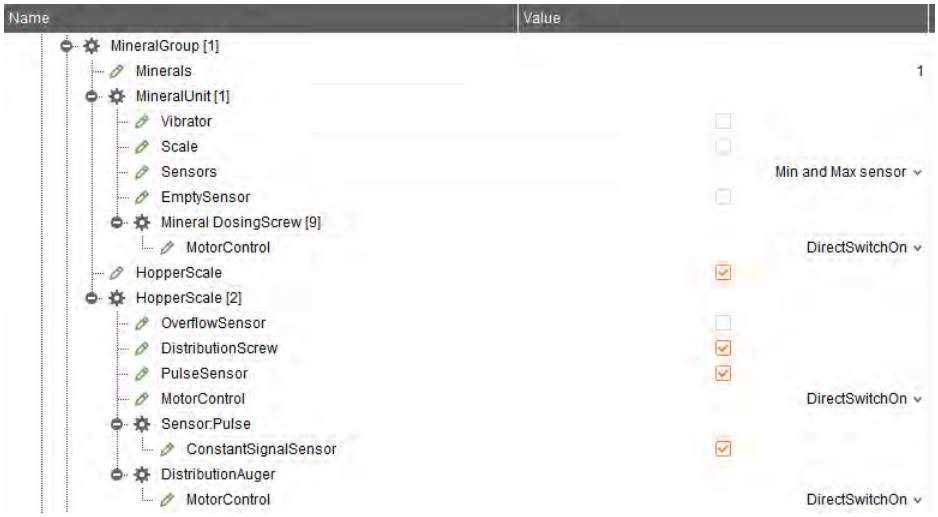
Cleaner

- **Motor control:** Type of control of the cleaner motor ("Direct switch-on", "Frequency inverter", "Shared frequency inverter").
- **Sensor overflow:** The cleaner has an overflow sensor.
- **Dirt auger:** The cleaner has a dirt auger.
- **Sensor dirt auger:** The dirt auger has a sensor.
- **Extra motors:** Number of additional cleaner motors.
  - **Motor control:** Type of control of the additional cleaner motor ("Direct switch-on", "Frequency inverter", "Shared frequency inverter").
- **Dirt auger**
  - **Motor control:** Type of control of the dirt auger motor ("Direct switch-on", "Frequency inverter", "Shared frequency inverter").

3.1.4 Mineral supply

Minerals: The mineral supply contains minerals.

Microminerals: The mineral supply contains microminerals.

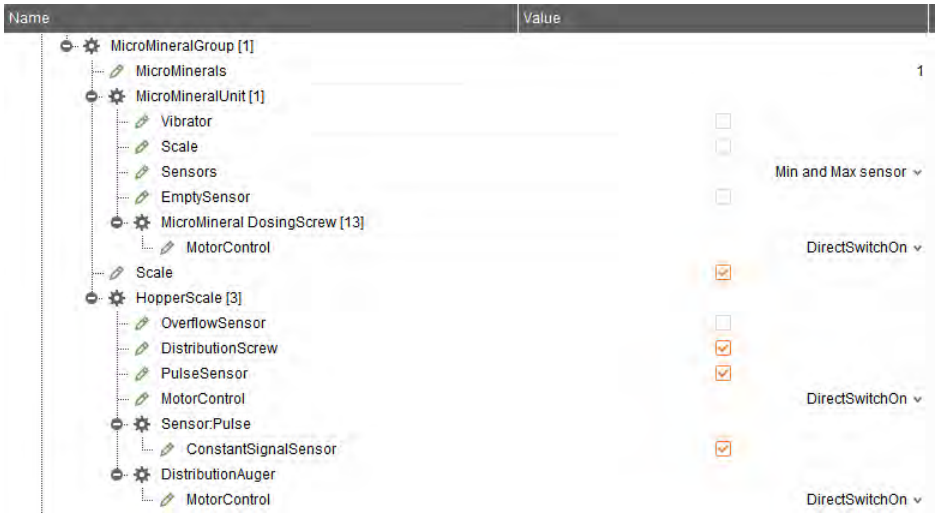


Minerals: Number of mineral dosing units in the mineral group.

- **Vibrator:** The mineral dosing unit has a vibrator.
- **Scale:** The mineral dosing unit has a scale.
- **Sensors:** Sensor type for the fill level monitoring of the mineral dosing unit
  - "None" = no sensors for fill level monitoring of the mineral dosing unit.
  - "Min sensor" monitors the minimum fill level in the mineral dosing unit.
  - "Max sensor" prevents overfilling of the mineral dosing unit.
  - "Min and max sensors" = "Min sensor" + "Max sensor".
- **Empty sensor:** The mineral dosing unit has an empty sensor.
- **Motor control:** Type of control of the dosing screw motor ("Direct switch-on", "Frequency inverter", "Shared frequency inverter").

Hopper scale: The mineral group has a hopper scale. If this is not the case, the minerals must be weighed in the mixer.

- **Overflow sensor:** The hopper scale has an overflow sensor.
- **Distribution screw:** The hopper scale has a distribution auger to distribute the dispensed components.
- **Pulse sensor:** The hopper scale has a pulse sensor.
- **Motor control:** Type of control of the motor ("Direct switch-on", "Frequency inverter", "Shared frequency inverter").
- **Constant signal sensor:** The pulse sensor provides a constant signal instead of pulses.
- **Distribution auger**
  - **Motor control:** Type of control of the distribution auger motor ("Direct switch-on", "Frequency inverter", "Shared frequency inverter").



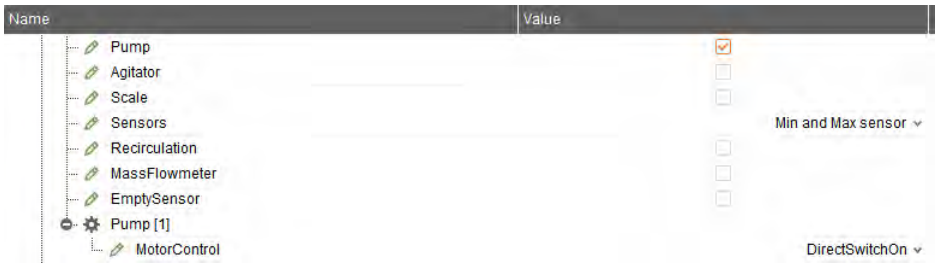
Microminerals: Number of micromineral dosing units in the micromineral group.

- **Vibrator:** The micromineral dosing unit has a vibrator.
- **Scale:** The micromineral dosing unit has a scale.
- **Sensors:** Sensor type for the fill level monitoring of the micromineral dosing unit.
  - "None" = no sensors for fill level monitoring of the micromineral dosing unit.
  - "Min sensor" monitors the minimum fill level in the micromineral dosing unit.
  - "Max sensor" prevents overfilling of the micromineral dosing units.
  - "Min and max sensors" = "Min sensor" + "Max sensor".
- **Empty sensor:** The micromineral dosing unit has an empty sensor.
- **Motor control:** Type of control of the dosing screw motor ("Direct switch-on", "Frequency inverter", "Shared frequency inverter").

Scale: The micromineral group has a hopper scale. If this is not the case, the micromineral dosing unit should have a scale to be used for negative dispensing.

- **Overflow sensor:** The hopper scale has an overflow sensor.
- **Distribution screw:** The hopper scale has a distribution auger to distribute the dispensed components.
- **Pulse sensor:** The hopper scale has a pulse sensor.
- **Motor control:** Type of control of the motor ("Direct switch-on", "Frequency inverter", "Shared frequency inverter").
- **Constant signal sensor:** The pulse sensor provides a constant signal instead of pulses.
- **Distribution auger**
  - **Motor control:** Type of control of the distribution auger motor ("Direct switch-on", "Frequency inverter", "Shared frequency inverter").

3.1.5 Liquids



Pump: The liquid unit has a pump.

Agitator: The liquid unit has an agitator.

Scale: The liquid unit has a scale.

Sensors: Sensor type for the fill level monitoring of the liquid unit.

- "None" = no sensors for fill level monitoring of the liquid unit.
- "Min sensor" monitors the minimum fill level in the liquid unit.
- "Max sensor" prevents overfilling of the liquid unit.
- "Min and max sensors" = "Min sensor" + "Max sensor".

Recirculation: The contents of the liquid unit can be recirculated.

Mass flow meter: The liquid unit has a mass flow meter.

Empty sensor: The liquid unit has an empty sensor.

Pump

- **Motor control:** Type of control of the pump motor ("Direct switch-on", "Frequency inverter", "Shared frequency inverter").

3.1.6 Post-milling

Mill pre-bins: Number of mill pre-bins in use.

- **Mills:** Number of mills that share the mill pre-bin.
  - **Mill door switch sensor:** The mill has a sensor to detect an open mill door.
  - **Mill type:** Type of the mill ("Hammer mill", "Disc mill", "Roller", "Structurizer").

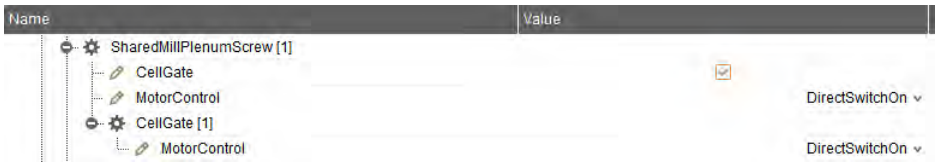
- **Motor control:** Type of control of the mill motor ("Direct switch-on", "Frequency inverter").
- **Load sensor:** The mill has a load sensor.
- **Overflow sensor:** The mill has an overflow sensor.
- **Motor control:** Type of control of the mill dosing screw's motor ("Direct switch-on", "Frequency inverter", "Shared frequency inverter").

Shared mill plenum: The mill pre-bins share one mill plenum.

Shared mill plenum control: Type of control of the shared mill plenum ("Direct switch-on", "Frequency inverter").

Cross chain conveyor

- **Overflow sensors:** The cross chain conveyor has overflow sensors.
- **Blockage sensor:** The cross chain conveyor has a blockage sensor.
- **Pulse sensor:** The cross chain conveyor has a pulse sensor.
- **Slide gate:** Number of slide gates of the cross chain conveyor.
  - **Sensors:** Type of sensors for the slide gate ("None", "Position OK", "Open", "Close", "Open and close").
- **Motor control:** Type of control of the cross chain conveyor's motor ("Pole reversing", "Frequency inverter", "Shared frequency inverter").
- **Constant signal sensor:** The pulse sensor provides a constant signal instead of pulses.



Shared mill plenum screw

- **Cell gate:** The mill plenum screw uses a cell gate.

- **Motor control:** Type of control of the mill plenum screw's motor ("Direct switch-on", "Frequency inverter", "Shared frequency inverter").
- **Cell gate**
  - **Motor control:** Type of control of the cell gate motor ("Direct switch-on", "Frequency inverter", "Shared frequency inverter").

Shared bucket elevator

- **Pulse sensor:** The bucket elevator has a pulse sensor.
- **Explosion sensor:** The bucket elevator has an explosion sensor.
- **Belt sensor:** The bucket elevator has a belt sensor.
- **Blockage sensor:** The bucket elevator has a blockage sensor.
- **Load sensor:** The bucket elevator has a load sensor.
- **Motor control:** Type of control of the bucket elevator motor ("Direct switch-on", "Frequency inverter", "Shared frequency inverter").
- **Constant signal sensor:** The pulse sensor provides a constant signal instead of pulses.

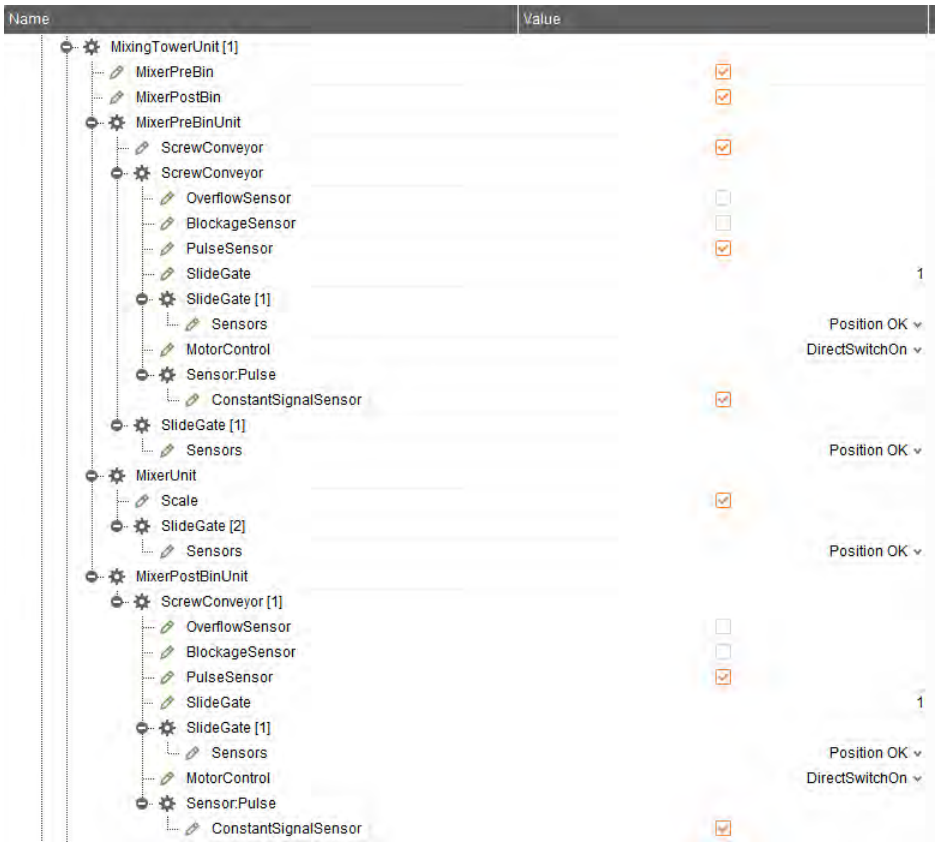
3.1.7 Mixing towers

Shared bucket elevator: The two mixing towers share one bucket elevator.

Cross chain conveyor

- **Overflow sensors:** The cross chain conveyor has overflow sensors.
- **Blockage sensor:** The cross chain conveyor has a blockage sensor.

- **Pulse sensor:** The cross chain conveyor has a pulse sensor.
- **Slide gate:** Number of slide gates of the cross chain conveyor.
  - **Sensors:** Type of sensors for the slide gate ("None", "Position OK", "Open", "Close", "Open and close").
- **Motor control:** Type of control of the cross chain conveyor's motor ("Pole reversing", "Frequency inverter", "Shared frequency inverter").
- **Constant signal sensor:** The pulse sensor provides a constant signal instead of pulses.



Mixer pre-bin: The mixing tower has a pre-bin.

Mixer post-bin: The mixing tower has a post-bin.

Screw conveyor: The mixer pre-bin has a screw conveyor to distribute the mix.

- **Overflow sensor:** The screw conveyor has an overflow sensor.
- **Blockage sensor:** The screw conveyor has a blockage sensor.
- **Pulse sensor:** The screw conveyor has a pulse sensor.
- **Slide gate:** Number of slide gates of the screw conveyor.
  - **Sensors:** Type of sensors for the slide gate ("None", "Position OK", "Open", "Close", "Open and close").

- **Motor control:** Type of control of the screw conveyor motor ("Direct switch-on", "Frequency inverter", "Shared frequency inverter").
- **Constant signal sensor:** The pulse sensor provides a constant signal instead of pulses.

Slide gate [of the mixer pre-bin]

- **Sensors:** Type of sensors for the slide gate ("None", "Position OK", "Open", "Close", "Open and close").

Scale: The mixer has a scale.

Slide gate [of the mixer]

- **Sensors:** Type of sensors for the slide gate ("None", "Position OK", "Open", "Close", "Open and close").

Screw conveyor [of the mixer post-bin]

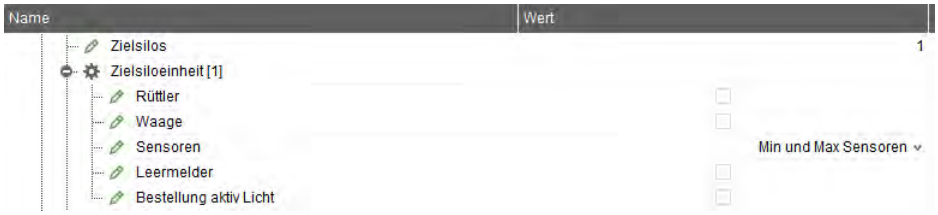
- **Overflow sensor:** The screw conveyor has an overflow sensor.
- **Blockage sensor:** The screw conveyor has a blockage sensor.
- **Pulse sensor:** The screw conveyor has a pulse sensor.
- **Slide gate:** Number of slide gates of the screw conveyor.
  - **Sensors:** Type of sensors for the slide gate ("None", "Position OK", "Open", "Close", "Open and close").
- **Motor control:** Type of control of the screw conveyor motor ("Direct switch-on", "Frequency inverter", "Shared frequency inverter").
- **Constant signal sensor:** The pulse sensor provides a constant signal instead of pulses.

Shared bucket elevator

- **Pulse sensor:** The bucket elevator has a pulse sensor.
- **Explosion sensor:** The bucket elevator has an explosion sensor.
- **Belt sensor:** The bucket elevator has a belt sensor.
- **Blockage sensor:** The bucket elevator has a blockage sensor.
- **Load sensor:** The bucket elevator has a load sensor.

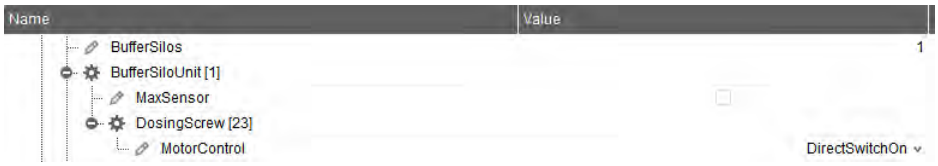
- **Motor control:** Type of control of the bucket elevator motor ("Direct switch-on", "Frequency inverter", "Shared frequency inverter").
- **Constant signal sensor:** The pulse sensor provides a constant signal instead of pulses.

3.1.8 Target silos



Target silos: Number of target silos.

- **Vibrator:** The target silo has a vibrator.
- **Scale:** The target silo has a scale.
- **Sensors:** Sensor type for the fill level monitoring of the target silo.
  - "None" = no sensors for fill level monitoring of the target silo.
  - "Min sensor" monitors the minimum fill level in the target silo.
  - "Max sensor" prevents overfilling of the target silo.
  - "Min and max sensors" = "Min sensor" + "Max sensor".
- **Empty sensor:** The target silo has an empty sensor
- **Active order light:** A lamp indicates whether the target silo is being filled at the moment.



Buffer silos: Number of buffer silo units.

- **Max sensor:** The buffer silo uses a maximum sensor.
- **Dosing screw**
  - **Motor control:** Type of control of the dosing screw motor ("Direct switch-on", "Frequency inverter", "Shared frequency inverter").

Cross chain conveyor

- **Overflow sensors:** The cross chain conveyor has overflow sensors.
- **Blockage sensor:** The cross chain conveyor has a blockage sensor.
- **Pulse sensor:** The cross chain conveyor has a pulse sensor.
- **Slide gate:** Number of slide gates of the cross chain conveyor.
  - **Sensors:** Type of sensors for the slide gate ("None", "Position OK", "Open", "Close", "Open and close").
- **Motor control:** Type of control of the cross chain conveyor's motor ("Pole reversing", "Frequency inverter", "Shared frequency inverter").
- **Constant signal sensor:** The pulse sensor provides a constant signal instead of pulses.

3.1.9 Accessories

Chain conveyor: Number of chain conveyors.

- **Overflow sensor:** The chain conveyor has an overflow sensor.
- **Blockage sensor:** The chain conveyor has a blockage sensor.
- **Pulse sensor:** The chain conveyor has a pulse sensor.
- **Slide gate:** Number of slide gates of the chain conveyor.
  - **Sensors:** Type of sensors for the slide gate ("None", "Position OK", "Open", "Close", "Open and close").

- **Motor control:** Type of control of the motor ("Direct switch-on", "Frequency inverter", "Shared frequency inverter").
- **Constant signal sensor:** The pulse sensor provides a constant signal instead of pulses.

Cross chain conveyor: Number of cross chain conveyors.

- **Overflow sensors:** The cross chain conveyor has overflow sensors.
- **Blockage sensor:** The cross chain conveyor has a blockage sensor.
- **Pulse sensor:** The cross chain conveyor has a pulse sensor.
- **Slide gate:** Number of slide gates of the cross chain conveyor.
  - **Sensors:** Type of sensors for the slide gate ("None", "Position OK", "Open", "Close", "Open and close").
- **Motor control:** Type of control of the cross chain conveyor's motor ("Pole reversing", "Frequency inverter", "Shared frequency inverter").
- **Constant signal sensor:** The pulse sensor provides a constant signal instead of pulses.

Screw conveyor: Number of screw conveyors.

- **Overflow sensor:** The screw conveyor has an overflow sensor.
- **Blockage sensor:** The screw conveyor has a blockage sensor.
- **Pulse sensor:** The screw conveyor has a pulse sensor.
- **Slide gate:** Number of slide gates of the screw conveyor.

  - **Sensors:** Type of sensors for the slide gate ("None", "Position OK", "Open", "Close", "Open and close").
- **Motor control:** Type of control of the screw conveyor motor ("Direct switch-on", "Frequency inverter", "Shared frequency inverter").
- **Constant signal sensor:** The pulse sensor provides a constant signal instead of pulses.

Cross screw conveyor: Number of cross conveyors.

- **Overflow sensors:** The cross conveyor has overflow sensors.
- **Blockage sensor:** The cross conveyor has a blockage sensor.
- **Pulse sensor:** The cross conveyor has a pulse sensor.
- **Slide gate:** Number of slide gates of the cross conveyor.
  - **Sensors:** Type of sensors for the slide gate ("None", "Position OK", "Open", "Close", "Open and close").
- **Motor control:** Type of control of the cross conveyor motor ("Pole reversing", "Frequency inverter", "Shared frequency inverter").
- **Constant signal sensor:** The pulse sensor provides a constant signal instead of pulses.

Bucket elevator: Number of bucket elevators.

- **Pulse sensor:** The bucket elevator has a pulse sensor.
- **Explosion sensor:** The bucket elevator has an explosion sensor.
- **Belt sensor:** The bucket elevator has a belt sensor.
- **Blockage sensor:** The bucket elevator has a blockage sensor.

- **Load sensor:** The bucket elevator has a load sensor.
- **Motor control:** Type of control of the bucket elevator motor ("Direct switch-on", "Frequency inverter", "Shared frequency inverter").
- **Constant signal sensor:** The pulse sensor provides a constant signal instead of pulses.

Flap box: Number of flap boxes.

- **Sensors:** Type of sensors in the flap box ("None", "Position OK", "Left", "Right", "Left and right").

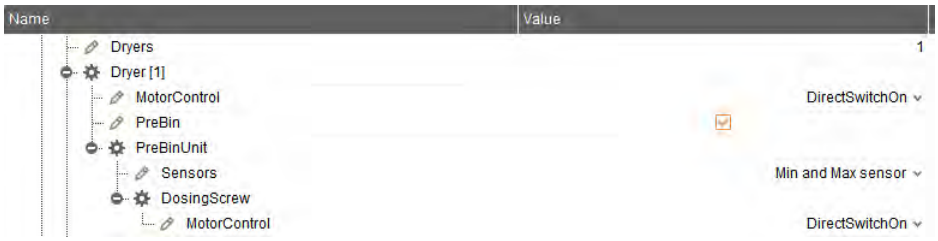
Flap box three-way: Number of three-way flap boxes.

- **Sensors:** Type of sensors in the three-way flap box ("Position OK", "Left and right").

Cleaner: Number of cleaners.

- **Motor control:** Type of control of the cleaner motor ("Direct switch-on", "Frequency inverter", "Shared frequency inverter").
- **Sensor overflow:** The cleaner has an overflow sensor.
- **Dirt auger:** The cleaner has a dirt auger.
- **Sensor dirt auger:** The dirt auger has a sensor.
- **Extra motors:** Number of additional cleaner motors.
  - **Motor control:** Type of control of the additional cleaner motor ("Direct switch-on", "Frequency inverter", "Shared frequency inverter").
- **Dirt auger**

- **Motor control:** Type of control of the dirt auger motor ("Direct switch-on", "Frequency inverter", "Shared frequency inverter").



Dryers: Number of dryers.

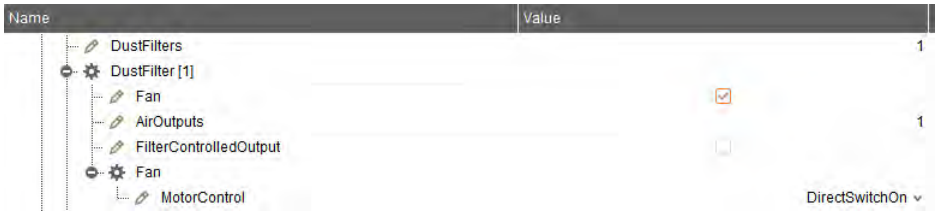
- **Motor control:** Type of control of the dryer motor ("Direct switch-on", "Frequency inverter", "Shared frequency inverter").
- **Pre-bin:** The dryer has a pre-bin for the overflow.
  - **Sensors:** Sensor type for the fill level monitoring of the pre-bin.

    "None" = no sensors for fill level monitoring of the pre-bin.

    "Min sensor" monitors the minimum fill level in the pre-bin.

    "Max sensor" prevents overfilling of the pre-bin.

    "Min and max sensor" = "Min sensor" + "Max sensor".
  - **Motor control:** Type of control of the pre-bin dosing screw's motor ("Direct switch-on", "Frequency inverter", "Shared frequency inverter").

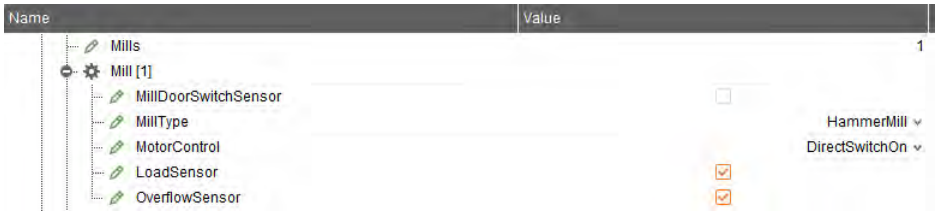


Dust filters: Number of dust filters.

- **Fan:** The dust filter uses a fan.
- **Air outputs:** Number of air outputs of the dust filter.
- **Filter-controlled output:** The output is filter-controlled.
- **Fan**
  - **Motor control:** Type of control of the fan motor ("Direct switch-on", "Frequency inverter", "Shared frequency inverter").

Chain: Number of chains.

- **Motor control:** Type of control of the chain motor ("Direct switch-on", "Frequency inverter", "Shared frequency inverter contactor").
- **Slide gate:** Number of slide gates of the chain.
  - **Sensors:** Type of sensors for the slide gate ("None", "Position OK", "Open", "Close", "Open and close").
- **Chain cover sensor:** The chain has a sensor for the chain cover.
- **Pulse sensor:** The chain has a pulse sensor.
- **Chain break sensor:** The chain has a sensor to detect chain breaks.
- **Blockage sensor:** The chain has a blockage sensor.
- **Load sensor:** The chain has a load sensor.
- **Overflow sensor:** The chain has an overflow sensor.
- **Constant signal sensor:** The pulse sensor provides a constant signal instead of pulses.



Mills: Number of mills.

- **Mill door switch sensor:** The mill has a sensor to detect an open mill door.
- **Mill type:** Type of the mill ("Hammer mill", "Disc mill", "Roller", "Structurizer").
- **Motor control:** Type of control of the mill motor ("Direct switch-on", "Frequency inverter").
- **Load sensor:** The mill has a load sensor.
- **Overflow sensor:** The mill has an overflow sensor.

Center outlet chain: Number of center outlet chains.

- **Overflow sensors:** The center outlet chain has overflow sensors.
- **Blockage sensor:** The center outlet chain has a blockage sensor.
- **Pulse sensor:** The center outlet chain has a pulse sensor.
- **Slide gate:** Number of slide gates in the center outlet chain.
  - **Sensors:** Type of sensors for the slide gate ("None", "Position OK", "Open", "Close", "Open and close").
- **Motor control:** Type of control of the center outlet chain's motor ("Pole reversing", "Frequency inverter", "Shared frequency inverter").
- **Constant signal sensor:** The pulse sensor provides a constant signal instead of pulses.

Pellet press: Number of pellet presses.

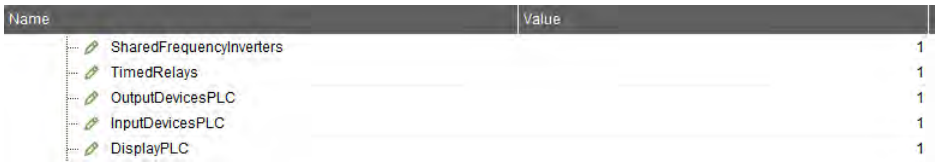
- **Motor control:** Type of control of the pellet press motor ("Direct switch-on", "Frequency inverter").

Label for user-defined text: Number of user-defined labels, see chapter 3.4 ”Editing a user-defined label”, page 74.

Additional output: Number of additional outputs.

External synchronisations: Number of external synchronizations.

3.1.10 Control unit



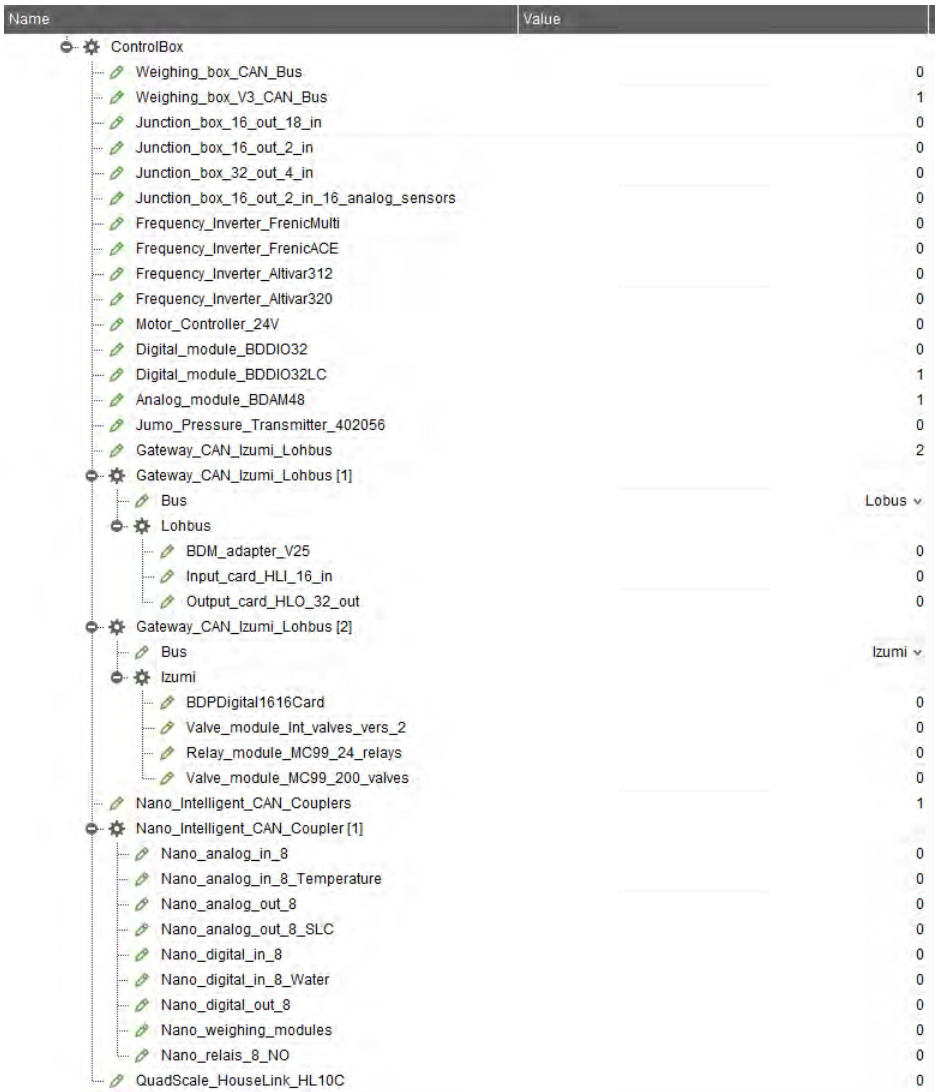
Shared frequency inverters: Number of shared frequency inverters.

Timed relays: Number of time relays.

Output devices PLC: Number of output devices for PLC.

Input devices PLC: Number of input devices for PLC.

Display PLC: Number of displays for PLC.



Control box

- **Weighing box CAN bus:** Number of weighing boxes (CAN).
- **Weighing box V3 CAN bus:** Number of weighing boxes V3.0 (CAN).

- **Junction box 16 out 18 in:** Number of junction boxes with 16 outputs and 18 inputs.
- **Junction box 16 out 2 in:** Number of junction boxes with 16 outputs and 2 inputs.
- **Junction box 32 out 4 in:** Number of junction boxes with 32 outputs and 4 inputs.
- **Junction box 16 out 2 in 16 analog sensors:** Number of junction boxes with 16 outputs, 2 inputs and 16 analog sensors.
- **Frequency inverter Frenic Multi:** Number of Frenic Multi frequency inverters.
- **Frequency inverter Frenic ACE:** Number of Frenic ACE frequency inverters.
- **Frequency inverter Altivar312:** Number of Altivar312 frequency inverters.
- **Frequency inverter Altivar320:** Number of Altivar320 frequency inverters.
- **Motor controller 24 V:** Number of 24 V motor controllers.
- **Digital module BDDIO32:** Number of digital modules BDDIO32.
- **Digital module BDDIO32LC:** Number of digital modules BDDIO32LC.
- **Analog module BDAM48:** Number of analog modules BDAM48.
- **Jumo pressure transmitter 402056:** Number of Jumo pressure transmitters 402056.
- **Gateway CAN Izumi Lohbus:** Number of Izumi/Lohbus CAN gateways.
  - **Bus:** Bus ("Lohbus", "Izumi").
  - **BDM Adapter V25:** Number of V25 BDM adapters.
  - **Input card HLI 16 in:** Number of HLI input cards with 16 inputs.
  - **Output card HLO 32 out:** Number of HLO output cards with 32 outputs.
  - **BDP Digital 16/16 card:** Number of BDP Digital 16/16 cards.
  - **Valve module intelligent valves vers. 2:** Number of intelligent valve modules version 2.
  - **Relay module MC99 24 relays:** Number of MC99 relay modules with 24 relays.
  - **Valve module MC99 200 valves:** Number of MC99 valve modules with 200 valves.
- **Nano intelligent CAN couplers:** Number of Nano intelligent CAN couplers.
  - **Nano analog in 8:** Number of cards Nano analog 8 inputs.
  - **Nano analog in 8 temperature:** Number of cards Nano analog 8 inputs temperature.
  - **Nano analog out 8:** Number of cards Nano analog 8 outputs.

- **Nano analog out 8 SLC:** Number of cards Nano analog 8 outputs SLC.
- **Nano digital in 8:** Number of cards Nano digital 8 inputs.
- **Nano digital in 8 water:** Number of cards Nano digital 8 inputs water.
- **Nano digital out 8:** Number of cards Nano digital 8 outputs.
- **Nano weighing modules:** Number of Nano weighing modules.
- **Nano relay 8 NO:** Number of cards Nano relay 8 NO.

- **QuadScale_HouseLink_HL10C:** Number of QuadScale houselink cards.

3.2 Configuring settings in the FeedMove Editor

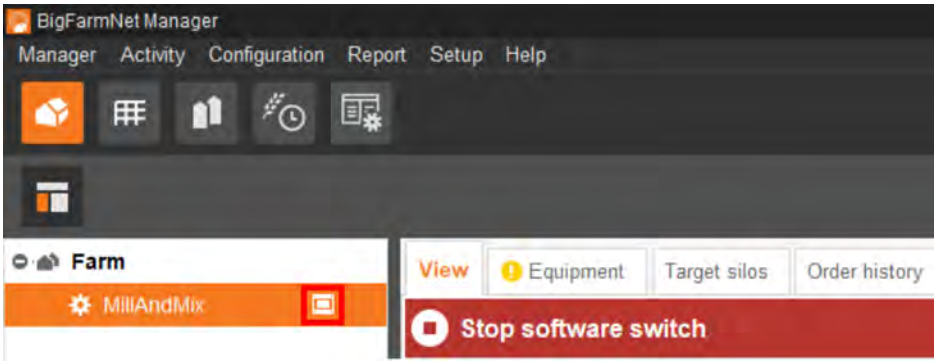
The Feedmove Editor is a program used to edit the graphical depiction of the installed system. All system components you have created in the Composer are displayed as icons in the FeedMove Editor. In the FeedMove Editor, you can connect the individual system components according to the installed system. You thus define the route of the feed move.

NOTICE!

Automatically generated feed moves must be edited!

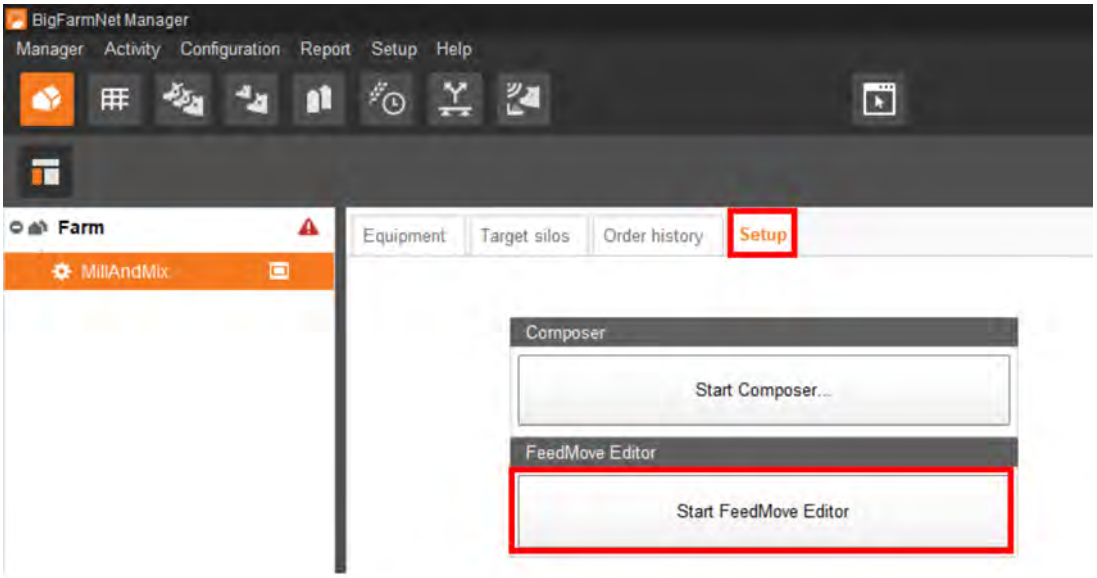
The completed depiction is displayed in the "View" application window. The image shows the system's activity during operation.

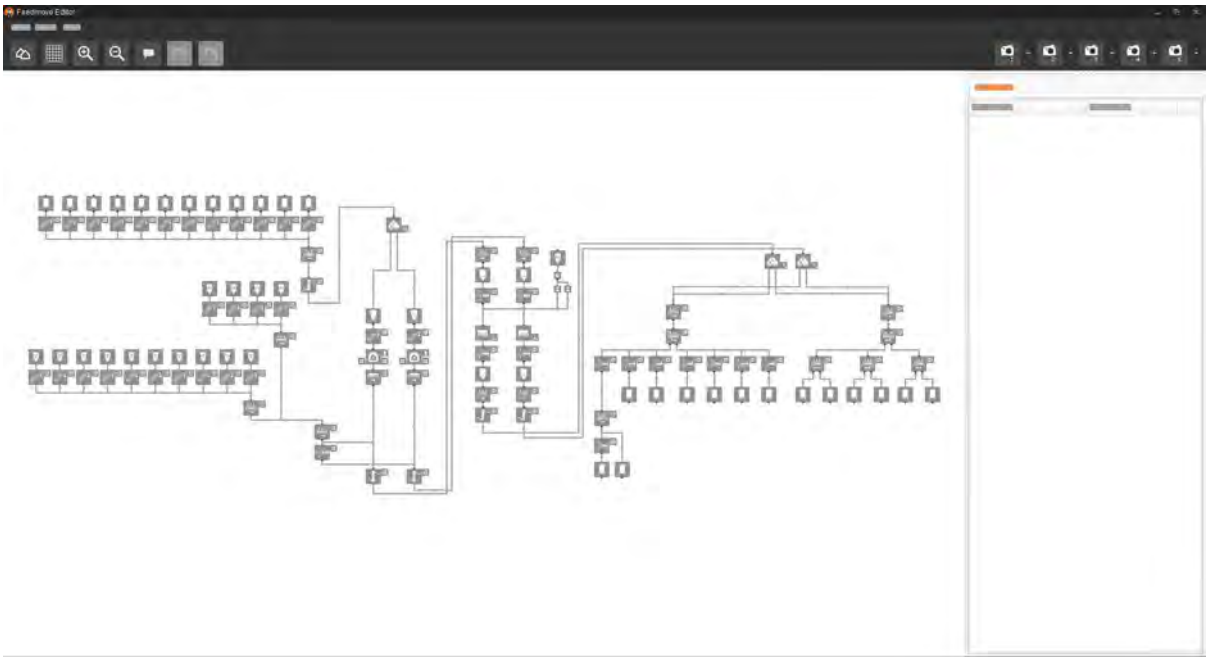
1. Click on the controller icon of the respective system application in the farm structure.



2. Under "Setup", click on "Start FeedMove Editor".

   The FeedMove Editor opens in a new window.





3.2.1 Icons of the system components

Dry silo

Liquid silo / liquid tank

Mineral dosing unit

Micromineral dosing unit

Truck pit

Manual supply

Mill

Mixing tower


Mixer pre-bin / post-bin

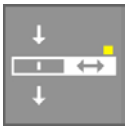

Mill pre-bin

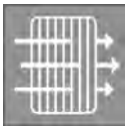

Cleaner inline mill


Dryer


Pellet press

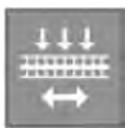

Bucket elevator

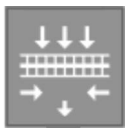

Slide gate

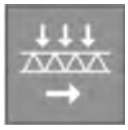

Dust filter

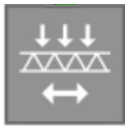

Chain


Chain conveyor


Cross chain conveyor


Center outlet chain


Screw conveyor


Cross conveyor


Dosing auger


Mill plenum screw


Flap box


Three-way flap box


Pump


Vibrator


Agitator

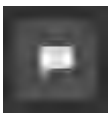

Valve

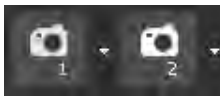

Motor


Cell gate


Air output

3.2.2 Basic functions

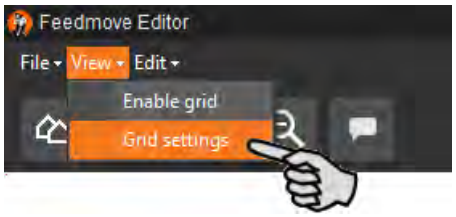
	View	Complete view of the system
	Grid	Hide / show grid lines
	Zoom in / zoom out	Zoom into / out of the view
	Description boxes (labels)	Hide / show description boxes of specific system components

	Undo / redo	Undo / redo an action
	Camera	Save different views of the system

3.2.3 Configuring the grid

If you want to align the system components based on a grid, click on  . Adjust the size of the grid as follows, if necessary:

1. Click on "Grid settings" in the "View" menu.



2. Enter the correct values into the input fields or change them using the arrows pointing upwards and downwards.
3. Accept these inputs by clicking on "OK".

3.2.4 Adjusting and saving views

NOTICE!

The below mentioned functions of the mouse depend on how you have configured your mouse in Windows.

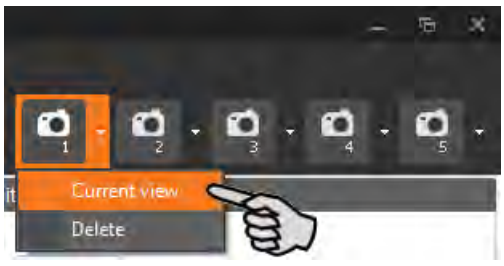
You can save up to 5 different views: one view for each camera icon. Saved views can be retrieved later on in the window "View".

1. Adjust the view as follows:
   - **Zooming in and out:** Roll the scroll wheel of your mouse.
   - **Moving to the left and to the right:** Hold down the Shift key while rolling the scroll wheel of your mouse.
   - **Moving up and down:** Hold down the Control (Ctrl) key while rolling the scroll wheel of your mouse.

     OR

     Press the scroll wheel of your mouse to move the image (two-dimensional) into all directions.
2. Click on the arrow pointing downwards at one of the camera icons.

3. Click on "Current view" in the context menu. The view is now saved.



4. If you would like to retrieve the saved view later on, click on the corresponding camera icon.

3.2.5 Selecting and moving system components

1. Move the mouse pointer over the respective system component.

   The mouse pointer will change its shape  . The name of the system component is additionally displayed as tooltip for a moment.

2. Click on the system component and hold the mouse button.

   The colour of the system component changes to orange.

3. Move the system component to the required position and release the mouse button.

   Or:

1. Select multiple system components

   a) by drawing a rectangle over the system components while holding the left mouse button

      Or:

      by clicking on the different system components while holding the Ctrl key.

      The colour of the selected components changes to orange.

2. Click into the selected area and hold the mouse button.
3. Move the system component to the required position and release the mouse button.

NOTICE!

You can also move objects that are marked orange using the arrow keys on your keyboard.

3.2.6 Linking system components

The links between system components, also called feed moves, are pre-defined by default.

NOTICE!

If you would like to use the default feed moves, make sure that they are possible with the system you have installed.

To link system components, you might have to delete existing links first.

- **Deleting individual links:**

a) Move the mouse pointer to the link you want to change.

The mouse pointer will change its shape  .

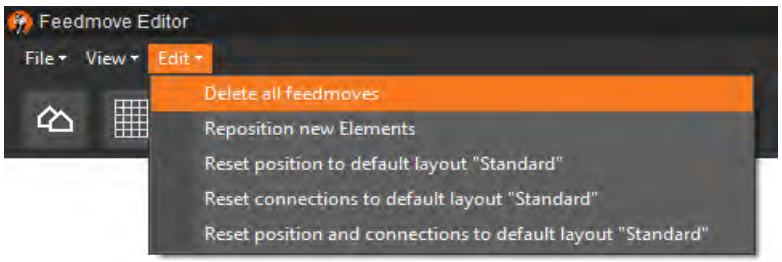
b) Click on the link.

The colour of the link changes to orange.

c) Press the "Delete" key on your keyboard.

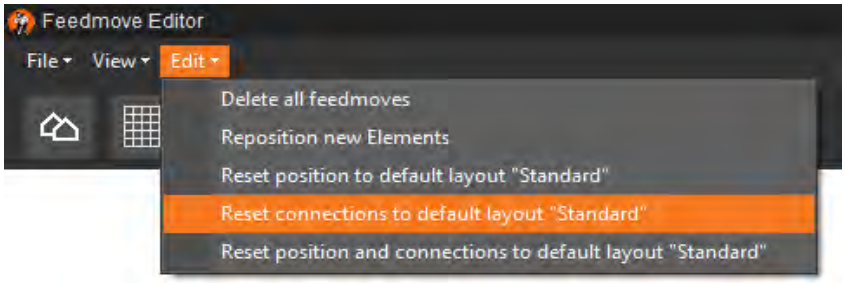
The link is deleted.

- **To delete all links**, click on "Delete all feedmoves" in the menu "Edit".



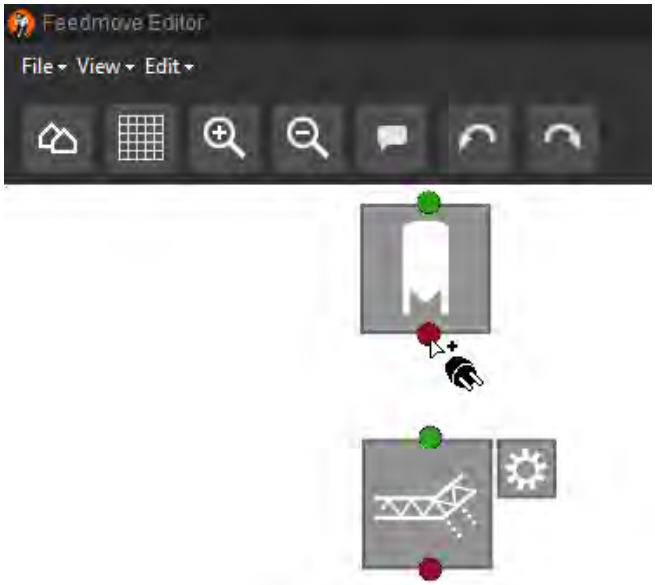
- **Resetting to default:** For EcoMatic, the system components are connected automatically by default links. If this configuration has been changed, you may reset the default links and continue using this default.

  In the menu "Edit", click on "Reset connections to default layout 'Standard'".



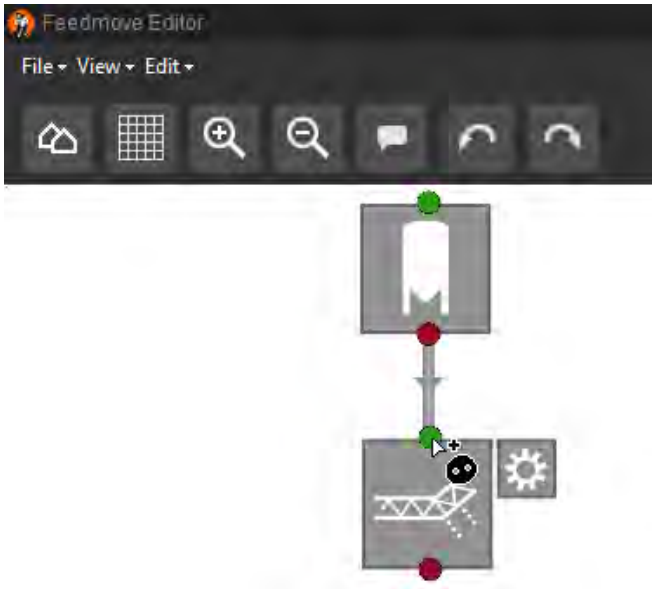
1. Move your mouse pointer to the **red dot** of the specific system component.

   The mouse pointer will change its shape  .



2. Click on the red dot and hold the mouse button.
3. Move the mouse pointer over the icon of the system component to which you want to link the selected system component.

   The mouse pointer will change its shape  and a line linking both components appears. The flow direction is indicated by an arrow within the line.



4. Release the mouse button.

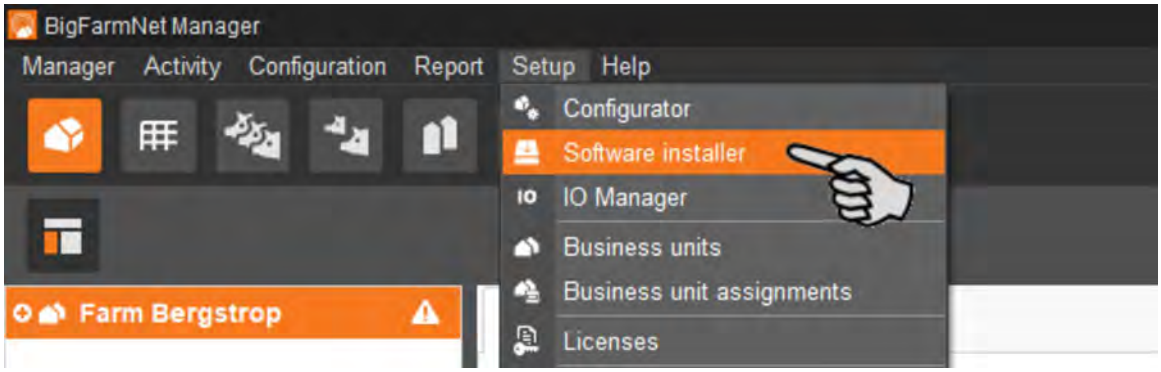
   The two system components are now linked.

   Linked system components without green or red dot cannot be linked further.
5. Continue linking all system components so that a complete feed move route from the silo to the circuit is created.

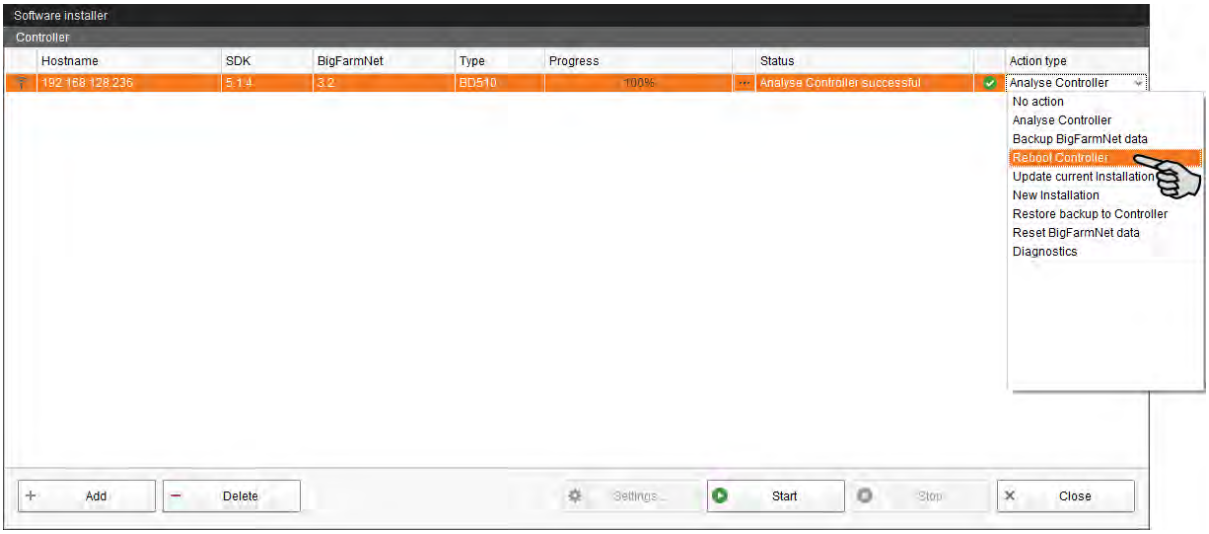
3.2.7 Closing the FeedMove Editor

After saving the changes in the FeedMove Editor, a new dialog appears, prompting the restart of the 501*pro* control computer.

6. Confirm the dialog by clicking on "OK".
7. Click on "Software installer" in the "Setup" menu.



8. Click on the control computer to select it.
9. Click into the corresponding input field under "Action Type" and select "Reboot Controller".



10. Click on "Start".

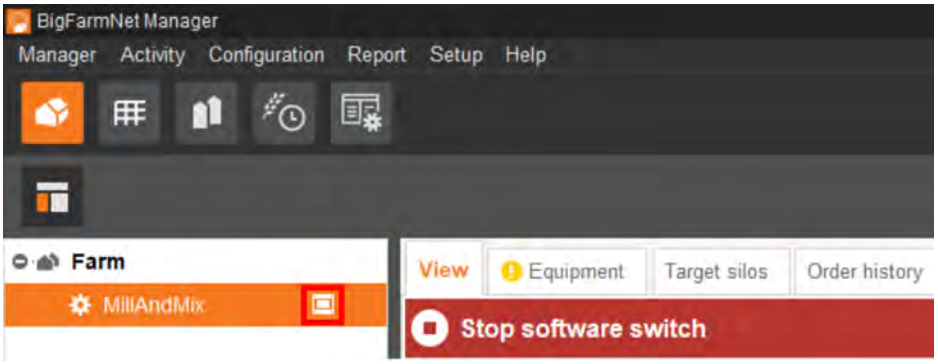
NOTICE!

This process may take a few minutes!

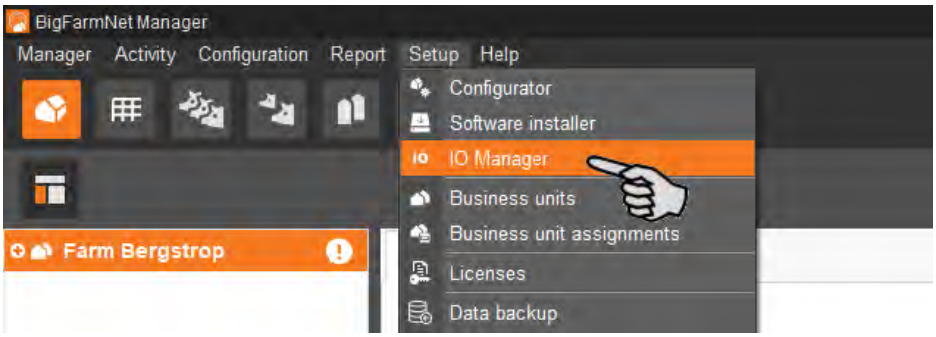
3.3 Configuring the IO Manager

The controller is configured in the IO Manager. Assign the system functions that you defined in the Composer in the previous step to the IO cards.

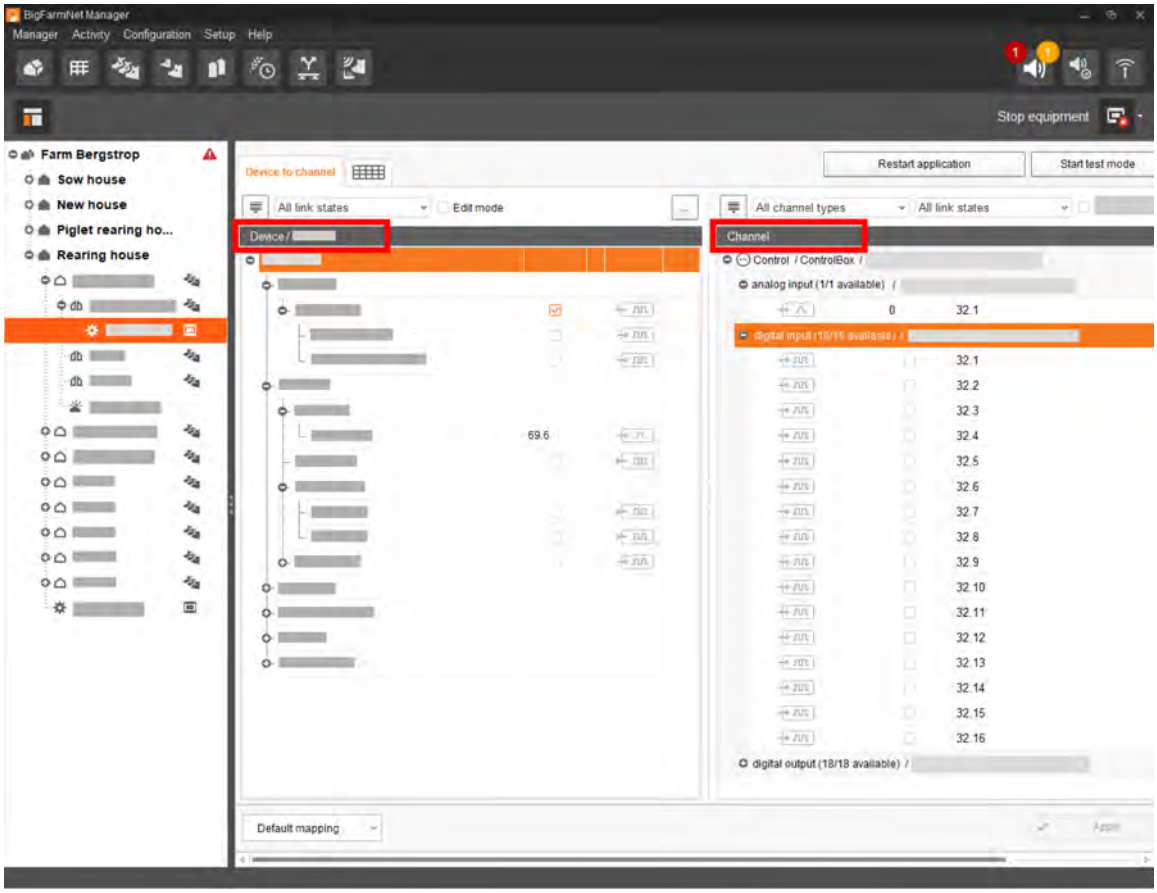
1. Click on the controller icon of the respective system application in the farm structure.



2. Click on "IO Manager" in the "Setup" menu.



The IO Manager opens in the application window. The left-hand part of the window shows the individual devices of the system under "Device". The right-hand part of the window displays the channels of the IO cards under "Channel".



Adjust the view in the IO Manager as follows using the upper bar:

- Expanding or collapsing the structure entirely
- Displaying the device and/or channel according to the link state
- Enabling or disabling the edit mode, in which you can edit device names and create links between devices and IO cards manually with your keyboard
- ... Showing control cabinet numbers and indices
- Showing the channel according to the channel type

The interfaces of the devices and the IO cards are indicated by the following icons:

- Digital output
- Digital input
- Analog output
- Analog input
- 123 Counter input
- Serial interface

– Linked interfaces are colored: 

– Non-linked interfaces are grayed out: 

3.3.1 Order of the IO cards: Lohbus, Izumi

If you use Lohbus or Izumi IO cards, the order of the IO cards in the IO Manager must match that in the control cabinet. Both Lohbus and Izumi are automatically added to the IO Manager after you have selected them in the Composer. The order of the IO cards is arbitrary in the IO Manager.

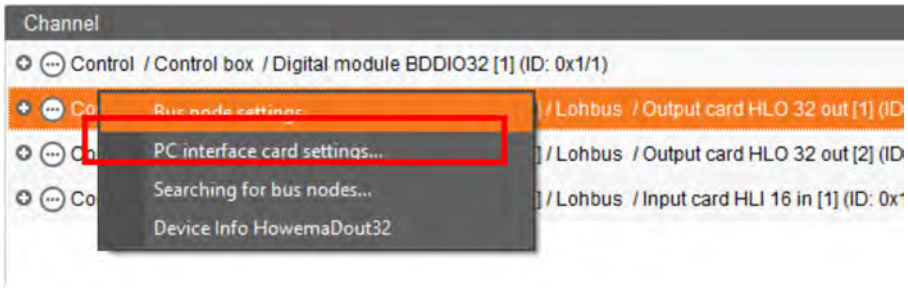
NOTICE!

Sort the Lohbus and Izumi IO cards in the IO Manager **before** creating any links.

The following instructions explain how the Lohbus IO cards are sorted. The Izumi IO cards are sorted in the same way.

1. Right-click on one of the Lohbus cards to open the context menu.
2. Click on "Bus node settings" in the context menu.

   This opens a new dialog window with the settings.

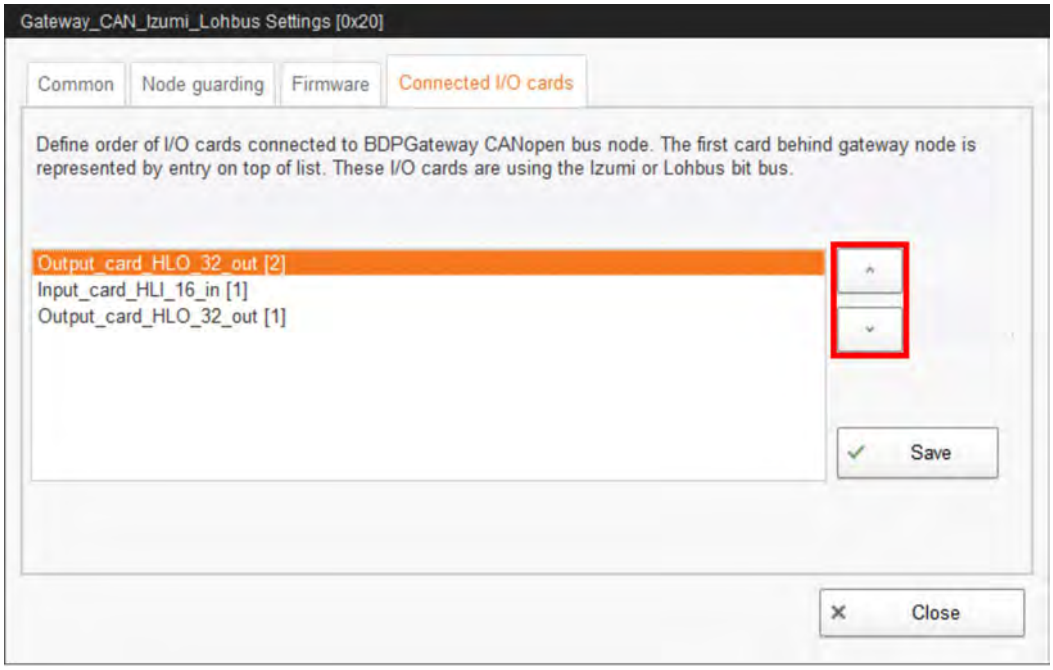


3. Click on the tab "Connected I/O cards".

4. Sort the IO cards that appear in the small view window:
   a) Click on one IO card.
   b) Change the position of the IO card using the arrows pointing upwards and downwards.

NOTICE!

Number the IO cards consecutively, starting with the first card behind the gateway when sorting the IO cards.



c) Save the defined order by clicking on "Save".

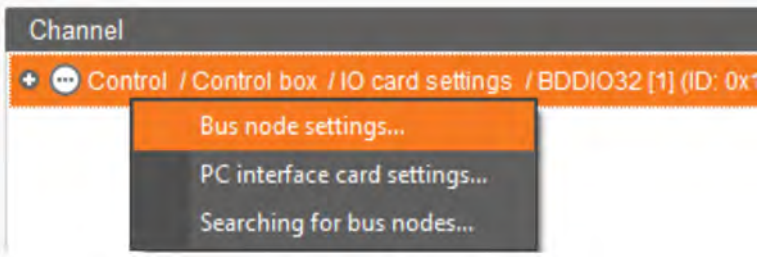
5. Close the dialog window for settings by clicking on the button "Close".

3.3.2 Changing the node ID

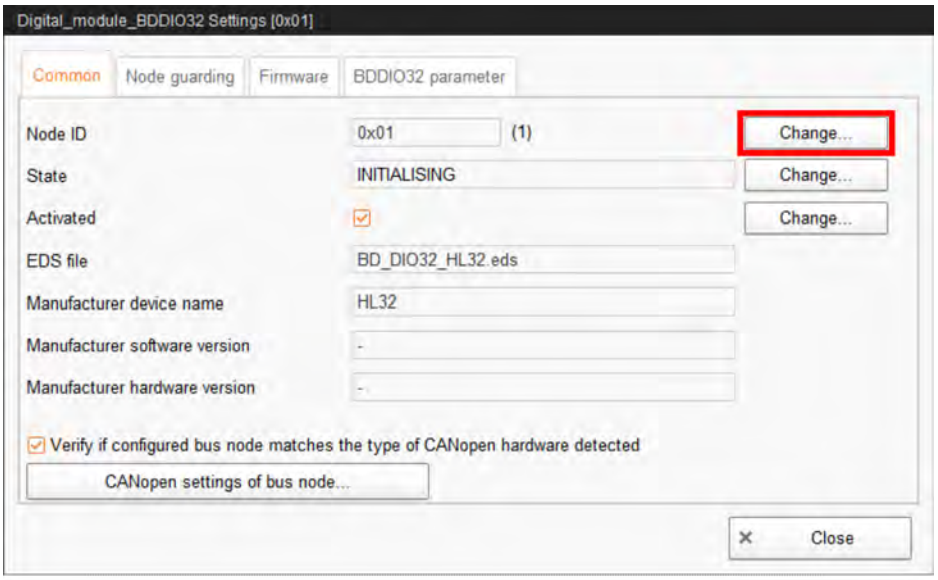
Please refer to the enclosed wiring diagram for information on the devices' CAN addresses. Assign the CAN addresses in accordance with the wiring diagram.

1. On the IO cards to be assigned, check to which CAN ID the rotary switch of each card is set (in the control box).
2. Open the context menu by right-clicking on the IO card (top level) and click on "Bus node settings...".

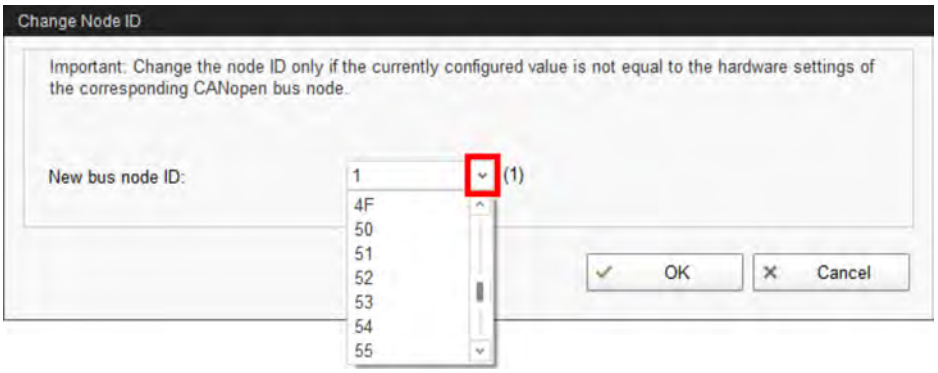
   This opens a new dialog.



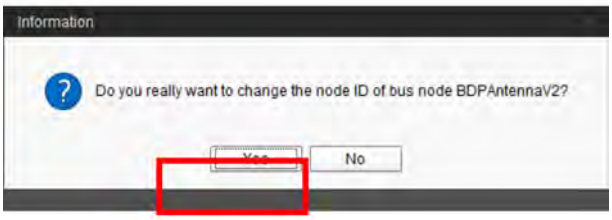
3. In the first tab, click on "Change..." next to "Node ID".



4. Select the new node ID and click on "OK".



5. Confirm the prompt for confirmation.



6. Click on "Close" to close the dialog.
7. Click on the button "Restart application" to accept the settings.

3.3.3 Creating links

Link the different devices manually with the corresponding IO card. The system currently does not support the "Default mapping" function (button).

1. Change one or more inputs to outputs with the supply voltage +24 V in the "Channel" area, where necessary.

   The default shows only inputs at first.

   This function is only possible for IO cards type BDDIO32 and BDDIO32LC.

   a) Select one input or select multiple inputs by holding the Ctrl key.

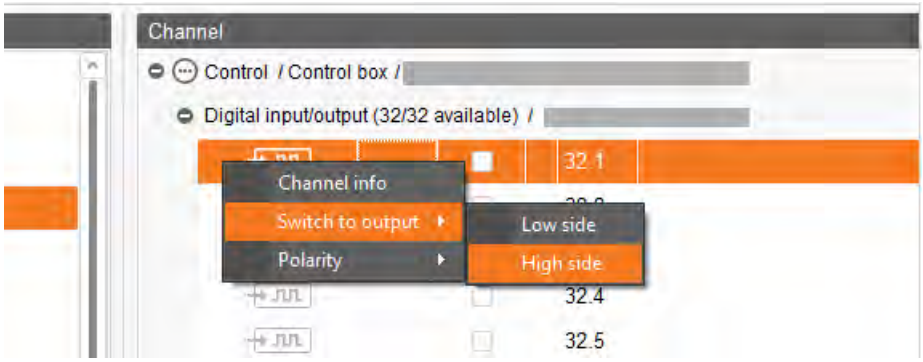
      Multiple editing is only possible for channels of the same type.

   b) Right-click into the marked area.

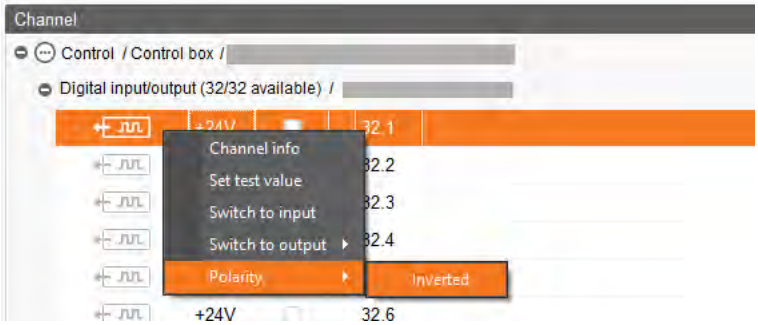
   c) In the context menu, select "Switch to output" > "High side", if the new output should switch to high side (24 V).

      OR:

      In the context menu, select "Switch to output" > "Low side", if the new output should switch to low side (ground).



   d) If necessary, you can invert the polarity of the signal by clicking on "Polarity" > "Inverted" in the context menu.



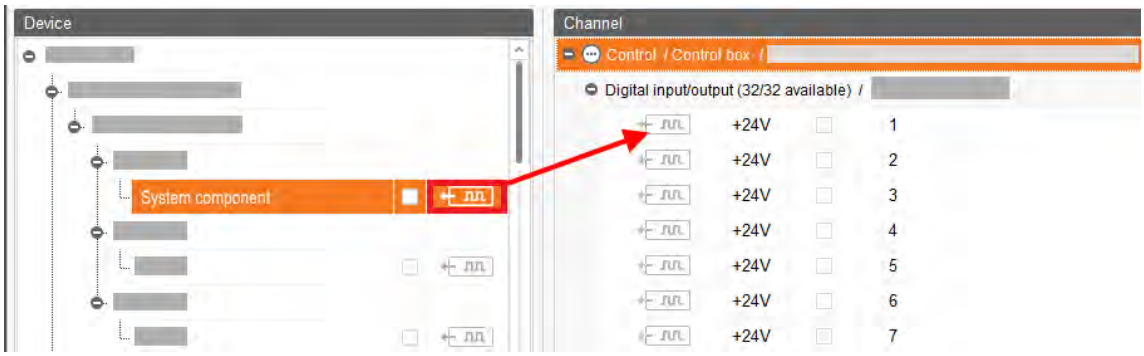
2. Select one of the following options to link the interfaces:

   Option 1:

a) Click on the interface of the respective system component and hold the mouse button.

b) Hold the mouse button and move the mouse to the interface of the correct channel, then release the button.

The system component and the channel are now linked. The icons are colored .

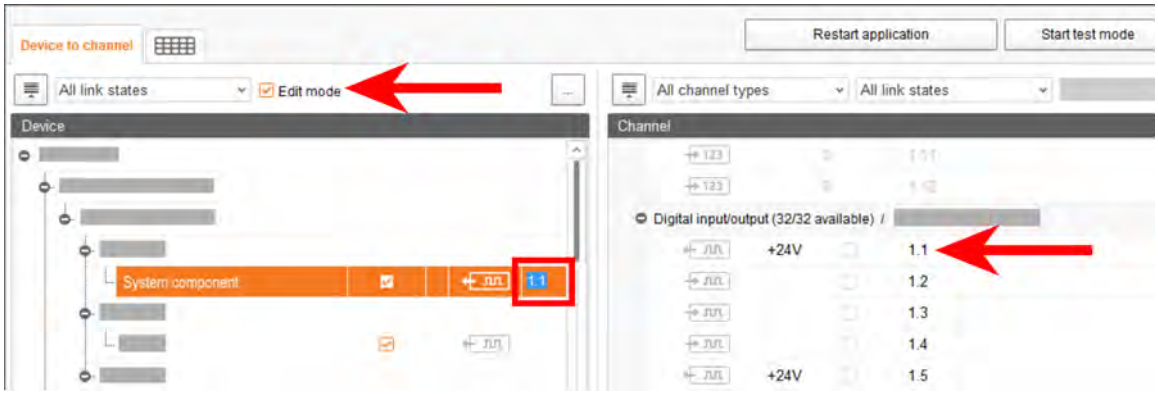


Option 2:

a) Activate the edit mode in the upper bar.

b) The IO card interfaces have numbers. Enter the corresponding number for the system component's interface.

The system component and the channel are now linked. The icons are colored .



3. If you have created an incorrect link, right-click on the corresponding linking icon. Click on "Delete connection" in the context menu.

NOTICE!

Checking links:

Double-click on the respective device to mark the linked channel.

4. Click on "Save" in the bottom command bar after having established all links.

5. Click on "Restart application" at the top of the window to start the control.

3.3.4 Importing a wiring diagram

Wiring diagrams can be loaded in CSV format.

1. Click on the arrow pointing downwards next to the button "Default mapping" in the lower bar.

   This opens a context menu.

2. Select "Load control cabinet mapping".

3.3.5 Using the test mode

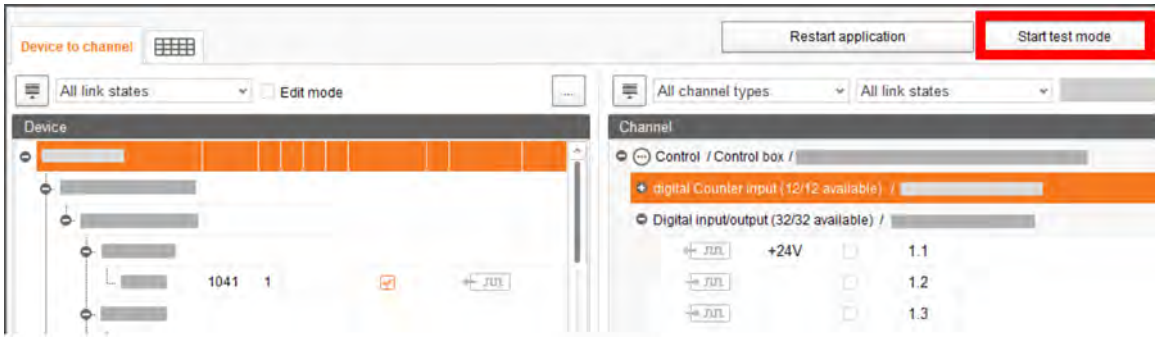
In the test mode of the IO Manager, all devices can be turned on and off to check the correct setup of the control before starting to operate the system.

⚠ CAUTION!

Only service technicians may use the test mode. Devices may start in case the system is connected. Make sure that no persons or animals are located in or around the station while using the test mode.

Deactivate the test mode when finished.

1. Click on "Start test mode" in the upper bar.



2. In the "Device" part of the window, double-click on the interface of the device you want to turn on  .

   The linked channel is marked accordingly.

3. Click on the check boxes of the selected device and respective channel to activate them.

   The actual device is now turned on.

   If the actual device does not turn on or if another actual device is running instead, correct the links in the IO Manager or reconnect the outputs of the IO card. Always refer to the overview drawing of the IO card attached to the wiring diagram.

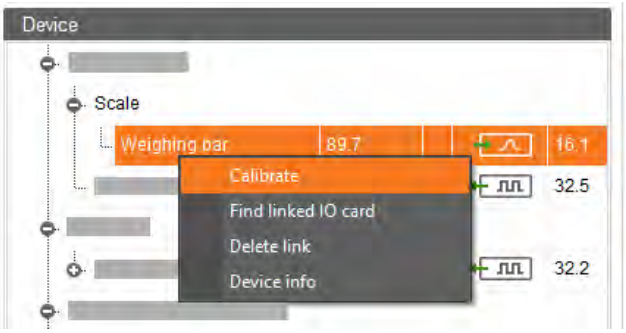
4. Turn off the device by deactivating the check box.
5. End the test mode by clicking on Stop test mode in the upper bar.

3.3.6 Calibrating the scale

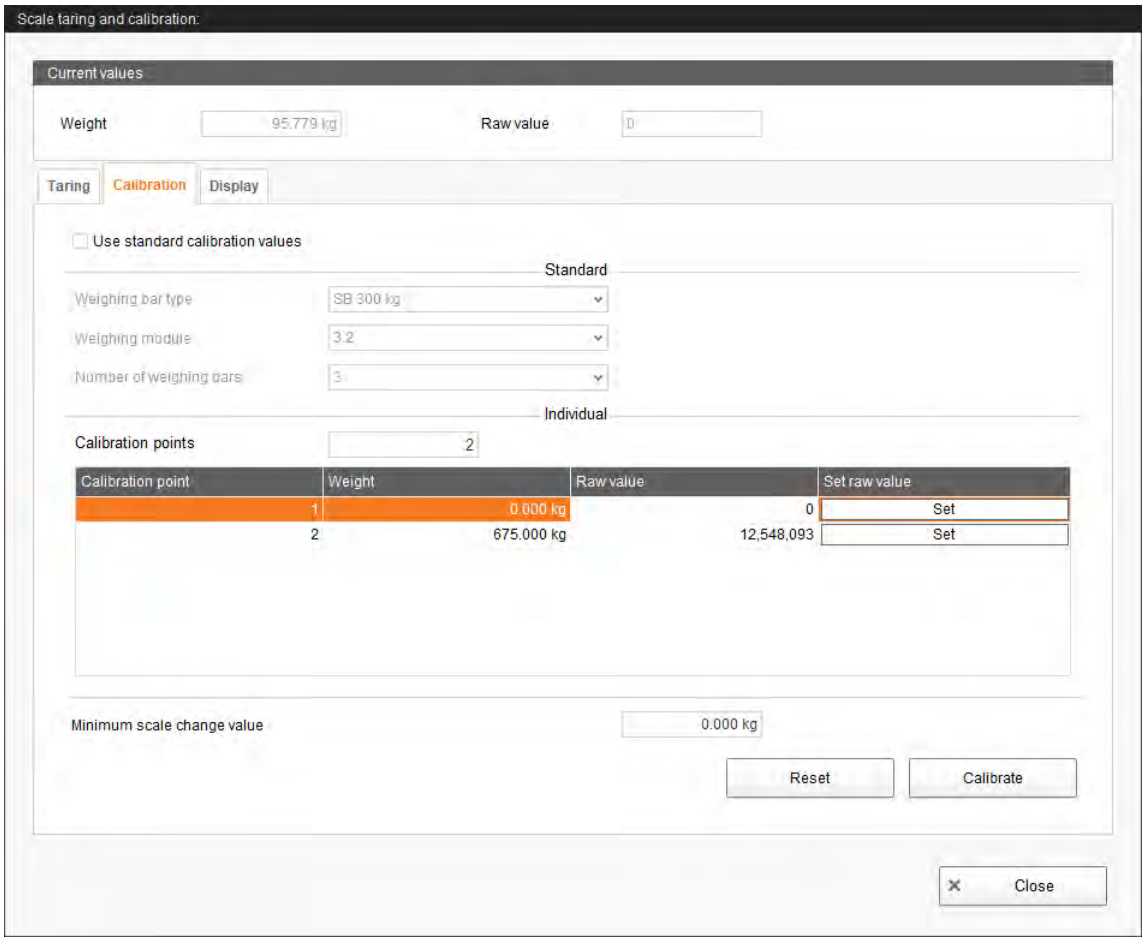
You may calibrate the scale as soon as you have created a link between the scale or its weighing bars and the respective weighing box.

1. Right-click on the connected scale or its subordinate weighing bars in the "Device" area.
2. In the context menu, click on "Calibrate".

   This opens a new dialog window.



3. To calibrate, click on the "Calibration" tab.



4. Enter the weight (usually the value 0) for calibration point 1 and click on "Set" in the "Set raw value" column.
5. Enter the weight used for calibration for calibration point 2.
6. Load MillAndMix with the calibration weight.
7. Click on "Set" in the "Set raw value" column in the row for calibration point 2.
8. Remove the calibration weight.
9. If you have defined further calibration points, repeat steps 5 to 8 with these points.
10. Click on "Calibrate" to complete the calibration process.
11. Close the dialog.

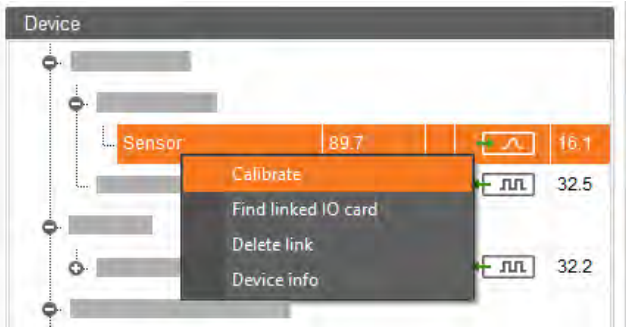
3.3.7 Calibrating the analog sensor

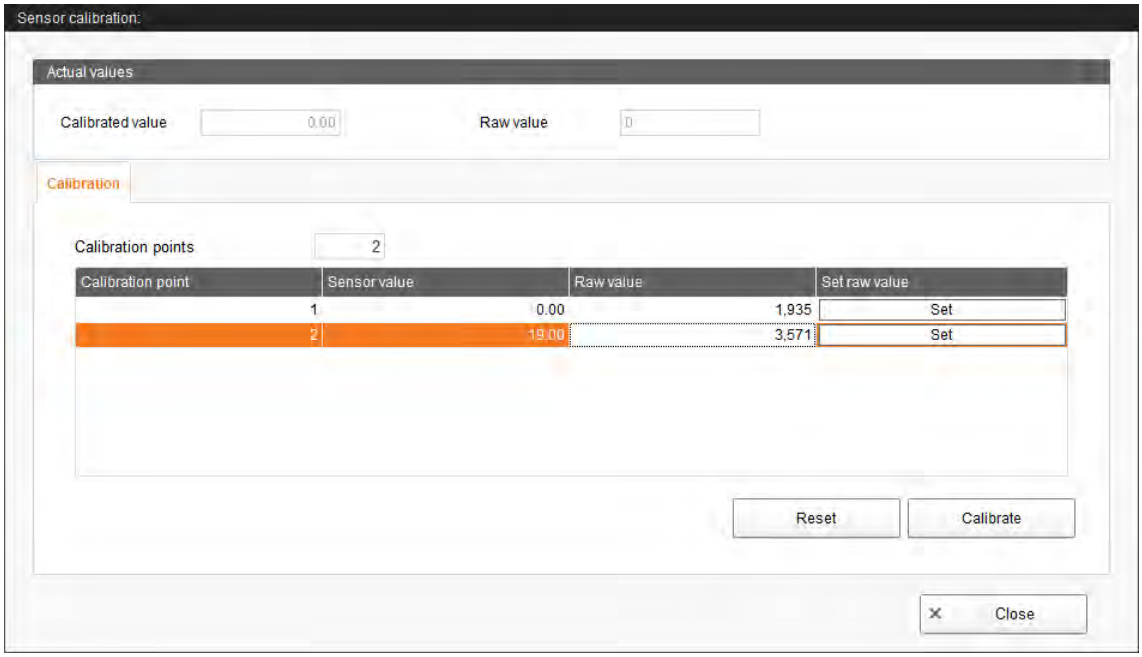
You may calibrate the analog sensor as soon as you have created the link between the analog sensor and the respective analog module.

Depending on the sensor type, an external measuring device must be available to measure current consumption, temperature, humidity, etc. With regard to sensible calibration values, also refer to the sensor supplier's documentation.

12. Right-click on a linked analog sensor in the "Device" area.
13. In the context menu, click on "Calibrate".

    This opens a new dialog window.



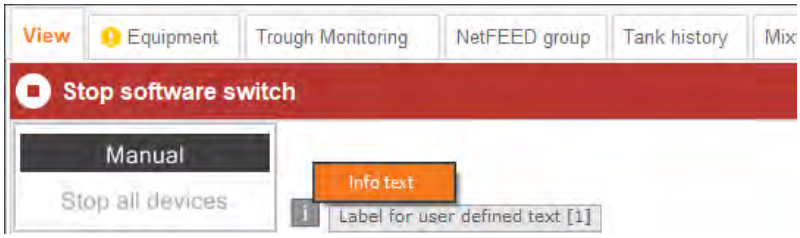


14. Enter the number of calibration points to be used. For each calibration point, a new row appears in the table.
15. Enter the first externally measured value (usually the value 0) for calibration point 1 in the "Sensor value" column and click on "Set" in the "Set raw value" column.

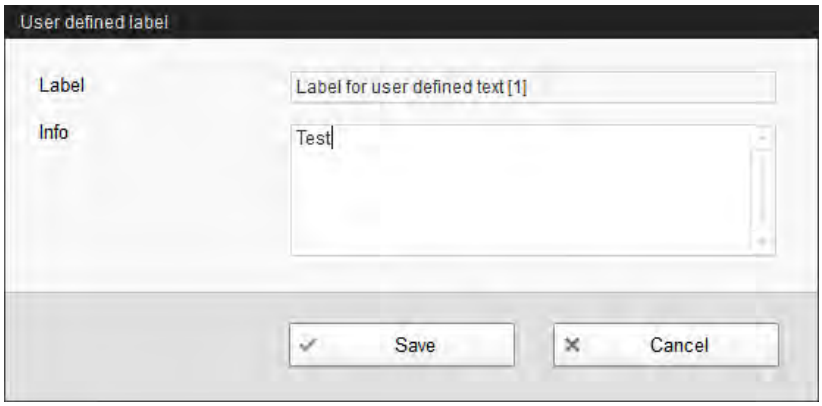
    A value appears in the column "Raw value".
16. Depending on the type of sensor, change the current consumption (switch on device), the temperature, the humidity, etc. to change the externally measured value.
17. Enter the second externally measured value for calibration point 2 in the "Sensor value" column and click on "Set" in the "Set raw value" column.
18. If you have defined more calibration points, repeat steps 5 and 6 for these points.
19. Click on "Calibrate" to complete the calibration process.
20. Close the dialog.

3.4 Editing a user-defined label

If you have defined "Label for user-defined text" in the Composer (see chapter 3.1.9 ”Accessories”, page 42), open the edit window for the user-defined label under "View" by right-clicking on the corresponding icon or on the label and then clicking on "Info text".



In the edit window, edit the label and the info text of the user-defined label and confirm by clicking on "Save".



As soon as an info text has been entered and saved, the info text is displayed as a label under "View".

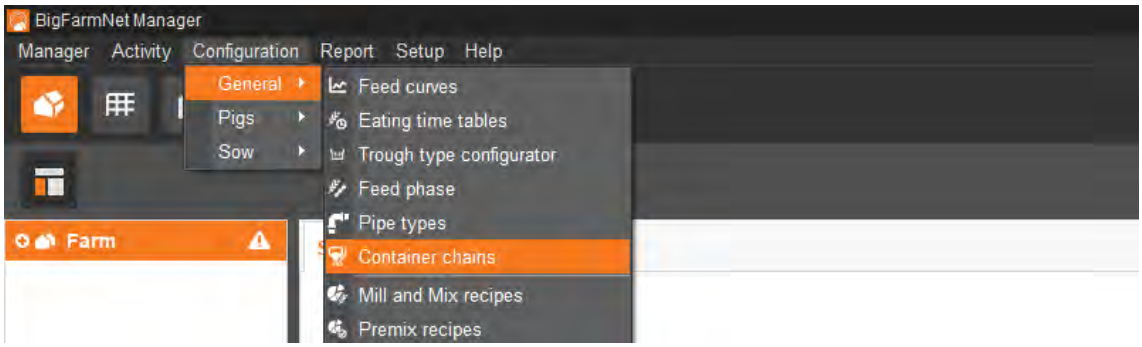
4 Container chains

The sequence of containers (silos) from which components are removed can be configured using so-called container chains.

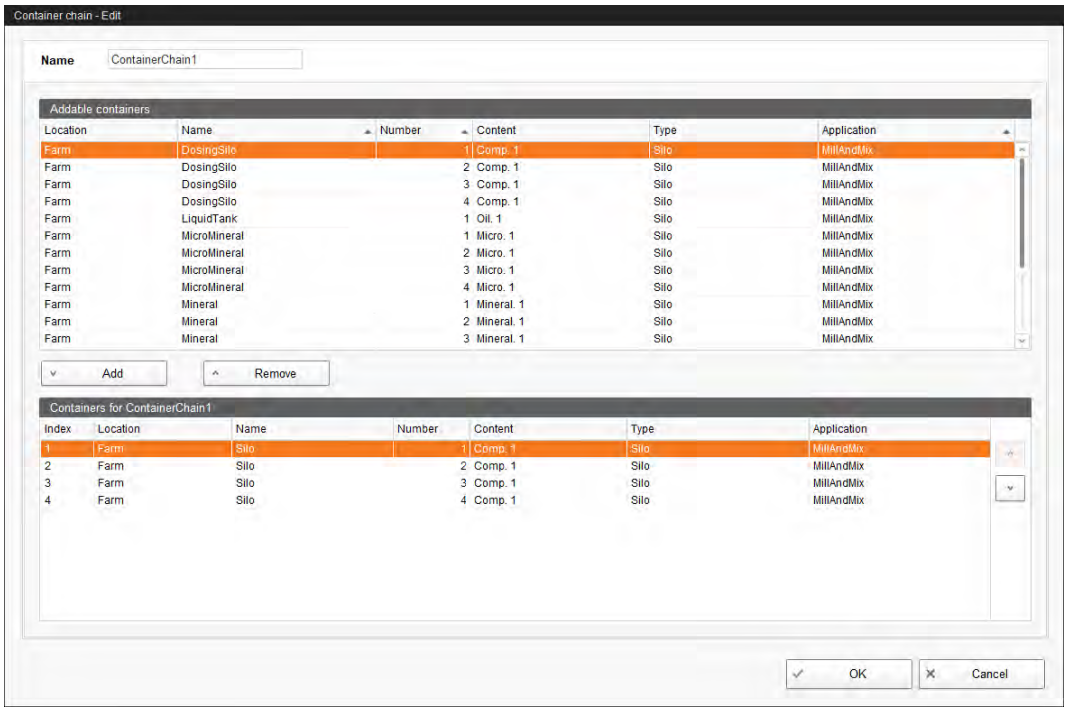
It is advisable to include only containers with the same component and priority in a container chain. However, a container chain may also include containers with different components and priorities.

After configuring the container chains, their priority can be adjusted (see chapter 5.13.3 ”Priority of container chains”, page 112).

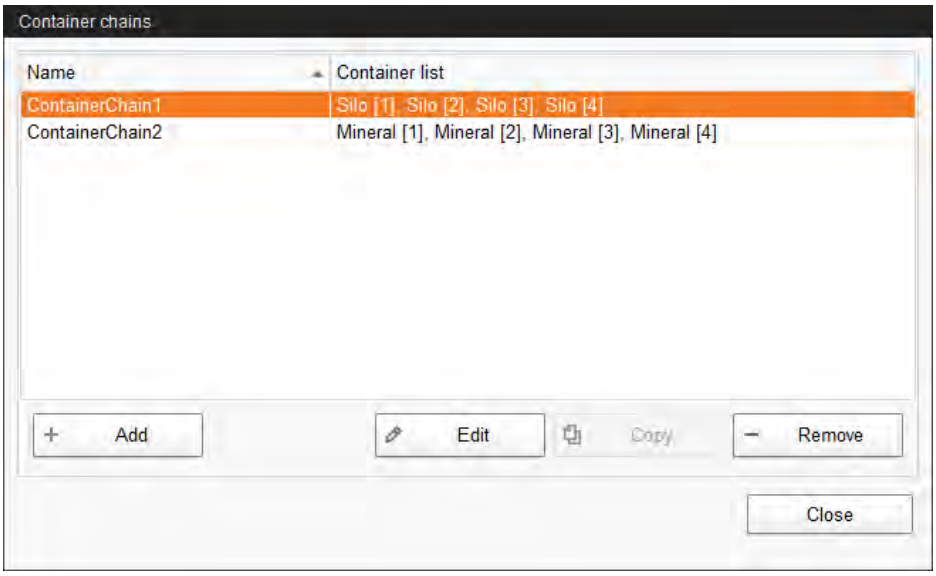
1. In the menu "Configuration" > "General", click on "Container chains".



2. In the dialog window "Container chains", click on "Add".
3. Enter a name for the container chain.
4. From the top list of containers that can be added, select the desired containers and click on "Add" to add them to the container chain below.



5. Sort the containers within the container chain using the arrows pointing upwards and downwards.
6. Confirm the container chain by clicking on "OK".



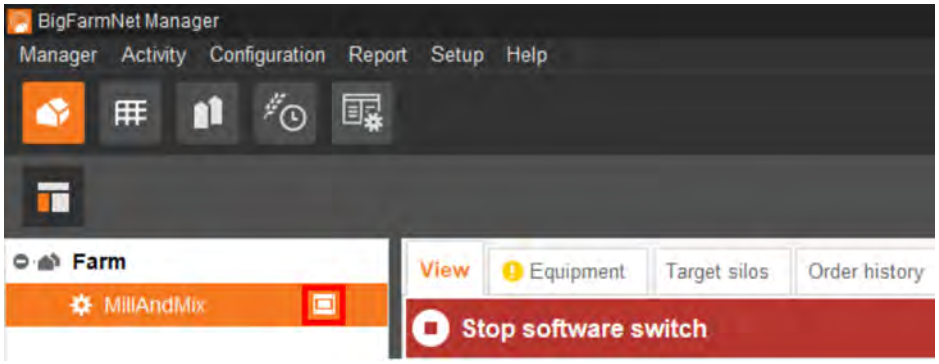
The containers that were listed from top to bottom during configuration of the container chain are listed from left to right in the "Container list" column of the "Container chains" dialog window.

7. Configure additional container chains, if required.
8. Confirm the container chains by clicking on "Close".

5 MillAndMix*pro* settings

Settings for the application are configured under the "Equipment" tab. Parameter values can be changed as necessary at any time to meet individual requirements.

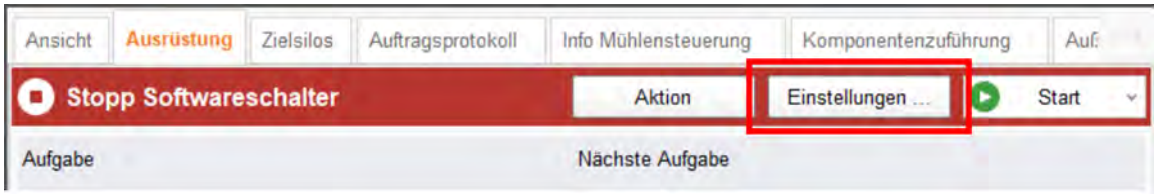
1. Click on the controller icon of the respective system application in the farm structure.



NOTICE!

Check whether the system is running. Stop the system by clicking on Stop in the upper bar.

2. Under "Equipment", click on "Settings...".

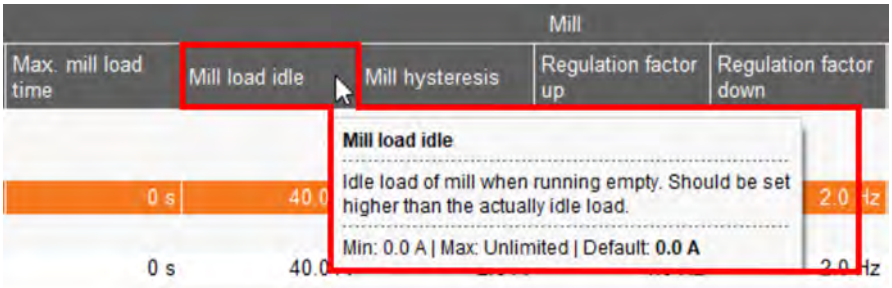


This opens the settings dialog, which contains all settings for the system components you defined in the Composer beforehand. The settings are grouped and may have pre-set values. The different parameters are described in the following chapters.

Only save after you have defined all settings of the tabs. The "Save" function affects the entire settings dialog. Saved changes are immediately applied to the system(s)!

NOTICE!

Tooltips available! Move the mouse pointer over the input fields or the parameters in the head line to see a more detailed description.

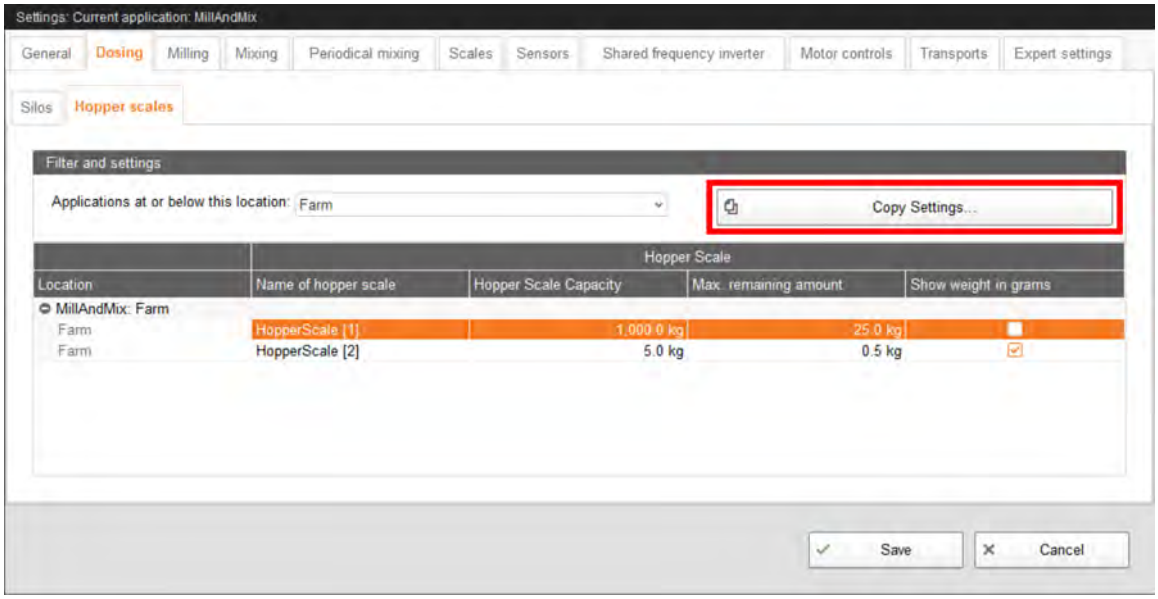


5.1 Copying the settings of an element

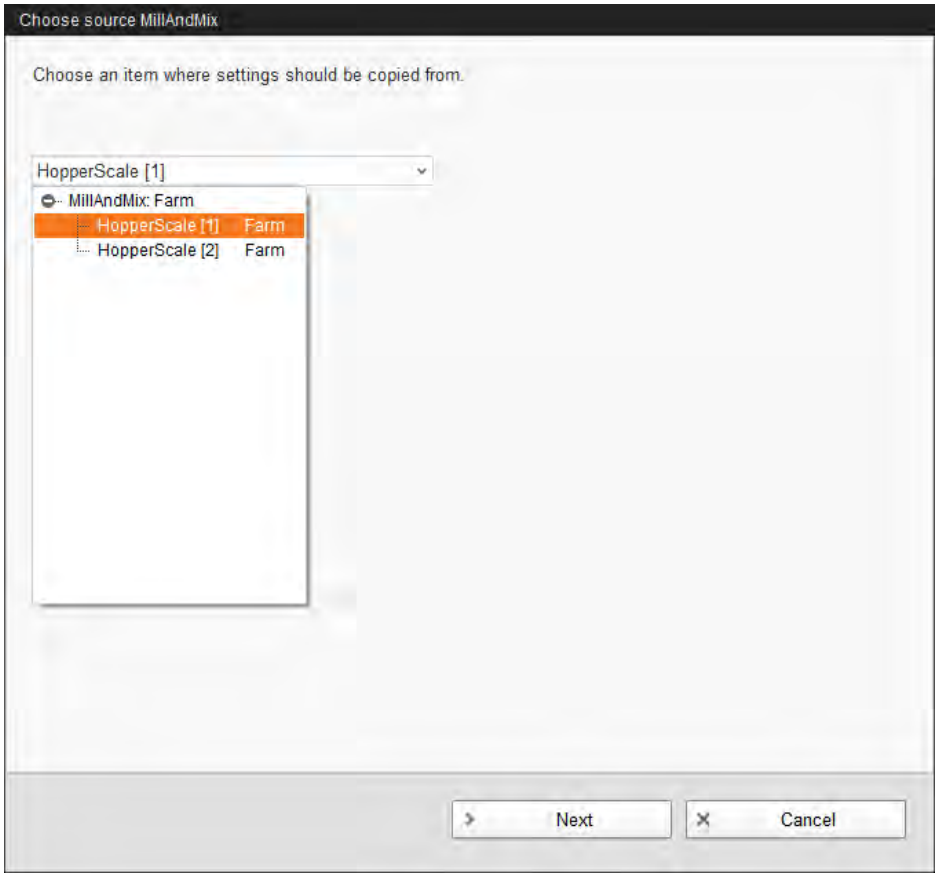
If multiple elements of the same type are to have the same settings, you can configure the settings for one element and copy them to other elements. The copy function is part of the settings dialog if a minimum of two elements of the same type exist. The function can only be used for the settings of the currently active tab.

Proceed as follows:

1. Configure the settings for one element.
2. Click on the button "Copy Settings..." in the top part of the window.

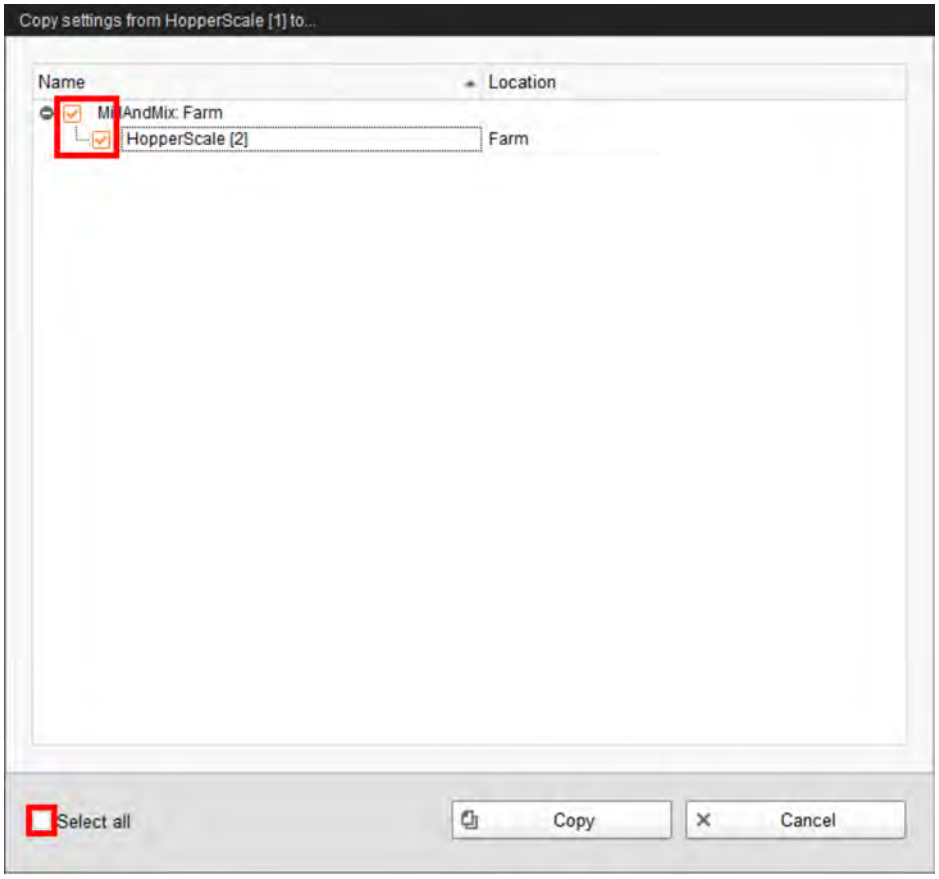


3. In the next dialog window, select the element whose settings you want to copy.



4. Click on "Next".
5. Select all elements to which you want to copy these settings in the next dialog window.

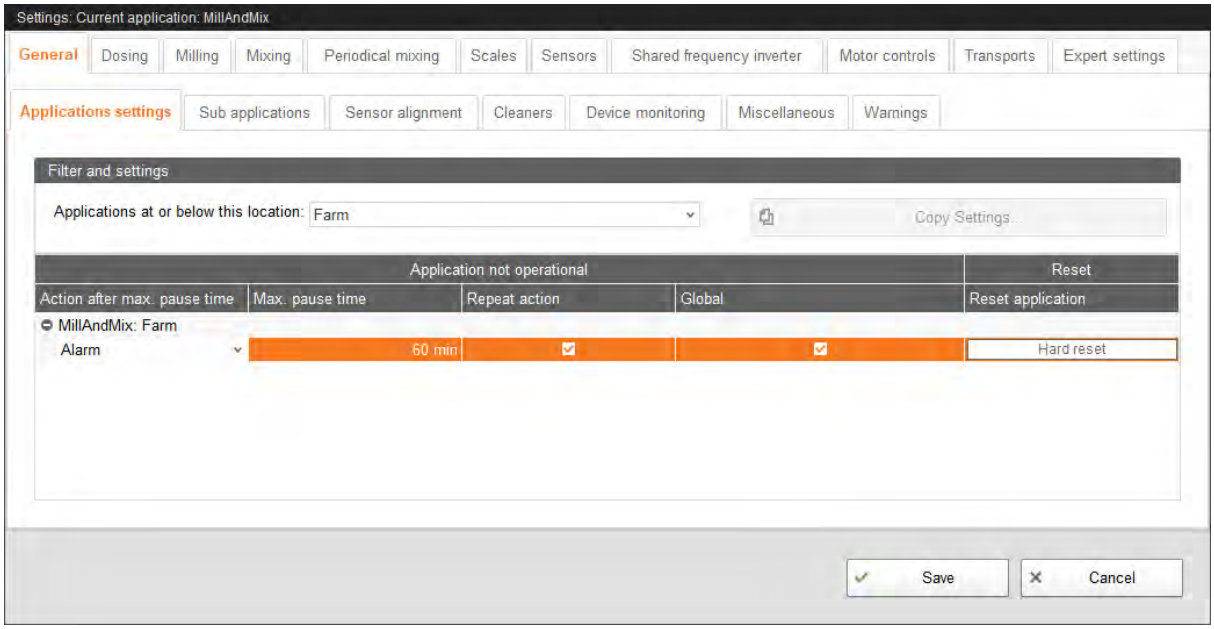
   Checking or unchecking the "Select all" box selects or deselects all elements.



6. Click on "Copy" to transfer the settings to all selected elements.

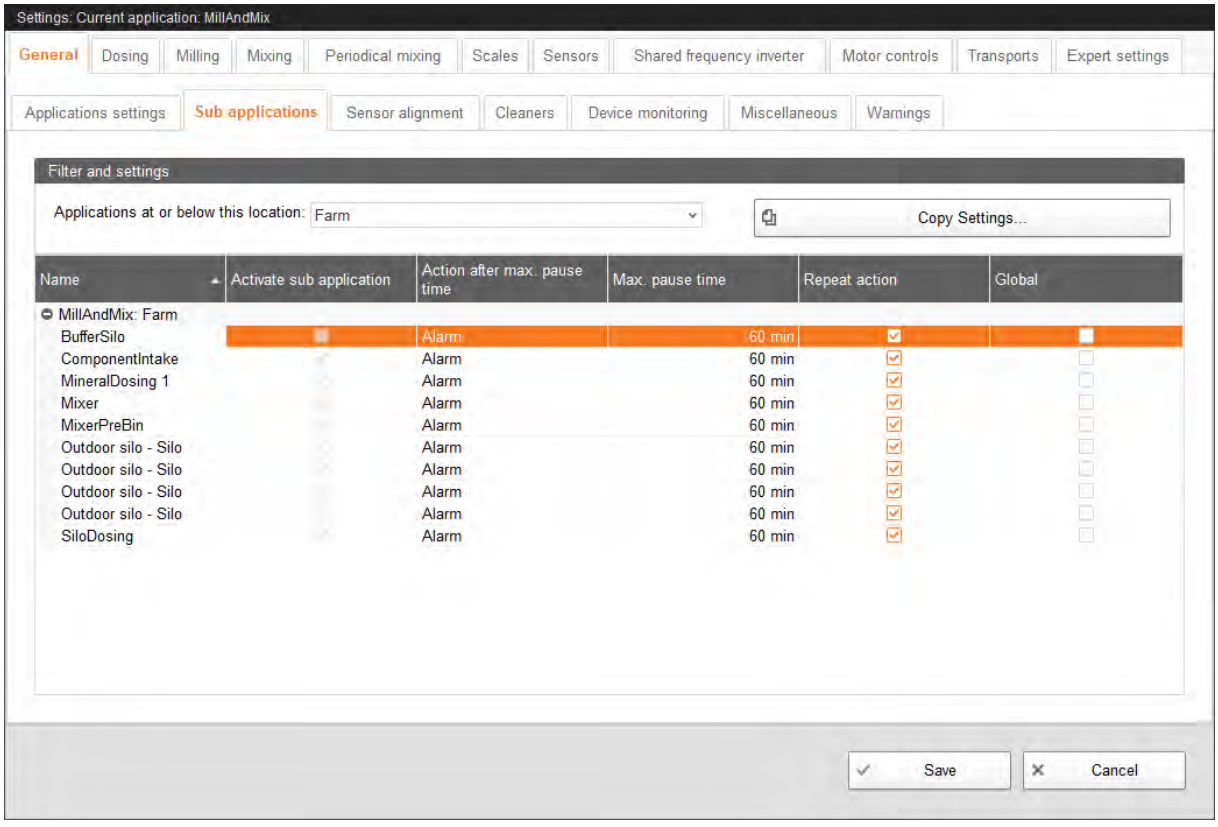
5.2 General

5.2.1 Application settings



- **Application not operational**
  - **Action after max. pause time** can be set to be either an alarm, a warning or no action at all ("No").
  - **Max. pause time:** If the application does not run for a time longer than set here (pause or error), an alarm or a warning is issued, depending on what is set for "Action after max. pause time". If the time is set to 0 minutes, there is no maximum pause time.
  - **Repeat action:** When this box is checked, the action (alarm, warning or no action) is repeated every time the maximum pause time expires.
  - **Global:** Allows defining the status **Application not operational** as a global alarm/warning.
- **Reset**
  - **Reset application:** Hard reset of the application.

5.2.2 Sub-applications

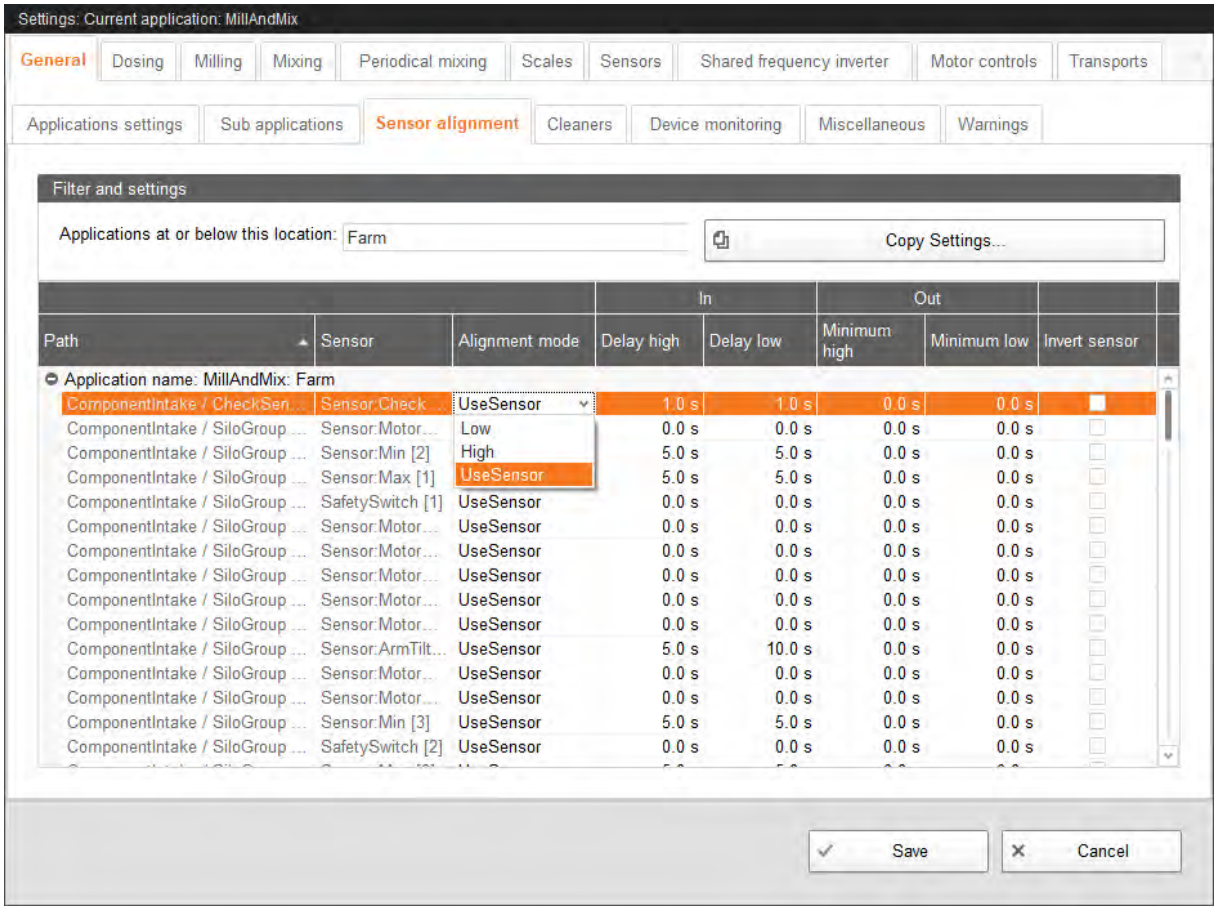


The application contains system components that are controlled as independent sub-applications. Sub-applications can be locked for a specified period, e.g. in case of damage.

- **Name:** System component that is controlled as sub-application.

- **Activate sub-application:** The system components are active by default. Click into the box to remove the checkmark if you want to lock system components.
- **Action after max. pause time** can be set to be either an alarm, a warning or no action at all ("No").
- **Max. pause time:** If the application does not run for a time longer than set here (pause or error), an alarm or a warning is issued, depending on what is set for "Action after max. pause time". If the time is set to 0 minutes, there is no maximum pause time.
- **Repeat action:** When this box is checked, the action (alarm, warning or no action) is repeated every time the maximum pause time expires.
- **Global:** The alarm/warning is global.

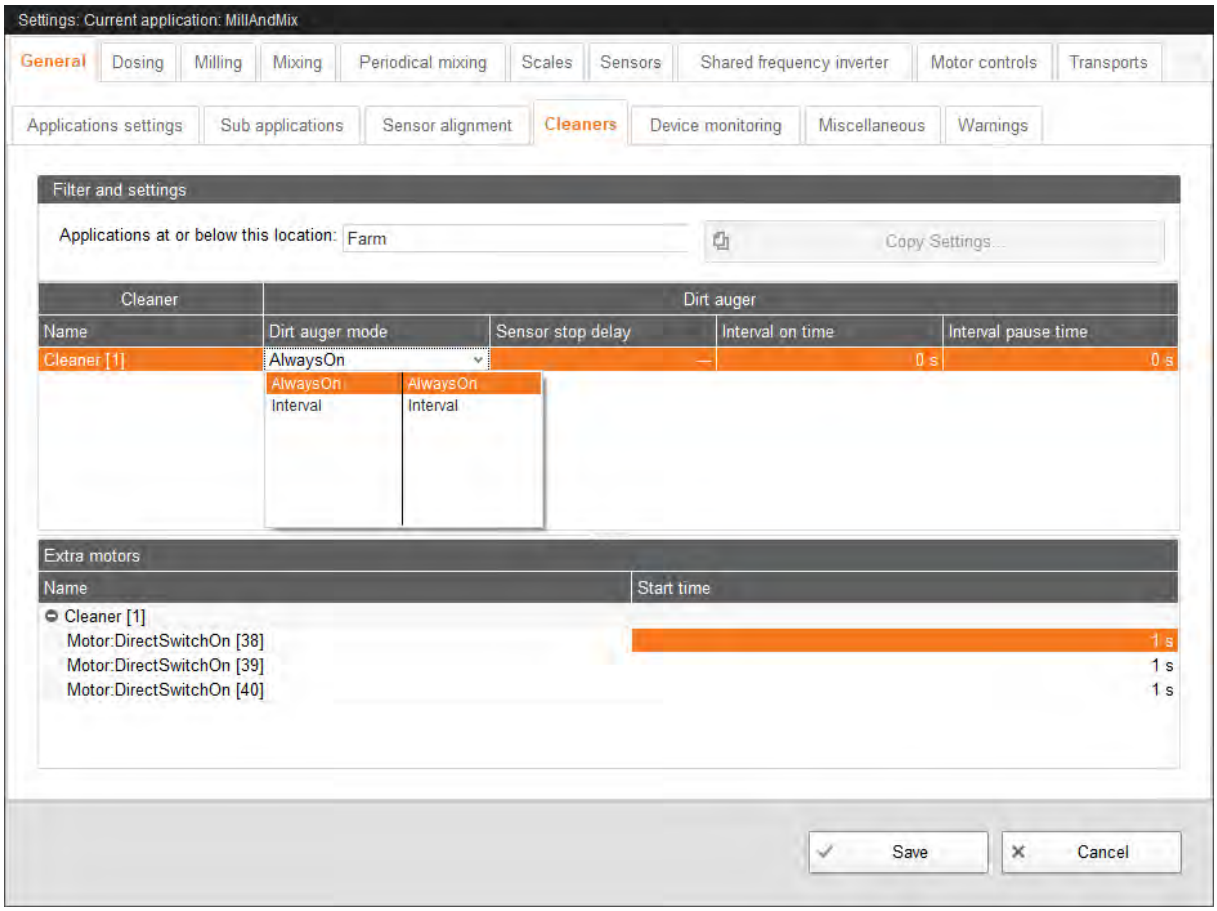
5.2.3 Sensor alignment



- **Path** (only an information): The corresponding path.
- **Sensor** (only an information): The name of the sensor.

- **Alignment mode:** Usually, the setting "UseSensor" should be used. The modes "Low" and "High" mean that the derived sensor value (output) is always either "Low" or "High", irrespective of the actual sensor value. These modes can be used temporarily so the software always has a correct value in case the sensor is defective. Do not use these modes always, however.
- **Delay high:** The actual sensor (input) must have reported "High" within this period before the derived sensor switches to "High" (output).
- **Delay low:** The actual sensor (input) must have reported "Low" within this period before the derived sensor switches to "Low" (output).
- **Minimum high:** The minimum time for which the derived sensor (output) reports "High".
- **Minimum low:** The minimum time for which the derived sensor (output) reports "Low".
- **Invert sensor:** This setting inverts the input value of the actual sensor (input). The parameters **Delay high** and **Minimum low** are then applied to the inverted input value of the sensor. The effect is similar to inverting the sensor on the card.

5.2.4 Cleaners

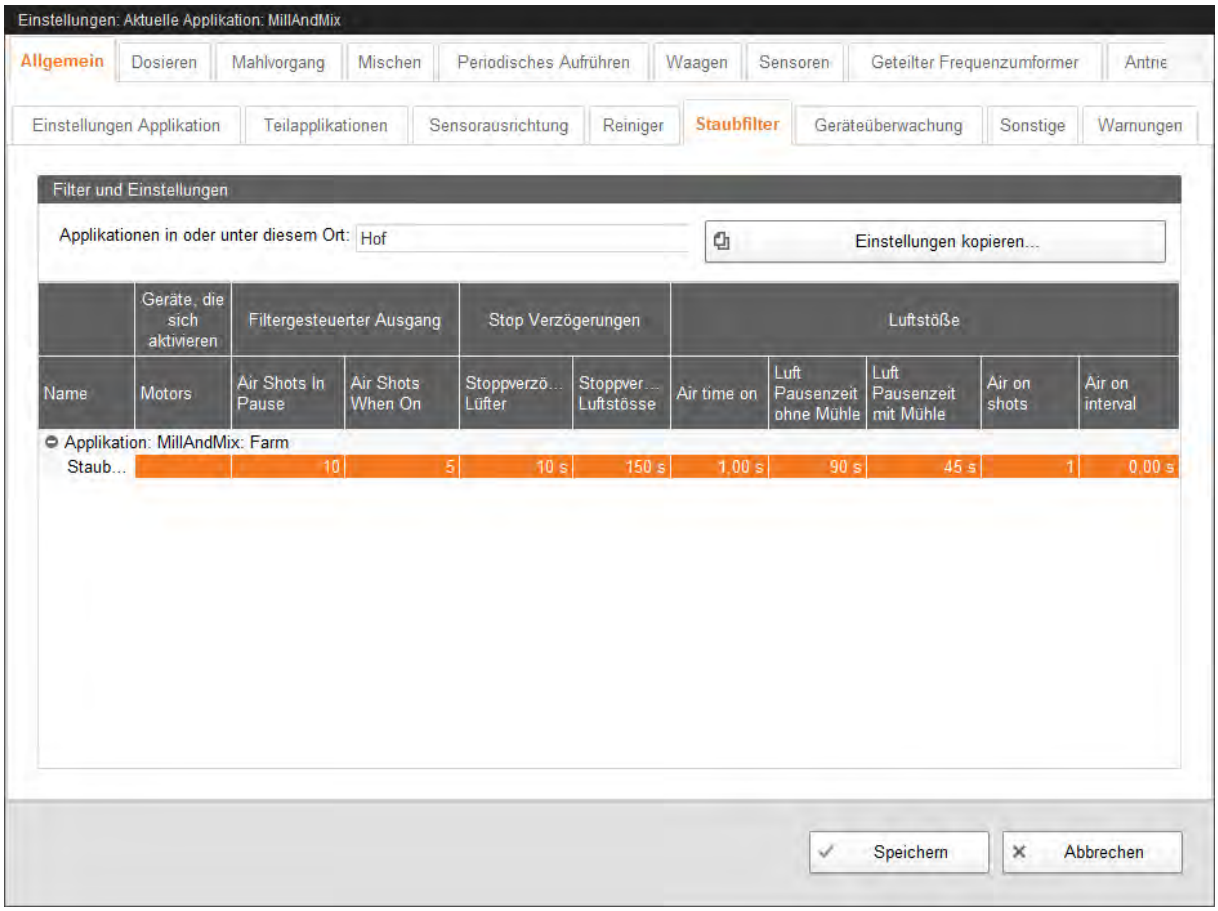


- **Cleaner**
  - **Name:** Name of the cleaner.
- **Dirt auger**
  - **Dirt auger mode**

    Always on: The dirt auger operates permanently.

    Interval: The dirt auger switches between on time and pause time.
  - **Sensor stop delay:** Delay of the sensor if the dirt auger is operated based on a sensor.
  - **Interval on time:** Period for which the dirt auger remains switched on between two pause times in the "Interval" mode.
  - **Interval pause time:** Period for which the dirt auger remains switched off between two on times in the "Interval" mode.
- **Extra motors**
  - **Name** (only an information): Name of the additional motor.
  - **Start time:** Start time used by the additional motor.

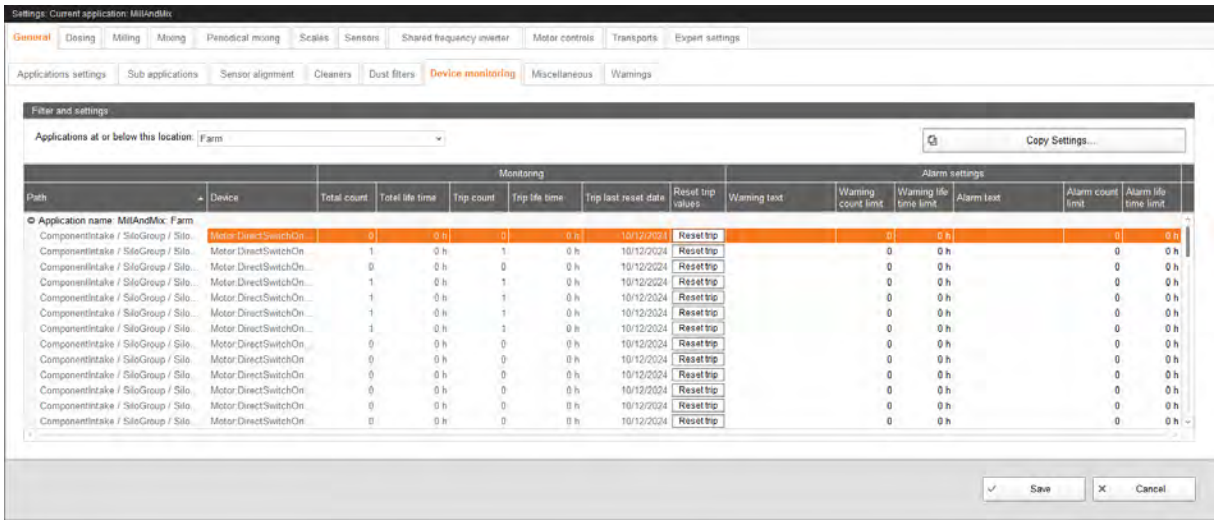
5.2.5 Dust filters



- **Name:** Name of the dust filter.
- **Devices that activate**
  - **Motors:** The motors selected here activate the dust filter when they are switched on. The dust filter remains switched on as long as at least one of the motors is running.
- **Filter-controlled output**
  - **Air shots in pause:** Number of air shots while the filter-controlled output is in pause mode.
  - **Air shots when on:** Number of air shots while the filter-controlled output is activated.
- **Stop delays**
  - **Fan stop delay:** Time for which the fan continues running after the final device that activated the dust filter has been switched off.
  - **Air shots stop delay:** Time for which the air shots continue after the final device that activated the dust filter has been switched off.
- **Air shots**

- **Air time on:** On time for each air valve.
- **Air time pause without mill:** Pause time of the dust filter air valves if the mill motor is not one of the active motors.
- **Air time pause with mill:** Pause time of the dust filter air valves if the mill motor is one of the active motors.
- **Air on shots:** Number of shots of each air valve.
- **Air on interval:** Time between two shots of the air valve.

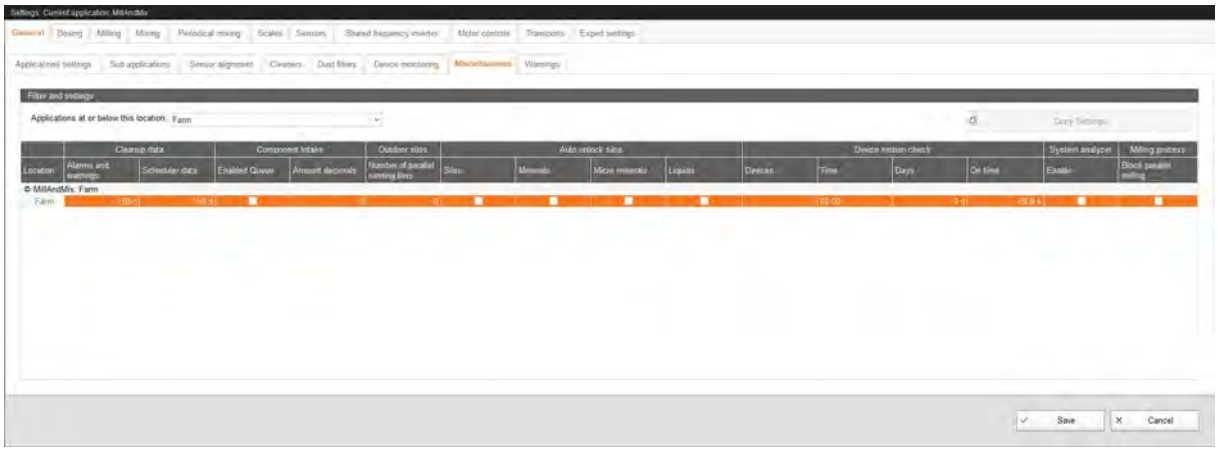
5.2.6 Device monitoring



- **Path** (only an information): Path of the device.
- **Device** (only an information): Name of the device.
- **Monitoring**
  - **Total count** (only an information): Total number of active devices.
  - **Total life time** (only an information): Total active period of the device.
  - **Trip count** (only an information): Number of times the device has been switched on since the last reset.
  - **Trip life time** (only an information): Period for which the device has been running since the last reset.
  - **Trip last reset date** (only an information): Day on which the trip values of the device have last been reset.
  - **Reset trip values:** The current trip values of the device can be reset here.
- **Alarm settings**

- **Warning text:** Text to be added to the warning as soon as the warning count limit has been reached or the warning life time limit has been exceeded.
- **Warning count limit**: Number of times the device is switched on before a warning is generated.
- **Warning life time limit**: Period for which the device is switched on before a warning is generated.
- **Alarm text:** Text to be added to the alarm as soon as the alarm count limit has been reached or the alarm life time limit has been exceeded.
- **Alarm count limit**: Number of times the device is switched on before an alarm is generated.
- **Alarm life time limit**: Period for which the device is switched on before an alarm is generated.

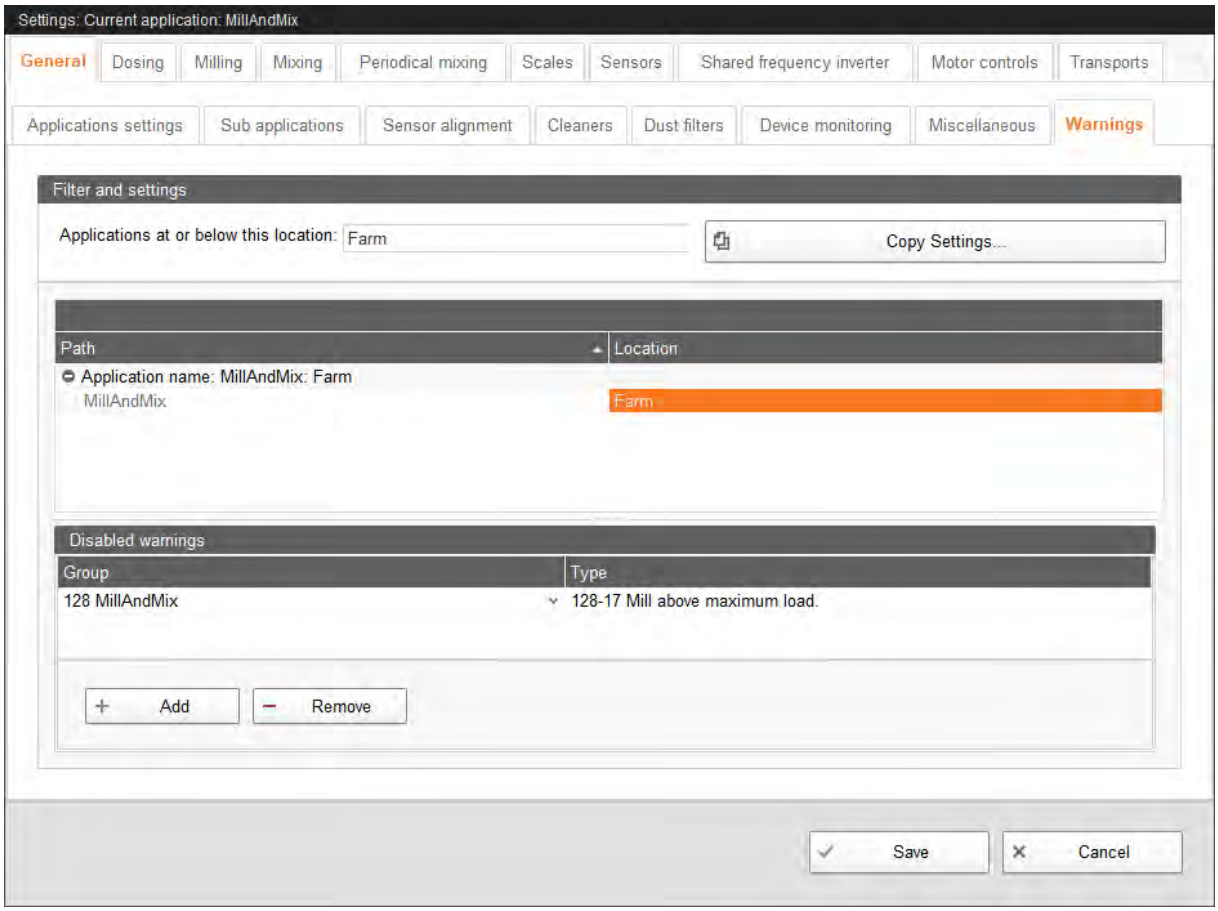
5.2.7 Miscellaneous



- **Location** (only an information): The corresponding location.
- **Cleanup data**
  - **Alarms and warnings:** Alarms and warnings older than the age stated here are deleted.
  - **Scheduler data:** Tasks older than the age stated here are deleted.
- **Component intake**
  - **Enabled queue:** The queue functionality for the start buttons of the component intake is active.
  - **Amount decimals:** Number of decimal places in the amount information within the component intake.
- **Outdoor silos**

  - **Number of parallel running fans:** Maximum number of outdoor silo fans that run in parallel. "0" = unlimited number.
- **Auto unlock silos**
  - **Silos:** Silos marked with the auto unlock flag are unlocked when a new batch starts.
  - **Minerals:** Mineral dosing units marked with the auto unlock flag are unlocked when a new batch starts.
  - **Microminerals:** Micromineral dosing units marked with the auto unlock flag are unlocked when a new batch starts.
  - **Liquids:** Liquid silos marked with the auto unlock flag are unlocked when a new batch starts.
- **Device motion check**
  - **Devices:** Devices to be checked. These devices are switched on for the stated on time at the given time if they have not moved for the stated number of days.
  - **Time:** Time of the device check.
  - **Days:** Period between two device checks.
  - **On time:** Period for which the devices to be checked are switched on at the given time if they have not moved within the stated number of days.
- **System analyzer**
  - **Enable:** Checking this box activates the system analyzer.
- **Milling process**
  - **Block parallel milling:** A single mill pre-bin uses the mills. Other mill pre-bins are locked until the active milling process has been completed.

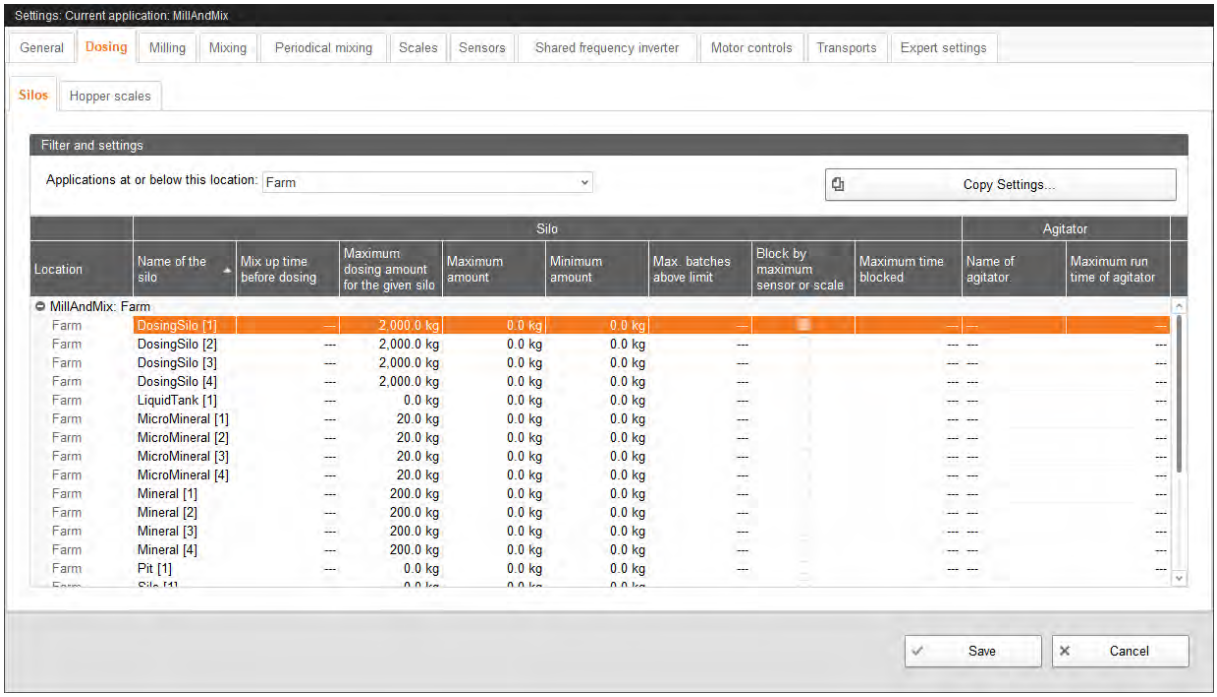
5.2.8 Warnings



- **Path:** Application for which the warnings set under "Disabled warnings" are deactivated.
- **Location:** Location on the farm of the application for which the warnings set under "Disabled warnings" are deactivated.
- **Disabled warnings**
  - **Group:** Superordinate groups to which the warnings set under "Type" belong.
  - **Type:** Disabled warnings.

5.3 Dosing

5.3.1 Silos

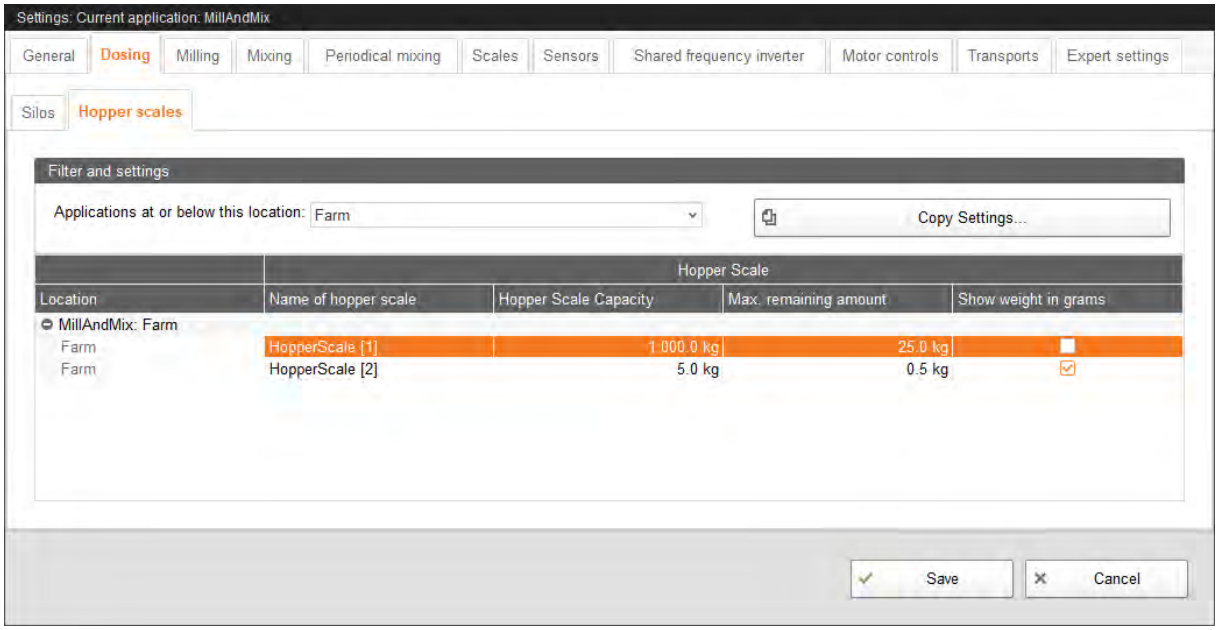


- **Silo**
  - **Name of the silo:** Name of the silo.
  - **Mix-up time before dosing:** This setting only applies to liquid silos with agitator. The parameter defines the duration for which the silo contents are mixed before the component is dispensed into the mixer.
  - **Maximum dosing amount for the given silo:** The maximum amount the silo may dispense before the scale is empty. This is only relevant if the component is dispensed into a hopper scale. This setting does not apply to liquid silos.
  - **Maximum amount:** Maximum filling amount of the silo if it stands on weigh bars.
  - **Minimum amount:** Minimum filling amount that remains in the silo after emptying if the silo stands on weigh bars.
  - **Max. batches above limit:** This setting only applies to target silos. The parameter defines the permitted number of batches that fit into the indicated target silo even above the maximum sensor's limit. If the target silo's content reaches the maximum sensor before an order is completed, the remaining number of unfinished batches is reduced by the number defined here.

- **Block by maximum sensor or scale:** The batches for the target silo are blocked based on the maximum sensor or the scale.
- **Maximum time blocked:** Maximum period for which the system can be blocked by the maximum sensor or the scale in the target silo.

- **Agitator**
  - **Name of agitator:** The name of the agitator.
  - **Maximum runtime of agitator:** The maximum time for which the agitator is allowed to run without pause.

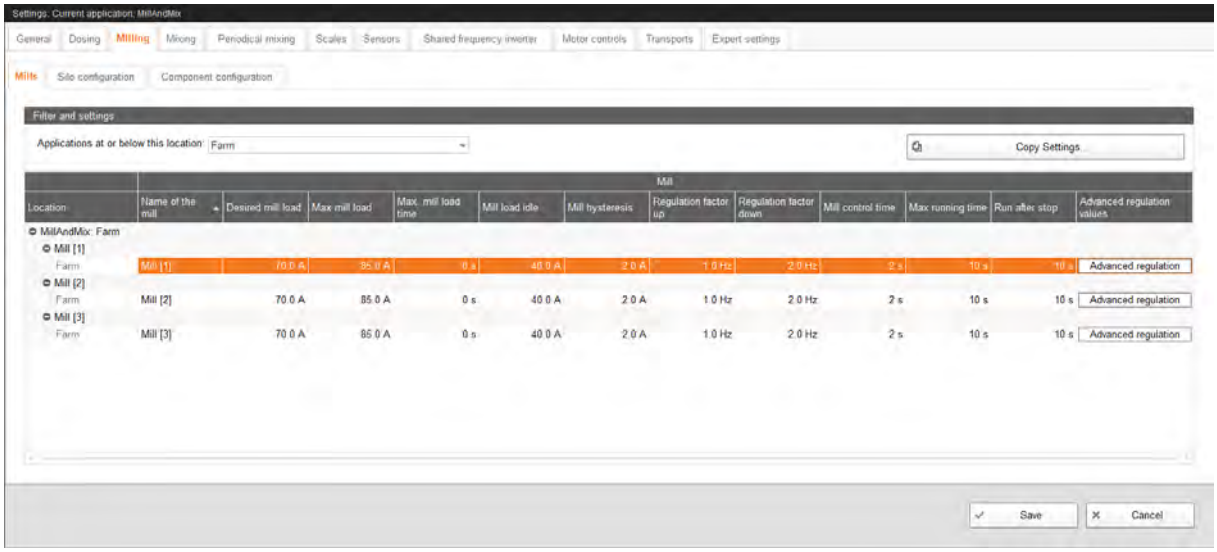
5.3.2 Hopper scales



- **Hopper scale**
  - **Name of hopper scale:** The name of the hopper scale.
  - **Hopper scale capacity:** The weighing capacity of the hopper scale.
  - **Max. remaining amount:** The maximum amount allowed to remain in the hopper scale when a new batch starts. If the hopper scale calculates a higher remaining amount than indicated here, an alarm is generated.
  - **Show weight in grams:** The content of the hopper scale is shown in grams in the "Equipment" window.

5.4 Milling (inline milling)

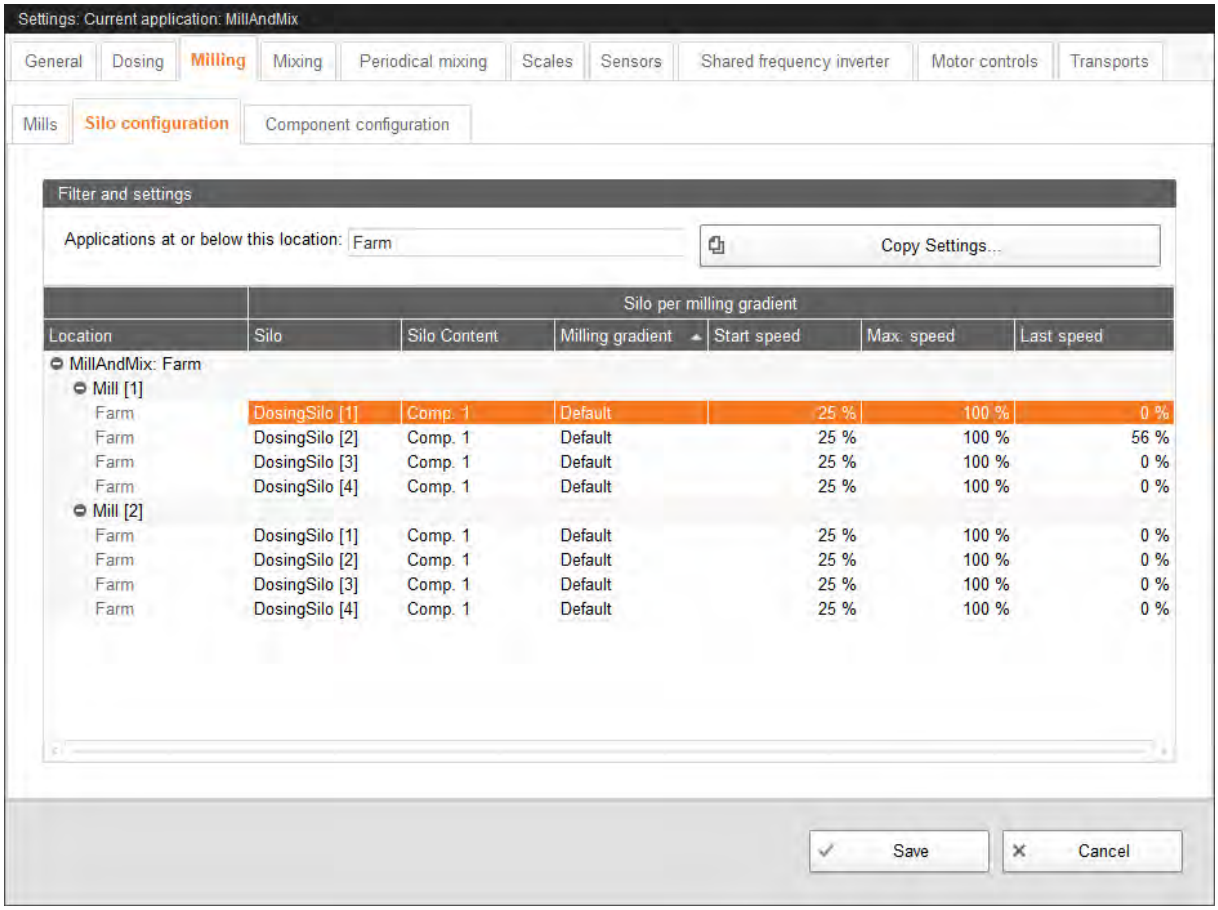
5.4.1 Mills



- **Name of the mill:** The name of the mill.
- **Desired mill load:** The desired load the mill should reach when milling any component. The mill control will try to achieve this load during milling.
- **Max. mill load:** If the value defined here is reached, the mill control is reset.
- **Max. mill load time:** If the value set under "Max. mill load" is exceeded for this time, the milling process is reset.
- **Mill load idle:** The load of the mill when idle (to be set higher than the actual idle load).
- **Mill hysteresis:** The hysteresis used in combination with the desired mill load. If the desired mill load is 70 A and the hysteresis is 2 A, the desired range is 68 – 72 A.
- **Regulation factor up:** The frequency inverter's speed will increase by this factor when filling the mill as long as the load is below the desired mill load.
- **Regulation factor down:** The frequency inverter's speed will decrease by this factor when filling the mill as long as the load is above the desired mill load.
- **Mill control time:** This value defines how often the control should regulate the mill load and set the frequency inverter.
- **Maximum runtime** The time for which the mill may continue running after processing the final component. This prevents the mill from starting and stopping continuously.

- **Run after stop:** Residual flow time of the mill before switching off, so that the last milling material after stopping the application is processed and the mill is empty before the next start.
- **Advanced regulation values:** Creates/changes advanced regulation values.

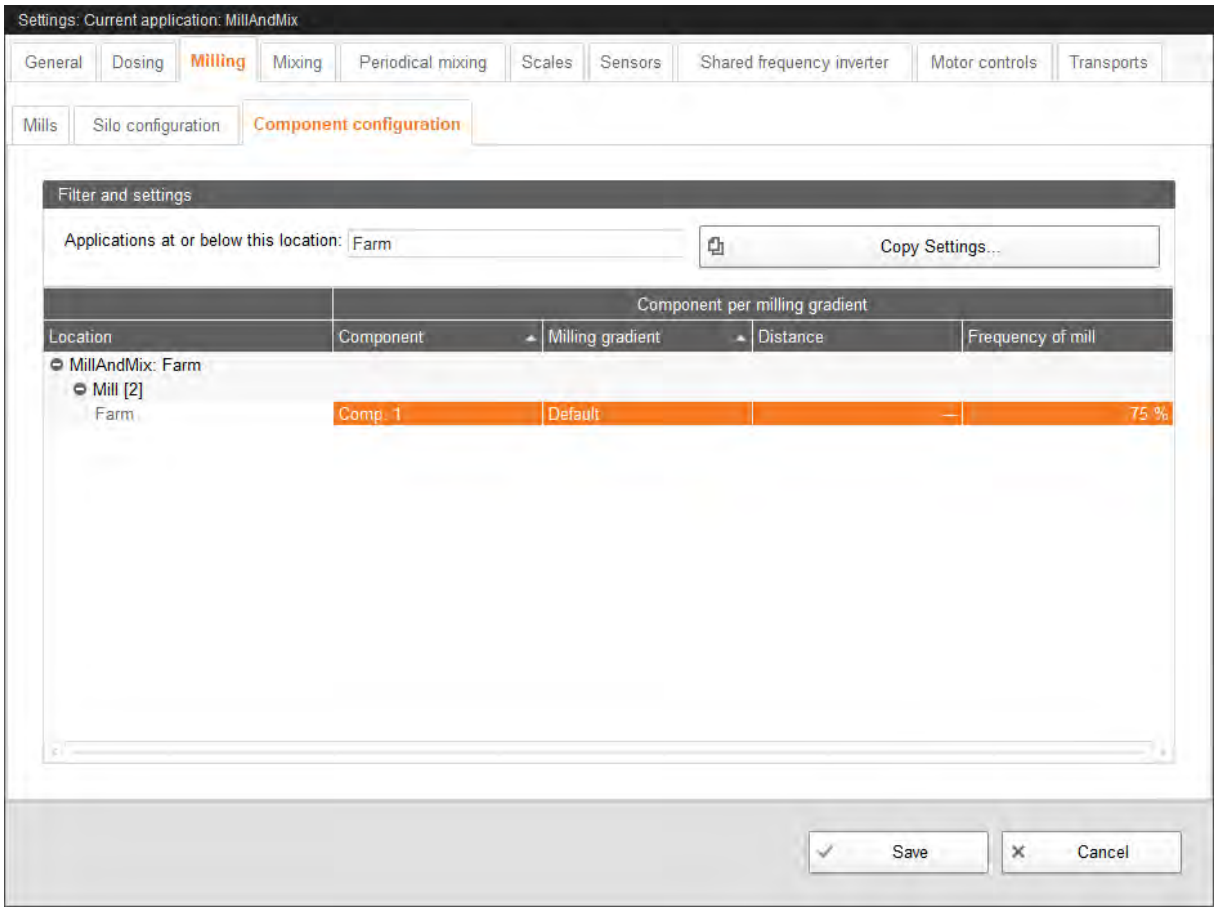
5.4.2 Silo configuration



Every dosing silo can be configured individually for each mill to which it is assigned. This allows for different start speeds for silos supplying the same mill. A silo can also have different start speeds for different mills.

- **Silo** (only an information): Name of the silo.
- **Silo content** (only an information): Current component in the silo.
- **Milling gradient** (only an information): The name of the milling gradient.
- **Start speed:** Start speed the silo should use during dispensing for the mill.
- **Max. speed:** Maximum speed the silo should use during dispensing for the mill.
- **Last speed** (only an information): Last speed used during a milling process.

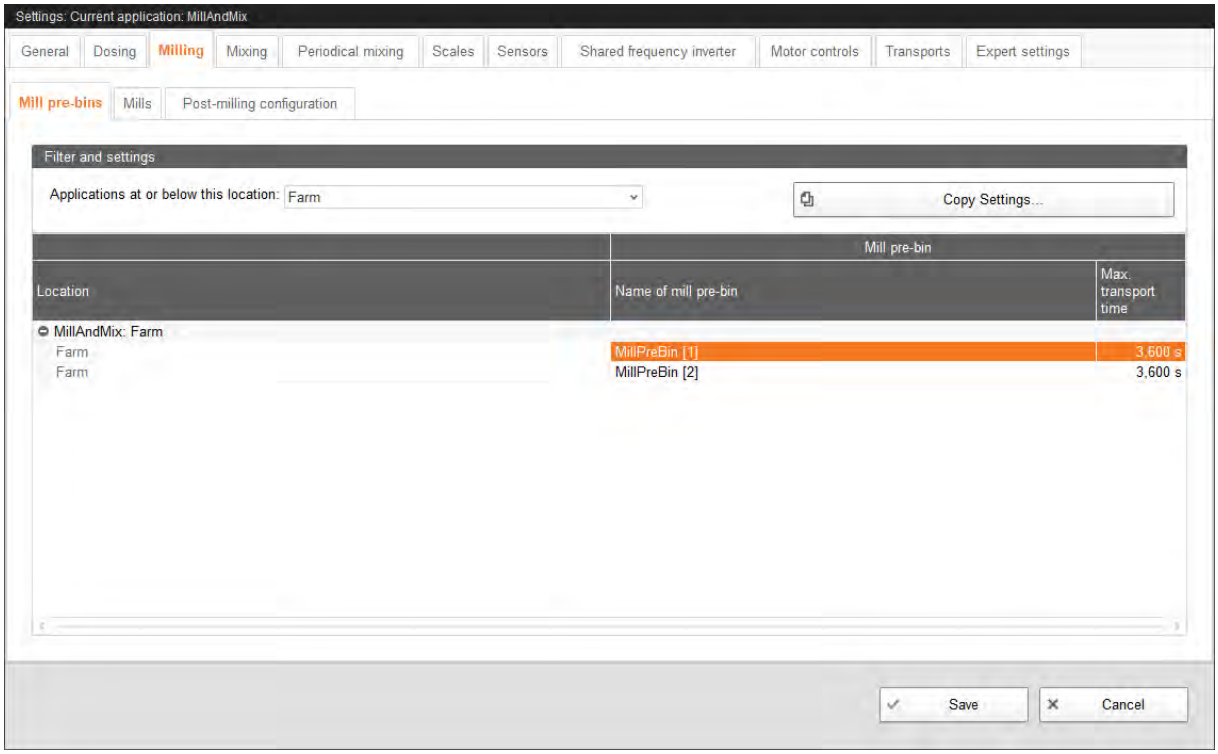
5.4.3 Component configuration



- **Component** (only an information): Component.
- **Milling gradient** (only an information): The name of the milling gradient.
- **Distance:** The distance used in the disc mill.
- **Frequency of mill:** The milling speed.

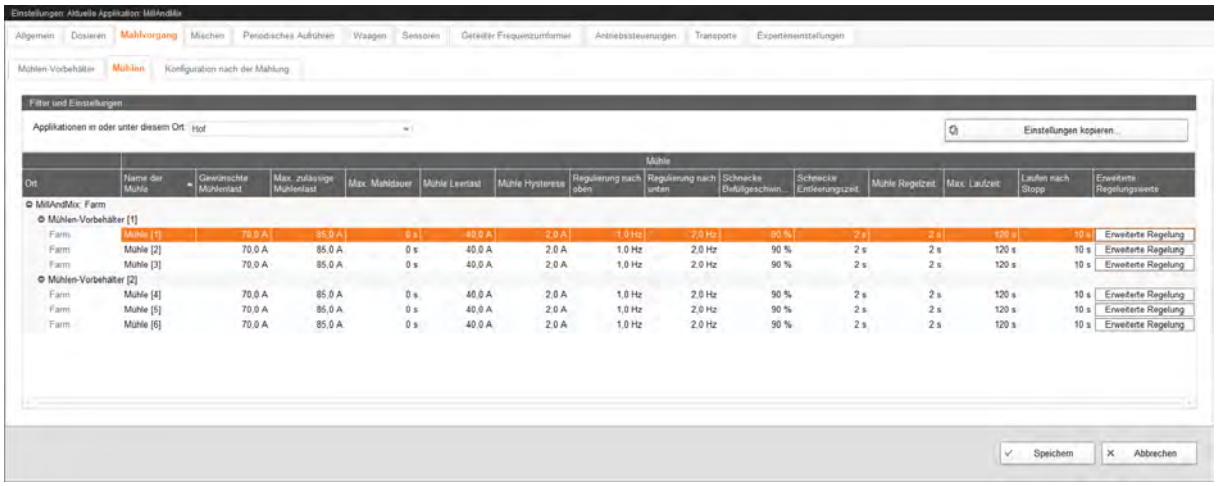
5.5 Milling (post-milling)

5.5.1 Mill pre-bins



- **Name of mill pre-bin:** The name of the mill pre-bin.
- **Max. transport time:** The maximum time for which the feed move starting from the mill pre-bin may run. When this time is reached, an alarm is generated.

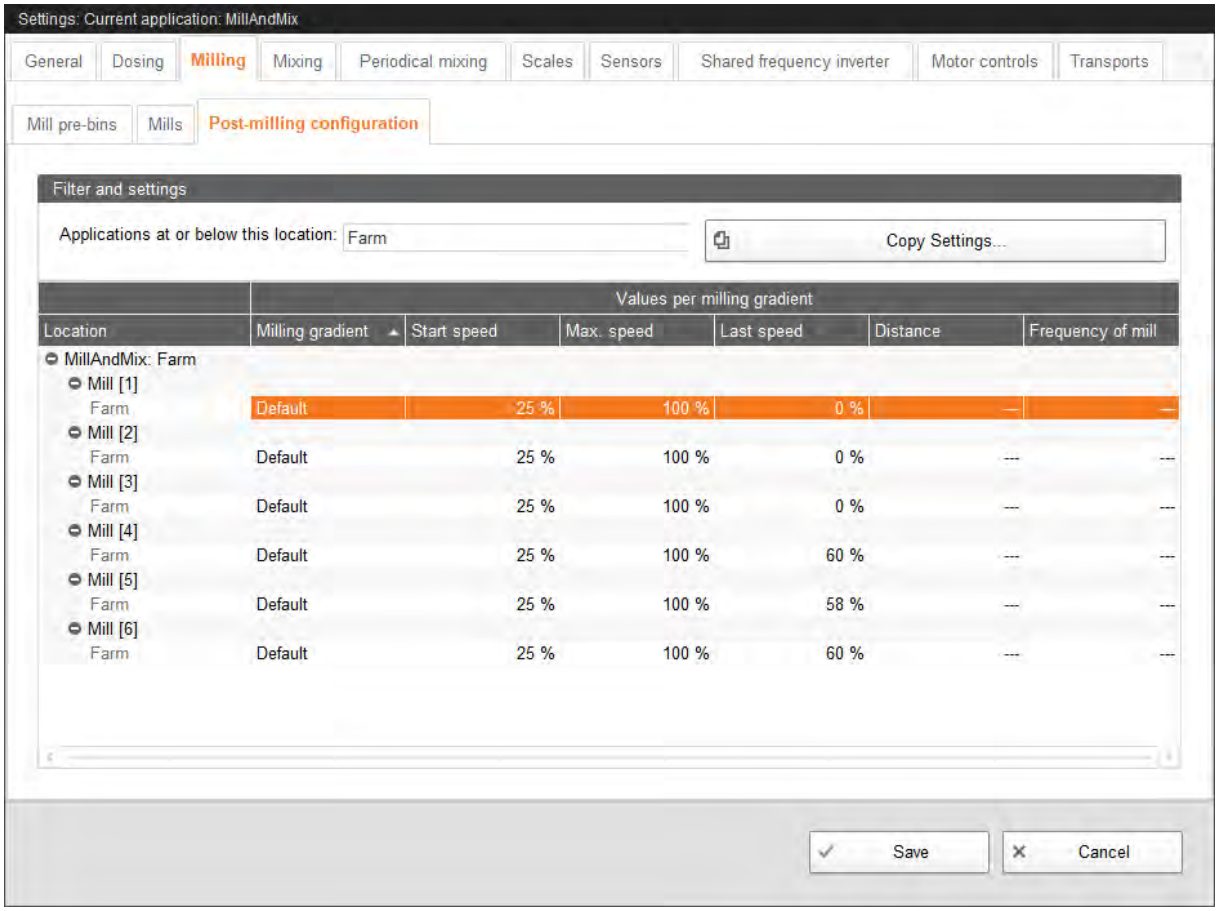
5.5.2 Mills



- **Name of the mill:** The name of the mill.
- **Desired mill load:** The desired load the mill should reach when milling any component. The mill control will try to achieve this load during milling.
- **Max. mill load:** If the value defined here is reached, the mill control is reset.
- **Max. mill load time:** Time for which the mill load must exceed the "Max. mill load" so the milling process is reset.
- **Mill load idle:** The load of the mill when idle (to be set higher than the actual idle load).
- **Mill hysteresis:** The hysteresis used in combination with the desired mill load. If the desired mill load is 70 A and the hysteresis is 2 A, the desired range is 68 – 72 A.
- **Regulation factor up:** The frequency inverter's speed will increase by this factor when filling the mill as long as the load is below the desired mill load.
- **Regulation factor down:** The frequency inverter's speed will decrease by this factor when filling the mill as long as the load is above the desired mill load.
- **Auger fill speed:** The speed of the frequency inverter that supplies the mill until the mill load exceeds the idle values.
- **Auger empty time:** The time for which the auger continues running after the minimum sensor in the mill pre-bin reports empty. If the mill pre-bin is empty, this time begins before the feed move starts stopping.
- **Mill control time:** This value defines how often the control should regulate the mill load and set the frequency inverter.

- **Maximum runtime** The time for which the mill may continue running after processing the final component. This prevents the mill from starting and stopping continuously.
- **Run after stop:** Residual flow time of the mill before switching off, so that the last milling material after stopping the application is processed and the mill is empty before the next start.
- **Advanced regulation values:** Creates/changes advanced regulation values.

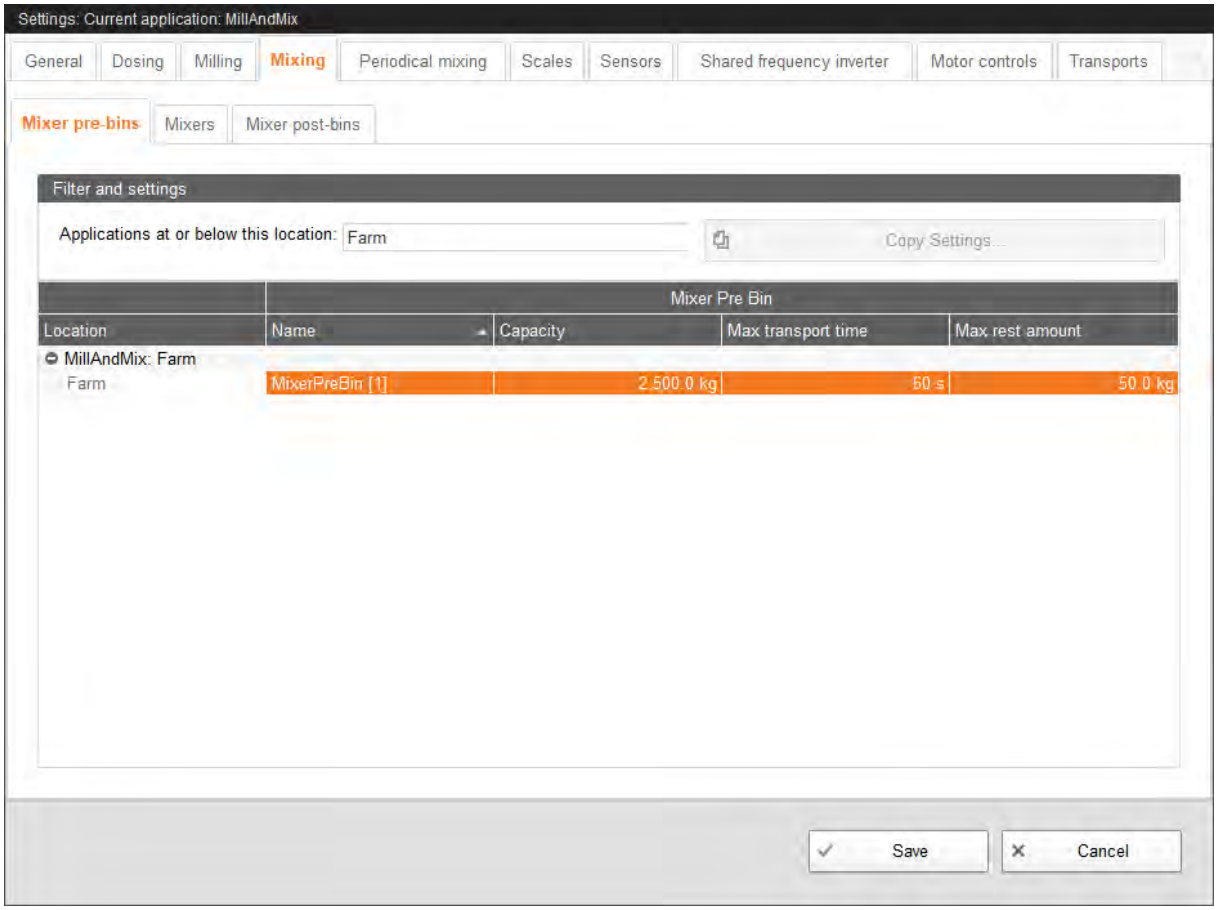
5.5.3 Post-milling configuration



- **Milling gradient** (only an information): The name of the milling gradient.
- **Start speed:** Start speed the silo should use during dispensing for the mill.
- **Max. speed:** Maximum speed the silo should use during dispensing for the mill.
- **Last speed** (only an information): Last speed used during a milling process.
- **Distance:** The distance used in the disc mill.
- **Frequency of mill:** The milling speed.

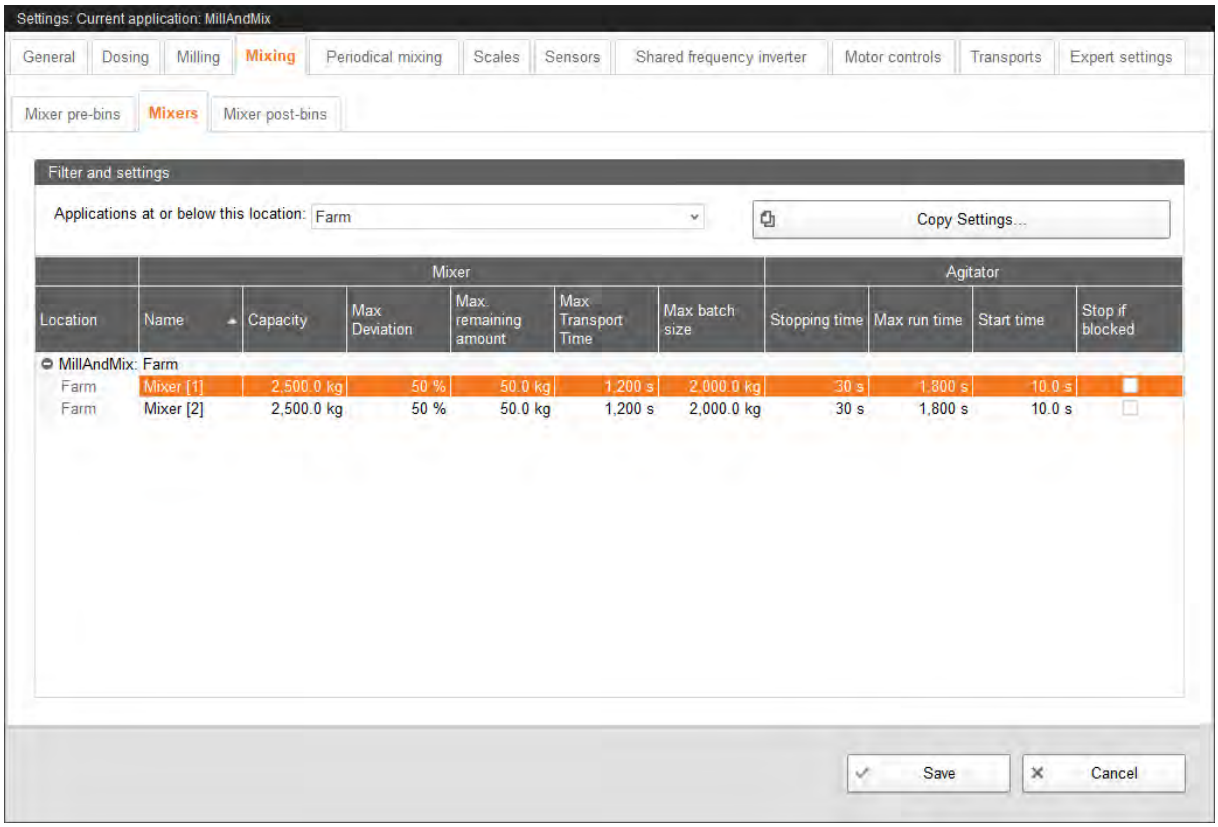
5.6 Mixing

5.6.1 Mixer pre-bins



- **Name:** The name of the mixer pre-bin.
- **Capacity:** The capacity of the mixer pre-bin.
- **Max. transport time:** The maximum transport time from the mixer pre-bin to the mixer.
- **Max. rest amount:** The maximally permitted amount that may have remained in the mixer pre-bin when a new batch starts.

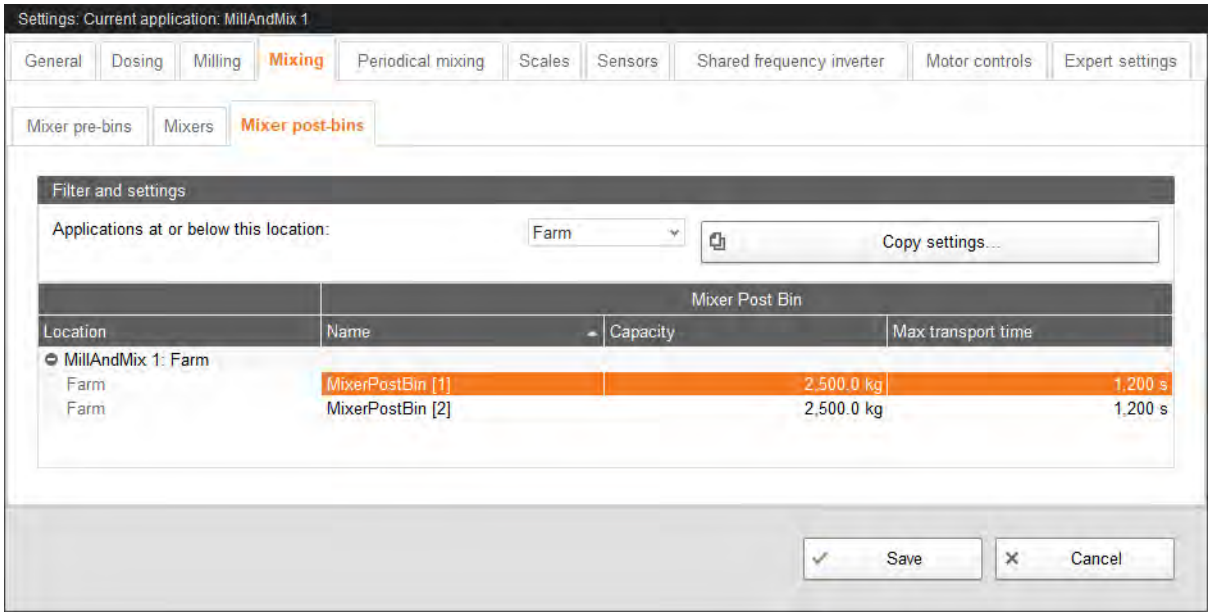
5.6.2 Mixers



- **Mixer**
  - **Name:** The name of the mixer.
  - **Capacity:** The capacity of the mixer.
  - **Max. deviation:** As soon as all components have been dispensed into the mixer, the deviation from the expected amount is calculated. If the deviation is smaller or greater than the percentage set here, a warning will be generated.
  - **Max. remaining amount:** The maximum amount allowed to remain in the mixer when a new batch starts.
  - **Max. transport time:** The maximum transport time from the mixer to a target silo or the mixer pre-bin. If this time is reached, an alarm is generated.
  - **Max. batch size:** The number of batches to be created is calculated automatically based on this value.
- **Agitator**
  - **Stopping time:** The agitator continues running for this time after the batch has left the mixer. This setting prevents the agitator from starting and stopping between the batches.
  - **Max. runtime:** The maximum time the agitator is allowed to run without pause.

- **Start time:** If a mixer pre-bin is installed before the mixer, the start of the feed move is delayed for this time before the mixing time starts.
- **Stop if blocked:** If the mixer is blocked by the maximum sensor in the target silo, the agitator in the mixer stops.

5.6.3 Mixer post-bins

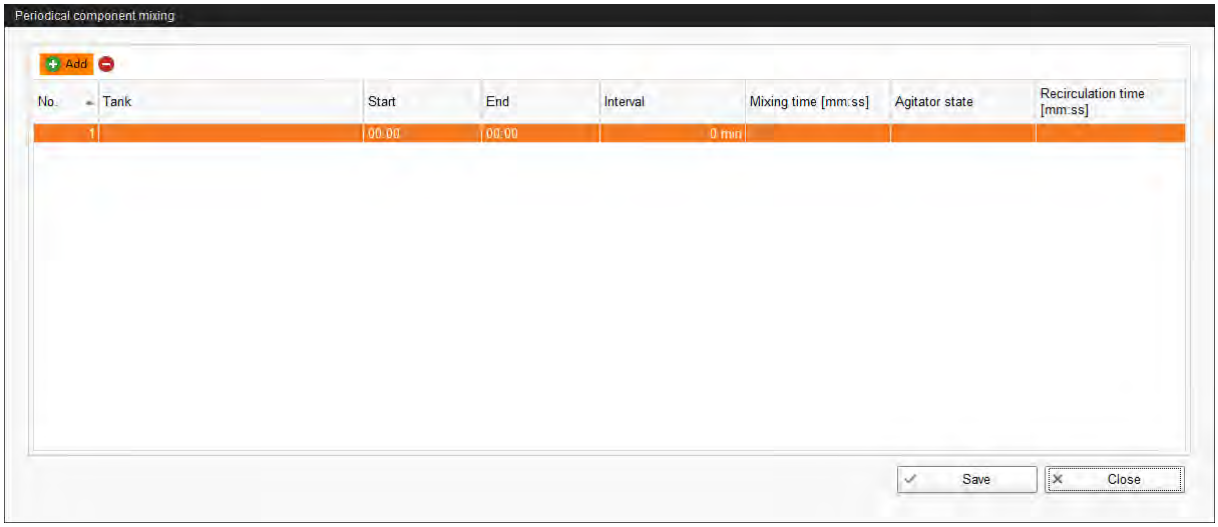


- **Name:** The name of the mixer post-bin.
- **Capacity:** The capacity of the mixer post-bin.
- **Maximum transport time:** The maximum transport time from the mixer post-bin to any target.

5.7 Periodical mixing

If liquid silos or liquid tanks are installed, the settings can be configured under the tab **Periodical mixing**.

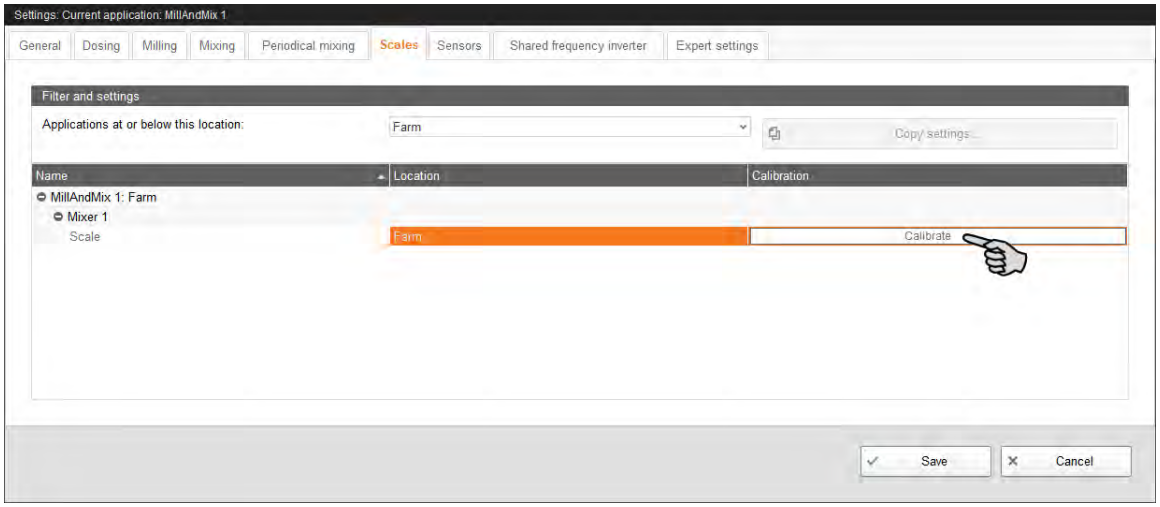
Select the tank and define a start time ("Start") and an end time ("End") as well as the interval duration ("Interval"). If the tank is equipped with an agitator, you can adjust the agitator's state and the mixing time. If the tank is equipped with a recirculation valve, you can define a recirculation time. The actions for recirculation and mixing via agitator use the same interval.



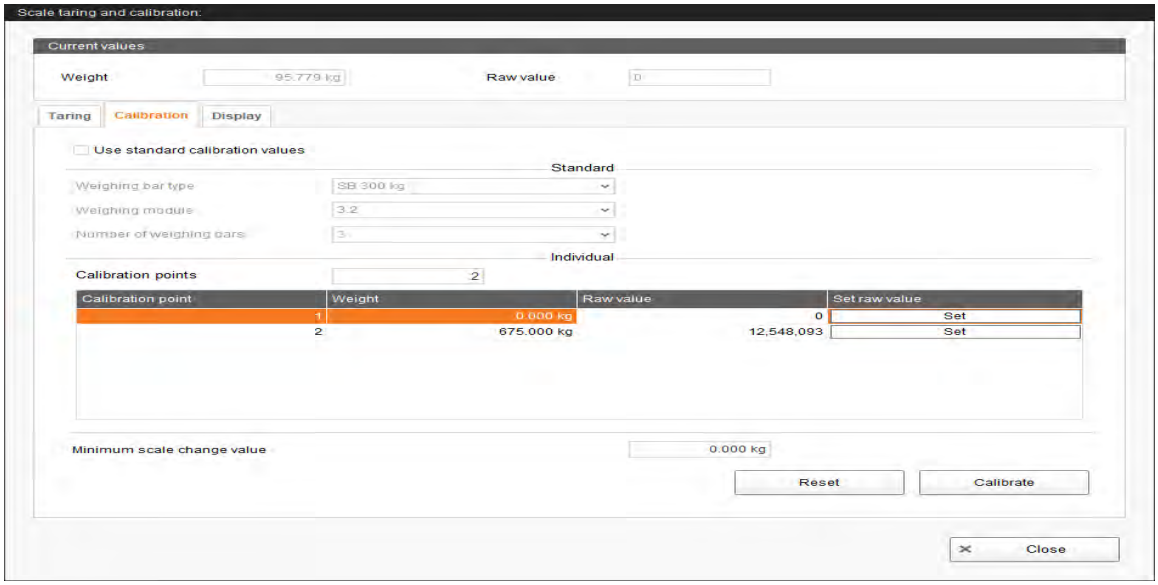
5.8 Scales

Use the tab **Scales** to tare and calibrate the scales of each MillAndMix.

1. Click on "Calibrate" next to the correct system component.



2. To calibrate, click on the "Calibration" tab.

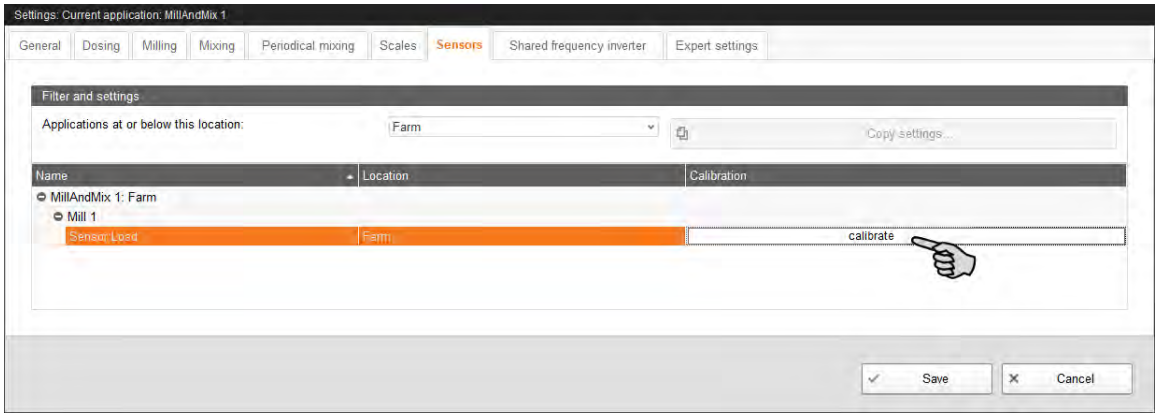


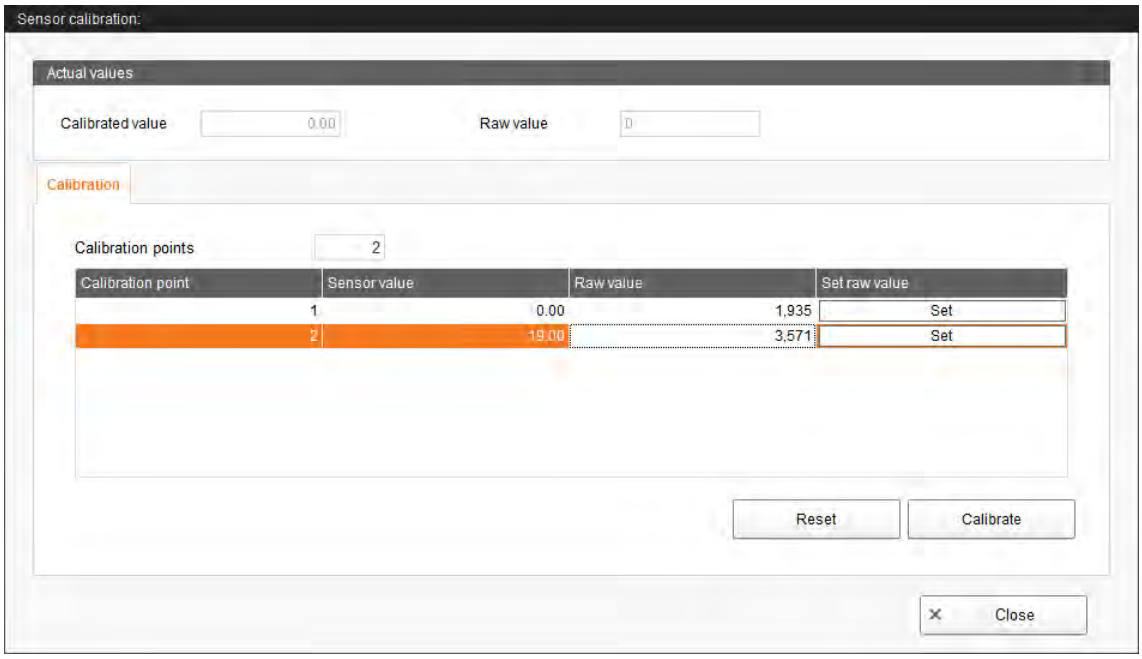
3. Enter the weight (usually the value 0) for calibration point 1 and click on "Set" in the "Set raw value" column.
4. Enter the weight used for calibration for calibration point 2.
5. Load MillAndMix with the calibration weight.
6. Click on "Set" in the "Set raw value" column in the row for calibration point 2.
7. Remove the calibration weight.
8. If you have defined further calibration points, repeat steps 5 to 8 with these points.
9. Click on "Calibrate" to complete the calibration process.
10. Close the dialog.

5.9 Sensors

Use the tab **Sensors** to calibrate the sensors of the mills, silos and component intake.

1. Click on "Calibrate" next to the correct system component.



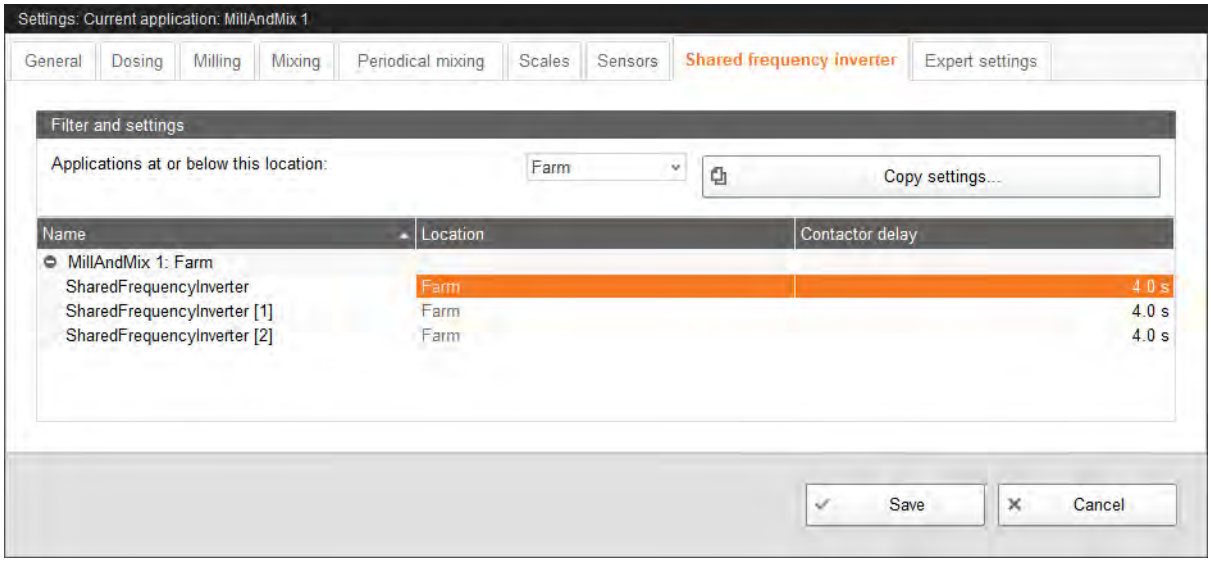


2. Enter the number of calibration points to be used. For each calibration point, a new row appears in the table.
3. Enter the first externally measured value (usually the value 0) for calibration point 1 in the "Sensor value" column and click on "Set" in the "Set raw value" column.

   A value appears in the column "Raw value".
4. Depending on the type of sensor, change the current consumption (switch on device), the temperature, the humidity, etc. to change the externally measured value.
5. Enter the second externally measured value for calibration point 2 in the "Sensor value" column and click on "Set" in the "Set raw value" column.

6. If you have defined more calibration points, repeat steps 5 and 6 for these points.
7. Click on "Calibrate" to complete the calibration process.
8. Close the dialog.

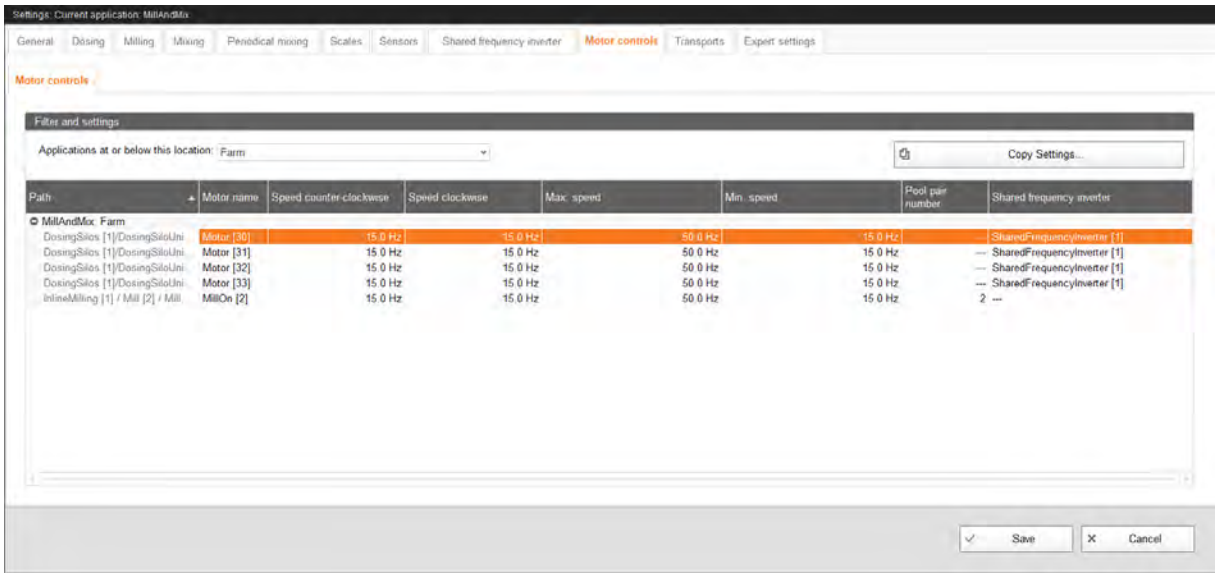
5.10 Shared frequency inverter



- **Name:** The name of the shared frequency inverter (can be edited here).
- **Location:** The location of the shared frequency inverter.
- **Contactor delay:** The switch delay between switching of the relay and control of the frequency inverter.

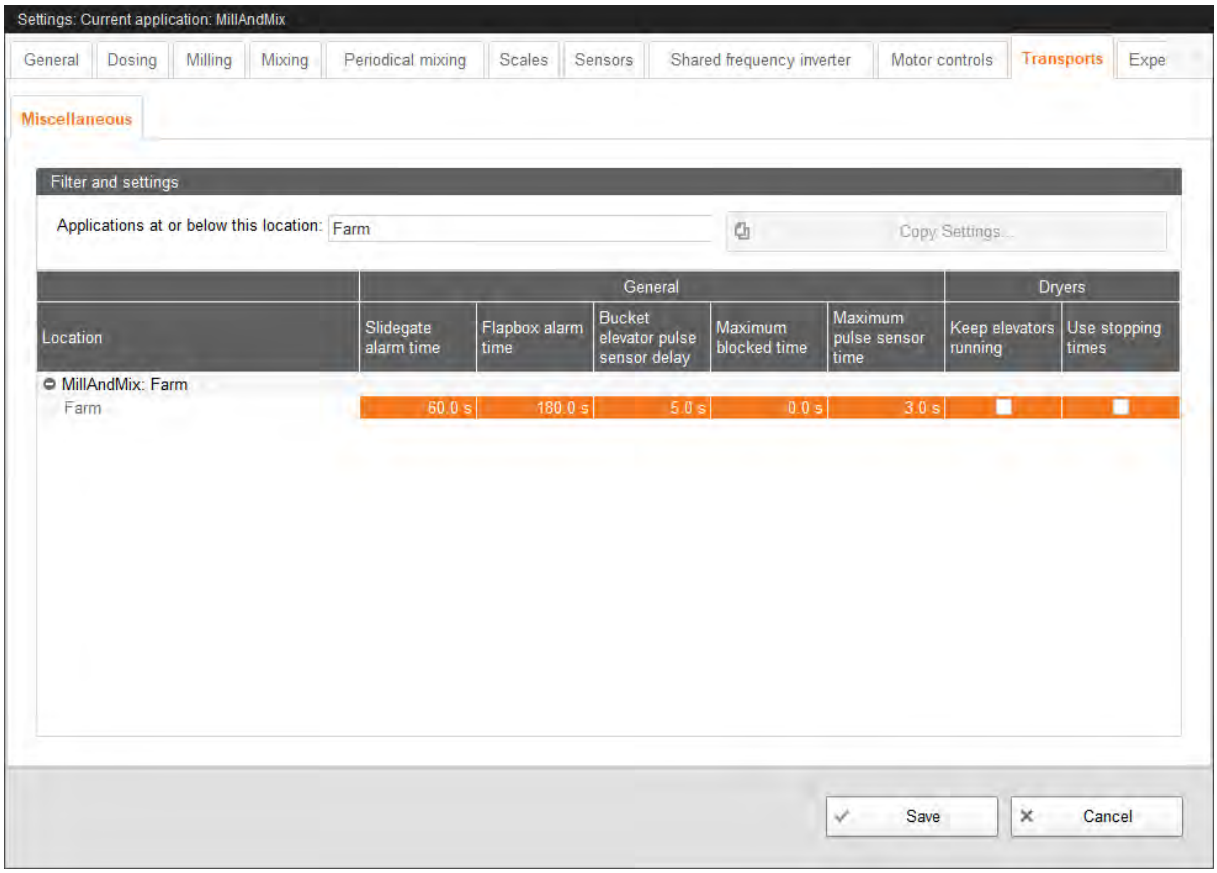
5.11 Motor controls

The tab **Motor controls** contains all drives that are controlled by a frequency inverter or a shared frequency inverter.



- **Path** (only an information): The path of the motor.
- **Motor name:** The name of the motor.
- **Speed counter-clockwise:** The speed which is used when the frequency inverter runs counter-clockwise.
- **Speed clockwise:** The speed which is used when the frequency inverter runs clockwise. If the frequency inverter is operated with a non-reversible motor, it will always run clockwise.
- **Max. speed:** The frequency inverter's maximum allowed speed.
- **Min. speed:** The frequency inverter's minimum allowed speed.
- **Pole pair number:** Number of pole pairs of the motor.
- **Shared frequency inverter:** If the motor is controlled by a shared frequency inverter, select the frequency inverter from this drop-down menu and assign it to the motor.

5.12 Transports



- **General**
  - **Slide gate alarm time:** The time required by the slowest slide gate (including safety time) to move into position. This parameter applies to all slide gates.
  - **Flap box alarm time:** The time required by the slowest flap box (including safety time) to move into position. This parameter applies to all flap boxes.
  - **Bucket elevator pulse sensor delay:** Start delay required by the pulse sensor of bucket elevators to register one rotation. This parameter applies to all bucket elevators.
  - **Maximum blocked time:** Maximally allowed time for a blockage sensor to recognize a blockage without generating an alarm.
  - **Maximum pulse sensor time:** Maximum time between two pulses for each pulse sensor of the application.
- **Dryers**
  - **Keep elevators running:** The elevators continue running, even if the dryer supply should stop.

- **Use stopping times:** Stopping times should be used if the dryer supply is to be stopped.

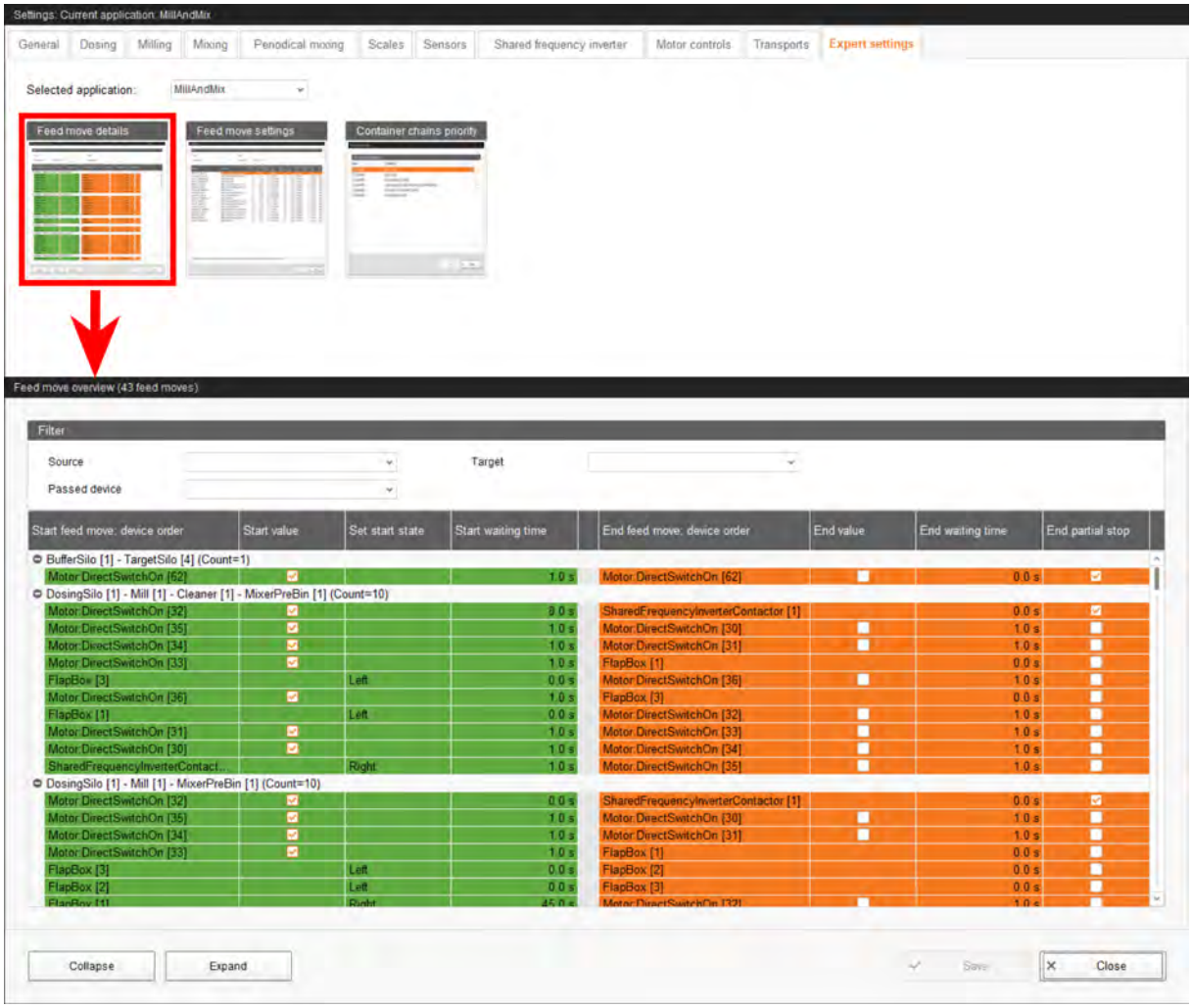
5.13 Expert settings

5.13.1 Switch order feed moves

Define the switch times and the switch order for feed moves under the tab **Expert settings**.

NOTICE!

These settings should only be configured by a service technician.



1. Filter the necessary feed moves, if required, e.g. for their start (source), target or device.

   Use the buttons "Collapse" and "Expand" in the lower command bar to show or hide the devices included in the feed move.

2. Define new switch times by entering the times directly into the input fields of the columns "Start waiting time" and "End waiting time".

   The values in the green area on the left refer to the start of the feed moves. The values in the orange area on the right refer to the end of the feed moves. The system moves from the first to the last device while starting and ending feed moves. After a device has been switched, the system waits for the waiting time before switching the next device.

3. Define partial stops for the switch from one feed move to the next:

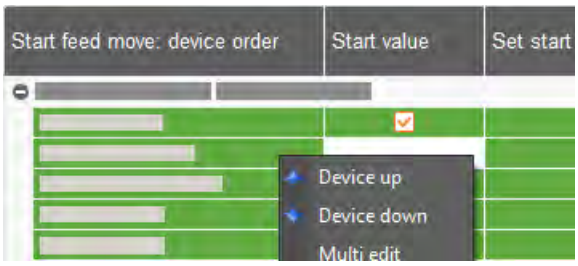
   a) Check the box in the column "End partial stop" for the corresponding devices.

   A partial stop is carried out when the system switches directly from one feed move to another. First, all devices of the old feed move for which "End partial stop" has been activated are switched. In case both feed moves use the same feed pump, all devices of the new feed move are switched all the way to the feed pump in the next step. This is to prevent the pump from running dry. Next, all devices of the old feed move for which "End partial stop" has not been activated and which are not part of the new feed move are switched. All as of yet unswitched devices of the new feed move are switched as the last step.

4. If necessary, define a new switch order for the devices.

   a) Right-click on the corresponding device.

   b) Change the position of the device using the option "Device up" or "Device down".



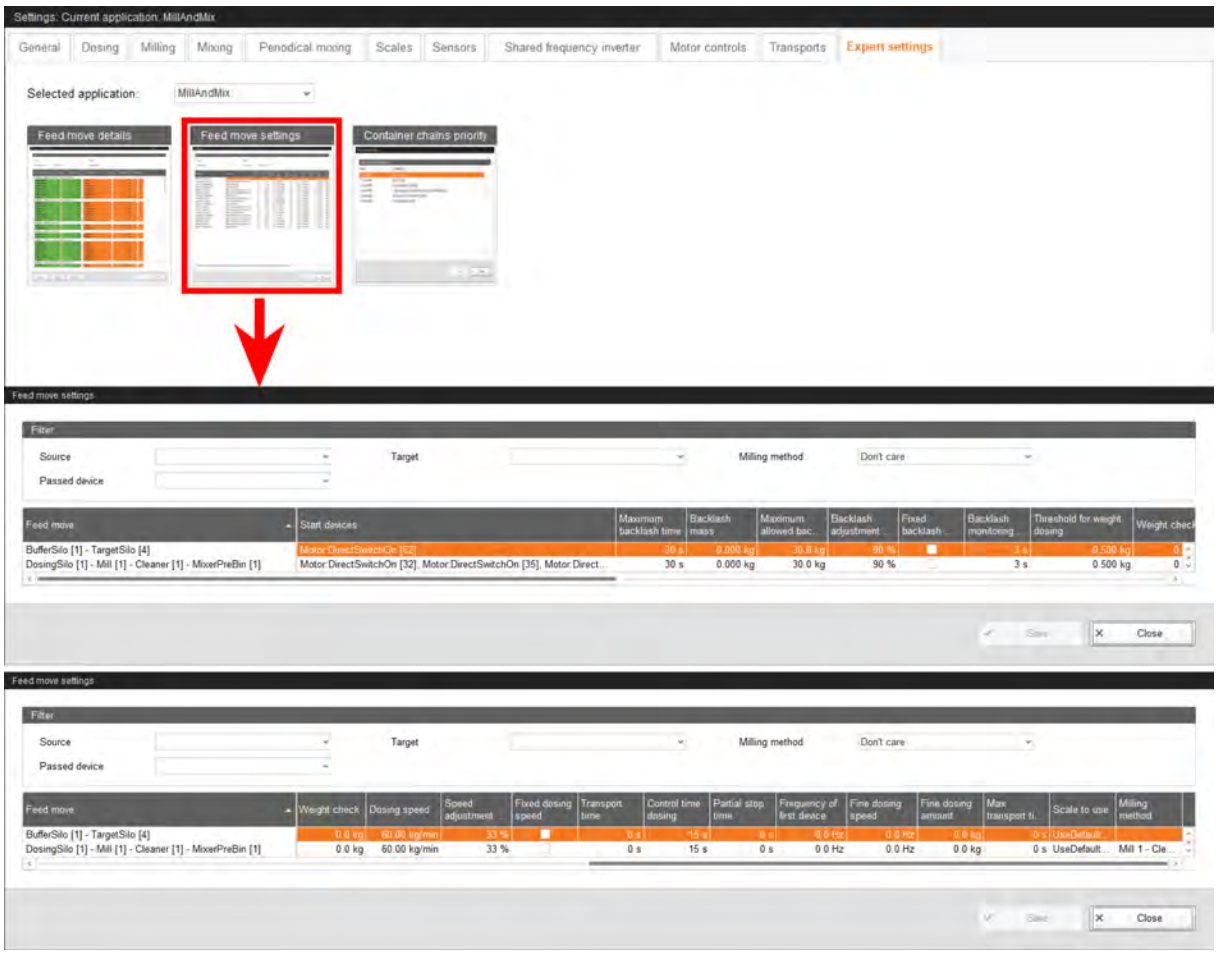
5. Change the start value and end value, if necessary. By default, the start value box is checked (= device switched on) and the end value box is unchecked (= device switched off).

6. Change the direction of rotation in the column "Set start state", if necessary. This option is available for devices whose poles can be reversed or which are controlled by a frequency inverter.

7. Click on "Save" to save all settings.

5.13.2 Feed move settings

Define the settings for the feed moves under the tab **Expert settings**.



- Individual feed moves and the corresponding devices to be switched are displayed under **Feed move** and **Start devices**.
- **Maximum backlash time** to measure the residual flow. If this time is reached, an alarm is generated.
- **Backlash mass** is determined by the control system.
- **Maximum allowed backlash mass:** The maximum allowed residual flow volume. If this amount is reached, an alarm is generated.
- **Backlash adjustment factor:** Weighting of the new value to calculate the residual flow.
- **Fixed backlash mass:** The residual flow volume is not calculated.
- **Backlash monitoring time:** Time for which the weight must remain stable before residual flow monitoring ends.

- **Threshold for weight dosing:** If the amount to be dispensed falls below the sum of this value and the value set under "Backlash mass", the system automatically uses time-based dispensing.
- **Weight check:** Shortage above which an alarm is generated after feed has been moved from the source to the target with both weigh bars.
- **Dosing speed:** The dosing speed is determined and set automatically for dosing based on weight. Calculate and enter the dosing speed if the system dispenses based on time.
- **Speed adjustment factor:** The weighting of the new value to calculate the dosing speed.
- **Fixed dosing speed:** The residual flow speed is not calculated.
- **Transport time:** If the transport time of a feed move is longer than the desired **Control time dosing**, a compensation value can be entered here. The time entered here will be added when a weigh bar is first checked during dosing to compensate for a transport time from source to target bin.
- **Control time dosing:** The application checks deviations at the weigh bar during dosing of a component at the regular interval set here. For every weigh bar check, the application expects a weight change of 5 kg. This does not apply if microminerals are dispensed (in this case, a deviation of only 5 g is expected). If the expected deviation does not occur, the vibrator is activated, if applicable. If this is not the case, the source silo will be locked and the application will try to use a replacement component.
- **Partial stop time:** Time used for the push forward. When a value of "0" is entered, the system uses a standard value of 10 s. For forward pushes with a mill, the maximum runtime indicated for the mill overrides this value.
- **Frequency of first device:** This parameter is only used for the feed move's first device that is controlled by a frequency inverter. The parameter is not used if the feed move includes a mill or if the feed move is started through the component intake.
- **Fine dosing speed:** This speed applies to the frequency inverter if this frequency inverter is the first device of the feed move. This speed is used to make dispensing onto the scale more accurate.
- **Fine dosing amount:** The remaining dosing amount for which the **fine dosing speed** is used. For example: The fine dosing amount is defined at 50 kg. A total of 200 kg need to be dispensed. As soon as 150 kg are reached on the scale, the speed for fine dosing is used.

- **Max. transport time:** Maximum runtime of the feed move. Only used by buffer silos.
- **Scale to use:** Scale to be used in the feed move (system definitions: "Default scale", "Source scale", "Target scale").
- **Milling method:** The milling method in the feed move. For recipes in which this milling method is used, the corresponding feed move is used.

1. Filter the necessary feed moves, if required, e.g. for their start (source), target or device.

   Drag the horizontal scroll bar at the bottom all the way to the right to see any hidden parameters.

2. If you want to define the same setting (value) for multiple feed moves, use one of the following options for multi-editing:

   a) Select multiple feed moves:

      Hold the Shift key and click on the first and last position to select all positions inbetween.

      Hold the Ctrl key and click on the individual positions to select multiple positions.

   b) Right-click into the marked area.

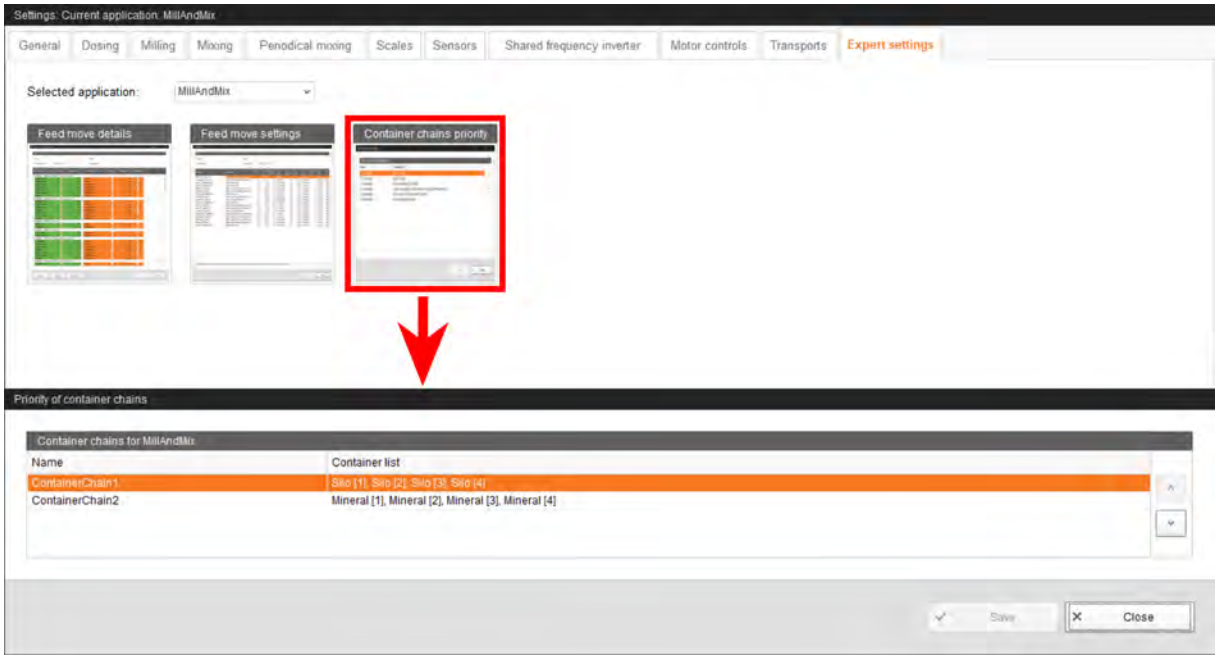
   c) Click on "Multi edit".

      This opens a dialog you can use to change the values.

3. Change the values either in the multi-edit dialog or directly in the respective input field when editing individual values.
4. Click on "Save" to save all settings.

5.13.3 Priority of container chains

Under the **Expert settings** tab, you can sort container chains that you previously configured under "Configuration" > "General" > "Container chains" (see chapter 4 ”Container chains”, page 75) according to priority using the arrows pointing upwards and downwards.



When using container chains, the control system selects the containers that contain the requested component following the steps below:

1. Only the containers with the highest container priority are considered.
   Peculiarity: For components that are obtained from containers with the corresponding source components by means of special feed moves (e.g. inline milling), the containers that contain the requested component themselves have priority, regardless of the container priority.
2. The top container chain whose containers contain the requested component is considered. Only those containers are considered starting from which a suitable feed move exists.
   a) Of these containers, the most recently used container is considered. If or as long as this container is not locked (or can be unlocked) and is not empty according to the minimum sensor or scale, the component is removed from the container. Otherwise, the next container in the container chain is considered, and so on. Starting from the end of the container chain, the next container is the container at the beginning of the chain, unless it is the last container used.
   b) If no unlocked (or unlockable) and non-empty container can be found (anymore) in this container chain, the container chain listed next, whose containers contain the requested component, is considered, and so on.
3. The control system makes the container selection in the usual way if no container chain can be found whose containers contain the requested component and from which container a suitable feed move exists and whose container is not locked (or unlockable) and not empty.

The contain chain priority can be configured individually for each application.

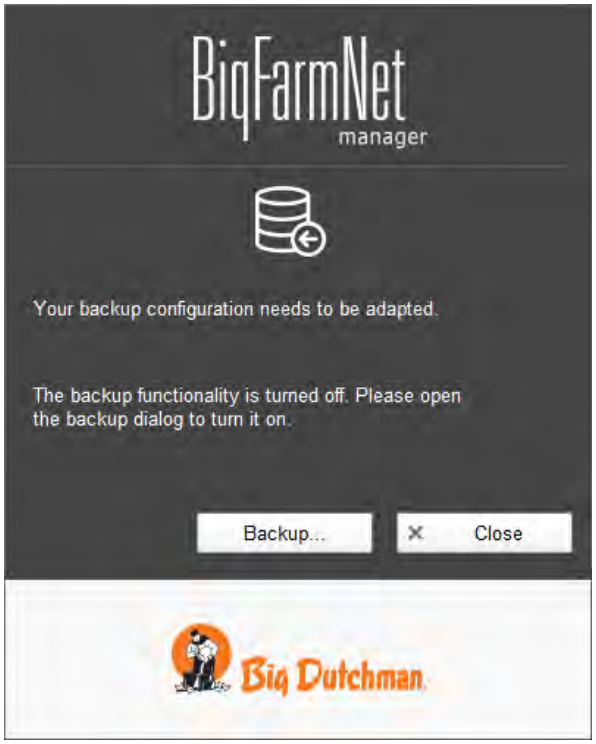
5.14 Data backup

From BigFarmNet Manager version 3.2.0, the following message regarding data backup configuration appears after installation or an update. If you only close this message, it will reappear after a short time.

NOTICE!

The system requires an external storage location for data backup, e.g. a network drive, an external hard drive or a USB flash drive. As soon as an external storage location has been indicated, the message no longer appears, irrespective of whether automatic data backup has been enabled or disabled.

If an external storage location has already been defined before updating to version 3.2.0, the message does not appear at all.



We recommend data backups in regular intervals. In case of a data loss, the backup can then be used to retrieve saved data.

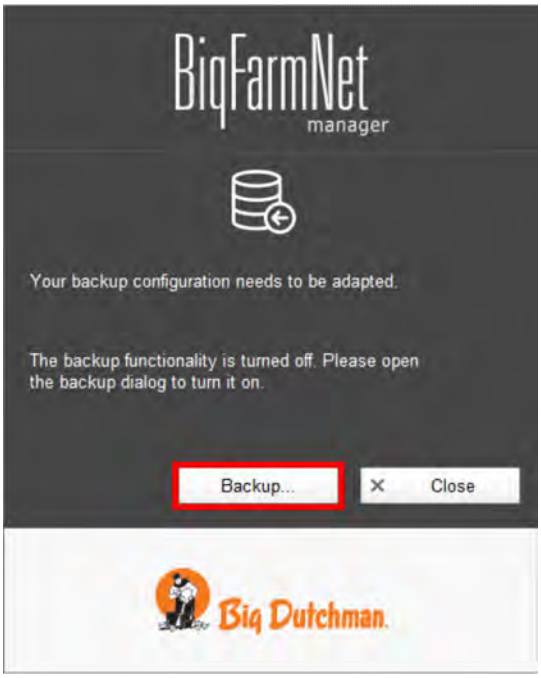
Remember that you can only retrieve the last data backup. Everything you have created or changed since then is not included in this backup. This means that the backup period should be determined depending on the amount of data you produce. You should find the ideal compromise between acceptable data loss and frequency of backups based on your individual needs.

The BigFarmNet Manager provides the following options for data backups:

- Manual backup, which you may carry out at any time when necessary.
- Automatic backup, for which you define a fixed backup period. The data is then backed up automatically according to the settings.

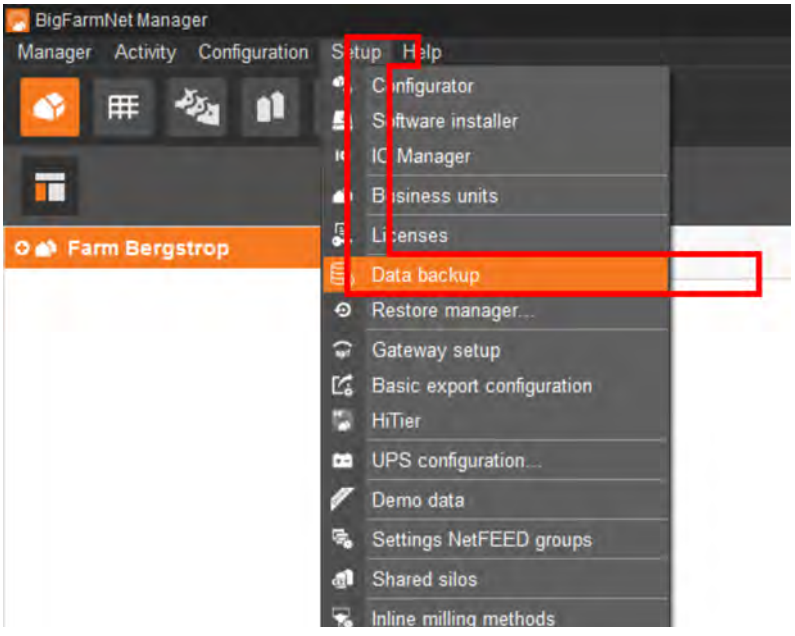
Open the settings dialog as follows:

1. Click on "Backup...".



OR

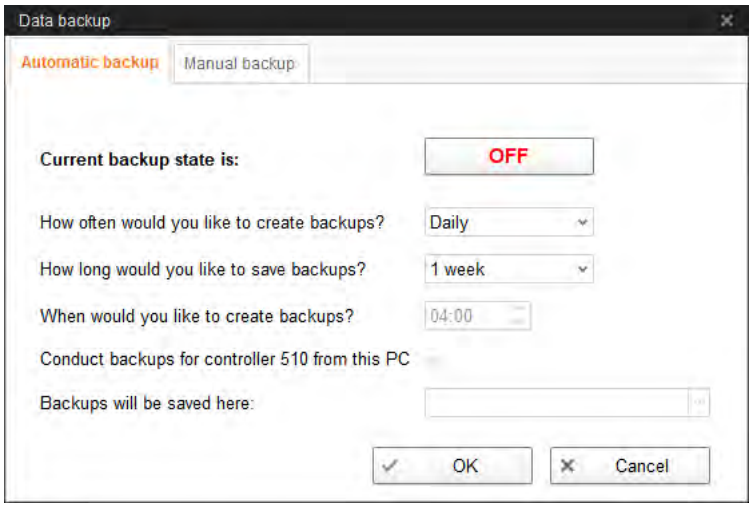
1. Click on "Data backup" in the "Setup" menu.



2. In the window "Data backup", select the desired process using one of the two tabs:

   Automatic backup

   The automatic backup is pre-set to "OFF".



   a) Click on "OFF" to turn off the deactivation.

      The button then switches to "ON".

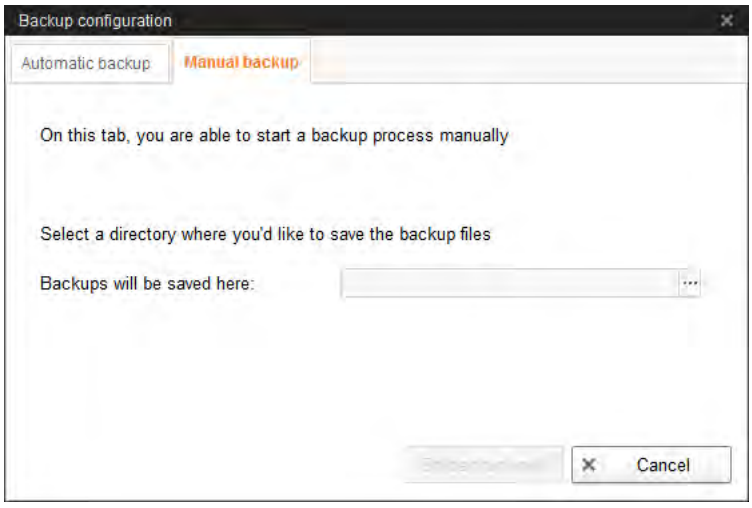
   b) Determine the backup period.

   c) Select an external storage location.

   d) Click on "OK" to accept these settings.

Or:

   Manual backup



   a) Select an external storage location.

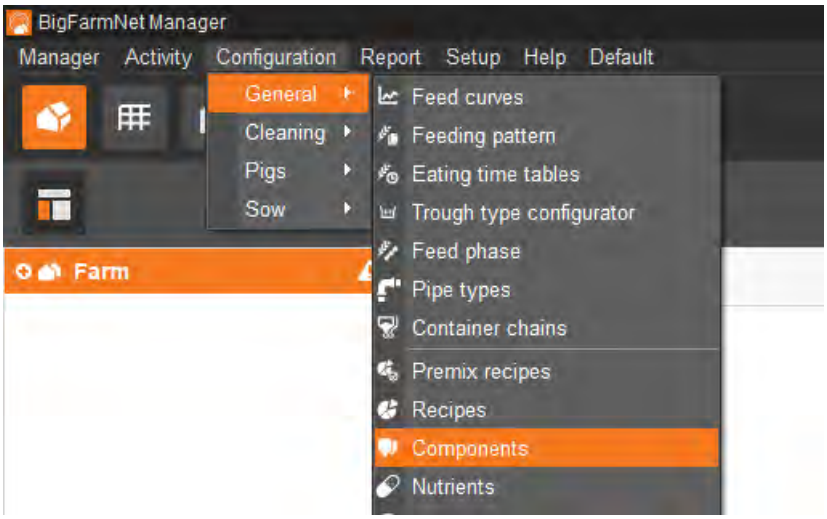
   b) Click on the now active button "Create backup now!"

6 Creating feed components and mill and mix recipes

6.1 Creating components

Use the "Component" dialog to create different components and to configure different settings depending on the application. Components are assigned to different categories. Components in the category "Feed" can be the individual ingredient of a feed mix or a complete compound feed.

1. In the menu "Configuration" > "General", click on "Components".

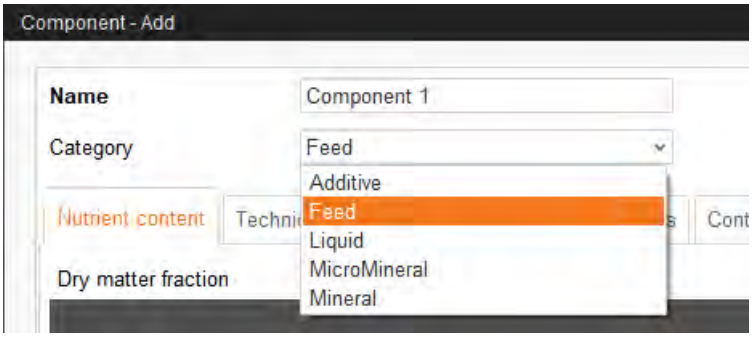


2. In the dialog window "Components", click on "Add".
3. Enter a name for the component and select a category.

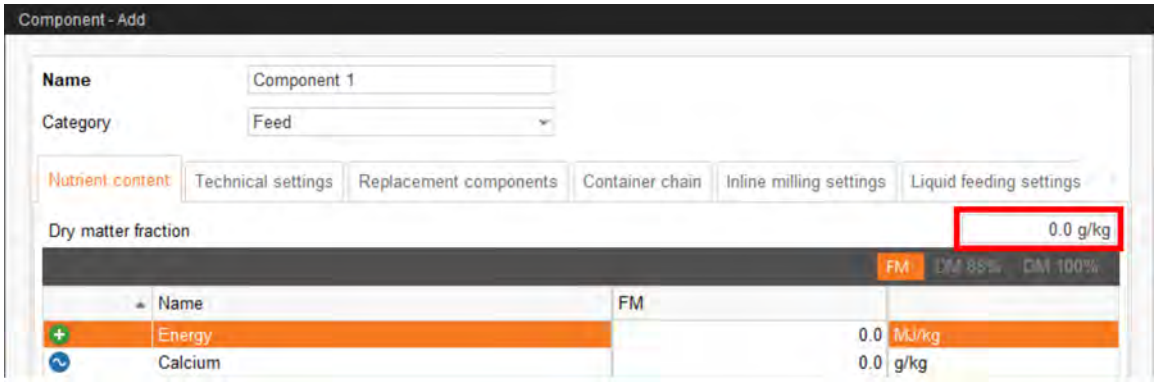
   In the MillAndMix system, the following component categories are used:

   – **Feed** in the dosing silo
   – **Mineral** in the mineral dosing unit
   – **Micromineral** in the micromineral dosing unit
   – **Liquid** in the liquid silo

   Only components of the category **Feed** can be used in a mill.

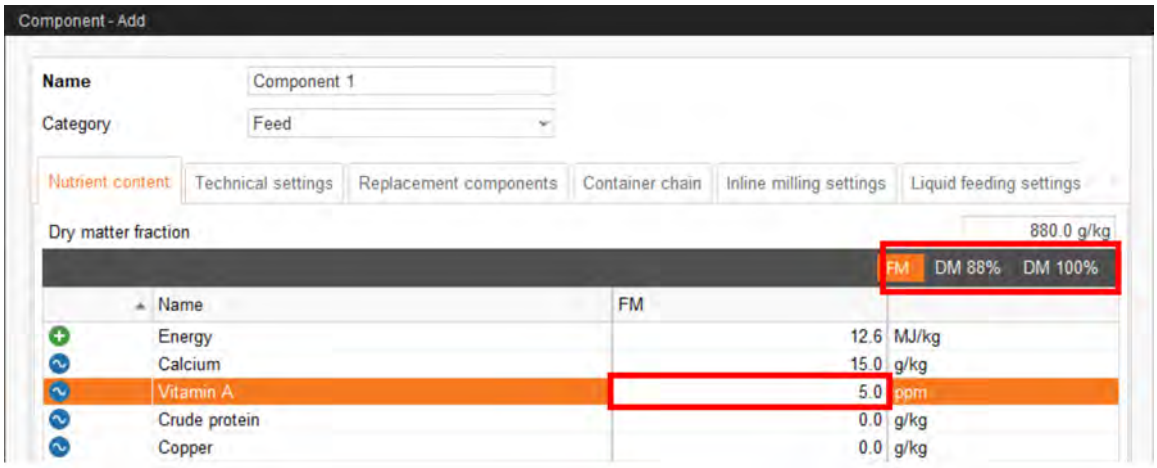


4. Under the tab "Nutrient content", define the dry matter fraction.

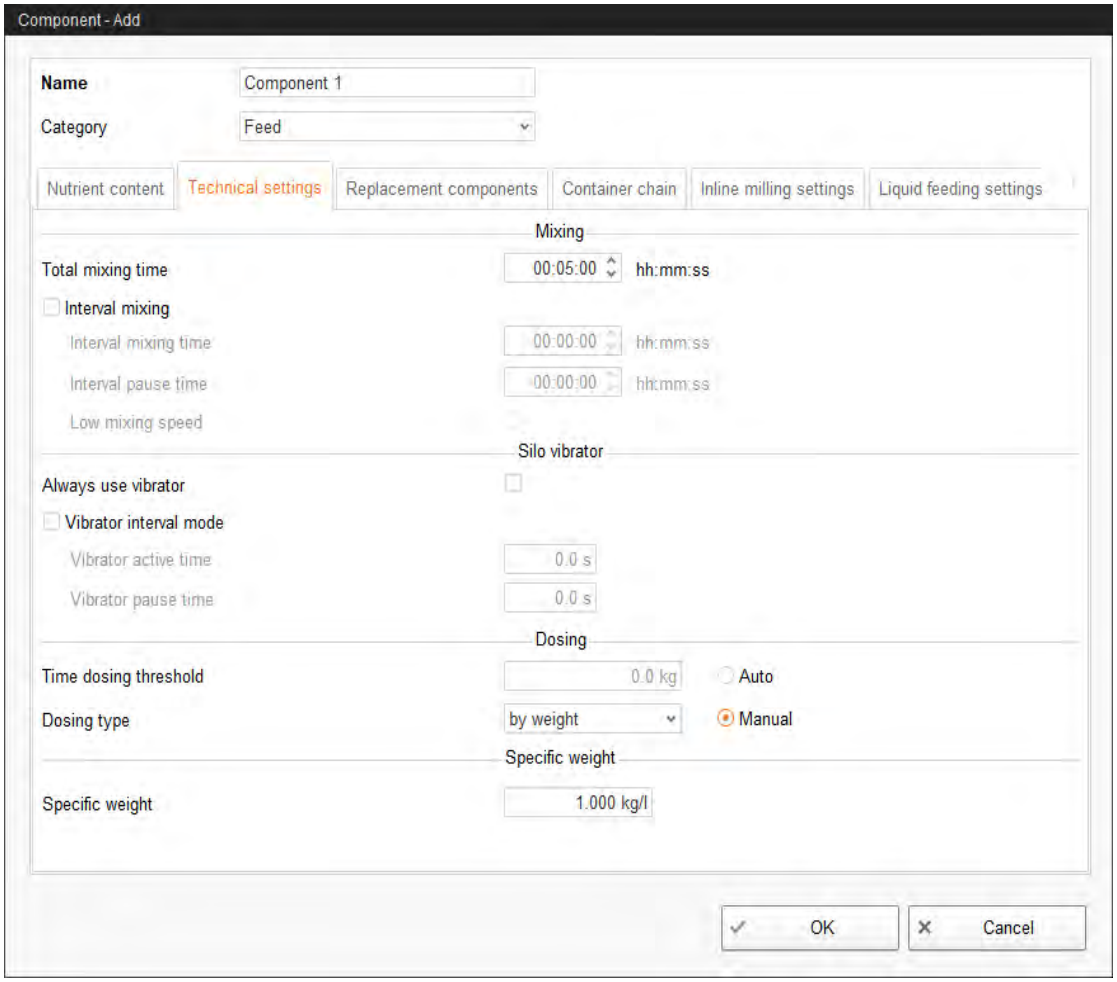


5. Only after entering the dry matter fraction can you choose one of the following quantities:
   - FM = per fresh matter
   - DM 88 % = in relation to 88 % dry matter
   - DM 100 % = in relation to 100 % dry matter

   If required, enter the energy content and the individual nutrient fractions in the table below (see 6.3 ”Creating nutrients”).



6. Define parameters for dosing of the component under the tab "Technical settings".



– If the silo from which the component is removed has a vibrator, you can configure the corresponding settings using the following parameters:

  If the box **Always use vibrator** is checked, the vibrator is always and constantly used during removal from the silo. If the box is not checked, the vibrator is only activated if the control system determines that too little of the component reaches the target during removal. This is the case if feed bridging occurred in the silo, which can block removal from a silo even though it is not empty. Such bridging can be solved by using a vibrator. If the vibrator is successful, it is switched off and removal from the silo continues. If the vibrator is not successful, the control system switches to another silo with the same component or to a replacement component. If this is not possible either, an alarm is generated.

  If the box **Vibrator interval mode** is checked, the silo vibrates at intervals, i.e. a vibrator active time (silo vibrates) and a vibrator pause time (silo does not vibrate) alternate. If this box is not checked, the vibrator is active constantly.

– Define settings for dispensing of the component:

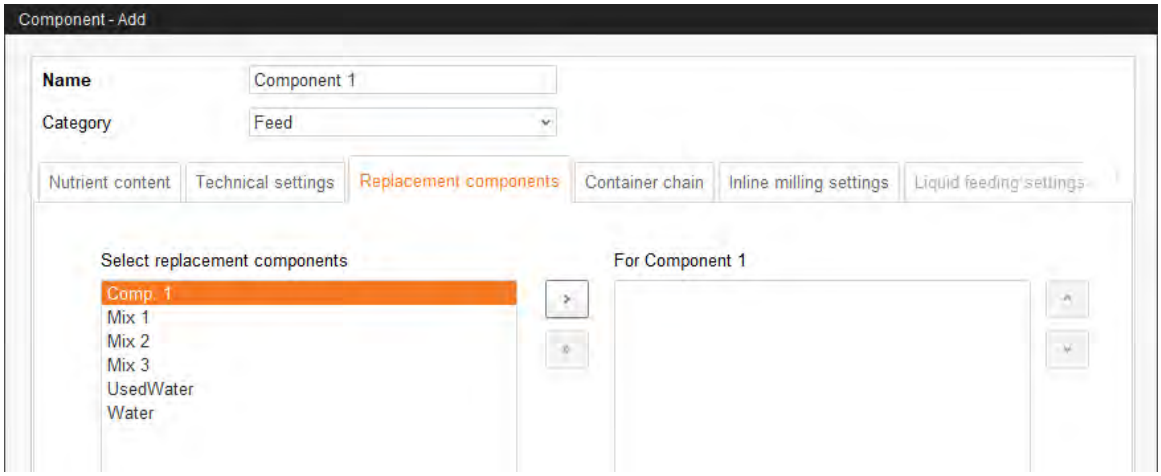
Auto: Define a weight as threshold value. If the weight of the dispensed component is below the threshold, dosing is automatically time-controlled. If the weight is above the threshold, dosing is automatically weight-controlled.

OR

Manual: Define whether components should generally be dispensed "by weight" or "by time".

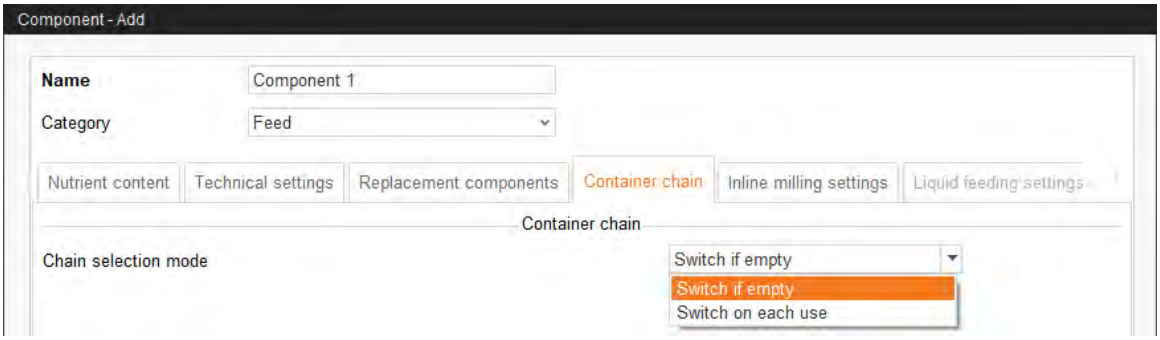
– If the component is dissolved in water, change the presetting under **Specific weight**, if necessary.

7. Select one or more replacement components from the tab "Replacement components" in case the component you entered is used up before a new order arrives. If you select more than one replacement component, you may sort them in descending order according to priority.



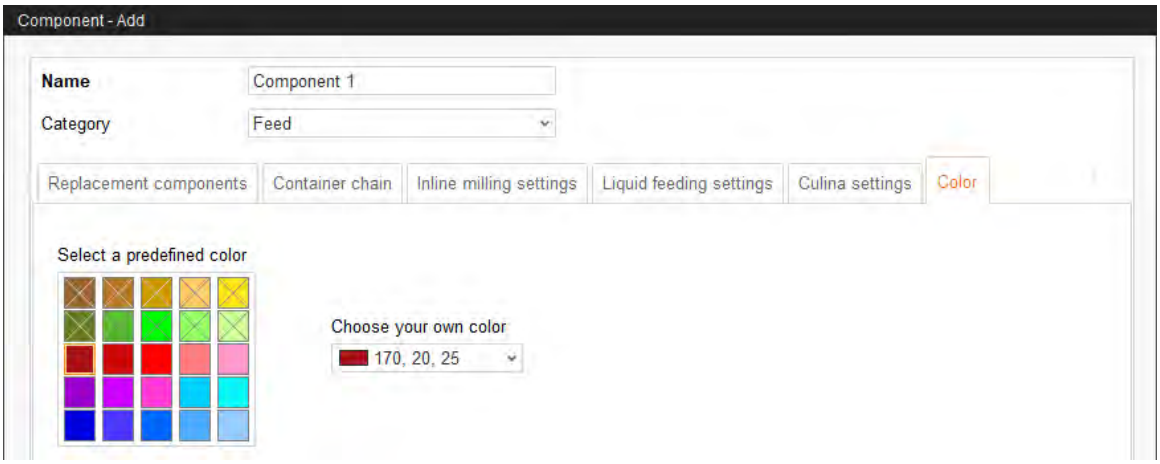
8. Under the tab "Container chain", define the component's behavior in case the component is used in a container chain (see 4 ”Container chains”).

- **Switch on each use:** If the component is located in different silos with the same priority in a container chain, the control system switches silos after each dispensing.
- **Switch if empty:** A new silo is only used after another silo has been emptied.



9. Define a color for the component under the tab "Color".

   If you do not define a color, the system will assign a color automatically. The color will help you differentiate between components in diagrams, e.g. when you create feed curves or recipes or when analyses are prepared.

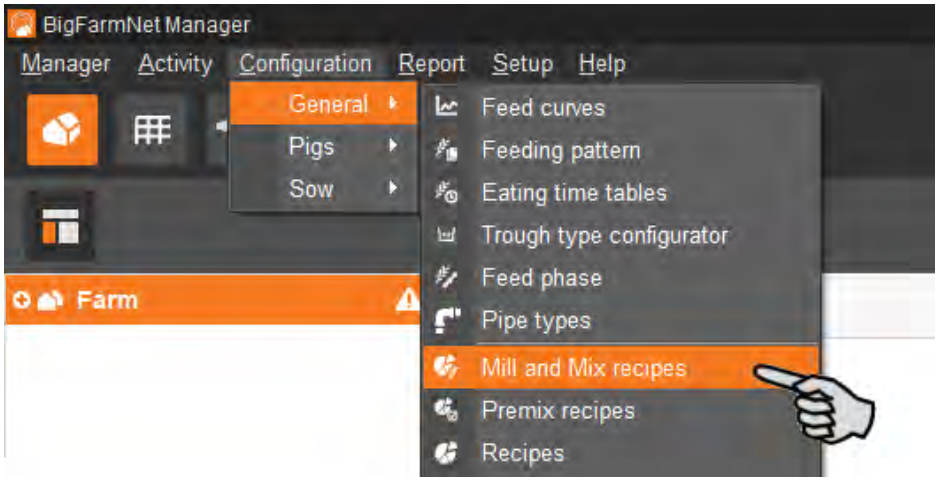


10. Click on "OK" after you have configured all settings.

6.2 Creating a recipe

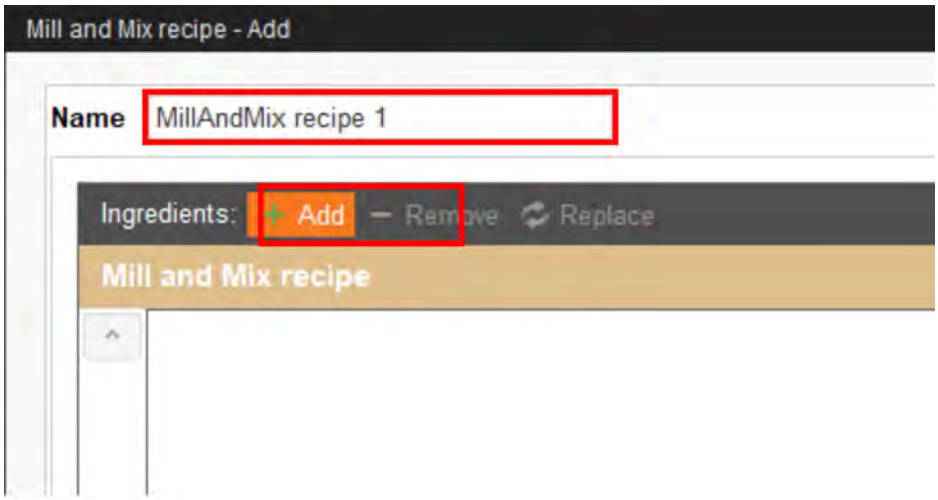
One batch consists of one recipe. A recipe consists of multiple components, of which a specific percentage is used, chapter 6.1 ”Creating components”.

1. In the menu "Configuration" > "General", click on "Mill and Mix recipes".



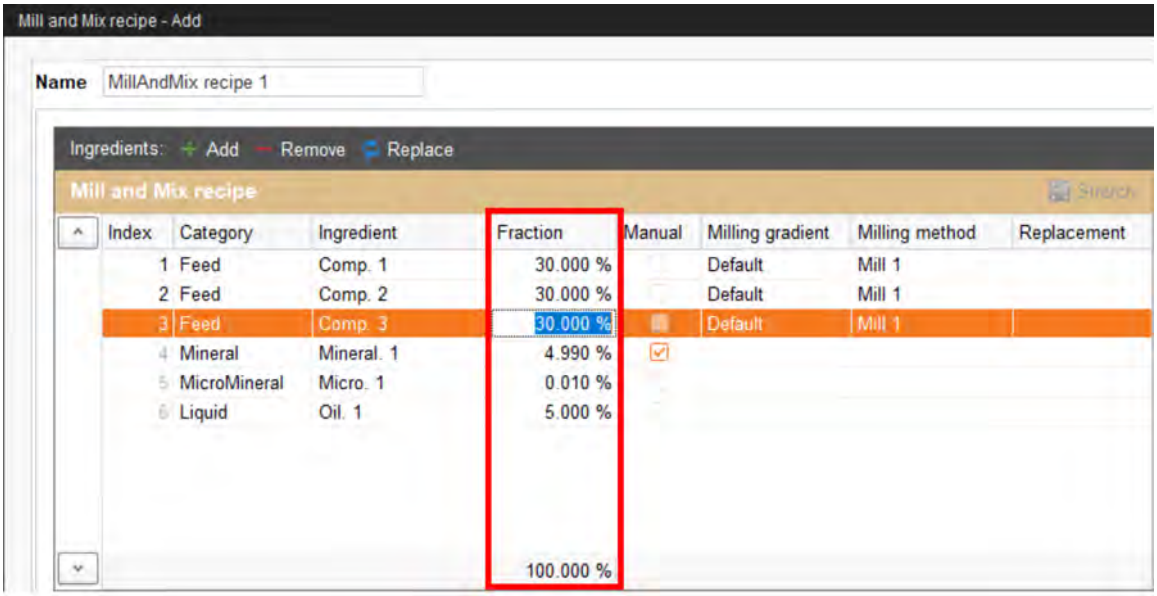
2. In the dialog window "Mill and Mix recipe", click on "Add".
3. Enter a name for the recipe.
4. Click on "Add" and select the components.

   In the recipe, you may use the same component multiple times with different technical settings.



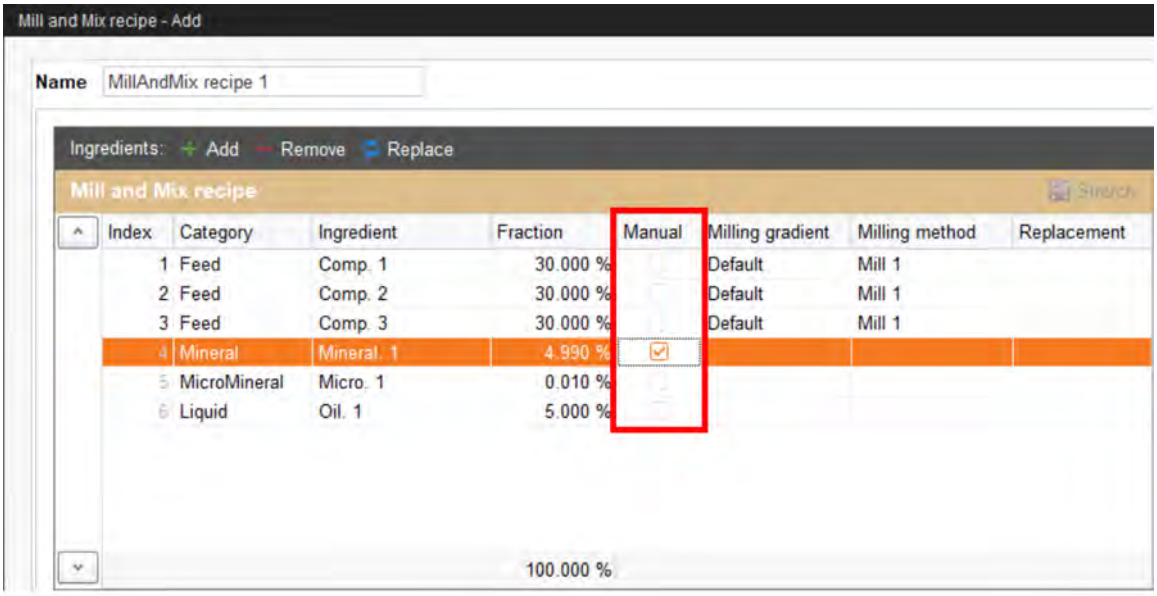
5. Define the correct fractions for the components.

   The fractions must sum up to 100 % in total.



6. If a component is dispensed manually, check the corresponding box for this component.

   This only applies to components of the "Mineral" category.



7. If the MillAndMix system can produce different milling gradients, select the correct one.

   This only applies to components of the "Feed" category.

   This only applies if a disc mill or a mill controlled by a frequency inverter is available.

8. Select the milling method(s).

   This only applies to components of the "Feed" category.

   For post-milling, you can select multiple milling methods, but just oned for inline milling.

9. Select a replacement component by entering the replacement component's index in the first column.

   If you do not enter an index, the replacement component defined for the component in chapter 6.1 ”Creating components” is selected. Milling gradient and milling method remain as selected in this dialog window.

10. In the lower part of the dialog, you have the following setting options:

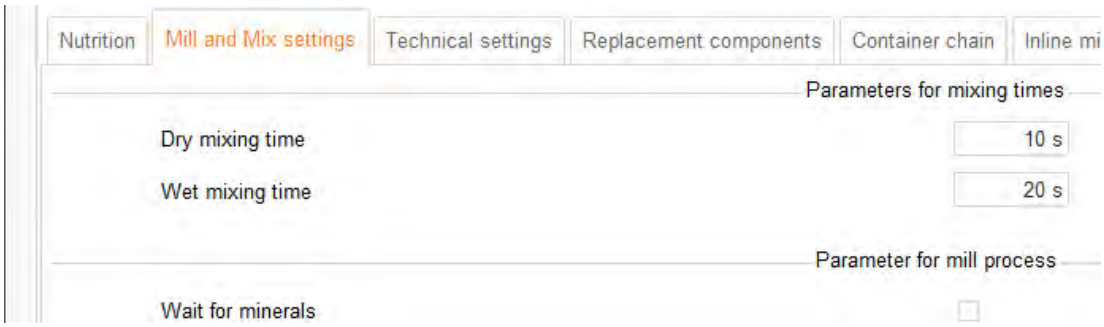
    – **Nutrient content:** Select between "FM", "DM 88%" and "DM 100%". The energy content and the nutrient fractions are then shown including the corresponding values.

    – **Mill and Mix settings:**

      Dry mixing time starts before liquid components are added.

      Wet mixing time starts after liquid components were added.

      Wait for minerals: Checking this box ensures that the milling process only starts after the mineral have been fully dispensed. This only applies to post-milling.



    – **Color:** Select a color for the recipe so it is easier to differentiate the recipe from components and other recipes in diagrams. If you do not select a color, the system will automatically assign one.

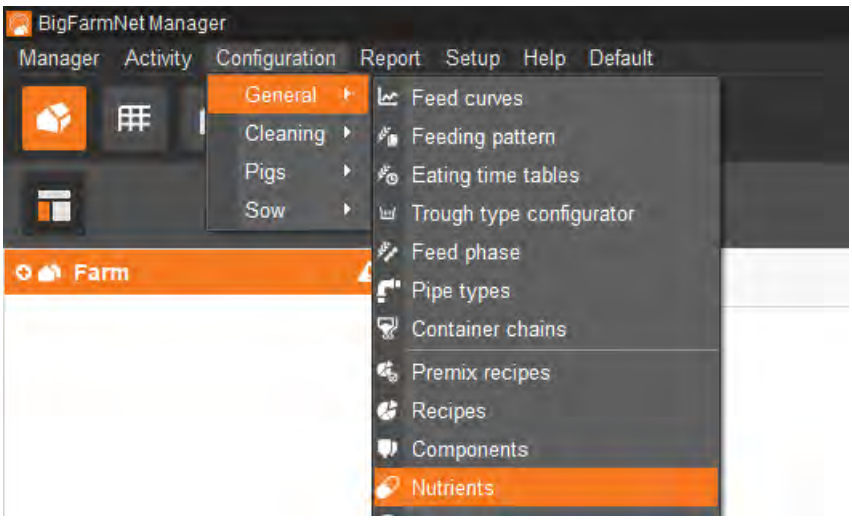
    The menus of the other tabs are identical to the menus described in chapter 6.1 ”Creating components”.

11. Click on "OK" after you have configured all settings.

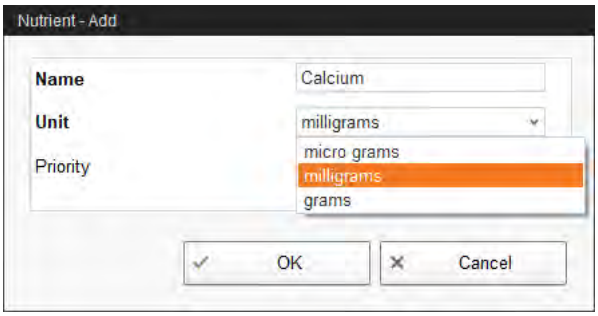
6.3 Creating nutrients

Nutrients include carbohydrates, fats and proteins, but also vitamins and minerals. The nutrients you create determine the nutritional value of the components. When you create a new component, all nutrients you created before will be listed. You can then enter the corresponding values per component, see chapter 6.1 ”Creating components”.

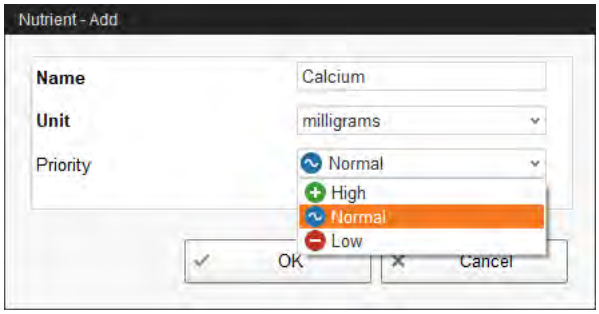
1. In the menu "Configuration" > "General", click on "Nutrients".



2. In the dialog window "Nutrients", click on "Add".
3. Enter a name for the nutrient and determine the unit.



4. As an option, you can also determine a priority for each nutrient. The nutrients can then be listed in ascending or descending order according to priority later on.



5. Accept these inputs by clicking on "OK".

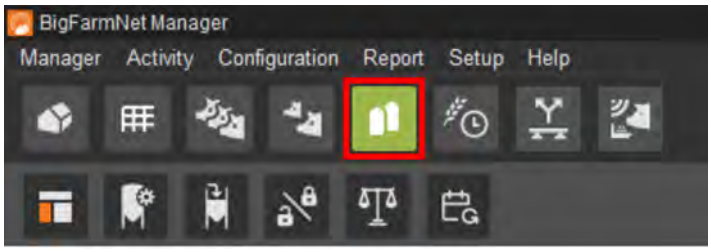
7 Silo Manager

With the Silo Manager, you can monitor and manage the data of all your silos.

The Silo Manager offers the following functions:

- registering the amounts of feed unloaded from the silos
- calculating the expected storage duration of the silo contents
- receiving a warning when a silo requires filling
- managing suppliers and prices for each feed component
  - BigFarmNet automatically calculates the total delivery amounts and your feed costs based on this information.

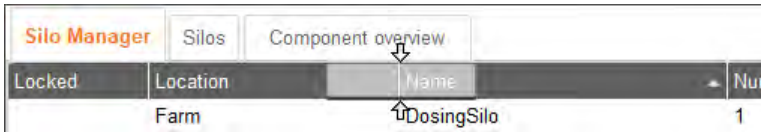
Open the Silo Manager by clicking on the respective icon in the toolbar.



The view "Silo Manager" shows the current data of your silos.

- Hiding and showing columns:
  - **a)** Right-click into the head line to open the context menu with all parameters.
  - **b)** Select or de-select parameters to hide and show the respective columns.
- Rearranging columns:
  - **a)** Click into the head line of the respective column and hold the mouse button.
  - **b)** Drag the column to the desired position.

    The arrows appearing at the head line when you move the columns help you assign the new position.



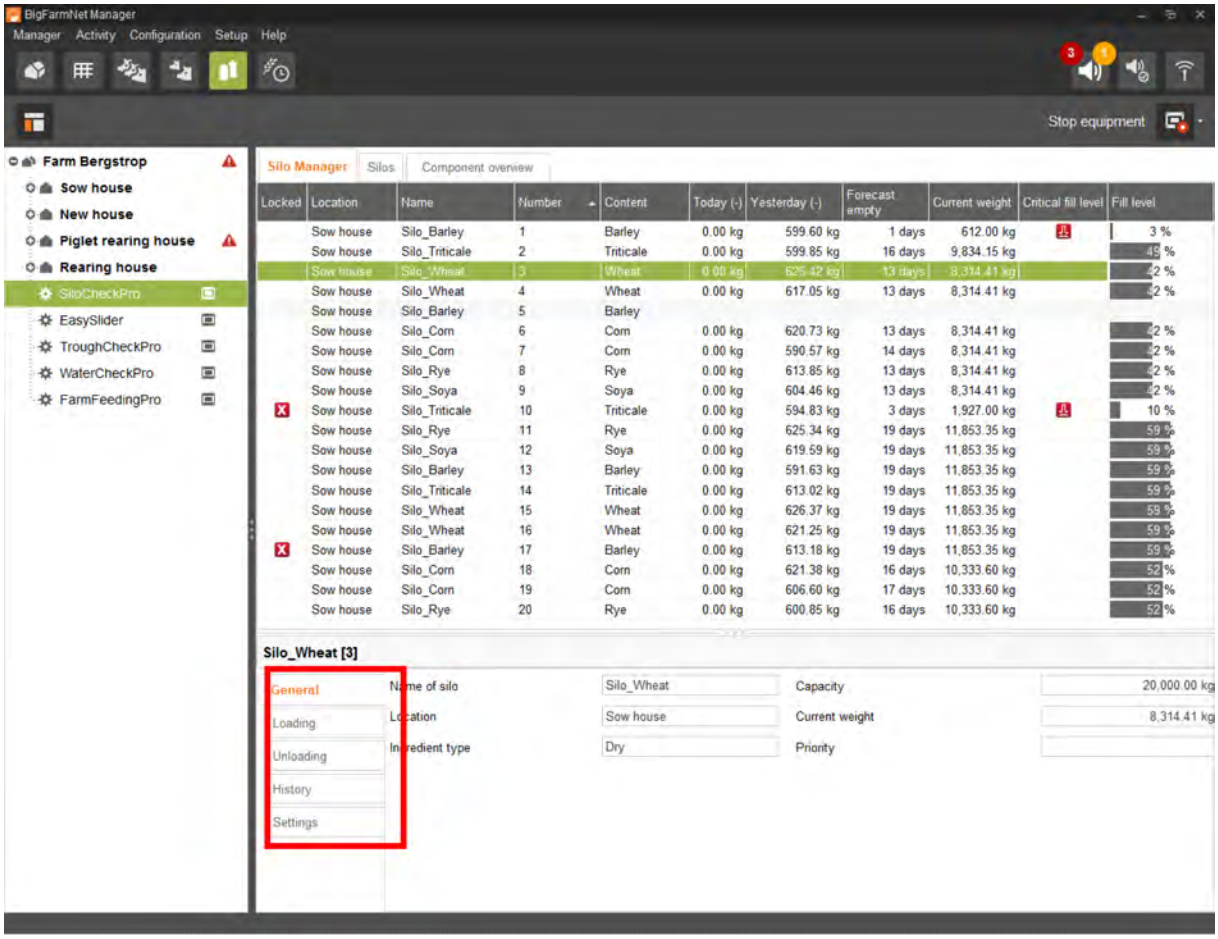
  - **c)** Release the mouse button.

    The column is now at its new position.
- Sorting based on dates:

  Click on the respective parameter in the head line to sort the silos in ascending or descending order according to the given values.

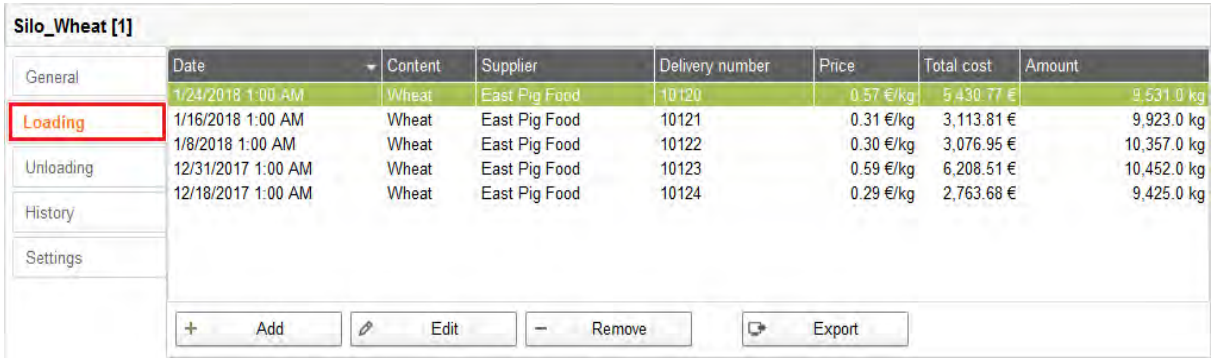
During configuration in the Composer, you assigned the correct locations to the silos. If you click on a house in the farm structure, you will only see the silos of this house.

The lower part of the application window shows additional silo data. The **General** category shows general information about the selected silo. Data under **Loading** (delivery, chapter 7.1) and **Settings** (chapter 7.4) can be edited.



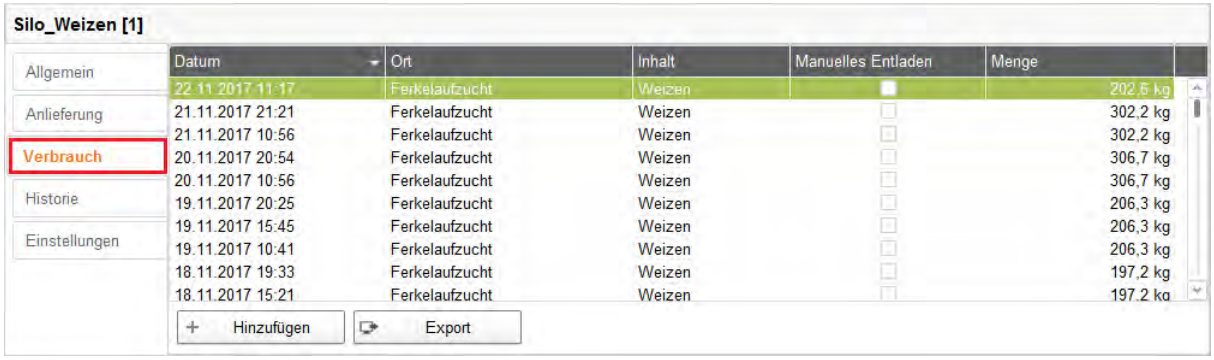
7.1 Delivery

The category "Loading" shows previous deliveries to the selected silo. You may add further deliveries, edit or delete them. Click on the button "Export" to export a CSV or XLS file with the data for further use.



7.2 Consumption

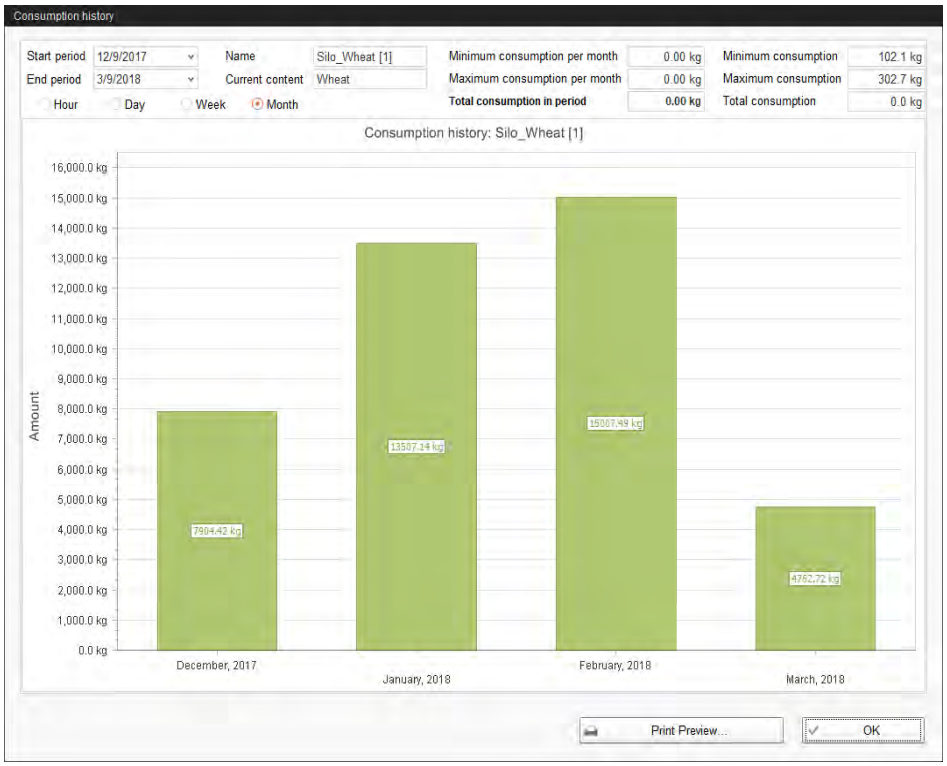
The "Unloading" category shows all quantities that have been removed from the selected silo up to now. Click on the button "Export" to export a CSV or XLS file with the data for further use.



7.3 History

All feed removed from the selected silo in the past seven days is displayed in the "History" category as a bar chart.

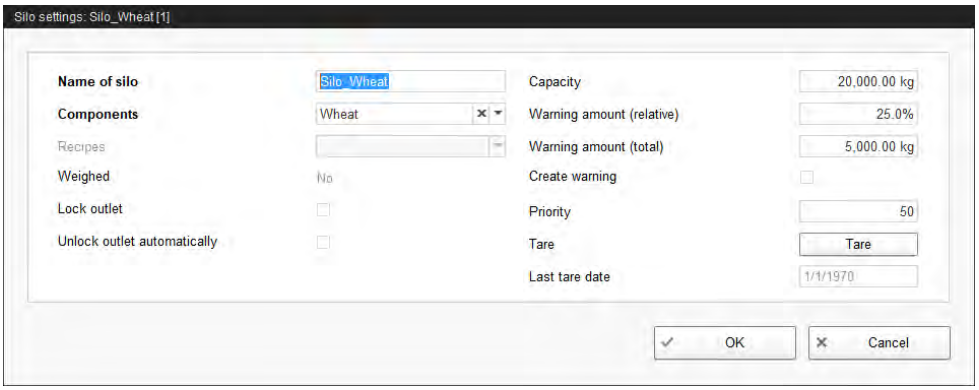
Clicking on the button "Details..." opens the consumption history in a separate window, in which you can select the time period as required. The consumption history can be printed.



7.4 Settings

Define the most important information about the selected silo under "Settings".

1. In the table, click on the silo you want to edit.
2. Under the category "Settings", click on "Edit".
3. Change the following settings, if necessary:



- **Name of silo**
- **Components** or **Recipes** indicate the silo's content.
- **Weighed** indicates whether the silo is weighed.
- **Lock outlet** is a manual setting.
- **Unlock outlet automatically** means that the automatic locking is automatically cancelled after delivery. A silo is locked automatically when its contents have been completely used up.
- **Capacity** is the maximum amount which can be filled into the silo.
- **Warning amount (relative)** or **Warning amount (total)**: If you enter one of these values, the other one is calculated automatically.

  The relative warning amount refers to the silo's capacity.

  If the silo weight falls below the (total, i.e. absolute) warning amount, the system can create a warning for a critical fill level (**Create warning**).
- Use the field **Priority** to sort the silos. The higher the priority value, the higher the chance that the component will be removed from this silo.
- **Tare** is used to set the silo's weighing system to zero. This is only possible if the silo is completely empty.
- Information regarding the **Last tare date**

NOTICE!

BigFarmNet automatically blocks a silo whose content has been completely used up.

After each delivery, check whether the box next to “Block outlet” has been checked by BigFarmNet and if necessary remove the check.

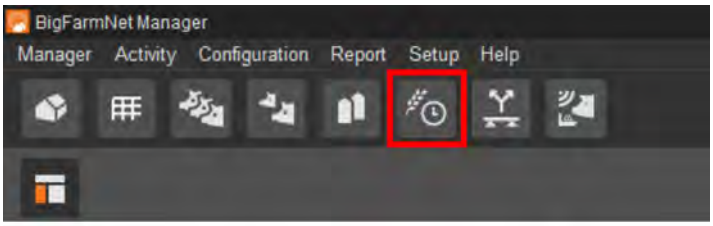
4. Click on "OK" to accept these settings.

8 Task Manager

The Task manager allows you to create tasks as new orders for the MillAndMix system to process.

8.1 Defining a task

1. Click on "Task Manager" in the toolbar.

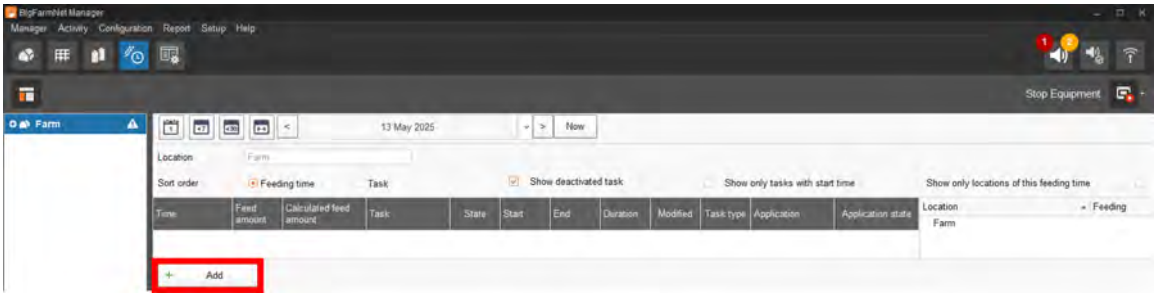


2. Click on the correct system in the farm structure.

   If you stay on the farm level, you will need to indicate the correct system in the mandatory field **Application** in the task dialog.

3. In the application window, click on "Add".

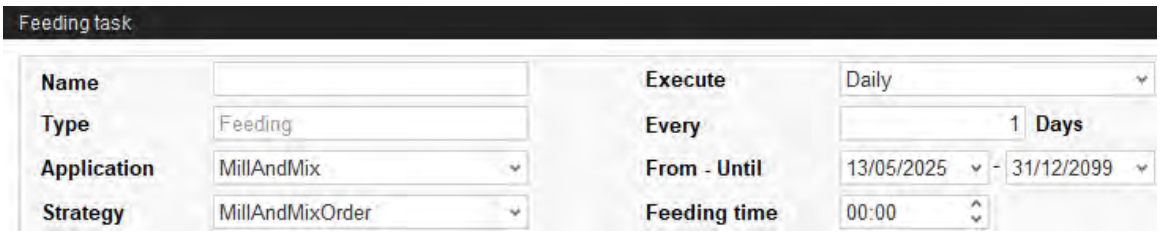
   This opens the task dialog.



4. Select the correct application.

   The tasks in the dialog change depending on the selected application.

5. Define the bold mandatory information:



   – **Name** of the task
   – **Type:** Pre-set to "Feeding".
   – **Application:** The selected application.

– **Strategy:** The type of the task.
– **Execute:** "Daily "> **Every ... days:** The task is performed every nth day.

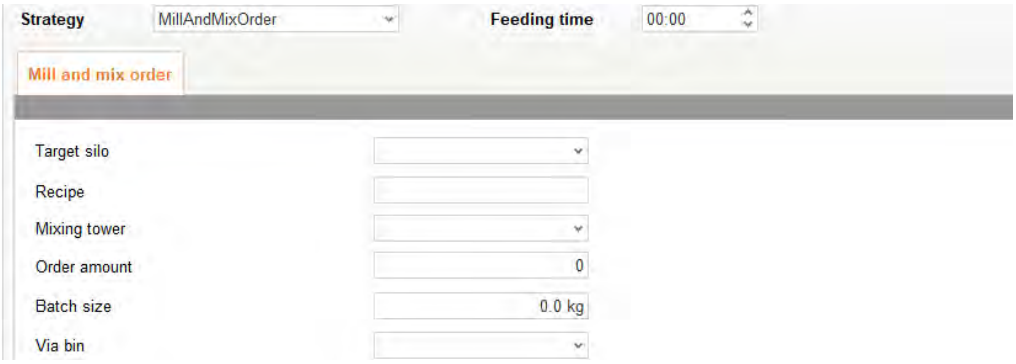
  OR

  Execute: "Weekly"> **Days:** The task is performed on the selected week days.
– **From – Until:** Time period for this task. The task will not be started outside of this time period.
– **Feeding time:** Time at which processing of the task starts.

All other settings depend on the selected "strategy". These settings are described in the following chapters.

8.1.1 Strategy: MillAndMix order

1. Follow the initiatory steps in 8.1.
2. Configure the following settings for the order in the lower part of the window:



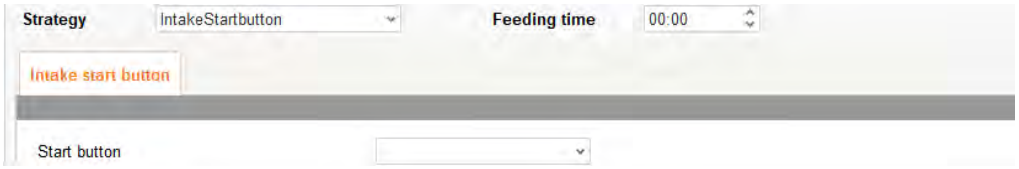
- **Target silo:** The target silo of the order.
- **Recipe:** This information automatically shows the recipe for the target silo.
- **Mixing tower:** Selection of one or two mixing towers, if applicable.
- **Order amount:** The number of batches in this order.
- **Batch size:** The size of a batch in kg.
- **Via bin:** The buffer silo to be used.

3. Click on "OK" after you have configured all settings.

8.1.2 Strategy: Intake start button

1. Follow the initiatory steps in 8.1.

2. Configure the following settings for the task in the lower part of the window:



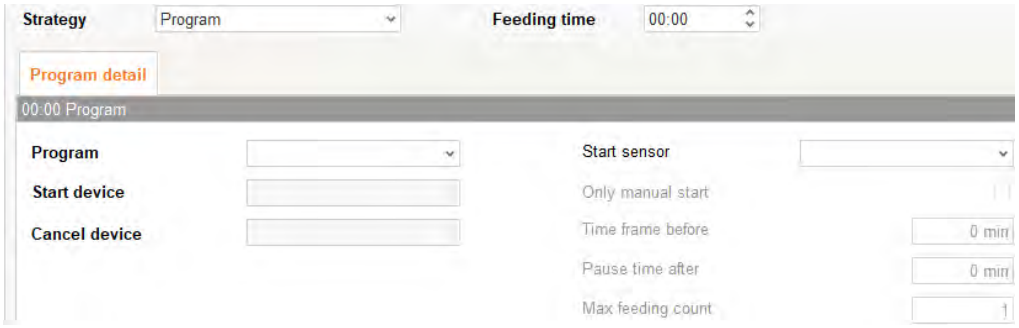
- **Start button:** The start button to be activated for intake.

3. Click on "OK" after you have configured all settings.

8.1.3 Strategy: Program

The "Program" strategy is used to start PLC programs. Starting with a start sensor (manual start) is currently not supported. Specific parameters are therefore inactive (grayed out).

1. Follow the initiatory steps in 8.1.
2. Configure the following settings for the task in the lower part of the window:



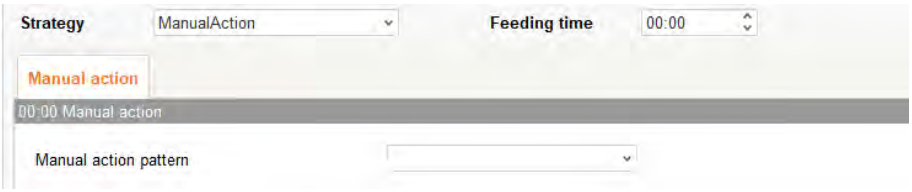
- **Program:** Defines the PLC program to be started.
- **Start device:** Defines the output that must be set to start the PLC program.
- **Cancel device:** Defines the input to terminate the PLC program.
- **Start sensor:** Sensor for manual start of the task.
- **Only manual start:** The task is started exclusively via a sensor and not based on time.
- **Time frame before:** Time frame for the manual start of the task using the start sensor before the automatic start of the task.
- **Pause time after:** Pause time after completion of the task before it can be restarted.
- **Max. feeding count:** Maximum number to execute the task.

3. Click on "OK" after you have configured all settings.

8.1.4 Strategy: Manual action

The "Manual action" strategy is used to start manual actions of feed moves that have been saved as a pattern (see chapter 9.2.2 ”Manual actions for the feed moves”, page 155).

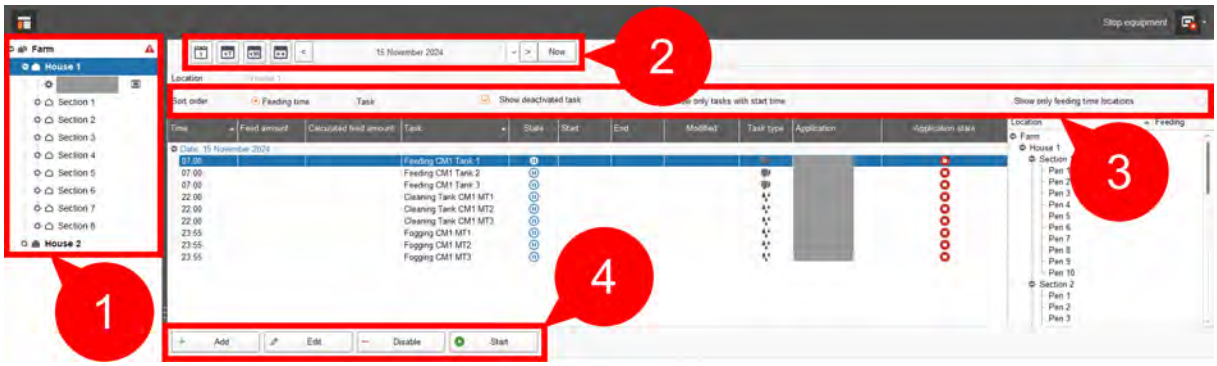
1. Follow the initiatory steps in 8.1.
2. Configure the following settings for manual operation in the lower part of the window:



   - **Manual action pattern:** Pattern to be executed for manual feed move actions.
3. Click on "OK" after you have configured all settings.

8.2 Editing a task

As soon as a task has been created, it will appear in the overview of the Task Manager. The following functions are available:



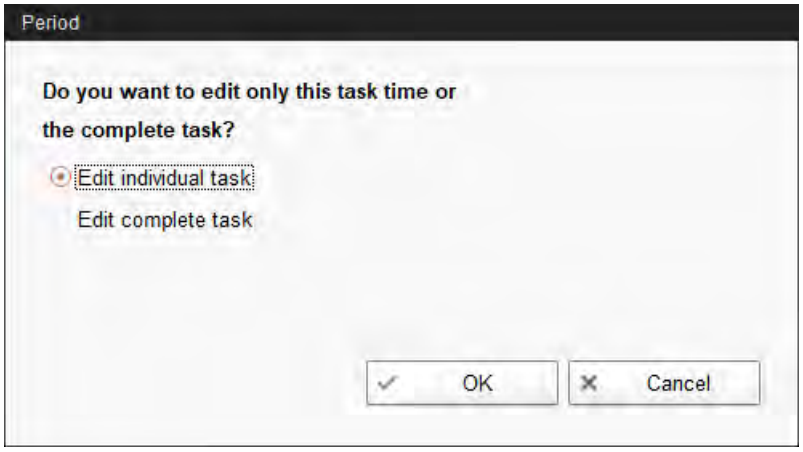
1. View the tasks by clicking on the correct system or location where the system is installed in the farm structure.

   On the farm level, all tasks of all systems are displayed.

2. Select a time period, if necessary.
   - Display of days, weeks or months
   - Display of any time period
   - Return to the current date by clicking on "Now"
3. Adjust the view, if necessary.
   - Sort according to "Feeding time" or the name ("Task").
   - "Show deactivated task"
   - "Show only tasks with start time"
   - "Show only feeding time locations"
4. You may edit task times as follows. First, select the correct task time by clicking on it.

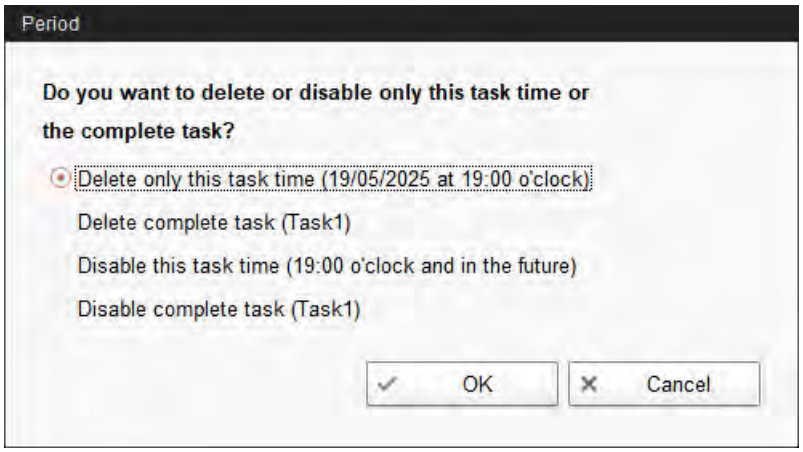
– "Edit" = edit the selected time or the entire connected task.

  Select the correct option and click on "OK".



– "Disable" = deactivate or delete the selected time or the entire connected task.

  Select the correct option and click on "OK".



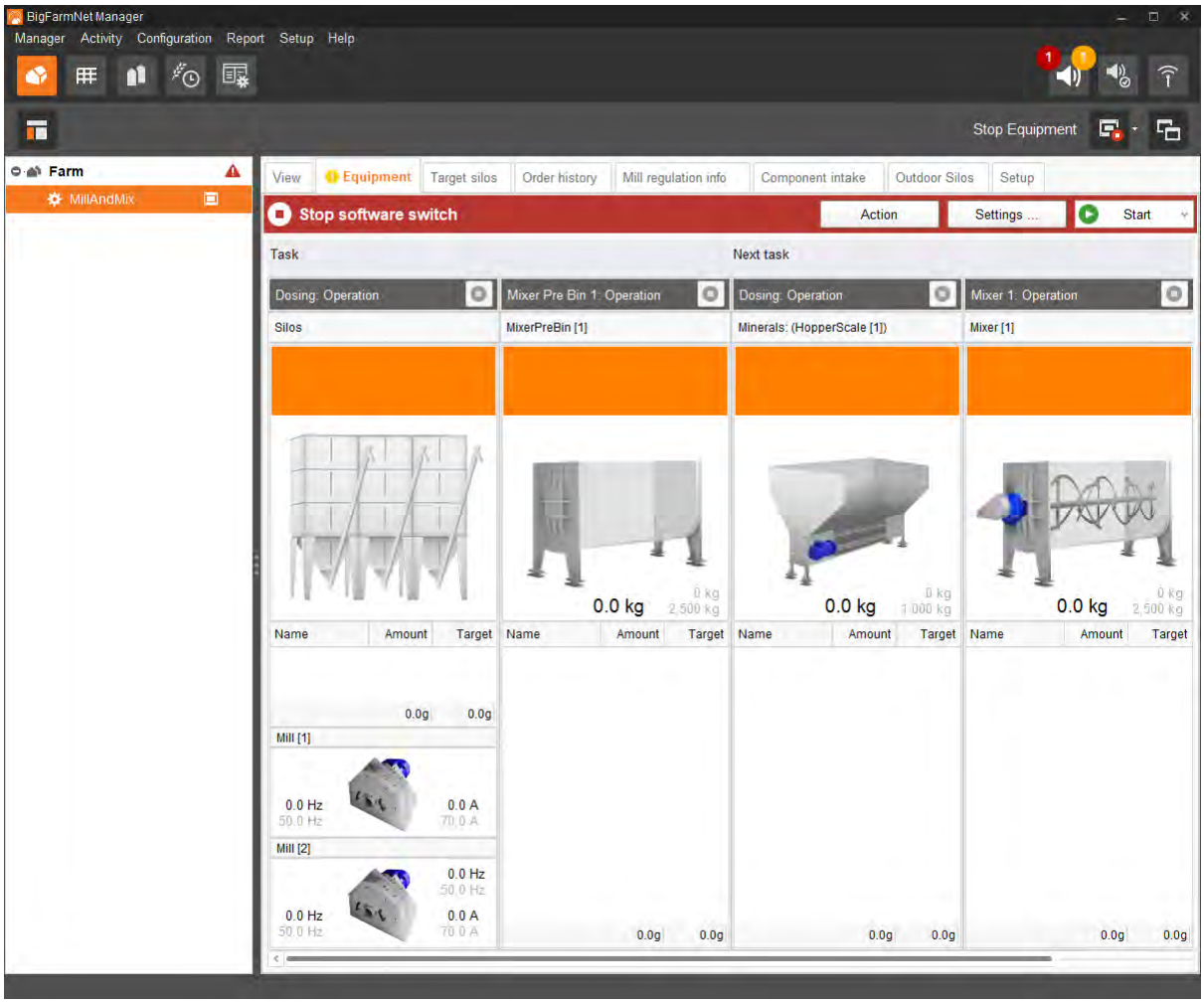
– "Start" = immediately start the selected action, even if a different time was saved.

9 Operation of the MillAndMix system

9.1 Automatic mode

9.1.1 "Equipment" window

The "Equipment" window shows all relevant data and individual system components of the installed MillAndMix system as independent sub-applications. Each sub-application can be stopped and restarted. If a sub-application generates an alarm, only this sub-application goes into error mode. The other sub-applications continue running.

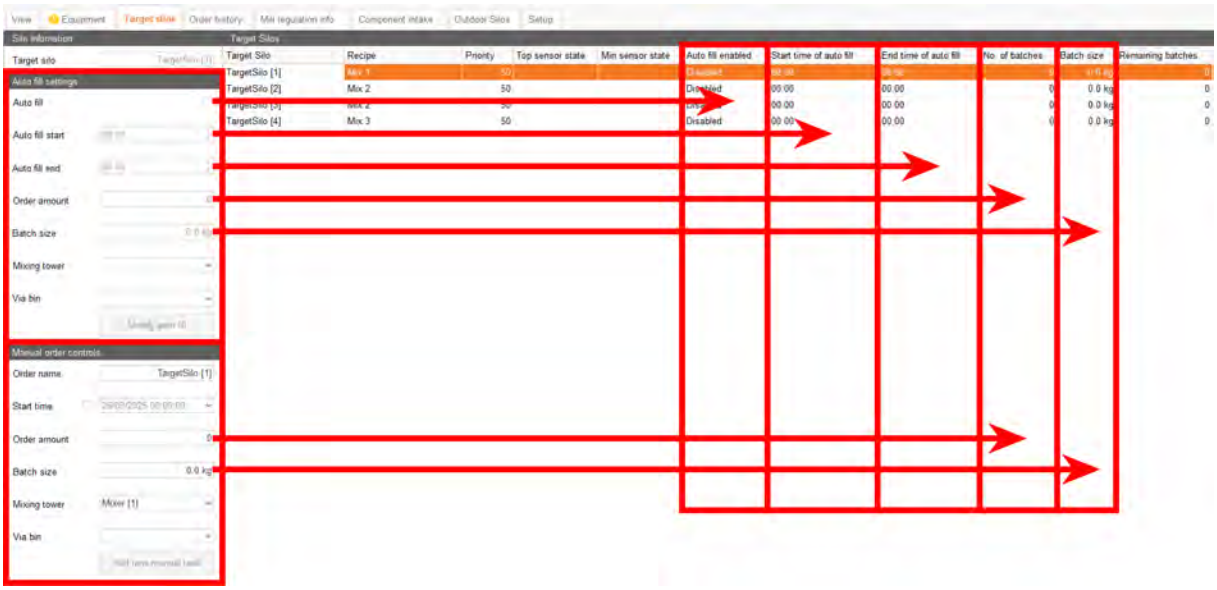


9.1.2 Target silo

The window "Target silos" contains a list of all target silos of the MillAndMix*pro* application. You can view information about the target silos and change settings regarding automatic filling as follows:

- **Auto fill (Auto fill enabled):** Activate or deactivate automatic filling. When automatic filling is activated, the target silo is filled automatically based on the "Min sensor state" and the other "Auto fill settings".
- **Auto fill start (start time of auto fill) / Auto fill end (End time of auto fill):** Period during which a silo should be filled automatically.
- **Order amount (No. of batches):** The number of batches in this order.
- **Batch size:** The size of the batch in kilograms.
- **Mixing tower:** Select one or both mixing towers, if applicable.
- **Via bin:** The buffer silo to be used, if applicable.

When all information for automatic filling is correct, the button "Modify auto fill" becomes active and can be actuated.



You can also create a manual order using the following parameters:

- **Order name:** The name of the order.
- **Start time:** The start time of the manual order.
- **Order amount (No. of batches):** The number of batches in this order.
- **Batch size:** The size of the batch in kilograms.
- **Mixing tower:** Select one or both mixing towers, if applicable.
- **Via bin:** The buffer silo to be used, if applicable.

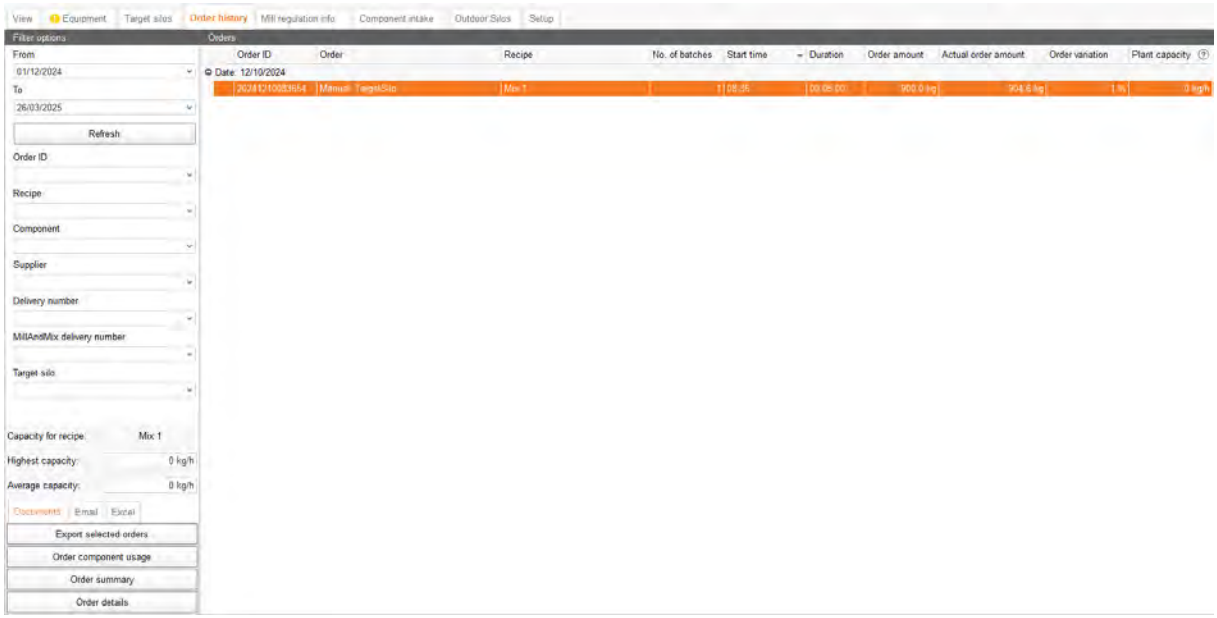
When all information for the manual order is correct, the button "Add new manual task" becomes active and can be actuated.

Additionally, the table shows the following settings or information, which do not correspond to the settings to be configured on the left:

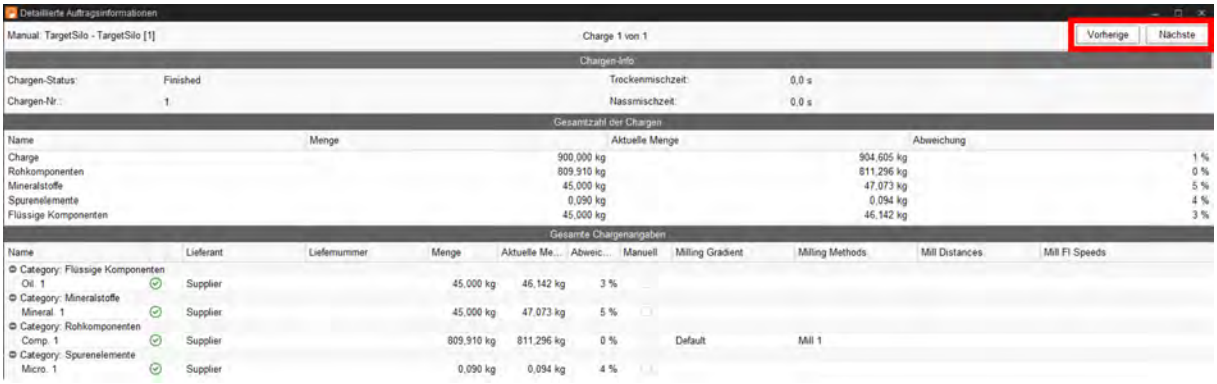
- **Recipe:** The recipe to be mixed for the target silo when batches have been ordered.
- **Priority:** The priority of the target silo. Batches ordered for multiple target silos are processed according to the priority. Higher priority = earlier filling.
- **Top sensor state** (only an information): Status of the maximum sensor in the target silo.
- **Min sensor state** (only an information): Status of the minimum sensor in the target silo.
- **Remaining batches** (only an information): Number of batches that still need to be processed for the target silo.

9.1.3 Order history

The window "Order history" shows all orders the MillAndMix system has processed. This log can be filtered for different criteria:

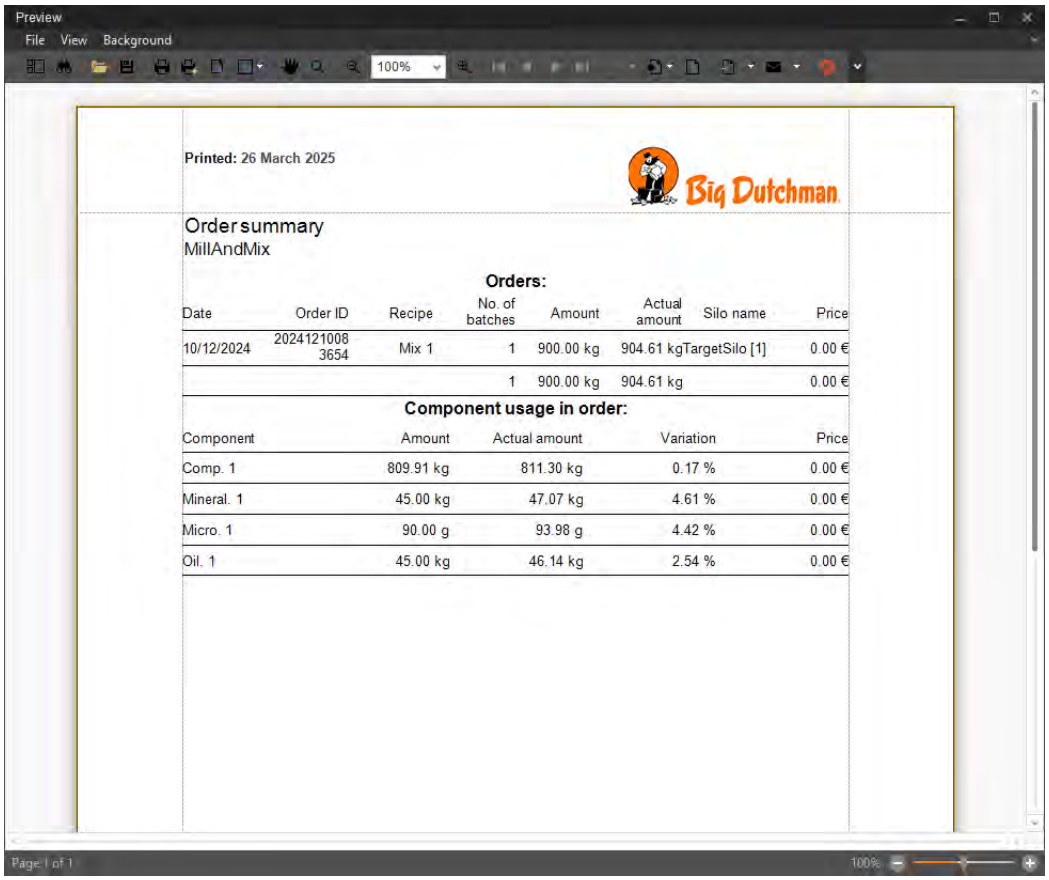


Double-click on an order to open a new window with additional information regarding the individual batches of the order. Toggle between the different batches using the buttons "Previous" and "Next".

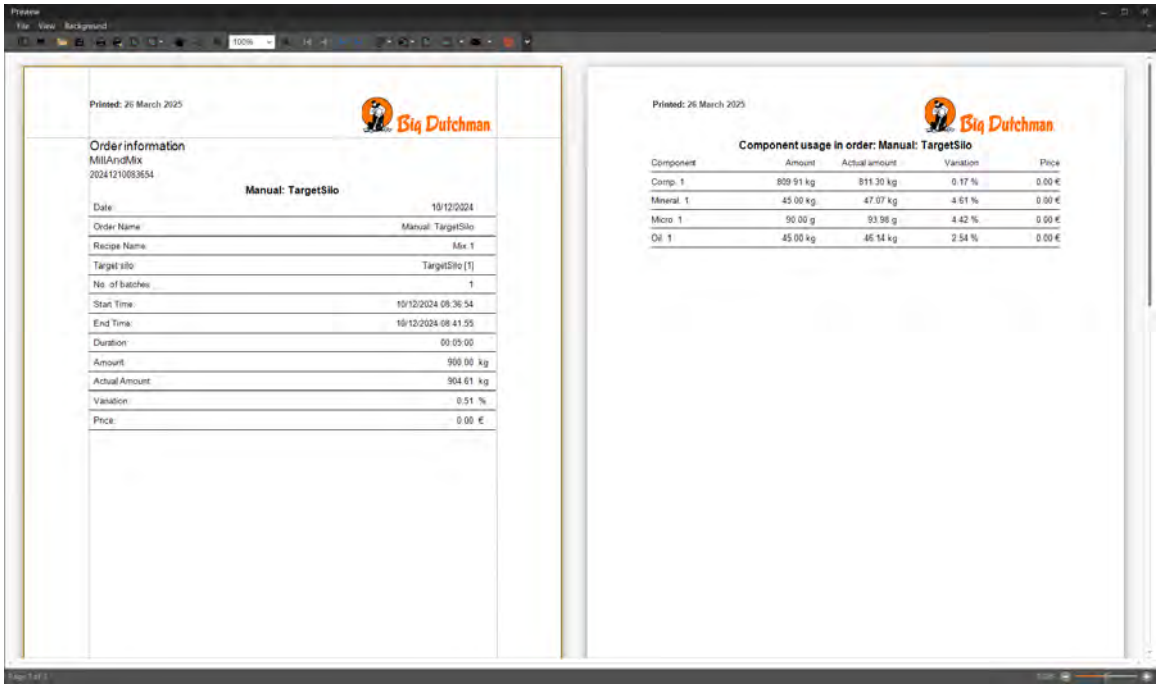


You can also save or print order information:

- Order summary by clicking on the button "Order summary"

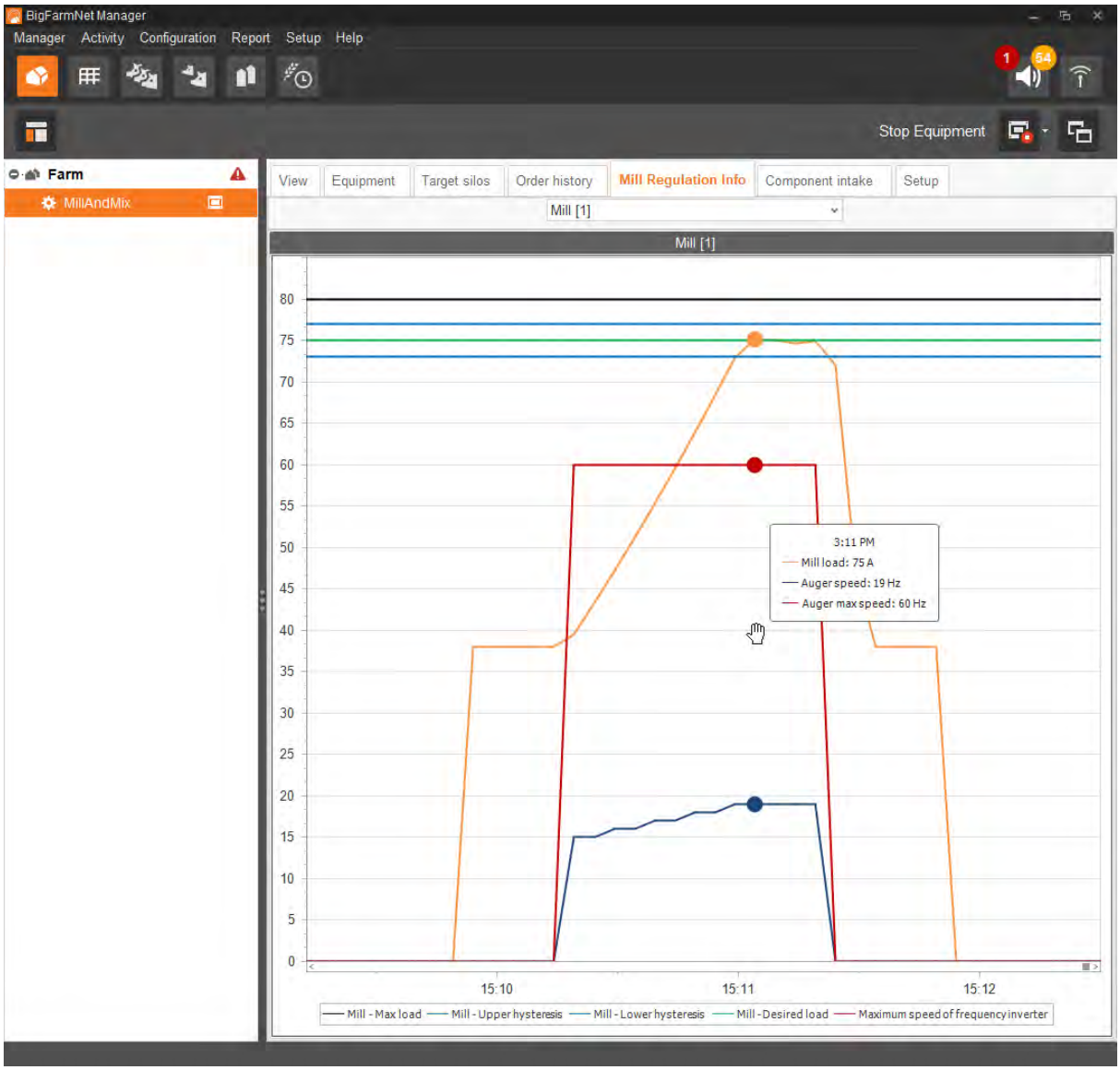


- Order information including historical data by clicking on the button "Order details"



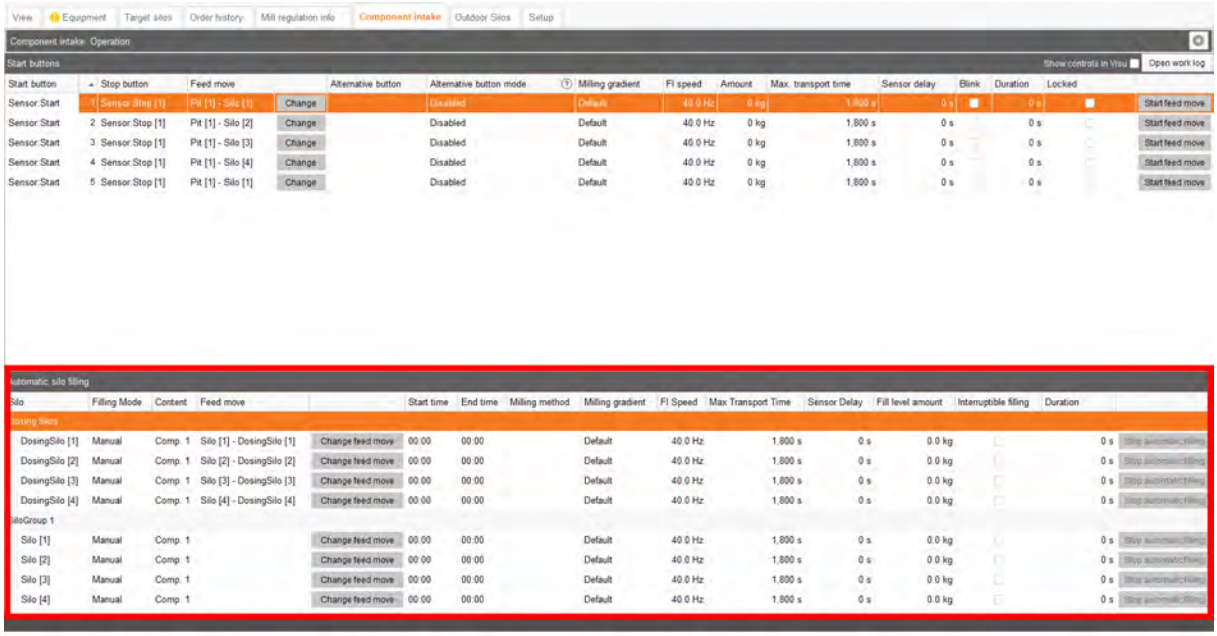
9.1.4 Mill regulation info

The window "Mill regulation info" shows a curve diagram based on the values defined under **Settings > Milling > Mills** and **Settings > Shared frequency inverter**. Two additional curves show the current mill load and the current speed of the frequency inverter. One curve diagram showing the past 24 hours is created for each mill. You may zoom into or out of the curve diagram by positioning the mouse pointer in the curve diagram and scrolling with the mouse wheel.



9.1.5 Automatic component intake

The window "Component intake" is only visible if you have added the component intake in the Composer.



Silos with a minimum sensor or a scale can be filled automatically by the MillAndMix application. You can make the following changes to the automatic component intake in the bottom table ("Automatic silo filling"):

- **Filling mode**
  - **Manual:** Automatic filling of the silo is deactivated.
  - **Auto:** The silo is filled automatically based on the minimum sensor's monitoring or the silo scale.
- **Feed move:** Click on "Change feed move" to select a feed move for automatic filling of the silo. If you do not select a feed move, the control system tries to find a suitable feed move with a source silo with the same content.
- **Start time:** Start time of automatic filling.
- **End time:** End time of automatic filling.
- **Milling method:** Selecting the milling method to be used restricts the search for a suitable feed move to fill the silo.
- **Milling gradient:** The milling gradient to be used. Only applies to feed moves with a hammer mill controlled by frequency inverter or a disc mill.
- **FI speed:** If the first device of the selected feed move after the source silo is a frequency inverter (FI), the speed set here is used.

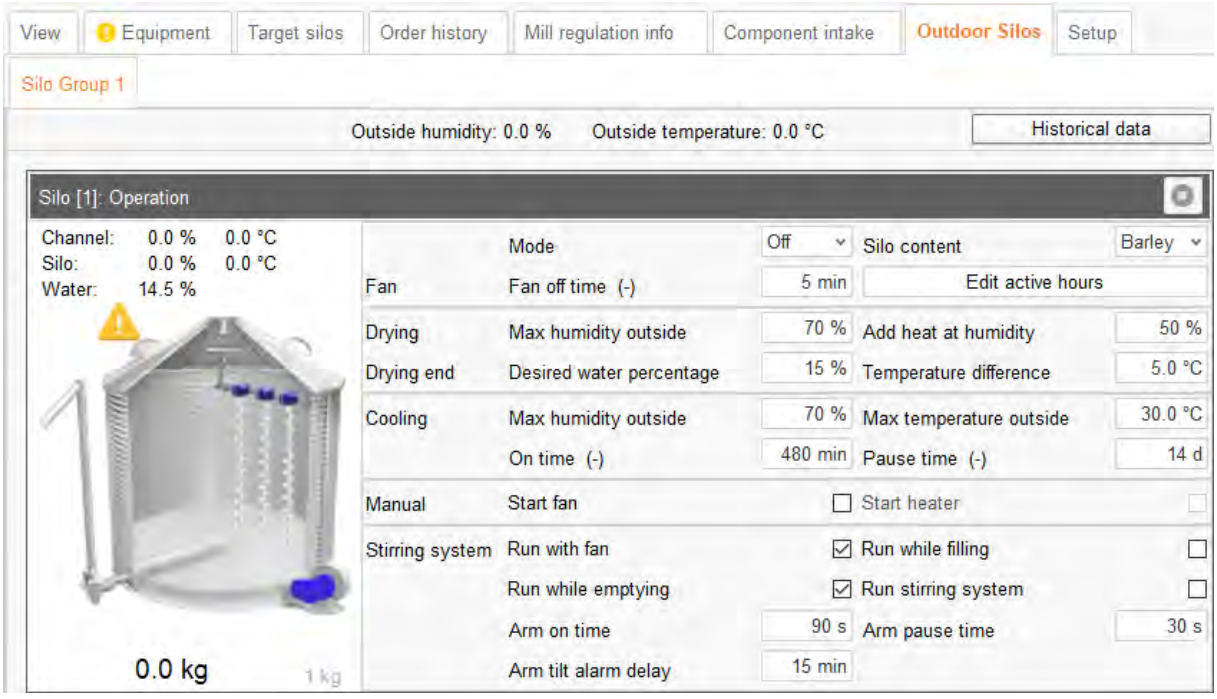
- **Max. transport time:** The maximum time for the feed move, after which it should be completed.
- **Sensor delay:** This delay is added if the feed move has a minimum sensor in its source silo. This ensures that the source silo is empty before the feed move stops. Only used for truck pits.
- **Fill level amount:** If automatic filling of the silo is based on silo scale monitoring, the silo is only refilled if the silo contents are below this value.
- **Interruptible filling:** Automatic silo filling can be interrupted by other feed moves.
- **Duration:** Duration for which the feed move is executed. If the value is greater than 0, the "Max. transport time" is ignored.

In the top right corner, clicking on the button "Open work log" opens a window with a chronological list of past feed moves started via component intake. The period to be considered can be filtered. Both manual and automatic feed moves, including some parameters, are displayed.

9.1.6 Outdoor silos

The tab "Outdoor silos" appears if a minimum of one silo group with at least one silo marked as outdoor silo in the Composer has been added to the component intake.

All outdoor silos of a silo group are displayed together in one tab. If multiple silo groups with outdoor silos have been added to the component intake, one tab per silo group appears.



The top row indicates the outside humidity and outside temperature if the corresponding sensors have been installed and added in the Composer. To the very right of this row, clicking on the button "Historical data" opens a window that shows the diagrams of all outdoor silos' sensor values as a trend. The diagrams can be filtered for period and silo and then be updated by clicking on the button "Update". Clicking on the button "Export" exports the data.

Each outdoor silo in the MillAndMix*pro* application is its own sub-application. This means that the functions of each outdoor silo can be started and stopped independently of the rest of the MillAndMix system. In case of an alarm, the alarm applies to the specific outdoor silo only.

The graphic depiction of the outdoor silos indicates their status and feed level as well as the operating state of fan, heater and stirring system, if applicable. The measured values of the installed sensors are shown above the silo.

When you move the mouse pointer to the depiction of a silo with alarm icon (yellow = active warning, red = active alarm), a tooltip with the corresponding error message appears.

The following settings can be configured for outdoor silos:

- **Mode:** Type of ventilation and/or drying of the silo contents, depending on the equipment of the silo. Other settings can be active or inactive based on the selected mode.
  - **Off:** No automatic functions. Fan and heater can be operated manually.
  - **Drying:** The fan is switched based on the outside humidity.
  - **Drying with heat:** The fan and the heater are switched based on the outside humidity.
  - **Cooling:** The fan is switched based on the outside humidity or the outside temperature.
  - **Cooling with interval:** The fan is switched at intervals based on the outside humidity or the outside temperature.
  - **Drying end without heat:** The fan is switched based on the outside humidity, the inside humidity and the inside temperature.
  - **Drying end with heat:** The fan and the heater are switched based on the outside humidity, the inside humidity, the outside temperature and the inside temperature.
- **Silo content:** The component in the outdoor silo. This information is required for the modes "Drying end without heat" and "Drying end with heat".

- **Edit active hours:** Input of times for starting and ending the daily runtime of the selected mode. Outside of the set period, the silo is operated in "Off" mode.
- **Fan off time (x):** Waiting time whenever the fan is switched off before it can be switched on again. The value in brackets indicates the remaining waiting time in minutes.
- **Drying / Drying end**
  - **Max. humidity outside:** If the outside humidity is higher than this value, the fan is switched off in the modes "Drying", "Drying with heat", "Drying end without heat" and "Drying end with heat".
  - **Add heat at humidity:** If the outside humidity is higher than this value, the heater is switched on in the modes "Drying with heat" and "Drying end with heat".
  - **Desired water percentage:** If the inside humidity (= moisture in the silo contents) corresponds to this value for 30 minutes, the fan is switched off in the mode "Drying end without heat", or the heater is switched off in the mode "Drying end with heat".
  - **Temperature difference:** If the difference between inside temperature and outside temperature is greater than this value, the fan remains switched on after the heater was switched off until this difference falls below this value in the mode "Drying end with heat".
- **Cooling**
  - **Max. humidity outside:** If the outside humidity is higher than this value, the fan is switched off in the modes "Cooling" and "Cooling with interval".
  - **Max. temperature outside:** If the outside temperature is higher than this value, the fan is switched off in the modes "Cooling" and "Cooling with interval".
  - **On time (x):** Period for which the fan remains switched on between two pause times in the mode "Cooling with interval". The on time can be interrupted when the "Max. humidity outside" or the "Max. temperature outside" is exceeded. The value in brackets indicates the remaining on time in minutes.
  - **Pause time (x):** Period for which the fan remains switched off between two on times in the mode "Cooling with interval". The value in brackets indicates the remaining pause time in days.
- **Manual**
  - **Start fan:** The fan can be switched on manually in the mode "Off".
  - **Start heater:** The heater can be switched on manually in the mode "Off".

- **Stirring system**
  - **Run with fan:** The agitator runs automatically while the fan runs.
  - **Run while filling:** The agitator runs automatically while the silo is being filled.
  - **Run while emptying:** The agitator runs automatically while the silo is being emptied.
  - **Run stirring system:** The agitator is switched on manually.
  - **Arm on time:** Period for which the agitator arm rotates in the silo between two pause times.
  - **Arm pause time:** Period for which the agitator arm remains switched off between two on times.
  - **Arm tilt alarm delay:** If the agitator arm is in a tilted position for longer than this period, an alarm is generated and the agitator is switched off.

9.2 Manual mode

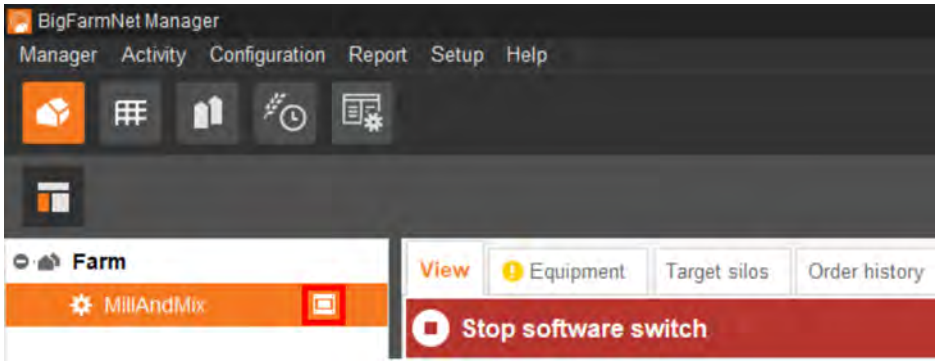
9.2.1 Manually controlling the system components

The system can be controlled manually in the "View" window after you have created the image in the FeedMove Editor (chapter 3.2). You may manually control the MillAndMix system via the image by activating or deactivating individual system components.

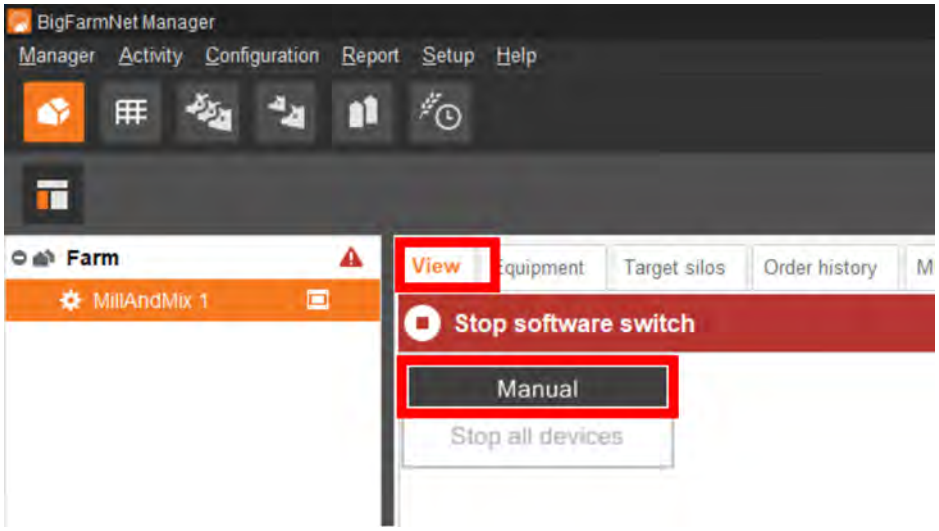
NOTICE!

Manual control of system components is done at your own risk and you are liable for any subsequent damage. The control software (application) no longer operates the system when using manual control!

1. Click on the controller icon of the respective system application in the farm structure.



2. Under "View", click on "Manual".

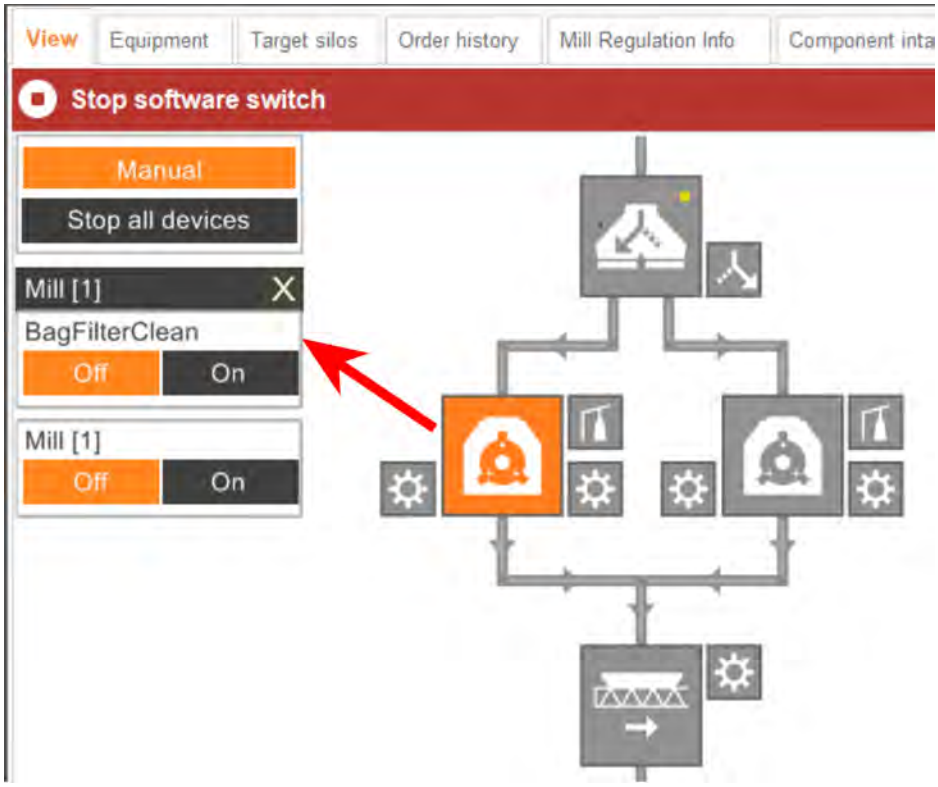


NOTICE!

Check whether the system is running. Stop the system by clicking on Stop in the upper bar.

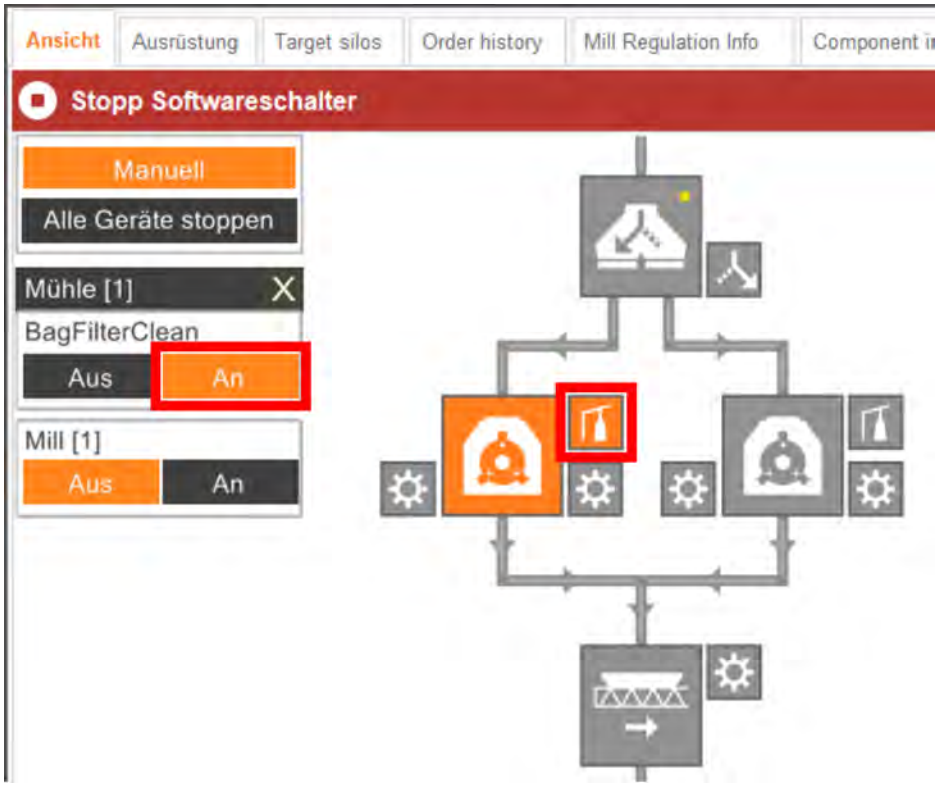
3. If necessary, adjust the view or retrieve one of your saved views using the camera icons, see chapter 3.2.4.
4. You can manually switch on or off functions of the system components as follows:
   a) Click on the respective system component.

      The colour of the system component changes to orange. The elements belonging to this component are displayed in the window to the left.



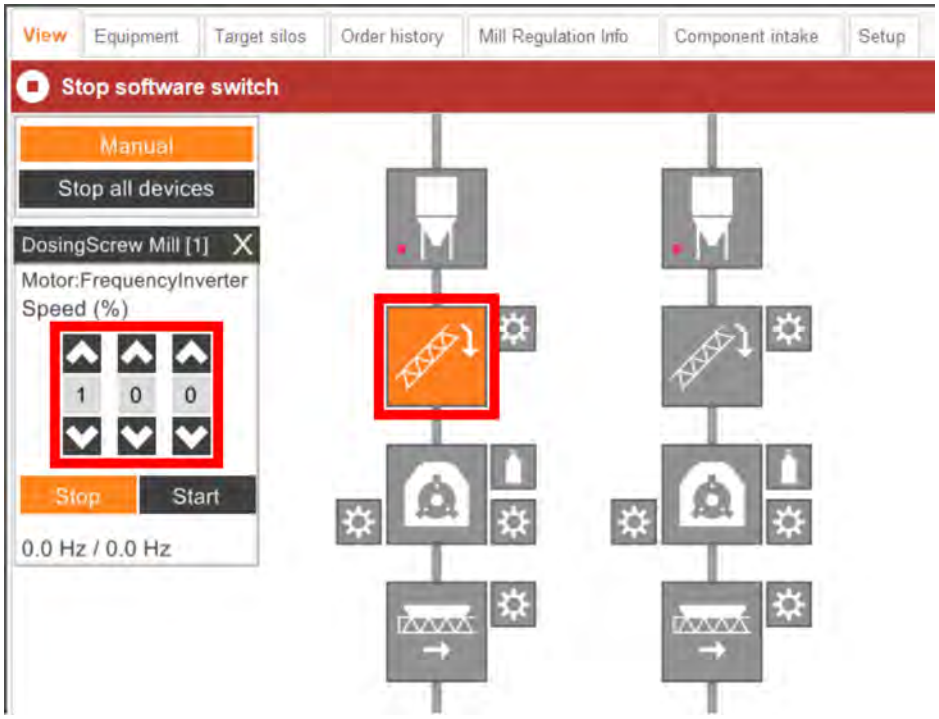
   b) Activate or deactivate the required element in the window to the left or by clicking directly on the element icon in the view.

      Active elements are orange. Inactive elements are gray.



5. Change the frequency of a system component that is controlled by a frequency inverter, e.g. an agitator or a pump, if necessary.

   Click on the respective system component and change the frequency using the arrows pointing upwards and downwards.



6. Move the mouse pointer over the different icons in the depiction to see the full name of the function or the system component.

   A tooltip shows the full name.

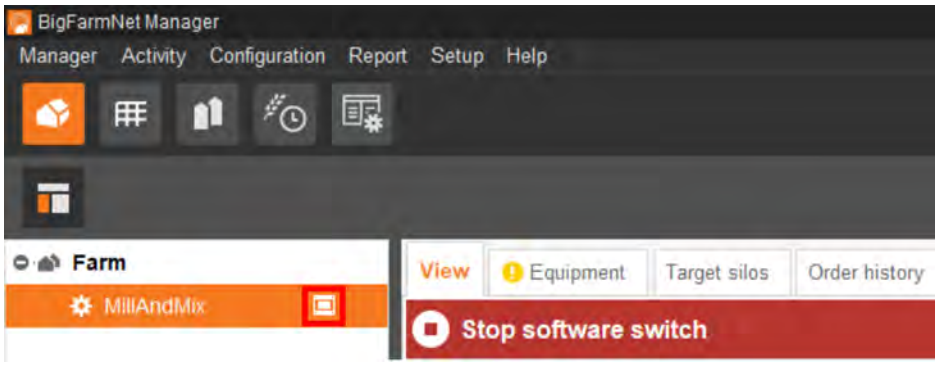
7. Stop manual control by clicking on "Manual" again.

9.2.2 Manual actions for the feed moves

The function for manual actions is located in the "View" window.

The system usually runs automatically, based on the configured settings. However, you may access individual feed moves and carry out actions manually, e.g. transport a component from a silo to a mixer. Manual actions can also be defined for multiple feed moves. Define an order according to which the actions will be processed.

1. Click on the controller icon of the respective system application in the farm structure.

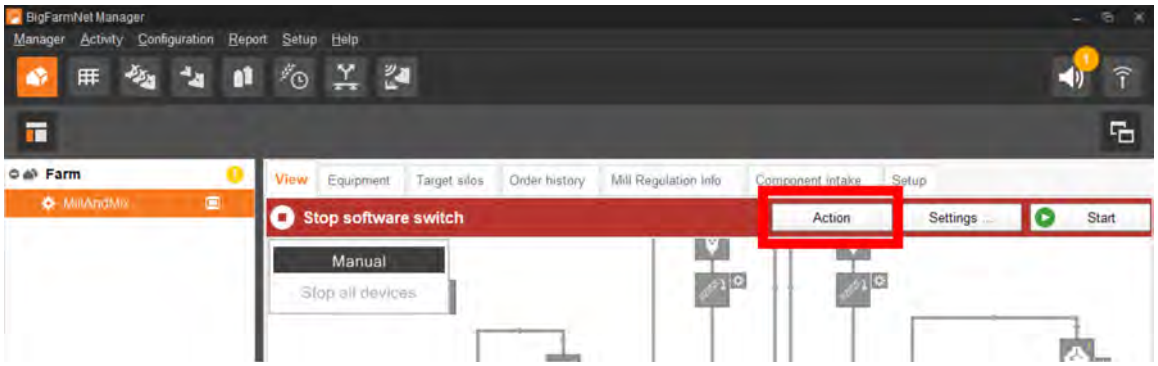


NOTICE!

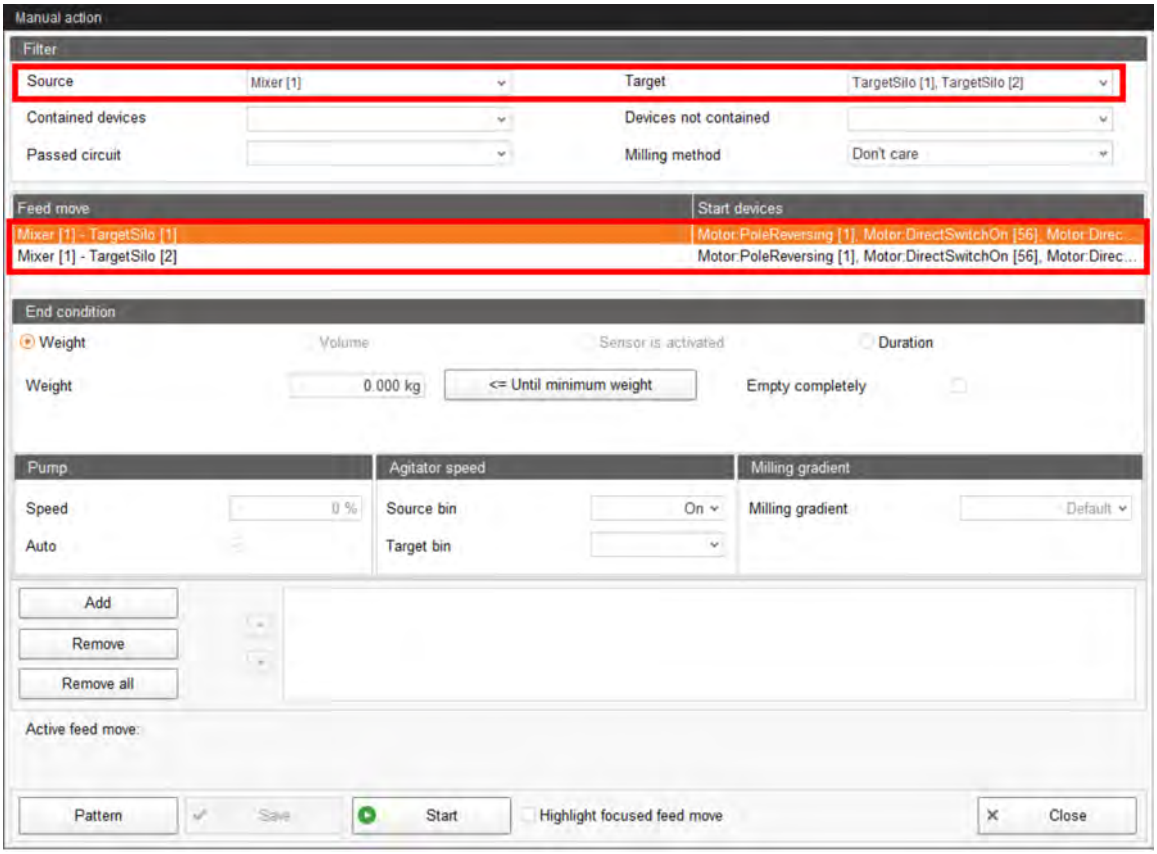
Check whether the system is running. Stop the system by clicking on Stop in the upper bar.

2. Click on the "Action" button in the "Equipment" or "View" tab.

   This opens the dialog window "Manual action".



3. In the upper area, enter the "Source" and the "Target" of the respective feed move and select the feed move from the list.



4. In the central area under "End condition", "Pump", "Agitator speed" and "Milling gradient", configure the temporary settings.

   Depending on the feed move and the installed system components, the corresponding parameters for the action become active, for example:

   – "Weight" only applies if the source or the target of the feed move has a scale.
   – "Volume" only applies if a flow meter is installed.
   – "Sensor is activated" only applies if the source of the feed move has a minimum sensor or if the target of the feed move has a maximum sensor.
   – The button "<= Until minimum weight" is the value of the parameter "Minimum amount" for each bin, e.g. mixer. This value is entered in the application settings, see chapter 5 ”MillAndMixpro settings”, page 77.

     If you click on this button, the system turns off as soon as the source from which components are removed has reached the minimum weight.
   – "Empty completely" simplifies specifying the end condition when processing several actions for interdependent feed moves.

     If you check this box, the system turns off as soon as the respective bin, e.g. mixer, has been completely emptied.

5. Click on "Add" in the lower area to add the feed move with the defined action to the field on the right.

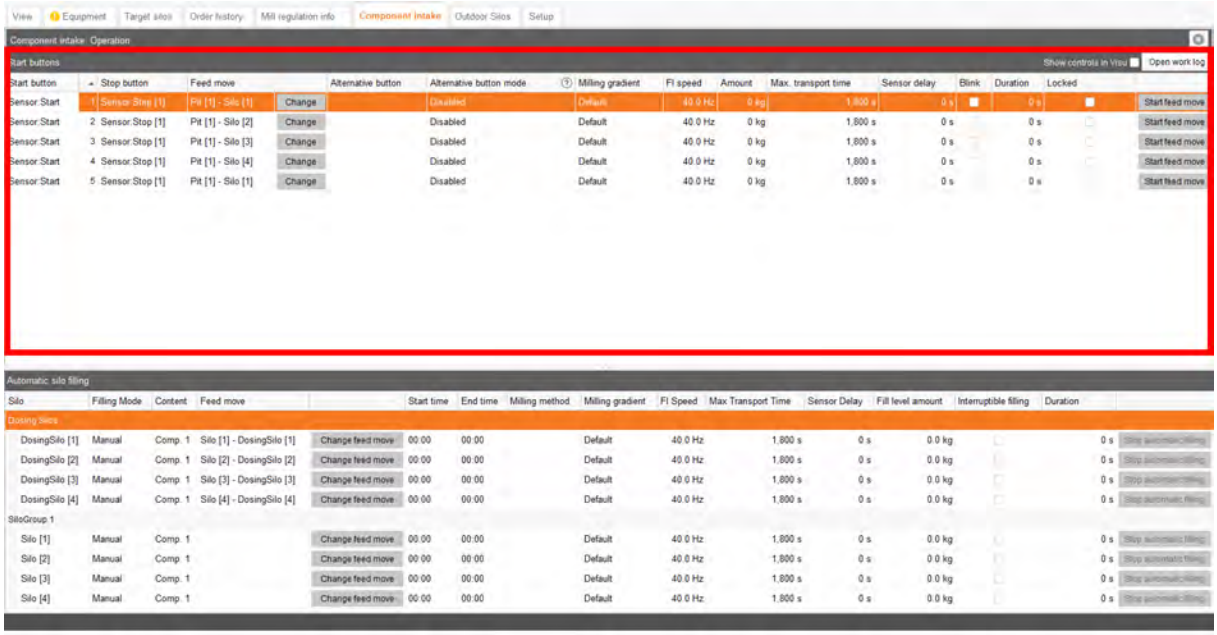
   If you add more feed moves with a defined action to the field, you can use the arrows pointing upwards and downwards to determine the order in which the actions are processed.

6. Check the box "Highlight focused feed move" in the lower command bar if you want the selected feed move to be highlighted in colour in the "View" tab.
7. Click on "Save" in the lower command bar if you want to save the actions listed in the field as a template for later reuse or for use as a strategy within the Task Manager (see chapter 8 ”Task Manager”, page 134).

   Under "Patterns", you can open previously saved action templates for editing or to rename, copy or delete them.
8. Click on "Start" in the lower command bar to start the action(s).
9. Click on "Close" in the lower command bar to close the dialog window.

9.2.3 Manual component intake

The window "Component intake" is only visible if you have added the component intake in the Composer. If you have added buttons to start the feed move in the Composer, these will be listed in the final column of the top table ("Start buttons").



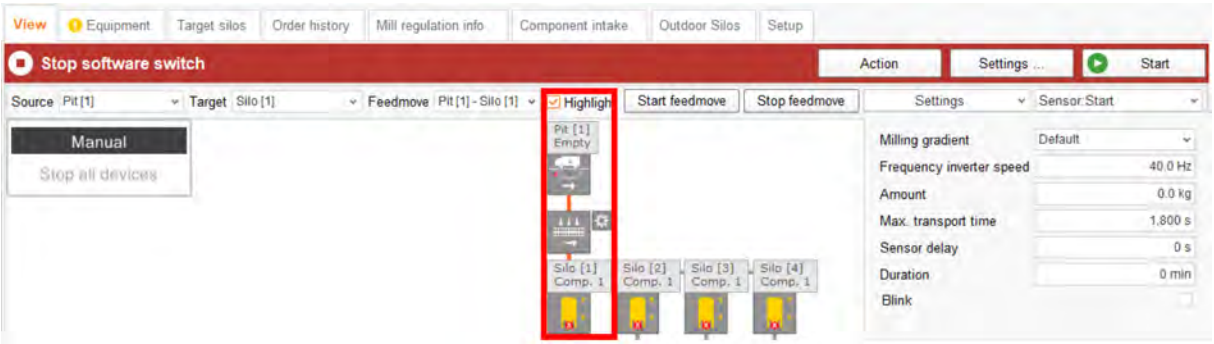
You can make the following changes to the manual component intake in the top table ("Start buttons"):

- **Stop button:** For each start button, a stop button must be defined for the button "Start feed move" to work.
- **Feed move:** Click on "Change" to select a feed move. Click on the button "Start feed move" to start the respective feed move.
- **Alternative button:** You can define an alternative start button for the original start button.
- **Alternative button mode**
  - **Disabled:** The alternative start button is never used.
  - **Max sensor:** If the maximum sensor of the target is triggered and the source silo is not empty, the alternative start button is selected to ensure that the source silo is emptied.
  - **Min sensor:** If the minimum sensor of the source is triggered and the target silo is not full, the alternative start button is selected to ensure that the target silo is filled.
  - **Stop:** If the stop button has been actuated, the alternative start button starts after the stop times of the original start button have expired.

- **Milling gradient:** The milling gradient to be used.
- **FI speed:** If the first device of the selected feed move after the source silo is a frequency inverter (FI), the speed set here is used.
- **Amount:** If the selected feed move has a scale, either at the target silo or at the source silo, the amount entered here will be transported whenever the button "Start feed move" is actuated. Otherwise, the duration is calculated based on the dosing speed.
- **Max. transport time:** The maximum time for the feed move, after which it should be completed.
- **Sensor delay:** This delay is added if the feed move has a minimum sensor in its source silo. This ensures that the source silo is empty before the feed move stops.
- **Blink:** The button flashes.
- **Duration:** Duration for which the feed move is executed. If the value is greater than 0, the "Max. transport time" is ignored.
- **Locked:** Checking this box locks the start button. A locked start button cannot be used, i.e. actuating the start button will have no effect.

In the top right corner, clicking on the button "Open work log" opens a window with a chronological list of past feed moves started via component intake. The period to be considered can be filtered. Both manual and automatic feed moves, including some parameters, are displayed.

Also in the top right corner, you can add a row to the top of the "View" window by checking the box "Show controls in Visu". With this row, you can access the start buttons and configure them as an alternative to the "Component intake" window. Check the box "Highlight" in this row to highlight the selected feed move in the depiction with a specific color.



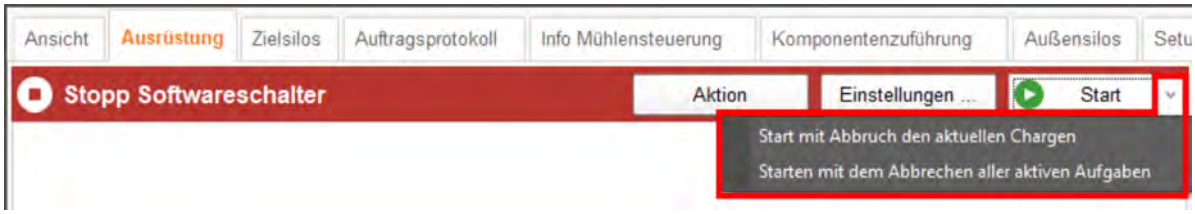
9.2.4 Stopping the system and canceling an action

You may stop the system during operation by clicking on "Stop" in the upper bar in the "Equipment" window. If you click on "Start" again, the system continues to operate with the current action.

If you click on the arrow pointing downwards next to the "Start" button, you have the following options:

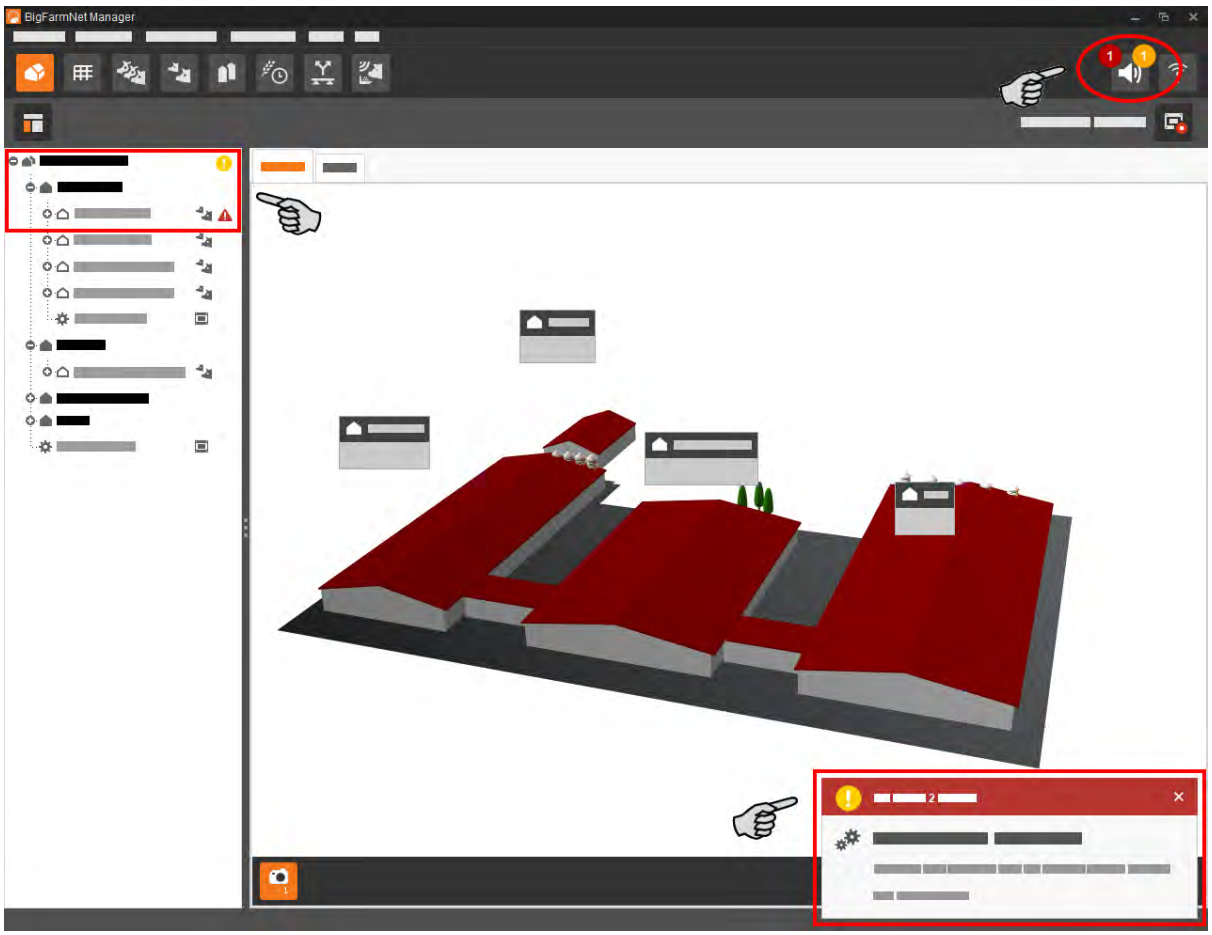
Start with canceling current batches: The system starts, cancels the current batches and then continues with the next batch of this order, as defined in the Task Manager. Before selecting this option, the entire system must be emptied via manual control and all active alarms must be acknowledged.

Start with canceling all active tasks: The system starts and cancels all current batches and all active tasks. No other tasks are performed. Before selecting this option, the entire system must be emptied via manual control and all active alarms must be acknowledged.



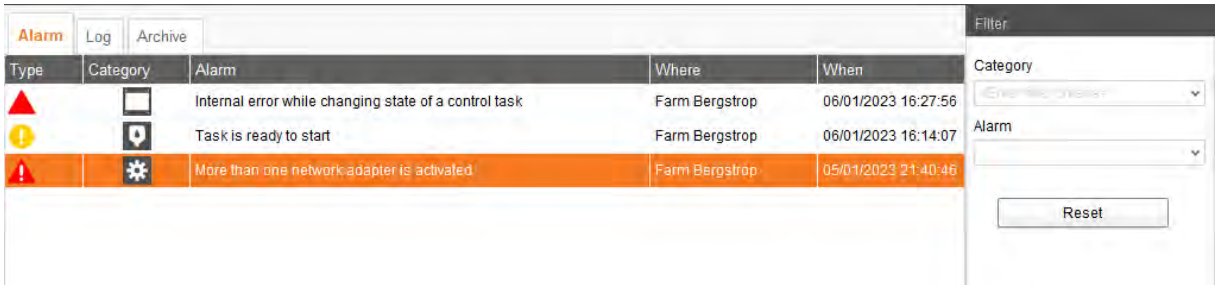
9.3 Alarms and warnings

Alarms and warnings are registered by the control computer, which transmits the message to BigFarmNet Manager. BigFarmNet Manager indicates alarms and warnings as follows:



Clicking on the pop-up window or the alarm icon in the tool bar opens the window for alarms. It shows all active alarms and warnings. Alarms and warnings are listed in the order of their occurrence.

If you click on a location with an alarm or warning icon in the farm structure, only problems active in the respective location are displayed.



Alarm types

Icon		Status	Description
without user note	with user note		
		Active alarm	Not acknowledged: Cause still exists.
		Inactive alarm	Not acknowledged: Cause no longer exists.
		Deactivated alarm	Acknowledged: Cause still exists.
		Ended alarm	Acknowledged: Cause no longer exists.
		Active warning	Not acknowledged: Cause still exists.
		Ended warning	Acknowledged: Cause no longer exists.
		Info	Information about an incident that has occurred.

Alarm categories

Icon	Category
	Climate: temperature, humidity
	Control or test (system-specific)
	IO connection
	BigFarmNet system or general
	Dry feeding system
	Liquid feeding system
	Production
	WebAccess

Icon	Category
	Gateway (ISOagriNET)
	CallMatic system
	EasySlider system
	HydroMixCallMatic system
	MillAndMix system
	SiloCheck system
	TriSort system

NOTICE!

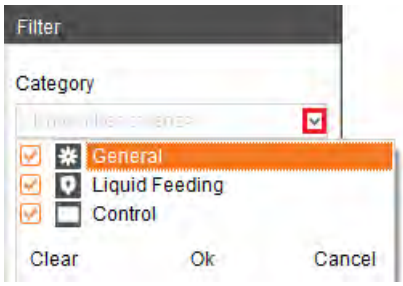
Always eliminate causes for alarms in the "Climate" category first.

9.3.1 Filtering alarms

Alarms can be filtered according to **Category** and cause (**Alarm**).

1. Open the drop-down menu under "Filter" in the right-hand part of the window.

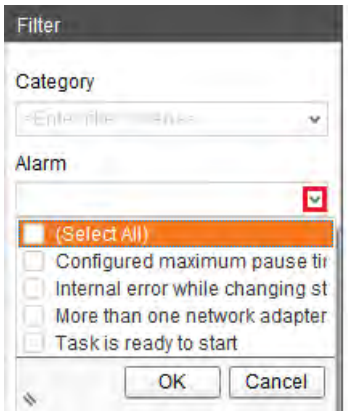
   By default, all categories are selected.



2. Click on "Clear" to delete all check marks.
3. Check the boxes of the correct categories and confirm by clicking on "OK".

4. Select the correct cause from the drop-down menu under "Alarm".

   The alarms will be displayed according to the selected filter.



5. To deselect the alarms, click on "Reset".

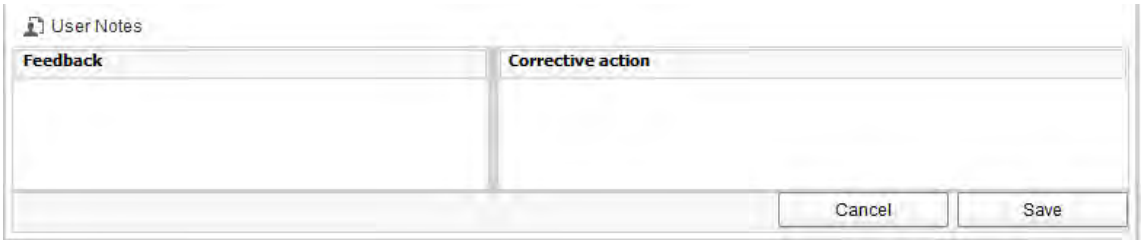
   The selection is discarded and all alarms are listed.

9.3.2 Acknowledging an alarm

Alarms can be acknowledged once their cause has been eliminated. The alarm is marked with the corresponding icon (see alarm types) in the table and the system no longer requires action from the user.

1. Save a note for an alarm before acknowledging it, if required.

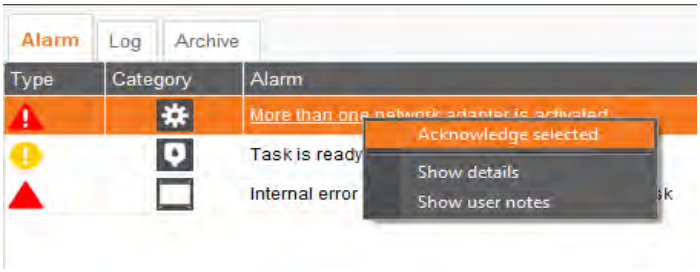
   This note may be helpful to eliminate similar alarms later on. Notes are saved for each alarm in the lower part of the window under **User Notes**. Save the note.



2. Select the alarm you want to acknowledge by clicking on it.

   You may also select multiple alarms to acknowledge them at the same time.

3. Right-click to open the context menu and click on "Acknowledge selected".



4. Click on "Acknowledge" in the next window.

   The alarm is removed from the **Alarm** window.

9.3.3 Alarm log

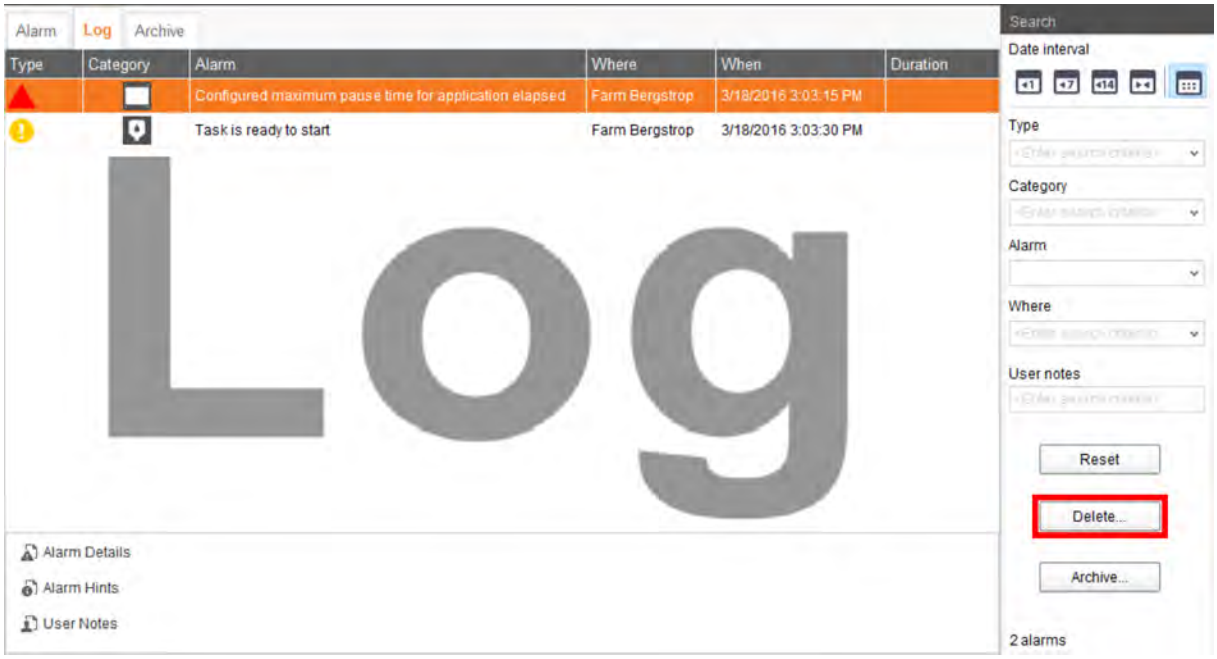
The log in the "Log" tab shows all alarms that have occurred since initial operation of BigFarmNet Manager.

Alarms can be

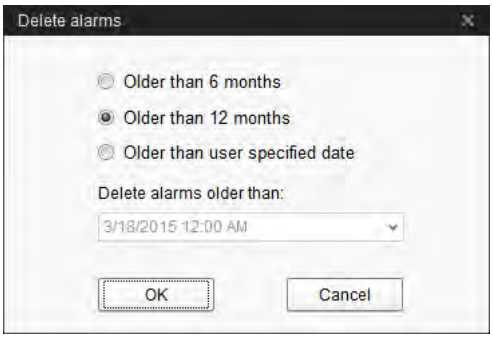
- filtered by **Date interval**, **Type**, **Category**, cause (**Alarm**), location (**Where**) and the content of **User notes**;
- **deleted**;
- **archived** (only applies to acknowledged alarms).

Deleting alarms

1. Click on "Delete..." in the right-hand part of the window.



2. Select the desired time period or enter a date.



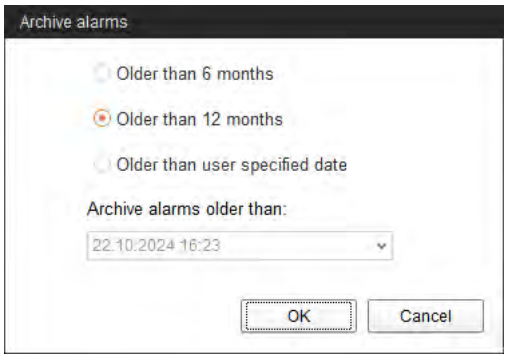
3. Click on "OK".

   All alarms within the selected time period are deleted.

Archiving alarms

1. Click on "Archive..." in the right-hand part of the window.

2. Select the desired time period or enter a date.



3. Click on "OK".

   All acknowledged alarms of the selected period are archived and can now also be found in the "Archive" tab.

9.3.4 Alarm Notification

Alarm Notification is a service that sends alarms via email. Alarm notification via SMS is currently not supported.

To use the Alarm Notification service via email, configure the service in BigFarmNet Manager. The following technical conditions must be met for email notifications:

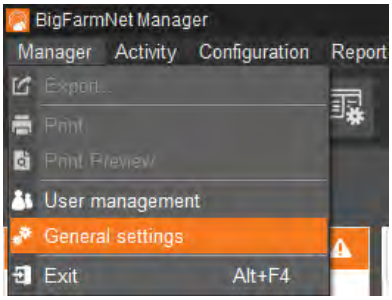
- Internet connection
- running BigFarmNet Manager

NOTICE!

The Alarm Notification service cannot replace an autocaller! The service is merely an additional help.

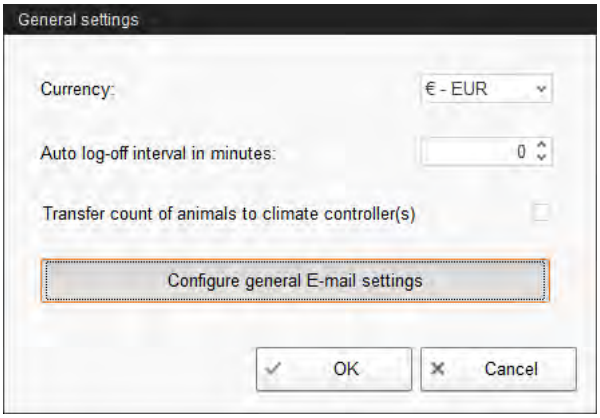
Carry out the following steps to set up the Alarm Notification service:

1. In the "Manager" menu, click on "General settings".



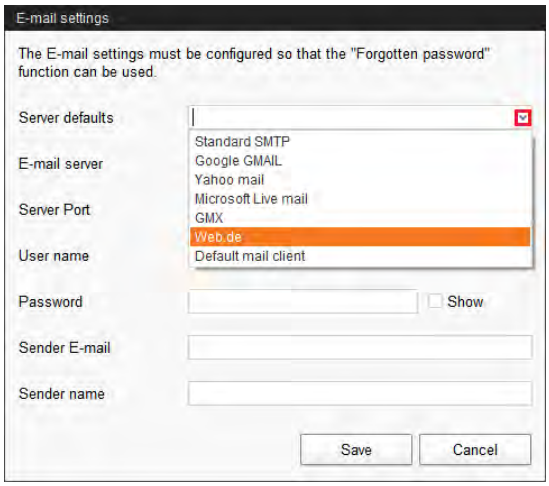
This opens the dialog window "General settings".

2. Click on "Configure general E-mail settings".



This opens the dialog window "E-mail settings".

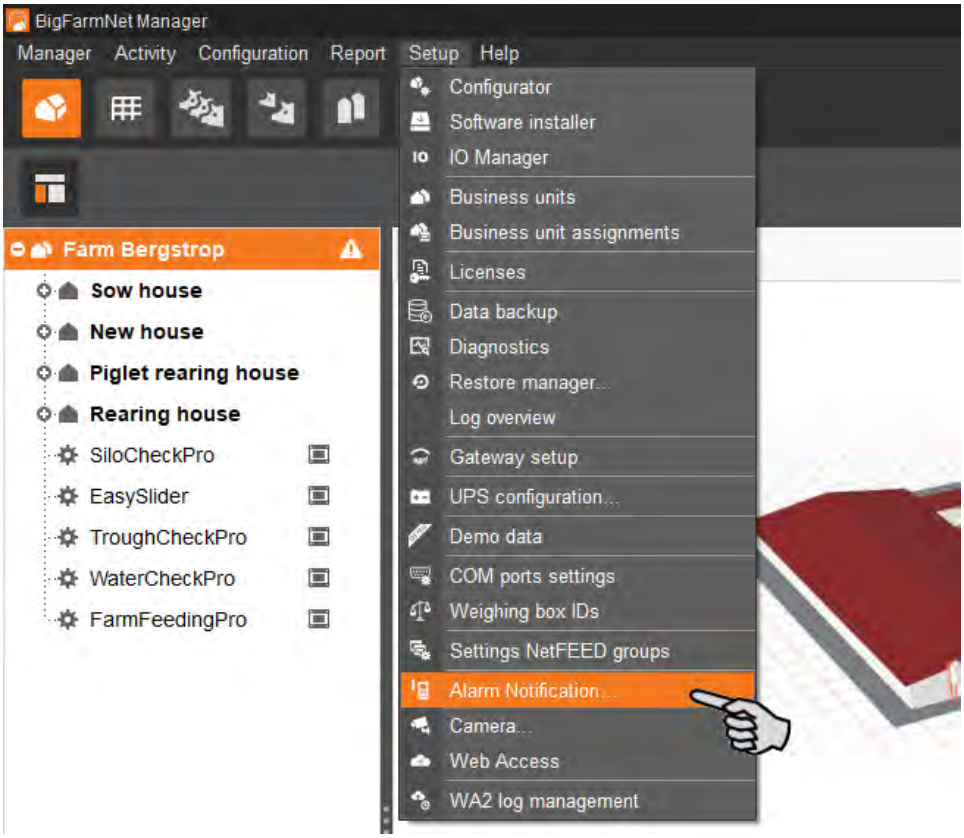
3. Click on the arrow pointing downwards next to **Server defaults** and select your server default from the drop-down menu.



   As soon as you have selected a server default, the e-mail server, the server port and the SSL are filled in automatically.

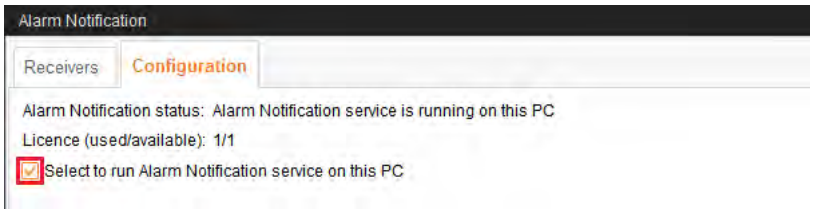
4. Enter the **user name**, the **password** and the **sender e-mail**.
5. Click on "Save" to accept all settings.

6. Click on "Alarm Notification..." in the "Setup" menu.

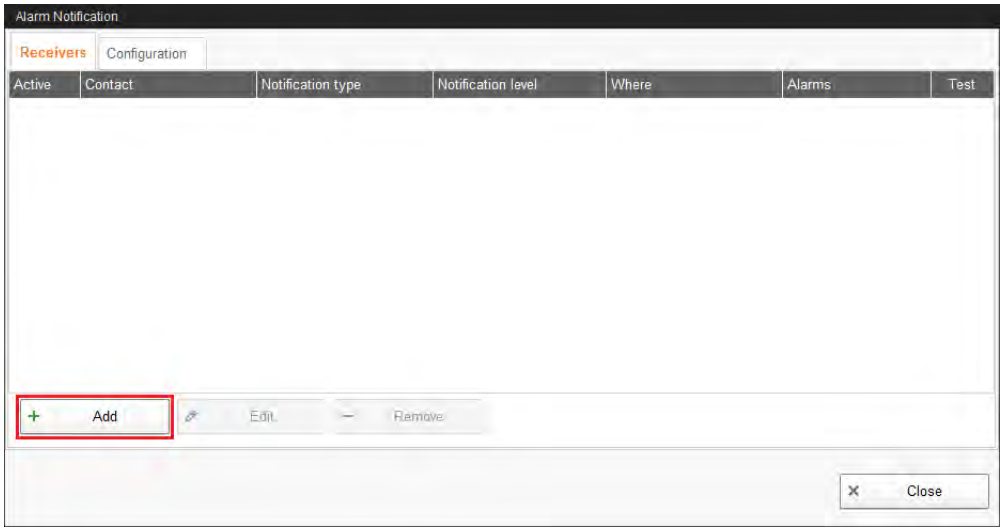


This opens the dialog window "Alarm Notification".

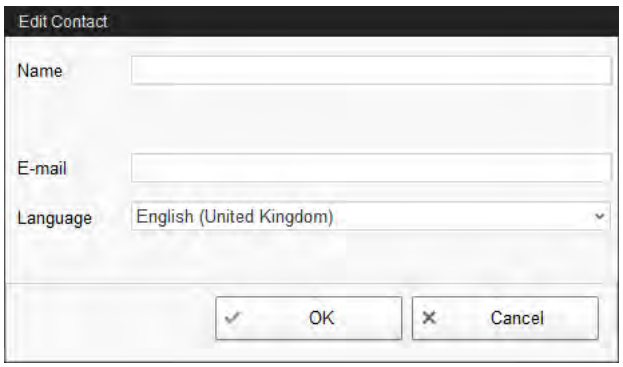
7. Activate the Alarm Notification service in the tab "Configuration".



8. In the tab "Receivers", click on "Add" to add a recipient.



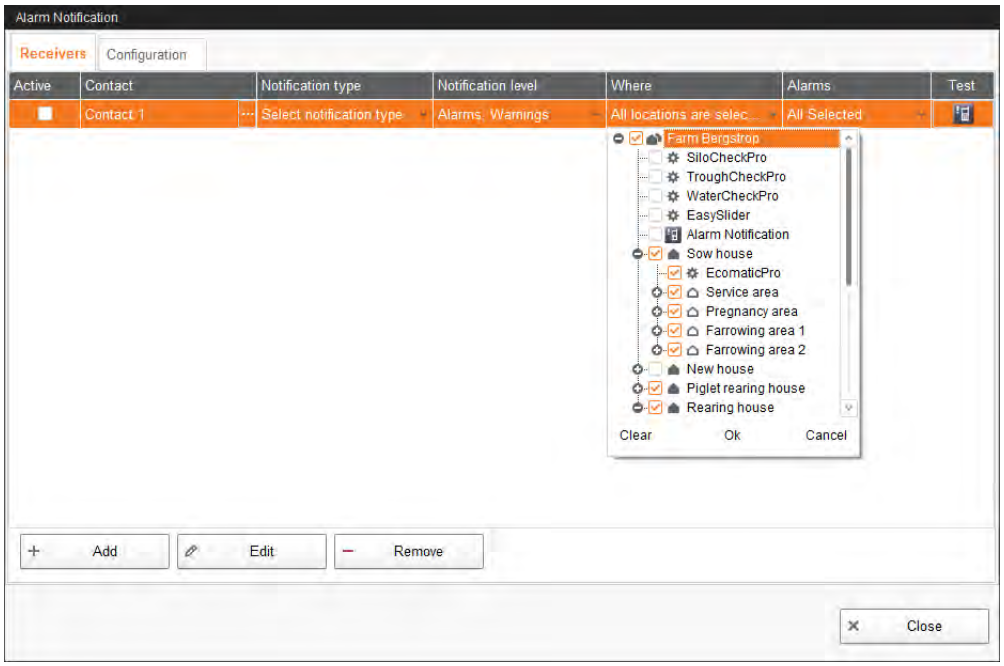
9. Enter the contact details and select the correct language.



10. Confirm your inputs by clicking on "OK".
11. Select "E-mail" as **notification type** and confirm your selection by clicking on "OK".
12. Select whether the recipient should receive alarms, warnings or both under **Notification level** and confirm your selection by clicking on "OK".

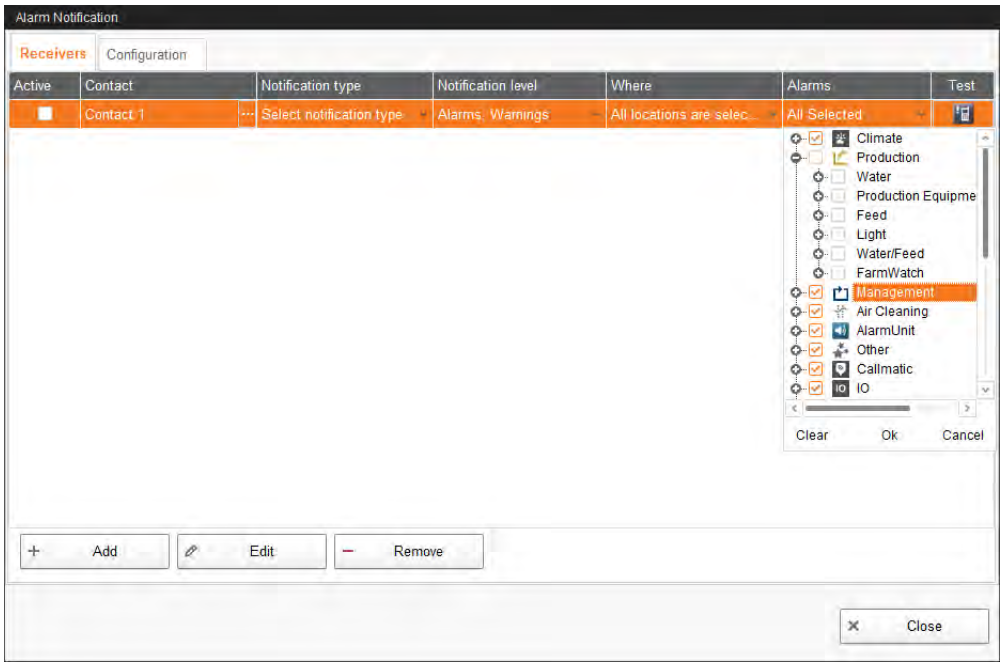
13. Under **Where**, select the location whose alarms the recipient should receive.

    You may select multiple locations.



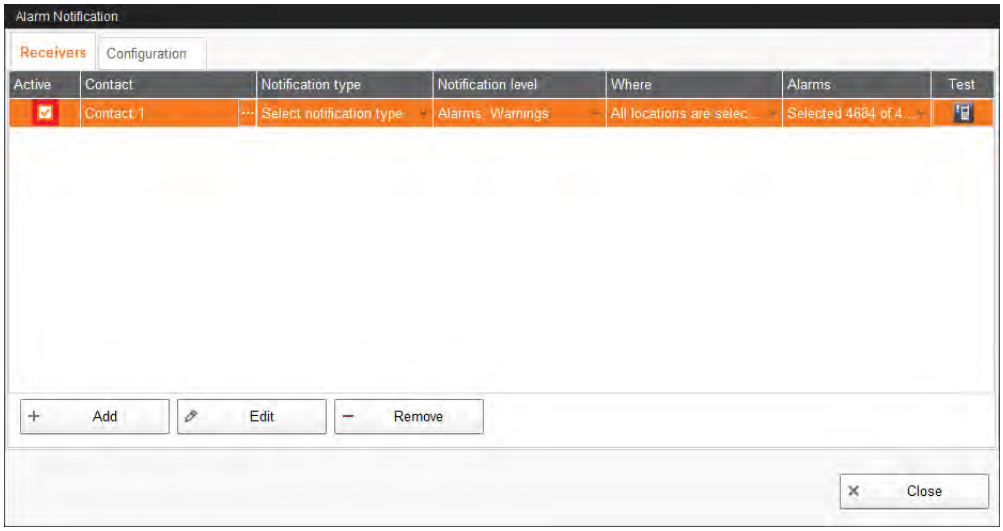
14. Confirm your selection by clicking on "OK" in the drop-down menu.
15. Under **Alarms**, select which alarm categories the recipient should receive.

    You may select multiple alarm categories.



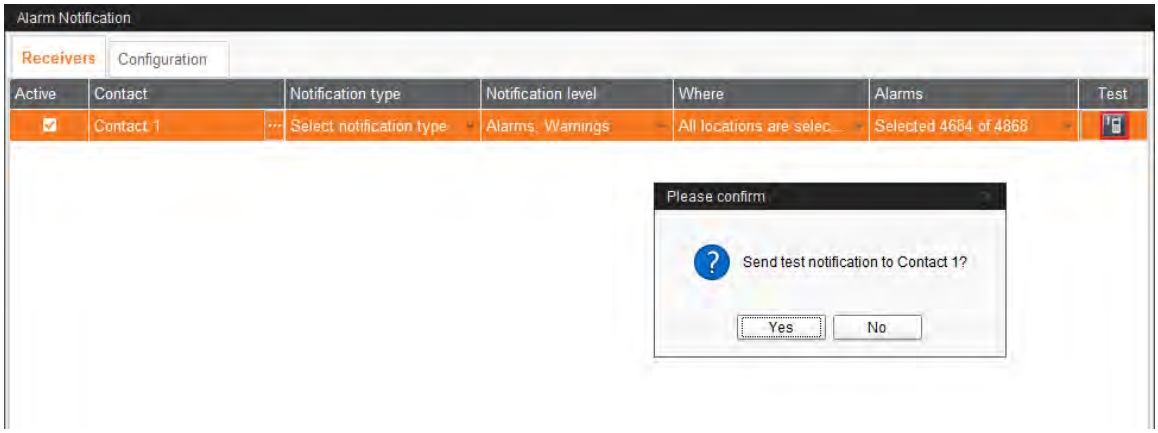
16. Confirm your selection by clicking on "OK" in the drop-down menu.

17. Activate the recipient for alarm notifications.



18. Check the recipient's data by sending the recipient a test message:

    Click on the alarm notification icon and confirm the next dialog with "Yes".



19. Click on "Close" after you have configured all settings.

    This closes the dialog window.

10 Operation of the control computer

NOTICE!

Some screenshots in this chapter may have been taken from other applications and can therefore show deviating names. Their structure and contents are still applicable for the application described in this manual, however.

The MillAndMix*pro* application uses the 510*pro* control computer to control the MillAndMix system. The MillAndMix system can also be controlled independently of BigFarmNet Manager by the 510*pro* control computer.

The control computer and BigFarmNet Manager constantly exchange data when they are connected. All control computer data is transferred to the Manager PC in the farm office and vice versa.

10.1 Technical data

Dimensions (H x W x D)	381 mm x 400 mm x 170 mm
Protection rating according to EN 60529	IP 54
Supply voltage	115 V, 200 V and 230 V/240 V AC +/- 10 %
Supply frequency	50/60 Hz
Power consumption	75 VA
Network	2 network interfaces, 10/100 BASE+TX RJ 45
USB	2 USB interfaces, USB 2.0 type A, max. 4 GB
Ambient temperature	-10 to +45 °C (+14 to +113 °F)
30 punch holes for metric cable gland M 25 x 1.5	
Code no.	91-02-4094
Description	Base computer 510pro Quad Core 10" display HW2

10.2 Icons

Application overview / Start screen

Silo overview

Settings

Alarm

An alarm is active.

Log out

Close the current view and return to the previous view

Open additional information or settings

Scroll up or collapse a sub-menu

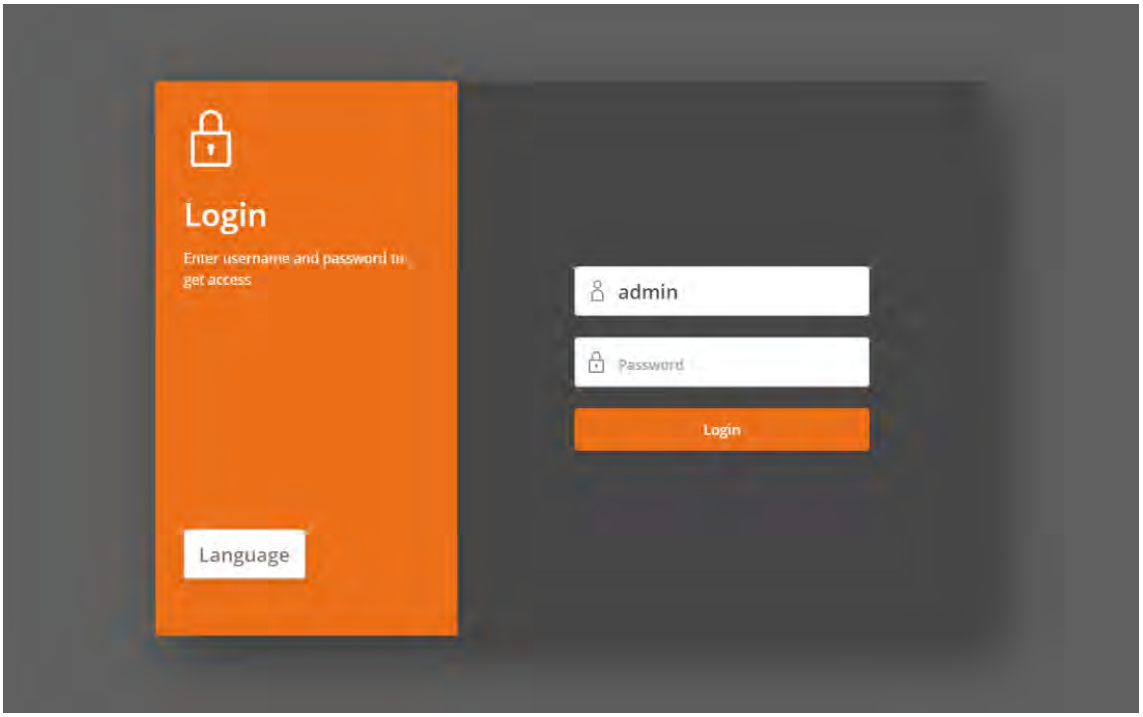
Scroll down or expand a sub-menu

10.3 Login

Log into the control computer using the login dialog.

The login dialog appears

- automatically after the software has been installed successfully, when the application starts;
- automatically after a specific time without activity (automatic logout); or
- if you actively log out of the control computer.

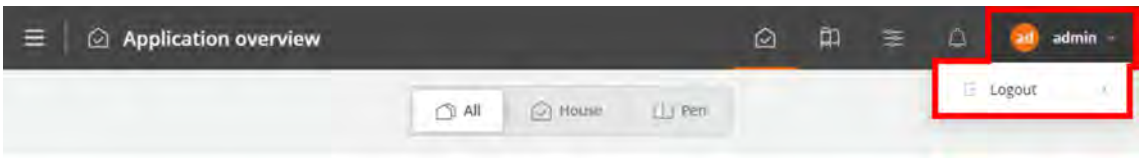


NOTICE!

The user name and the password are the same as when logging into BigFarmNet Manager.

10.4 Logout

To log out, tap on the button in the top right corner. A new button appears. Tap on the "Logout" icon.



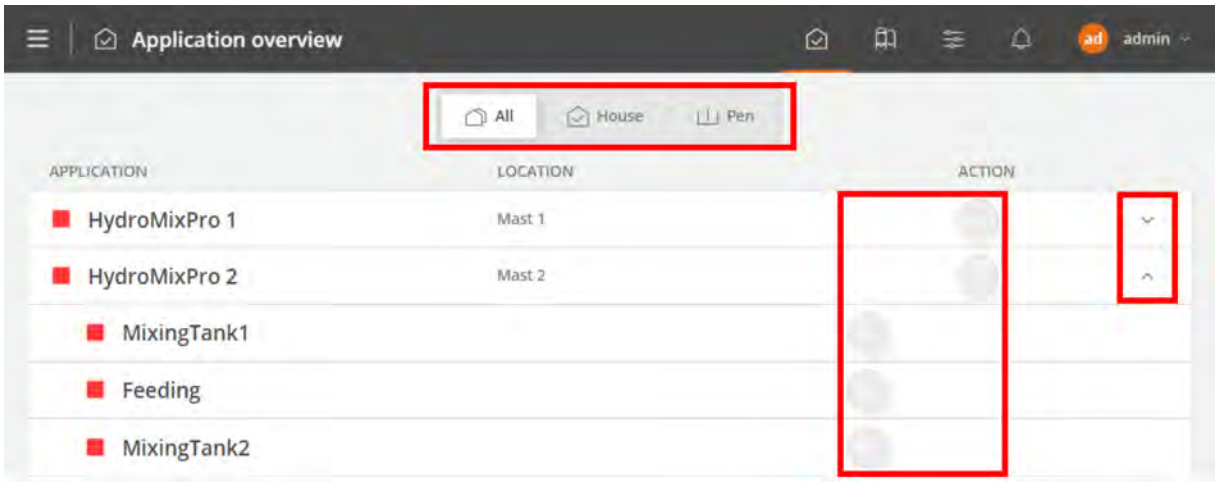
The login dialog appears on the display again.

10.5 Application overview

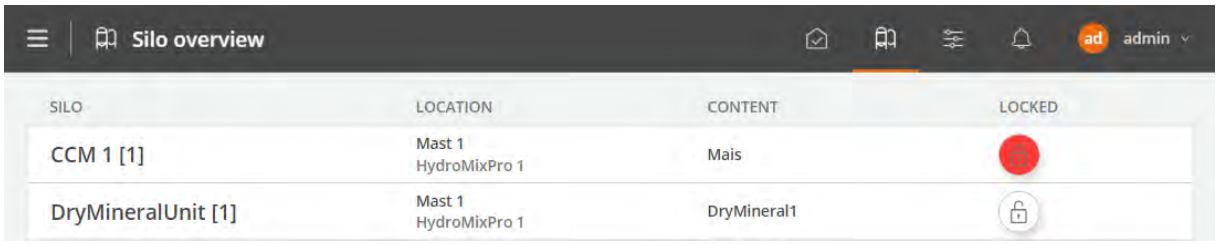
After logging in, the application overview appears with a list of all available applications and the respective location.

If sub-applications are available, they can be expanded and collapsed by tapping on the corresponding icon at the end of the line. In addition, the applications and sub-applications can be started and stopped by tapping on the icon in the "Action" column.

By tapping on the corresponding buttons, the applications can be filtered according to the "House" and "Pen" levels.



10.6 Silo overview



The silo overview shows a list of all silos and dosing units with their respective location, content and current outlet status. The outlet status in the "Locked" column can be changed by tapping on or :

- **Lock**: The unlocked outlet is locked immediately after confirmation.
- **Unlock**: The locked outlet is unlocked immediately after confirmation.

10.7 Settings

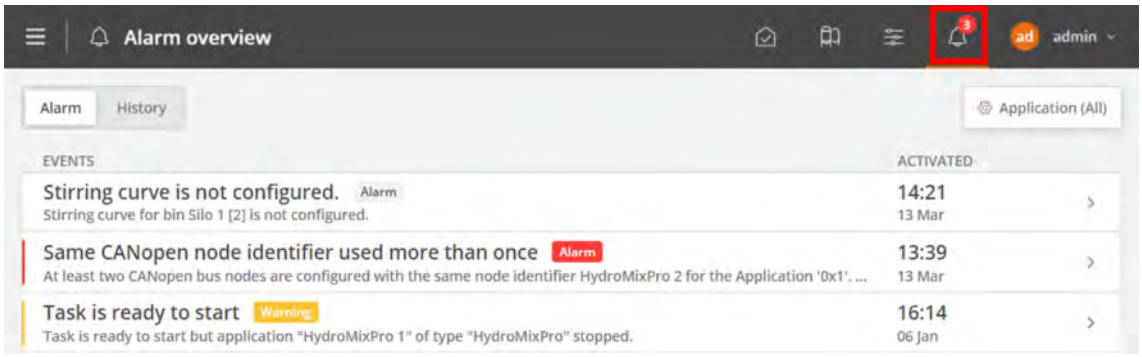
Switch to the settings by tapping on the corresponding icon.

No application settings can be configured here, only general and technical settings.

10.8 Alarms

In case of an active alarm or warning, the alarm icon has a red dot indicating the total number of alarms and warnings.

1. Tap on the icon to open the alarm overview.



In the alarm overview, the different alarms and warnings are shown in a list and sorted depending on when they occurred. The list provides the following information:

– Alarm type (see chapter 9.3 ”Alarms and warnings”)

  Active alarm: Icon Alarm and red vertical line on the left

  Inactive alarm: Icon Alarm

  Active warning: Icon Warning and yellow vertical line on the left

  Deactivated alarm (only in "History"): Icon Alarm

  Ended alarm (only in "History"): Icon Alarm

  Ended warning (only in "History"): Icon Warning

– Description of the alarm or warning

– Time of occurrence

2. Tap on the correct alarm or warning to read the full description and to acknowledge the alarm or warning, if necessary.