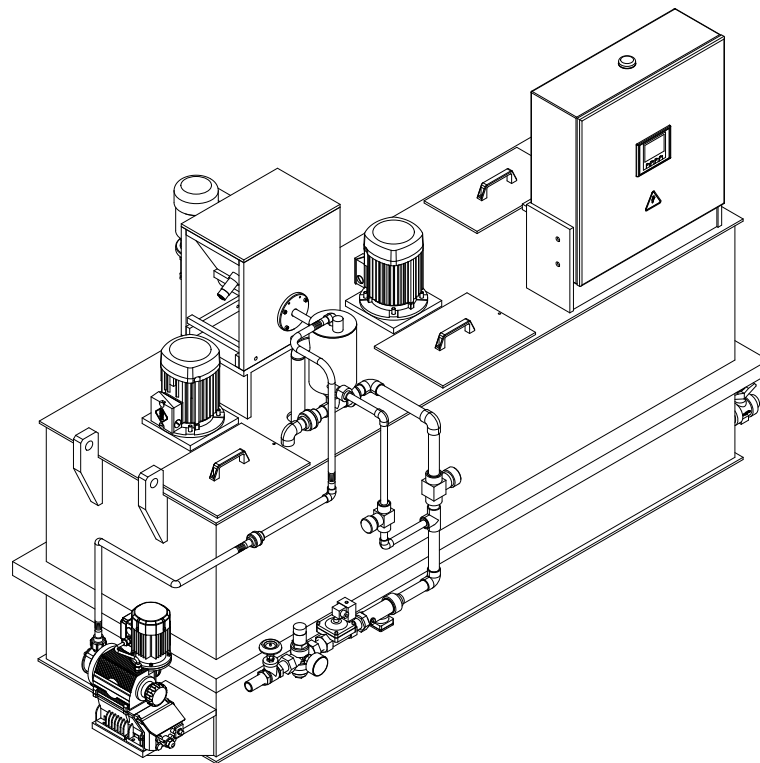


# Assembly and operating instructions

## Ultromat® ULFa

### Continuous Flow System

**EN**

A0777

Please carefully read these operating instructions before use. · Do not discard.  
The operator shall be liable for any damage caused by installation or operating errors.  
The latest version of the operating instructions are available on our homepage.

### General non-discriminatory approach

In order to make it easier to read, this document uses the male form in grammatical structures but with an implied neutral sense. It is aimed equally at both men and women. We kindly ask female readers for their understanding in this simplification of the text.

### Supplementary information

➔ Please read the supplementary information in its entirety.

#### Information



*This provides important information relating to the correct operation of the unit or is intended to make your work easier.*

#### Warning information

Warning information includes detailed descriptions of the hazardous situation, see ➔ *Chapter 2.1 „Labelling of Warning Information“ on page 9.*

The following symbols are used to highlight instructions, links, lists, results and other elements in this document:

Tab. 1: More symbols

Symbol	Description
1. ➔	Action, step by step.
⇒	Outcome of an action.
➔	Links to elements or sections of these instructions or other applicable documents.
■	List without set order.
[Button]	Display element (e.g. indicators). Operating element (e.g. button, switch).
„Display /GUI“	Screen elements (e.g. buttons, assignment of function keys).
CODE	Presentation of software elements and/or texts.

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# 1 Product Identification

## 1.1 Identity code ULFa

U L F a	Type / Tank Size / Extraction rate	
	0400	Continuous flow system / 400 l / 400 l/h
	1000	Continuous flow system / 1000 l / 1000 l/h
	2000	Continuous flow system / 2000 l / 2000 l/h
	4000	Continuous flow system / 4000 l / 4000 l/h
	6000	Continuous flow system / 6000 l / 6000 l/h
	8000	Continuous flow system / 8000 l / 8000 l/h
	Construction	
	N	Normal
	S	Mirror imaged
Electrical connection		
A	400 VAC, 50/60 Hz (3ph, N, PE)	
B	440 VAC, 60 Hz	
C	460 VAC, 60 Hz	
Control		
0	PLC Programmable Logic Controller S7-1200	
1	PLC Programmable Logic Controller S7-1200 with PROFIBUS® + DP/DP coupler	
2	PLC Programmable Logic Controller S7-1200 with PROFINET® + PN/PN coupler	
3	PLC Programmable Logic Controller S7-1200 with MODBUS®/TCP	
Options		
0	without options	
1	Extraction pipework, PVC (400, 1000)	
2	Extraction pipework, PVC (2000)	
3	Extraction pipework, PVC (4000, 6000)	
4	Extraction pipework, PVC (8000)	
Powder feeder		
P0	none	
P1	Powder feeder (0400, 1000)	
P2	Powder feeder (2000)	
P3	Powder feeder (4000, 6000)	
P4	Powder feeder (8000)	
Vibrator for powder feeder		
0	none	
1	with vibrator for powder feeder	

U		Type / Tank Size / Extraction rate	
L			
F			
a			
			Powder conveyor, add-on hopper
	0		none
	1		Add-on hopper 50 l (0400, 1000, 2000)
	2		Add-on hopper 75 l (4000, 6000)
	3		Add-on hopper 100 l (8000)
	4		Add-on hopper 50 l + Powder conveyor FG205 (0400, 1000, 2000)
	5		Add-on hopper 75 l + Powder conveyor FG205 (4000, 6000)
	6		Add-on hopper 100 l + Powder conveyor FG205 (8000)
	7		with adapter cover + Powder conveyor FG205
			Liquid concentrate pump
	L0		none
	L1		with Sigma
	L2		with Spectra
	L3		prepared for Sigma
	L4		prepared for Spectra
	L5		prepared for Sigma, no bracket
	L6		prepared for Spectra, no bracket
	L7		prepared for peristaltic pump
	L8		with peristaltic pump
			Monitoring for liquid concentrate pump
	0		none
	1		with float switch for concentrate tank
	2		with flow monitor (Spectra only)
	3		with float switch and flow monitor (Spectra only)
			Water pipework for flush valve
	1		Y-flush inlet, PVC (0400, 1000, 2000)
	2		Y-flush inlet, PVC (4000, 6000)
	3		Y-flush inlet, PVC (8000)
	4		Wetting cone, PVC (0400.1000, 2000)
	5		Wetting cone, PVC (4000, 6000)
	6		Wetting cone, PVC (8000)
	7		Wetting cone, PP (0400.1000, 2000)
	8		Wetting cone, PP (4000, 6000)
	9		Wetting cone, PP (8000)
			Stirrer for 3rd chamber
	0		none

U L F a	Type / Tank Size / Extraction rate			
	1	Stirrer for storage tank 400, 0.18 kW		
	2	Stirrer for storage tank 1000, 0.55 kW		
	3	Stirrer for storage tank 2000, 0.75 kW		
	4	Stirrer for storage tank 4000/6000, 1.1 kW		
	5	Stirrer for storage tank 8000, 2.2 kW		
	A	Stirrer for storage tank 400, 0.21 kW, 460 AC		
	B	Stirrer for storage tank 1000, 0.65 kW, 460 AC		
	C	Stirrer for storage tank 2000, 0.9 kW, 460 AC		
	D	Stirrer for storage tank 4000/6000, 1.3 kW, 460 AC		
E	Stirrer for storage tank 8000, 2.6 kW, 460 AC			
Language				
BG	Bulgarian	LV	Latvian	
CZ	Czech	MS	Malay	
DA	Danish	NL	Dutch	
EN	German	NO	Norwegian	
EL	Greek	PL	Polish	
EN	English	PT	Portuguese	
ES	Spanish	RO	Romanian	
ET	Estonian	RU	Russian	
FI	Finnish	SK	Slovakian	
FR	French	SL	Slovenian	
HR	Croatian	SV	Swedish	
HU	Hungarian	TR	Turkish	
IT	Italian	ZH	Chinese	
LT	Lithuanian	all other languages on request, at a charge.		



## 2 Safety and Responsibility

### About This Product

The Ultramat® manufactured by ProMinent is an automatic polyelectrolyte preparation system. The Ultramat® can be used in any application where synthetic polymers are to be automatically prepared to form polymer solutions to act as flocculation aids. As a dissolving station, the system is suitable for a large number of process engineering applications, e.g. in the water treatment sector, in waste water treatment and paper manufacture.

### 2.1 Labelling of Warning Information

#### Introduction

These operating instructions provide information on the technical data and functions of the product. These operating instructions provide detailed warning information and are provided as clear step-by-step instructions.

The warning information and notes are categorised according to the following scheme. A number of different symbols are used to denote different situations. The symbols shown here serve only as examples.



#### **DANGER!**

##### **Nature and source of the danger**

Consequence: Fatal or very serious injuries.

Measure to be taken to avoid this danger.

Description of hazard

- Denotes an immediate threatening danger. If the situation is disregarded, it will result in fatal or very serious injuries.



#### **WARNING!**

##### **Nature and source of the danger**

Possible consequence: Fatal or very serious injuries.

Measure to be taken to avoid this danger.

- Denotes a possibly hazardous situation. If the situation is disregarded, it could result in fatal or very serious injuries.



#### **CAUTION!**

##### **Nature and source of the danger**

Possible consequence: Slight or minor injuries. Material damage.

Measure to be taken to avoid this danger.

- Denotes a possibly hazardous situation. If the situation is disregarded, it could result in slight or minor injuries. May also be used as a warning about material damage.



### NOTICE!

#### Nature and source of the danger

Damage to the product or its surroundings.

Measure to be taken to avoid this danger.

- Denotes a possibly damaging situation. If the situation is disregarded, the product or an object in its vicinity could be damaged.



### *Type of information*

*Hints on use and additional information.*

*Source of the information. Additional measures.*

- *Denotes hints on use and other useful information. It does not indicate a hazardous or damaging situation.*

## 2.2 Correct and Proper Use



### WARNING!

#### Danger caused by incorrect use!

Incorrect use of the Ultromat® can result in hazardous situations.

- The Ultromat® is only designed to produce a polymer solution as a flocculent from powdered polymer or liquid concentrate and with drinking water.
- All other uses or a modification of the system are only permitted with the written authorisation of ProMinent Dosiertechnik GmbH, Heidelberg!
- The system is not designed for use in areas at risk from explosion!
- The correct and proper operation of the system cannot be guaranteed if non-genuine parts or third party accessories are used.
- Please observe the relevant national regulations and the information provided in the operating instructions at all phases of the system's life!
- The Ultromat® may only be operated by adequately qualified personnel

## 2.3 Users' qualifications



**WARNING!**

**Danger of injury with inadequately qualified personnel!**

**The operator of the plant / device is responsible for ensuring that the qualifications are fulfilled.**

If inadequately qualified personnel work on the unit or loiter in the hazard zone of the unit, this could result in dangers that could cause serious injuries and material damage.

- All work on the unit should therefore only be conducted by qualified personnel.
- Unqualified personnel should be kept away from the hazard zone

Training	Definition
Instructed personnel	An instructed person is deemed to be a person who has been instructed and, if required, trained in the tasks assigned to him/her and possible dangers that could result from improper behaviour, as well as having been instructed in the required protective equipment and protective measures.
Trained user	A trained user is a person who fulfils the requirements made of an instructed person and who has also received additional training specific to the system from ProMinent or another authorised distribution partner.
Trained qualified personnel	A qualified employee is deemed to be a person who is able to assess the tasks assigned to him and recognize possible hazards based on his/her training, knowledge and experience, as well as knowledge of pertinent regulations. The assessment of a person's technical training can also be based on several years of work in the relevant field.
Electrician	Electricians are deemed to be people, who are able to complete work on electrical systems and recognize and avoid possible hazards independently based on his/her technical training and experience, as well as knowledge of pertinent standards and regulations.  Electricians should be specifically trained for the working environment in which they are employed and know the relevant standards and regulations.  Electricians must comply with the provisions of the applicable statutory directives on accident prevention.
Customer Service department	Customer Service department refers to service technicians, who have received proven training and have been authorised by ProMinent to work on the system.



**Note for the system operator**

*The pertinent accident prevention regulations, as well as all other generally acknowledged safety regulations, must be adhered to!*

## 2.4 Ultramat® Safety Information



**WARNING!**

**Qualification of personnel**

Danger due to incorrect operation of the system

The operating personnel must be instructed by a ProMinent service technician" (When the system is first operated)

The operating instructions must be available by the system!



**WARNING!**

**Danger of electric shock!**

Possible consequence: Fatal or very serious injuries

The control cabinet must always be closed during operation.

The mains switch must be set to "0" and secured against restart before any installation or maintenance work can begin.



**CAUTION!**

**Propellers are rotating in the reservoirs!**

Slight or minor injuries.

Switch off the system and only then remove the screwed cover of an inspection opening!



**CAUTION!**

**A screw conveyor and a loosening wheel are located under the safety guard of the dry material feeder.**

Slight or minor injuries. Material damage.

Do not reach into the dry material feeder.



**CAUTION!**

**Hot surface!**

Incorrectly set heating on the metering pipe may become hot!

Ensure that the metering pipe heating is correctly set!

## 2.5 Description and testing of safety equipment

### Safety Equipment

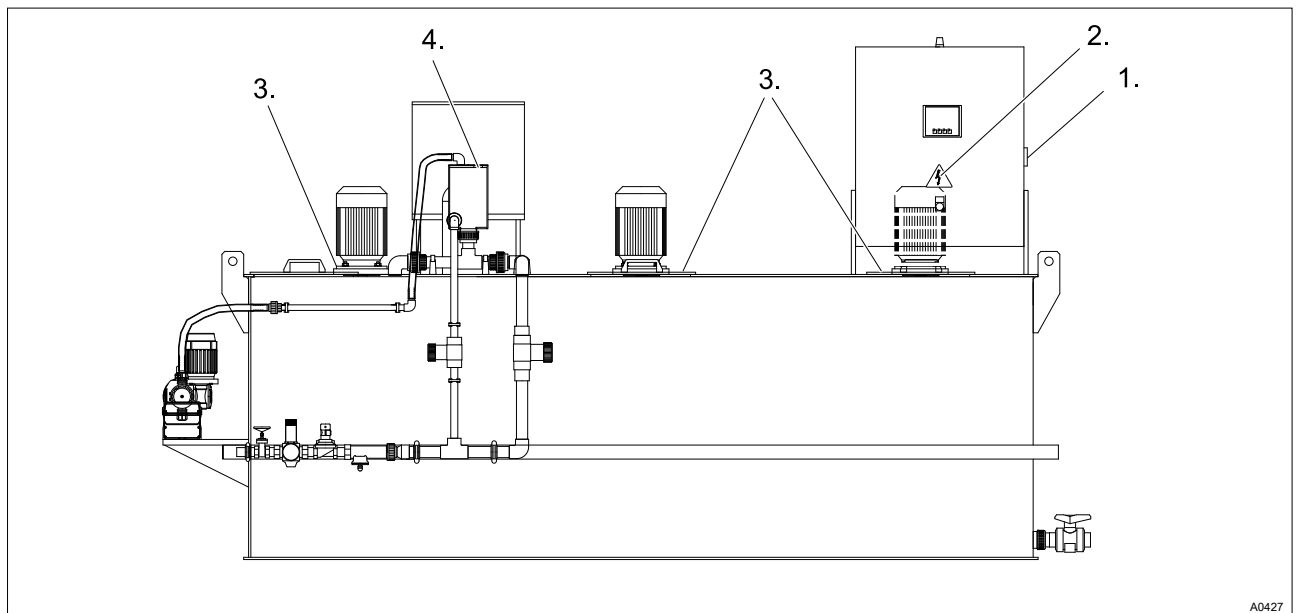


Fig. 1: Safety Equipment

1. Main switch
2. "Warning of hazardous electrical voltage" warning label
3. Cover of inspection opening with "Warning of injury to hands" warning label
4. "Warning of hot surfaces" warning label

#### Main switch

The red-yellow main switch on the right-hand side of the control cabinet disconnects the system and any connected units.

Test: With all parts of the system are operational, switch the main switch to „Off“ - all of the parts must stop - all the lights must go out.

#### Covers of inspection openings

The screw covers of the inspection openings prevent persons injuring their hands on the rotating propellers of the stirrers.

Test: Check that the covers of the inspection openings are being used and are secured with screws

Warning labels

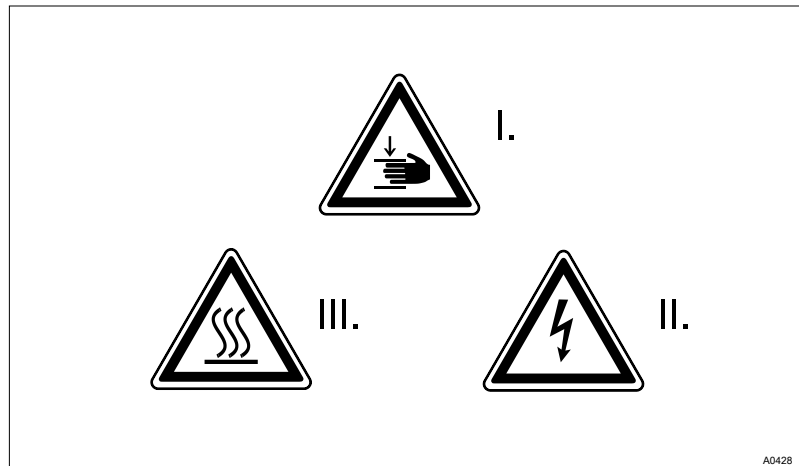


Fig. 2: Warning labels

- I. Warning of injury to hands
- II. Warning of hazardous electrical voltage
- III. Warning of hot surfaces

Test: Check whether the labels are still affixed and legible.

## 2.6 Sound Pressure Level

The sound pressure level is < 70 dB (A) for powdered polymer, according to EN ISO 11202:1997 (Acoustics - Noise emission from machinery and equipment)

### 3 Transporting and storing the system

User qualification: trained user, see [Chapter 2.3 „Users' qualifications“](#) on page 11



#### WARNING!

##### High system weight

Possible consequence: Death or severe injuries, if the floor cannot support the system and breaks.

Measure: Ensure that the floor of the installation site can support the weight of both the empty and full system.



#### WARNING!

##### Never stand under suspended loads.

Possible consequence: Fatal or very serious injuries

- It is prohibited to walk under or stand underneath suspended loads
- When lifting and transporting the Ultramat ensure it cannot slip or topple
- Use suitable approved lifting tackle. Observe the information given in the lifting equipment data sheets.
- Ultramat® systems of type 4000 and 8000 may only be lifted with a traverse if they are fitted with lifting lugs. The length of the traverse must be at least 10 - 20 cm longer than the storage tank



#### CAUTION!

##### Possibility of damage to the system during transport

Improper transport can result in system damage.

- Only move the Ultramat® system when empty
- The storage tank wall must not be subjected to point loading
- Avoid heavy vibration and impact loads
- Only move the system with suitable hoisting and lifting equipment
- When using forklift trucks, use long forks, which extend across the entire depth of the storage tank
- If a crane is used, attach the slings, even if lifting lugs are fitted, such that shear forces are avoided

#### Ambient conditions for storage and transport

Permissible ambient temperature: -5 °C to +50 °C.

Humidity: None. Rain and condensation not permitted.

Other: No dust, no direct sunlight.

## 4 Information on the system

The Ultromat® manufactured by ProMinent is an automatic polyelectrolyte preparation system.

The Ultromat® can be used in any application where synthetic polymers are to be automatically prepared to form polymer solutions, e.g. to act as flocculation aids. As a dissolving station, the system is suitable for a large number of process engineering applications, e.g. in the water treatment sector, in waste water treatment and paper manufacture.

### 4.1 Design

The system is designed for the fully automatic batching of polymer solutions.

Almost all commercially available polymers can be used. Under the control of Ultromat® systems, concentrations from 0.05 to 1.0 % can be set. The viscosity of the polymer solution produced must not however exceed 1500 mPas. Please refer to the polymer suppliers' application data sheets for information about the viscosity of the different polymer solutions.

Adjust the flow rate of the preparation water to make full use of the preparation range. Concentrations of greater than 0.5 % can reduce the capacity of the preparation performance.

The maturing time available for the production of a polymer solution depends on the extraction rate and the volumetric capacity of the Ultromat® and is approximately 60 minutes at a maximum extraction rate. The system capacities extend from max. 400 l usage solution per hour for the Ultromat® 400 up to 8,000 l for the Ultromat® 8000.

### 4.2 Technical Data



*Please refer to the dimensional drawing for the precise dimensions of your Ultromat® system*



Tab. 2: Ultromat® ULFa

Ultromat® ULFa	400	1000	2000	4000	6000	8000
Storage tank volume (l)	400	1000	2000	4000	6000	8000
Extraction rate (l/h)	400	1000	2000	4000	6000	8000
Maturing time (min)	60					
Solution concentration (%)	0.05 ... 1.0					
Dimensions	1999x918	2643x1002	3292x1186	3301x1456	4120x1651	4605x1910
LxWxH (mm)	x1390	x1740	x1890	x2182	x2182	x2290
Empty weight (kg)	190	400	450	600	900	1,200
Total weight (kg)	590	1400	2450	4600	6900	9200
Overflow connection	DN 40	DN 50	DN 50	DN 65	DN 65	DN 80
Extraction connection	DN 25	DN 25	DN 32	DN 40	DN 40	DN 50
NW water supply	1"	1"	1"	1 1/2"	1 1/2"	2"
Liquid concentrate pipework	DN 15	DN 15	DN 15	DN 20	DN 20	DN 20
Max. water supply	600 l/h	1,500 l/h	3,000 l/h	6,000 l/h	9000 l/h	12,000 l/h
Electrical rating	1.5 kW	2.6 kW	3.2 kW	5.0 kW	5.0 kW	9.5 kW
External fuse	32 A	32 A	32 A	32 A	32 A	32 A
Degree of protection, control cabinet	IP 55	IP 55	IP 55	IP 55	IP 55	IP 55
<b>Stirrer 1</b>						
Capacity	0.25 kW	0.55 kW	0.75 kW	1.1 kW	1.1 kW	2.2 kW
Speed (50 Hz)	700 rpm	700 rpm	700 rpm	700 rpm	700 rpm	750 rpm
Degree of protection	IP 55	IP 55	IP 55	IP 55	IP 55	IP 55
<b>Stirrers 2 + 3 (optional)</b>						
Capacity	0.18 kW	0.55 kW	0.75 kW	1.1 kW	1.1 kW	2.2 kW
Speed (50 Hz)	700 rpm	700 rpm	700 rpm	700 rpm	700 rpm	700 rpm
Degree of protection	IP 55	IP 55	IP 55	IP 55	IP 55	IP 55
<b>Powder feeder</b>						
Type	TGD 11	TGD 11	TGD 18	TGD 55	TGD 55	TGD 110
Maximum capacity	11 kg/h	11 kg/h	18 kg/h	55 kg/h	55 kg/h	110 kg/h
<b>Pressure sensor</b>						
Part number	1076395	1076395	1076395	1076395	1076395	1076395
Type	PL 2658	PL 2658	PL 2658	PL 2658	PL 2658	PL 2658
Measuring range	0 ... 250 mbar	0 ... 250 mbar	0 ... 250 mbar	0 ... 250 mbar	0 ... 250 mbar	0 ... 250 mbar
Signal	4 ... 20 mA	4 ... 20 mA	4 ... 20 mA	4 ... 20 mA	4 ... 20 mA	4 ... 20 mA
<b>Turbodos</b>						

## Information on the system

Ultromat® ULFa	400	1000	2000	4000	6000	8000
Part number	1025379	1025379	1025379	1025379	1025379	1040023
Pulse/litre	67.5	67.5	67.5	67.5	67.5	26.6
Output	PNP	PNP	PNP	PNP	PNP	PNP

Tab. 3: Metering pumps of type Ultromat® ULFa

Ultromat® ULFa	400	1000	2000	4000	6000	8000
Sigma						
Type S1CaH	12017	12035	12035	10050	10050	10050
Capacity	17 l/h	35 l/h	35 l/h	50 l/h	50 l/h	50 l/h
Degree of protection	IP 65	IP 65	IP 65	IP 65	IP 65	IP 65
Spectra						
Type Spectra	12 / 13 F	12 / 33 F	12 / 33 F	12 / 100 F	12 / 100 F	12 / 100 F
Capacity	13 l/h	33 l/h	33 l/h	100 l/h	100 l/h	100 l/h
Degree of protection	IP 55	IP 55	IP 55	IP 55	IP 55	IP 55
DFBa						
Type DFBa	010A41BA	010A41BA	010A41BA	013B41BA	016C41BA	016C41BA
Capacity	47 l/h, 4 bar	47 l/h, 4 bar	47 l/h, 4 bar	78 l/h, 4 bar	188 l/h, 4 bar	188 l/h, 4 bar
Degree of protection	IP 55	IP 55	IP 55	IP 55	IP 55	IP 55

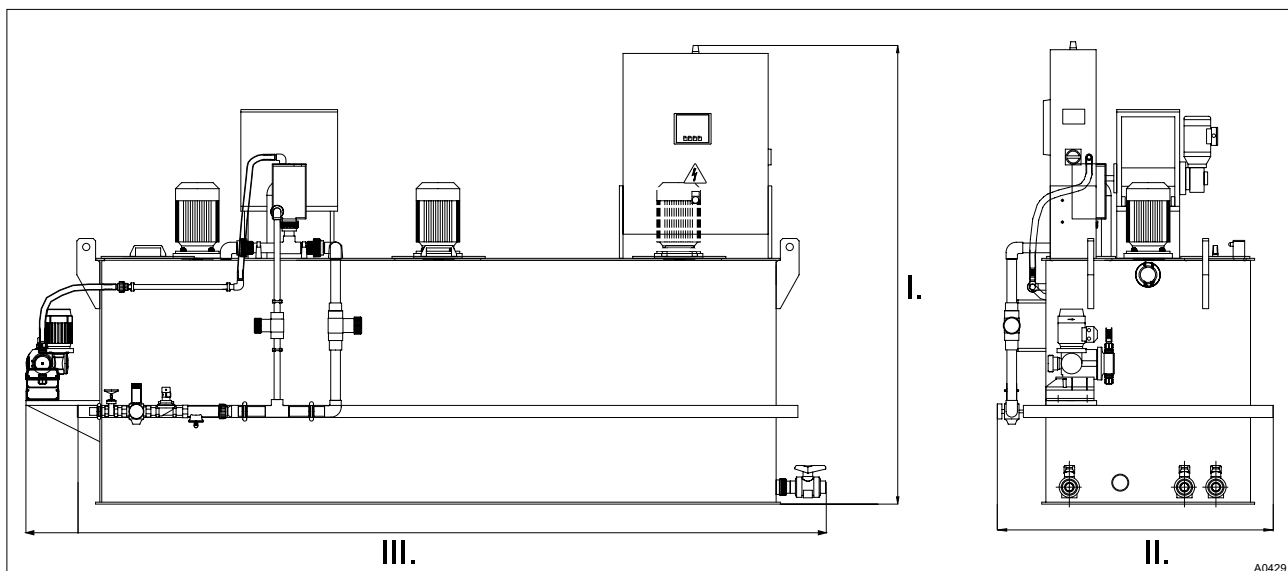


Fig. 3: System dimensions

- I. Height (H)
- II. Width (B)
- III. Length (L)

Tab. 4: Ambient conditions

	Value
Storage and transport temperature	- 5 °C ... + 50 °C
Operating temperature	+ 5°C ... + 40 °C
Storage and operating air humidity	< 92 % relative air humidity (non-condensing)
Powdered polymer air humidity	Observe the instructions of the polymer manufacturer. If necessary use an air dehumidifier
System sound pressure level	< 70 dB (A)

## 5 Construction and Function

### 5.1 System construction

The system parts for powder storage, powder metering, wetting, dissolving and maturing of the powder polymers are combined in a compact unit.

An Ultramat® is assembled using the identity code from the following functional units:

- Water fitting (1)
- Concentrate pump (2)
- Stirrers (3)
- Flush fitting (4)
- Powder feeder (5)
- Control cabinet (6)
- Three-chamber storage tank (7)

The flush fittings and water piping are available in either PVC or PP.

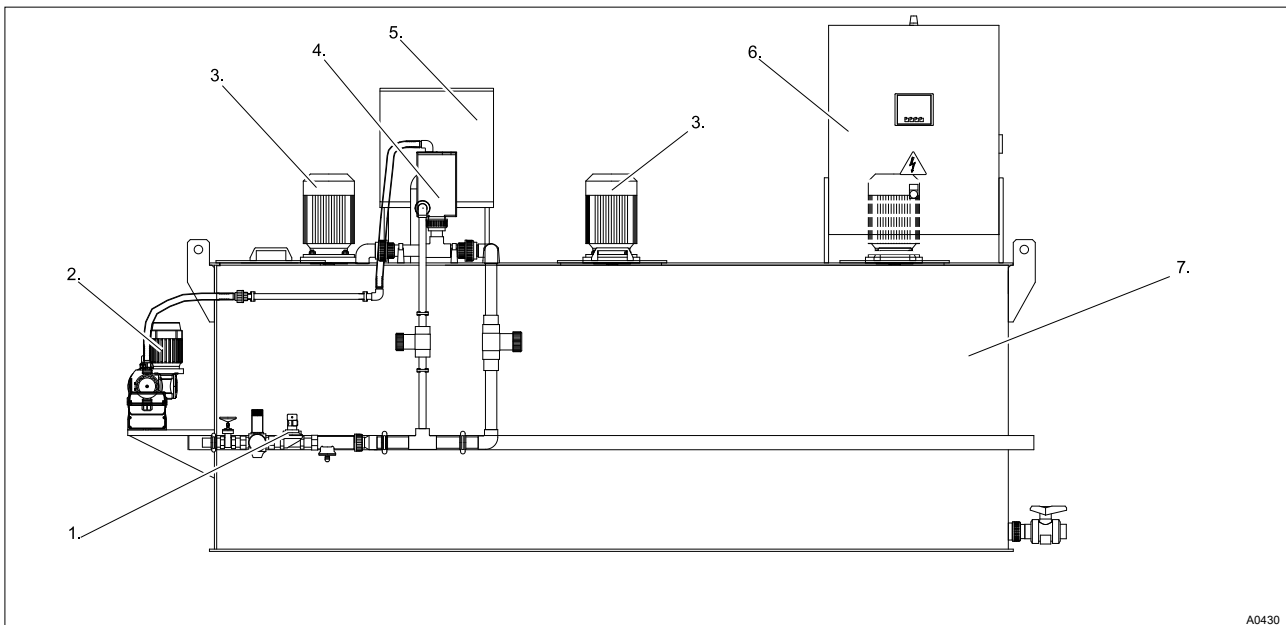


Fig. 4: System construction

The seals are made from EPDM as standard. The stirrer shafts and propellers of the stirrers plus the liquid end of the powder feeder are made from corrosion-resistant stainless steel.

### 5.2 Description of the Units



*The units are only available if they have been selected with the identity code.*

### 5.2.1 Three-chamber storage tank

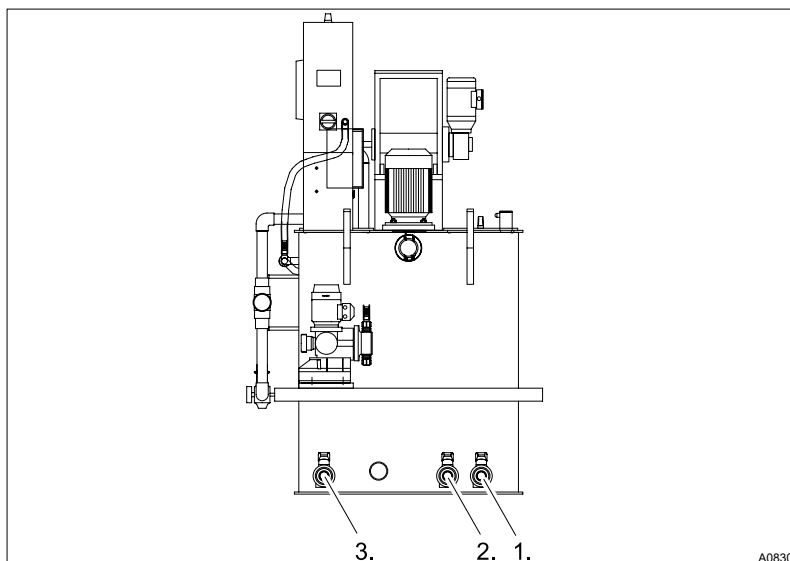


Fig. 5: Extraction openings

1. Ball valve chamber 1
2. Ball valve chamber 2
3. Extraction cock for the matured polymer (chamber 3)

The closed design PP storage tank with stirrer traverses, the brackets for powder feeder and control cabinet, plug overflow, drainage and extraction connections is divided into three separate chambers. This ensures sufficient polymer solution maturing time. The division of the storage tank largely prevents the mixing of matured and freshly prepared solution and enables continuous extraction.

All inspection openings of the storage tank are secured with tightly screwable covers.

The liquid level of chamber 3 is continuously measured using a pressure sensor.

### 5.2.2 Crane Lifting Lugs

For easier handling of the system, a suitable hoisting device can be attached to the four lifting lugs.

### 5.2.3 Water fitting with flush fitting

The water pipework supplies the system with the required preparation water. The pressure reducer with filter insert ensures that the pressure is limited and maintained at the correct operating pressure. A solenoid valve automatically opens and closes the water inlet. The flow meter used, continuously reports the current flow rate to the control. During commissioning the two regulating valves are used to set the water flow rate. The flush fitting ensures that the polymer powder is intensively wetted with preparation water. A manual shut-off valve also shuts off the supply of water if maintenance work is necessary.

There are two versions of flush fitting:

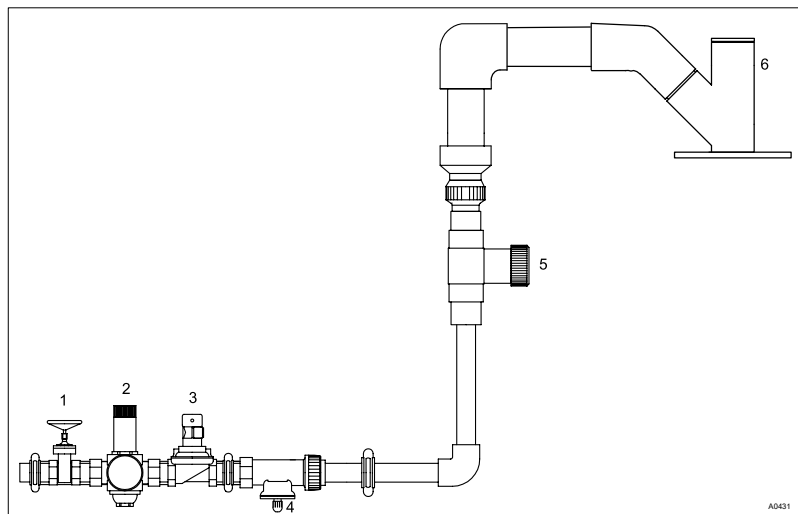
- Y-flush inlet
- Wetting cone

With the wetting cone, the flushing process is more complicated, as described above:

The powdered polymer falls into the wetting cone, where it is uniformly wetted with a partial flow from the preparation water. This ensures clumping of the feed chemical does not occur.

The main flow of the preparation water produces, by way of a mixing device, a slight vacuum at the outlet of the cone. Consequently, the wetted powder is sucked out and then travels with the preparation water into chamber 1.

The switching on of the powder feeder is controlled to occur at a time delay after the solenoid valve activation. Consequently at the start of the preparation process, no powder deposits can occur in the flush fitting. There is always a water flow for a few seconds before the powder feeder starts. At the end of the preparation process, the reverse procedure is followed. The system switches off immediately once the upper level is reached. However, the water continues to run for a few seconds after this.



*Fig. 6: Water fitting with Y-flush inlet*

1. Shut-off valve
2. Pressure reducer
3. Solenoid valve
4. Flow meter
5. Regulating valve
6. Y-flush inlet

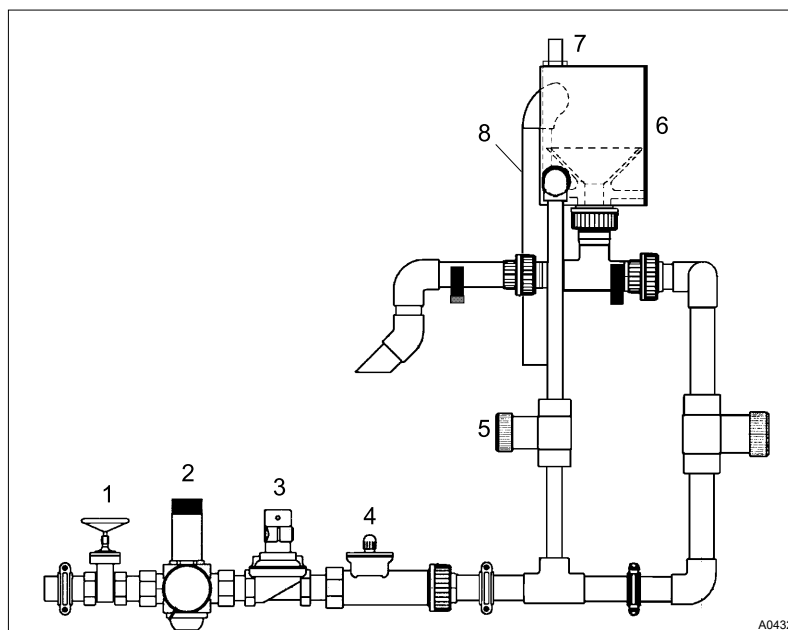


Fig. 7: Water fitting with wetting cone

1. Shut-off valve
2. Pressure reducer
3. Solenoid valve
4. Flow meter
5. Regulating valves
6. Wetting cone
7. Overflow sensor
8. Overflow

## 5.2.4 Powder feeder

Please refer to the separate operating instructions entitled "Dry Feeder" for detailed information about the design and function of this device.

The heater of the feeder screw pipe and the minimum fill level sensor for the dry material hopper are fitted as standard to the Ultromat® treatment systems. The dry feeder is activated by a frequency converter to ensure quantity-proportional dosing of the powdered polymer into the preparation water. A loosening wheel is fitted directly above the feeder screw for the continuous discharge of the powdered polymer. A metering pipe heating system also removes any moisture that has penetrated the unit and thus prevents any caking of the powdered polymer.

## 5.2.5 Vibrator

The vibrator helps to prevent bridging in the dry material feeder so that the powdered polymer matures better.

### 5.2.6 Stirrers

**CAUTION!**

The stirrers can start up suddenly as soon as they are connected to mains power.

The Ultromat® is fitted with two electrical stirrers as standard. A third stirrer for chamber 3 can be selected via the identity code. The stirrers ensure that the solution is gently agitated in the reservoir chambers.

### 5.2.7 Control cabinet

The control cabinet contains, alongside the power supply and the fuses, all the electrical control and command devices necessary for operation of the system, especially the Ultromat® control and the frequency converter for control of the powder feeder.

### 5.2.8 Concentrate piping

The Ultromat® is equipped with the following pipework for dosing of liquid concentrate:

Ultromat® type	Pipe diameter	Tube nozzle
400	DN 15	DN 15
1000	DN 15	DN 15
2000	DN 15	DN 15
4000	DN 20	DN 20
6000	DN 20	DN 20
8000	DN 20	DN 20

### 5.2.9 Evaluation of the lack of water state for the redilution unit

The redilution unit is used to redilute the prepared polymer solution. To do this the feed pump transports the polymer solution out of the Ultromat® storage tank into the redilution unit.

The dilution water is fed into the redilution unit via a solenoid valve. A downstream float flow meter with a minimum contact monitors the dilution water.

The Ultromat provides a potential-free contact (feed pump enable) for control of the feed pump. This contact is closed if the level undershoots the low flow contact in chamber 3 and opens once the low flow contact is exceeded again. The feed pump is normally controlled using an external circuit (combination starter motor).

As the feed pump can be switched on and off externally, there is an additional input at the Ultromat control for determining the state of the motor starter (potential-free auxiliary contact). The evaluation of the min. contact at the flow meter is only carried out if the feed pump is running and consequently the potential-free auxiliary contact at the motor starter has been closed.



If the feed pump is stationary, the potential-free contact is not closed and the min. contact at the flow meter is not evaluated.

#### **5.2.10 Empty signal for concentrate tank**

The „*Empty signal concentrate tank*“ option comprises a float switch, which is inserted from above in the delivery drum.

#### **5.2.11 Dosing monitor for liquid concentrate**

The Ultramat® can be operated with liquid polymer. The concentrate pump doses the concentrate into chamber 1. The dosing monitor can only be used when an eccentric screw pump is being used. The dosing monitor comprises a flow adapter and a flow sensor.

#### **5.2.12 Top hopper 50 l, 75 l and 100 l**

Should an enlarged powder reservoir be required, top hoppers with an additional volumetric capacity of 50, 75 and 100 litres are available.

#### **5.2.13 Powder conveyor for Automatic Refilling**

A powder conveyor can be used for the automatic filling of the powder hopper with powdered polymer. A powder conveyor can be mounted directly onto the dry feeder or top hopper by means of an adapter plate. The installation of a 50 l top hopper with a connecting adapter is recommended to overcome short periods of service work on the powder conveyor or when there is a high consumption of powder.

When selecting a powder conveyor the Ultramat® has a terminal box fixed to the dry feeder. The terminal box is electrically fused via a safety cut-out in the control cabinet.

## 6 Assembly and Installation

User qualification, mechanical installation: trained qualified personnel, see [Chapter 2.3 „Users' qualifications“ on page 11](#)

User qualification, electrical installation: Electrical technician, see [Chapter 2.3 „Users' qualifications“ on page 11](#)

The system is fully factory-assembled. The cabling between the control cabinet and the electrical power units is fully installed.

### 6.1 Assembly



#### **WARNING!**

##### **Heavy system weight**

Possible consequence: Death or severe injuries, if the floor cannot support the system and breaks.

Measure: Ensure that the floor of the installation site can support the weight of both the empty and full system.

Ensure that the entire system is fully installed vertically on the floor. Make sure that there are no foreign objects on the floor where the system is being installed.



#### ***Selection of the installation site***

*The system must be easily accessible at all times for operation, maintenance and filling.*

#### **Ambient conditions for operation**

Permissible ambient temperature: +5°C ... +40°C.

Humidity: None. Avoid rain and condensation.

Other: No dust, no direct sunlight.

### 6.2 Installation, hydraulic



#### **CAUTION!**

##### **Possible environmental damage due to the polymer solution is possible**

Observe the safety data sheet for the polymer, as well as statutory regulations for disposal when draining the drainage lines and the overflow line.

Requirements:

- The preparation water must be of drinking water quality and must be free of solids and suspended particles
- The inlet water pressure must be between 3 and 5 bar
- The dimensioning of the process water, overflow and drainage lines must be correct



**NOTICE!**

- Route the overflow and drainage lines with a slope. These must be operated without back pressure
- To drain the system install a T-piece with a stopcock to provide a drainage option between the chamber 3 shut-off valve and the feed pump

1. ➤ Connect the preparation water line to the water fitting
2. ➤ Connect the concentrate pump line for the liquid polymer
3. ➤ If available: Connect the feed pump (not contained in the scope of supply) to the extraction line
4. ➤ Connect up the drainage lines and lead into a suitable drain
5. ➤ Connect up the overflow line to the overflow connector and lead into a suitable drainage

### 6.3 Installation, electrical



**WARNING!**

**Live parts!**

Possible consequence: Fatal or very serious injuries.

- Measure: Disconnect the system from the mains power supply at the electrical connections before carrying out any installation work.
- Secure the system to prevent it being switched back on again.

#### 6.3.1 Mains Power Connection



**CAUTION!**

**Danger of malfunction!**

Ensure that the terminals are assigned correctly when connecting the units.

Ensure that the motors rotate in the right direction ... when connecting the stirrers, powder feeders, motor pumps.

1. ➤ Connect the electrical supply cable as shown in the wiring diagram (see the pouch in the control cabinet)
2. ➤ Guide the mains cable through an appropriate opening in the system control cabinet and connect it in the cabinet to the provided terminal strip

## 7 General Operating Information

The Ultramat is equipped with the KTP 400 BASIC COLOUR operating unit to visualise the control process. Operate the control using the touch display and the 4 function keys.

The illustration of the Ultramat to be controlled is sufficient to represent the most important Ultramat functions. Warnings and fault messages are also displayed as text and saved in an archive. A maximum of 100 text messages can be called up. Furthermore, changes in operation, parametrisation,...are listed and stored in a data memory for a maximum of 100 individual diagnostics.

Intuitively input control parameters or perform calibration as well as other operating functions by calling up operating screens.

A brief training session is sufficient to enable you to operate the Ultramat. Please carefully read the operating instructions prior to use.

The operation of the system in manual mode must only be carried out by experienced service technicians. Here, knowledge of the detailed control process is particularly important, so that incorrect operation can be avoided.

An alarm is issued audibly and visually by the Ultramat via the integral horn and alarm lamp. To switch off the horn, immediately press the reset key [F4] on the panel. The horn alarm is deleted, however the alarm remains until the cause of the fault is rectified and the reset key [F4] is pressed again.

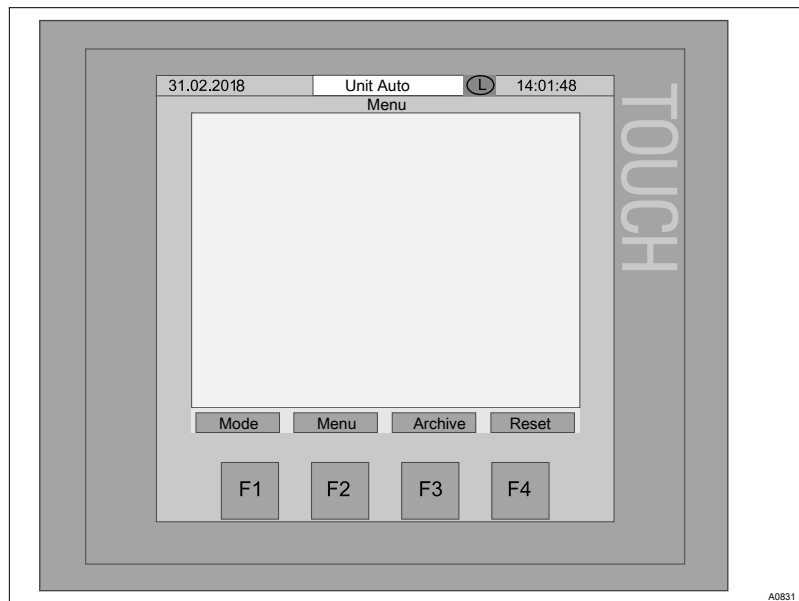


Fig. 8: Operating Menu ULFa

## 7.1 Operating menu ULFa

Keys	Level 1	Level 2	Input
[F1] Mode	STOP / AUTO / MANUAL / RUNNING EMPTY		[Change Powder/Liquid/Activate running empty]
[F2] Mode	PARAMETER	Water	Pre-rinse; post-rinse period; min. flow
		Stirrer	Stirrer (1+2) On / Off
			Stirrer (3) On / Off
		Level	Max-Max; Max; Min; Min-Min
			First filling
		Powder	Heater ON/OFF
			Vibrator ON/OFF
	Liquid	Min. setpoint freq. conv.	
	Calibration (F1 mode stop)	Powder/Liquid	Calibration time
			Elapsed time
			Enter weight
			Capacity
		Liquid	Calibration time
			Elapsed time
			Enter weight
			Capacity
		Flow monitor	Switching point
			START / STOP
	Water	Actual flow	
		START/STOP water calibration	
	Concentration	Concentration	Powder
			Liquid
			Liquid active ingredient
			Internal / External (PROFIBUS® / PROFINET®, MODBUS®)
	System	Language	[DE], [EN], [FR], [ES], [PT], max. 10 languages, depending on language module selected.
			Select language
		Set date and time	31.02.2017, 12:13:14
[dd.mm.yyyy hh:mm:ss] Input language-dependent			
Touch panel		Clean screen	
		Calibrate touch	
Control	Diagnostics, Overview		

## General Operating Information

Keys	Level 1	Level 2	Input
	Info	Identcode	Type
			Size
			Polymer
			Options
		Version	Version Touchpanel
			Creation date
			Version S7 Project
			Creation date
		Info	Project
	Operating hour counter		
	for stirrer 1-3, powder feeder, Liquid concentrate pump		
	Service	Water meter	Mode measurement: Auto / Manual
			Manual value
			Pulse rate <i>[DFM]</i>
		Pressure sensor	Sensor measured value
			Measured value
			Offset
Factory setting		Factory setting reset	
		Identcode: Change	
Frequency converter	Status display of frequency converter		
<i>[F3]</i> Archive			
<i>[F4]</i> Reset			

## 7.2 Start Screen

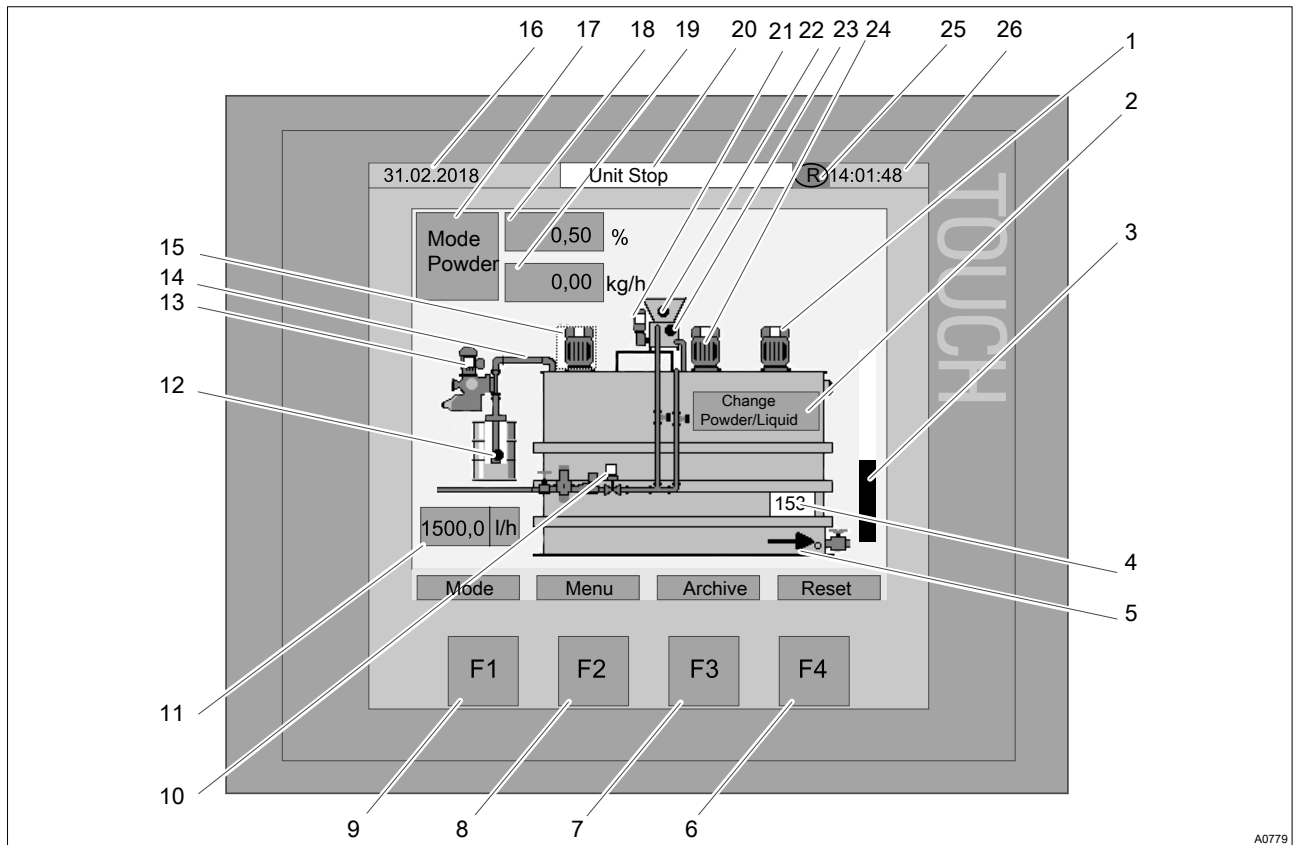


Fig. 9: Start screen

- |    |   |    |   |
|----|---|----|---|
| 1  | Stirrer (white=off), (black=on), (flashing=fault)                                   | 15 | Stirrer (white=off), (black=on), (flashing=fault)                             |
| 2  | Switch-over (Powder/Liquid)   | 16 | Date  |
| 3  | Level indicator for chamber 3 (0 ... 100%)  | 17 | Display of the current dosing product (powder/liquid)                         |
| 4  | Level display in [mm]   | 18 | Display of the desired concentration  |
| 5  | Extraction enable display (no arrow=no enable // arrow=enable)                      | 19 | Display of the current capacity in [kg/h]                                     |
| 6  | Function key [F4] [RESET]   | 20 | Ultromat operating mode status bar: [STOP], [AUTO], [MANUAL], [RUNNING EMPTY] |
| 7  | Function key [F4] jump to the [Archive]   | 21 | Dry feeder (white=off), (black=on), (flashing=fault)                          |
| 8  | Function key [F2] jump to the [Menu]  | 22 | Dry product empty signal (white=not OK), (black=OK), (flashing=fault)         |
| 9  | Function key [F1] Operating mode switchover [STOP], [AUTO], [MANUAL][RUNNING EMPTY] | 23 | Wetting cone overflow (white=not OK), (black=OK), (flashing=fault)            |
| 10 | Water supply (white=valve closed) (black=valve open)                                | 24 | Stirrer (white=off), (black=on), (flashing=fault)                             |
| 11 | Display water supply in [l/h]   | 25 | Language switchover   |
| 12 | Empty message liquid concentrate (white=not OK), (black=OK), (flashing=fault)       | 26 | Time  |
| 13 | Pump-liquid concentrate (white=off), (black=on), (flashing=fault)                   |    |   |
| 14 | Flow sensor liquid concentrate (white=not OK), (black=OK), (flashing=fault)         |    |   |

## 7.3 Changing Operating Mode

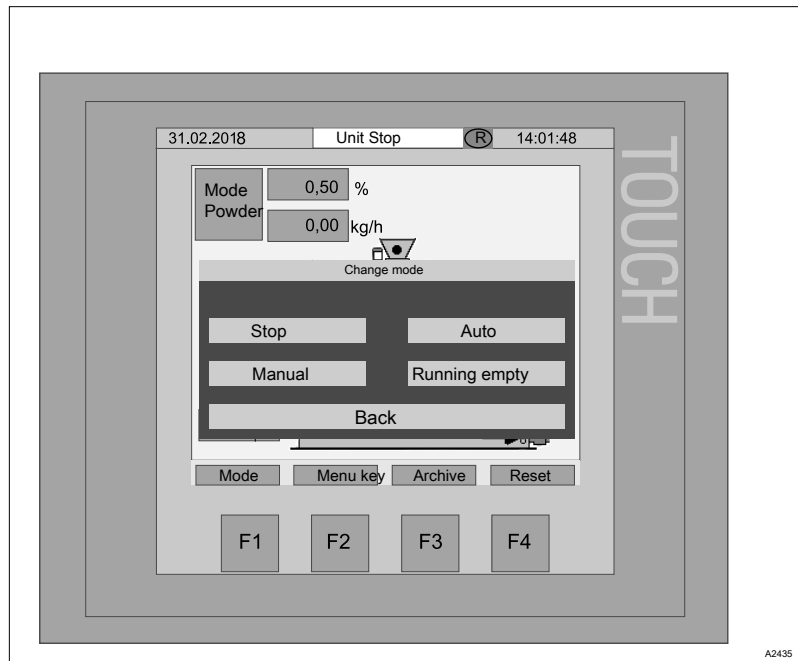


Fig. 10: Changing operating mode

### Changing operating mode

You can switch operating mode using the *[F1]* function key.

➔ If you press *[F1]*,

- ⇒ then a window opens with the buttons for the operating modes *[STOP]*, *[AUTO]*, *[MANUAL]*, *[RUNNING EMPTY]* and the button for *[BACK]*.



*The current operating mode is displayed in the status bar.*

### *[STOP]* operating mode

Functionality:

- In *[STOP]* operating mode, all drives and the water supply valve (10) are switched off.
- No new batching operation is started.
- The content of chamber 3 can be extracted down to the level *[MIN MIN]*.
- If the level falls below this, the error message „*Ultromat tank empty*“ is displayed.

### *[AUTO]* operating mode

In *[AUTO]* operating mode, the automatic batching operation is started, as soon as the *[MIN]* level is undershot in chamber 3.

Exception:

- Pause active
- *[RUNNING EMPTY]* operating mode active



**[MANUAL] operating mode****NOTICE!**

This operating mode is only for service technicians. To avoid damage to the system, only service technicians may operate the system in *[MANUAL]* operating mode.

## Functionality:

- In *[MANUAL]* operating mode, all drives and valves are initially switched off.
- Pressing the buttons (not currently visible) above the symbols, of the water supply valve (10), stirrers (1, 15, 24) and pump (13), lets you switch the drives on and off and close and open the valves manually.
- In *[MANUAL]* operating mode you can set the capacity in the input field at from 0 ... 100%.

**[RUNNING EMPTY] operating mode**

*This operating mode is protected and can be unlocked using the initial User Code.*

## Functionality:

- The content of chamber 3 can be extracted down to the [Min Min] level.
- A batching operation already under way is interrupted, unlike with the *[PAUSE]* and *[STOP]* function.
- No new polymer batching operation is started.
- The *[Ultramat batching ready]* [DQ A.0] is activated.

*[RUNNING EMPTY]* operating mode is deactivated by switching to *[AUTO]* operating mode.

## 7.4 User Administration

### 7.4.1 User Groups

Touch panel operation is subdivided into 3 groups:

- General operation
- Advanced operation ([User] + XXXX)
- Service ([Service] + XXXX)

Task	User rights for user groups		
	General operation	Advanced operation	Service
Code character	no code	operator code	customer code
Unit Stop - System Auto switchover	X	X	X
Switchover dry product/liquid concentrate	X	X	X
Change concentration	X	X	X
Change active ingredient liquid concentrate		X	X
Read parameter data	X		
Change parameter data		X	X
Perform calibration		X	X
Read calibration data	X	X	X
Read info	X	X	X
Change language	X		X
Set date and time	X		X
Change system functions		X	X
Reset factory settings			X
Switchover flow measurement Auto/Manual			X
Change flow measurement pulse parameter			X
Activate running empty		X	
Parameter Stirrer gentle operation			X

## 7.4.2 Login

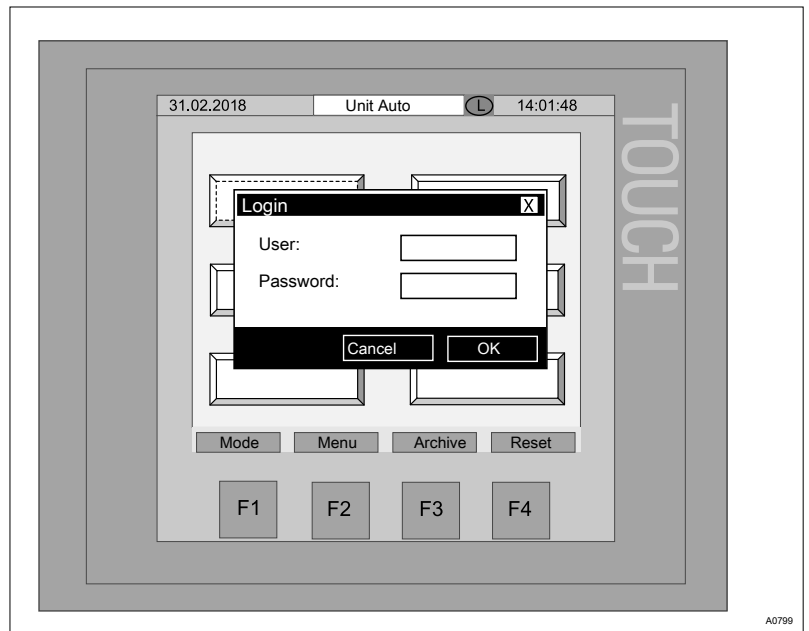


Fig. 11: User administration

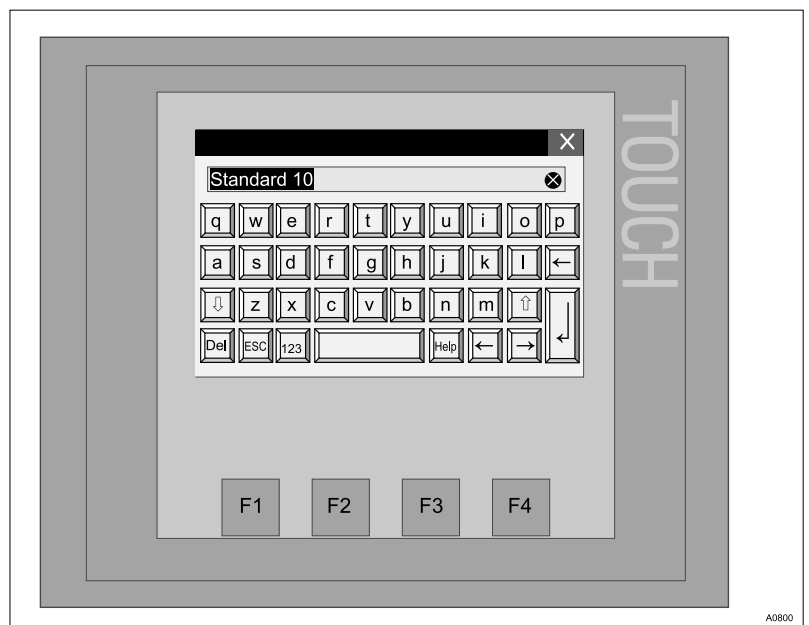


Fig. 12: Login screen keyboard

If you call up a function on the touch panel, which requires higher user rights, the login window appears automatically for entry of the user and password.

If you activate the *[User]* field, the screen keyboard appears and the username can be entered. Once entered, the name is confirmed with the  $\leftarrow$  key.

Then, using the same approach, you can fill in the *[password]* field. The password is not displayed in plain text

## 7.5 Entering Values on the Touch Panel

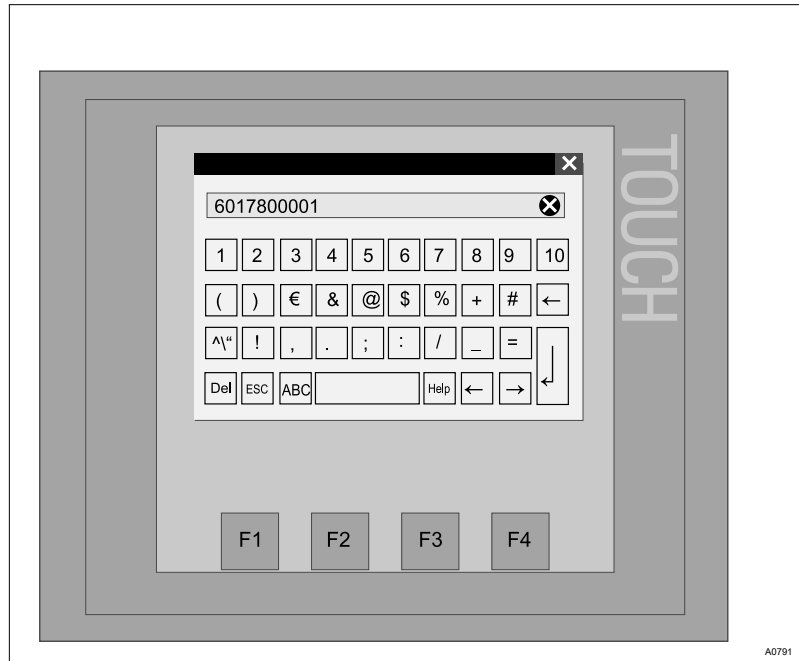


Fig. 13: Entering values on the touch panel

1. Tap an entry field on the touch panel  
⇒ The virtual keyboard appears for input of the value.



*The MIN and MAX limits are displayed at the top left of the touch panel.*

2. Enter the desired value and press the ↵ key.  
⇒ The value set is transferred to the PLC Programmable Logic Controller.
3. Press ESC to exit the menu without saving the value.

## 7.6 Selecting the Dosing Product

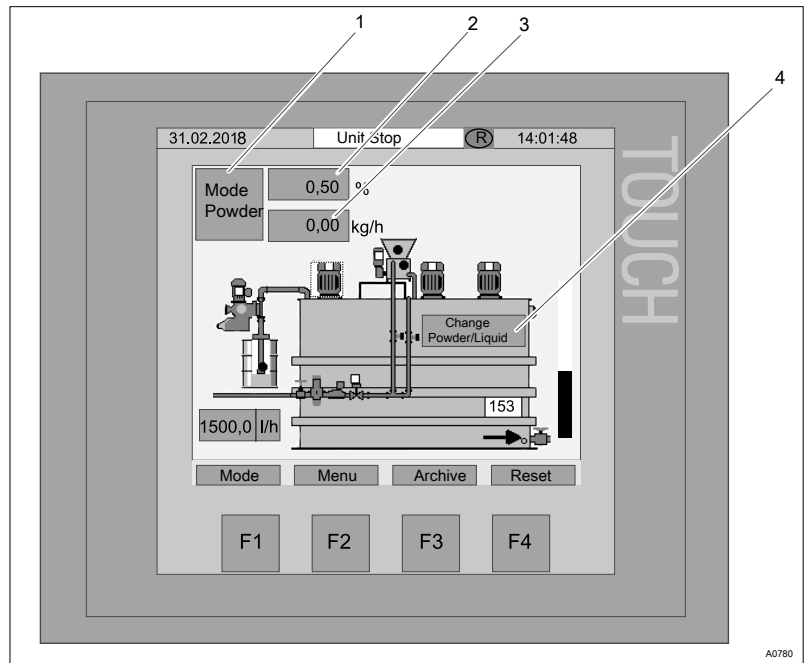


Fig. 14: Selecting the dosing product

- 1 Display of the dosing product currently used
- 2 Display of the concentration
- 3 Display of the feed rate
- 4 [Change Powder / Liquid] button



*You can only change the dosing product when the system is switched off, [STOP] mode.*

*The change is actuated using [Change Powder / Liquid] (2).*

*The current status (1) is displayed at the top left of the display.*

## 7.7 [PAUSE] Operating Mode

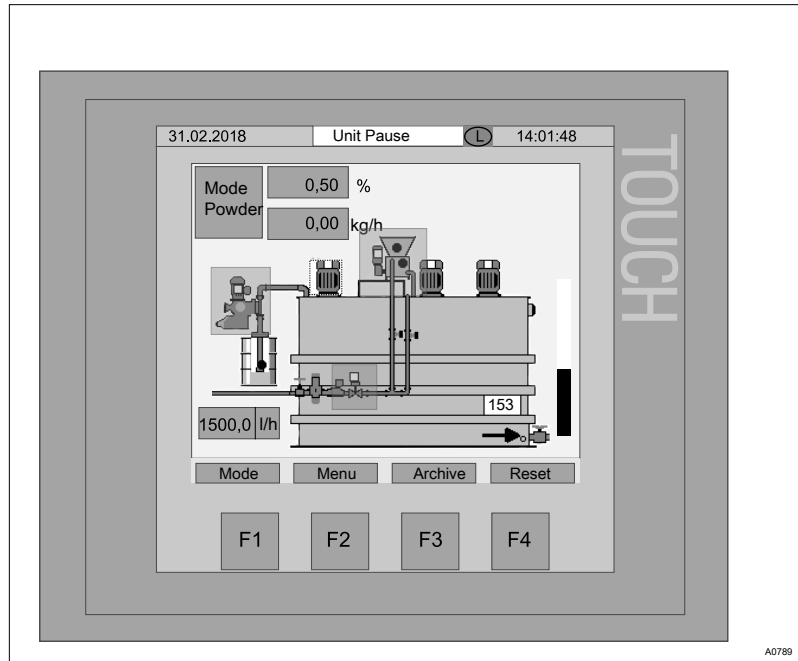


Fig. 15: System in [PAUSE] operating mode

The Ultramat can be set to [PAUSE] operating mode via an external signal or an external switch. Then remove the integral bridge of the terminal strip.

Functionality:

- The content of chamber 3 can be extracted down to the [Min-Min] level.
- A batching operation currently under way is ended.
- No new polymer batching operation is started.
- The [Ultramat batching ready] [DQ A.0] is activated.

## 7.8 Using [F3] to Select the Archive

The function key [F3] is used to jump to the [Archive]. The last 100 errors are saved in the archive. These faults can then be called up for troubleshooting using the function key [F3].

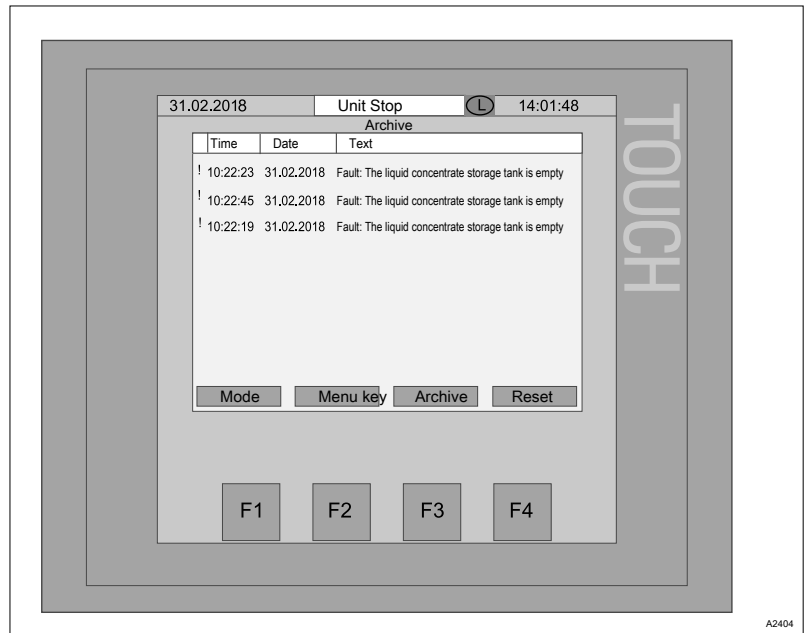


Fig. 16: Archive

## 7.9 Level Display

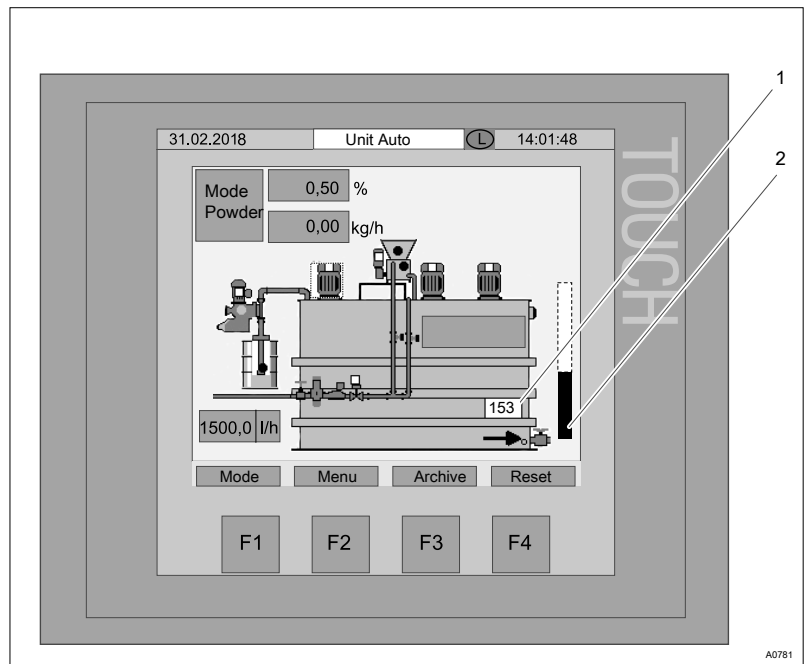


Fig. 17: Level measurement

- 1 Current level in [mm]
- 2 Bar indicator of the current level



**NOTICE!**

**Incorrect measurement due to contamination of the pressure sensor**

Clean the pressure sensor when maintaining the system to avoid incorrect measurements. Do not damage the diaphragm of the pressure sensor. Do not use hard and/or pointed objects for cleaning. Do not exert any firm pressure on the diaphragm during cleaning.

The filling level is measured using a pressure sensor. [mBar] is converted to [mm] in the PLC Programmable Logic Controller.

## 7.10 Water Supply

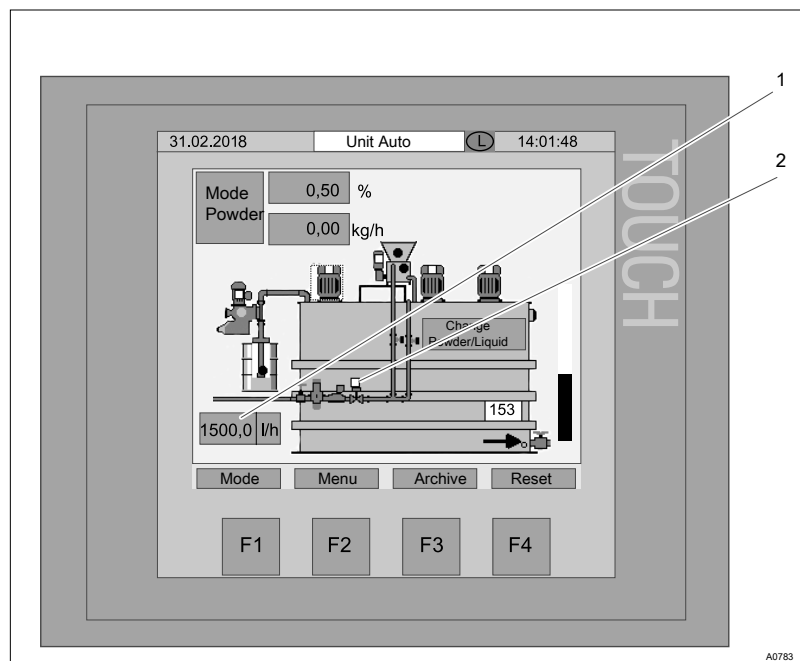


Fig. 18: Water supply

- 1 Process water flow volume in [l/h]
- 2 Process water solenoid valve display (white = off // black = on)

The flow volume is measured using a pulse encoder in the water apparatus. The flow volume is monitored. If the limit value (adjustable in the parameter menu) is undershot, a warning is first output. If the flow volume does not increase above this limit value, then the system switches to fault mode and the batching operation is interrupted.



*If the flow measurement is not working, the system can be operated with a default value. Find the setting for this in the Service menu.*



## 7.11 Redilution

This function is used by the control to monitor a downstream redilution unit. For this, the running signal of the transfer pump is signalled via a potential-free contact. Additionally, the control has an input, which monitors a limit switch in the water supply line. If the limit switch is not active „5 s“ after switching on of the pump, a fault message appears on the touch panel and the fault indicating relay triggers.

## 7.12 MANUAL Operating Mode



### NOTICE!

This operating mode is only for service technicians. To avoid damage to the system, only service technicians may operate the system in *[MANUAL]* operating mode.

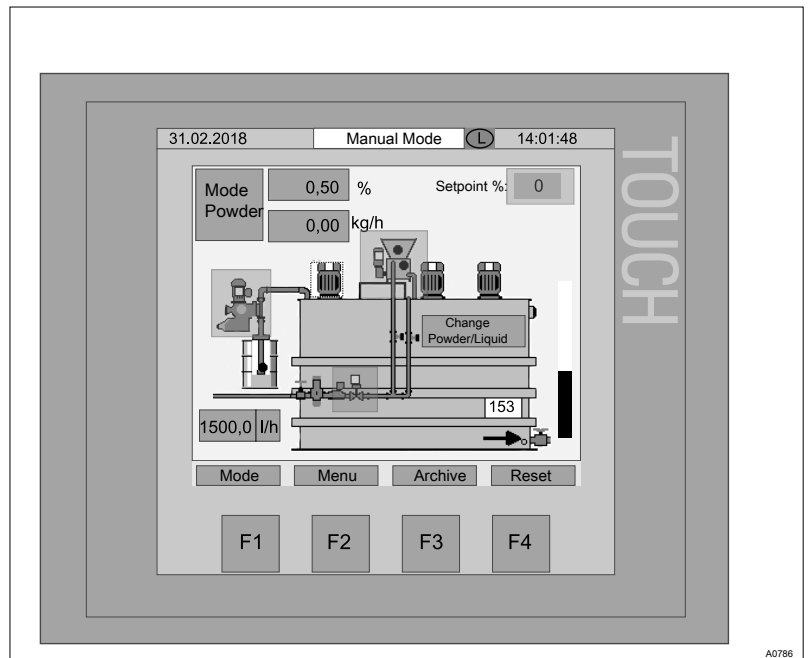


Fig. 19: *[MANUAL]* operating mode

In *[MANUAL]* operating mode, it is possible to switch the individual drives on and off independently. To switch over to *[MANUAL]* operating mode, press the *[MODE]* key in the start screen and then *[MANUAL]*.

You can switch the individual drives on manually. To do so, tap the points corresponding to the drives on the touch panel. If a drive is activated, the point for the drive lights up in black. If a drive is deactivated, the point for the drive lights up in white.

On the screen above, it is possible to activate the following drives in *[MANUAL]* operating mode:

- Switch on/off solenoid valve for water supply.
- Switch the stirrer on/off.
- Switch the liquid concentrate pump on/off.
- Switch the dry feeder on/off.

## 8 [F2] Operating Menu

The function key [F2] is used to jump to the [Menu]. Further settings can be made in the menu.

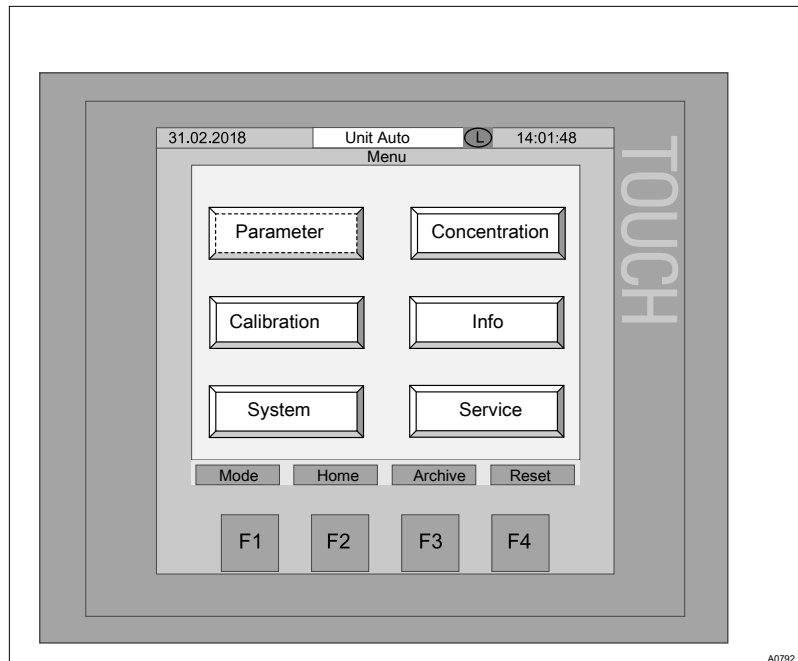


Fig. 20: Jump to the menu

Parameter	see ↗ Chapter 8.1 „Parameters“ on page 42
Calibration	see ↗ Chapter 8.2 „Calibration“ on page 49
System	see ↗ Chapter 8.3 „System“ on page 54
Concentration	see ↗ Chapter 8.4 „Concentration“ on page 58
Info	see ↗ Chapter 8.5 „Information“ on page 59
Service	see ↗ Chapter 8.6 „Service“ on page 61

### 8.1 Parameters

The parameters can be set for the following fields:

- Water
- Stirrer
- Level (pressure sensor)
- Powder
- Liquid

## 8.1.1 Parameter [WATER]

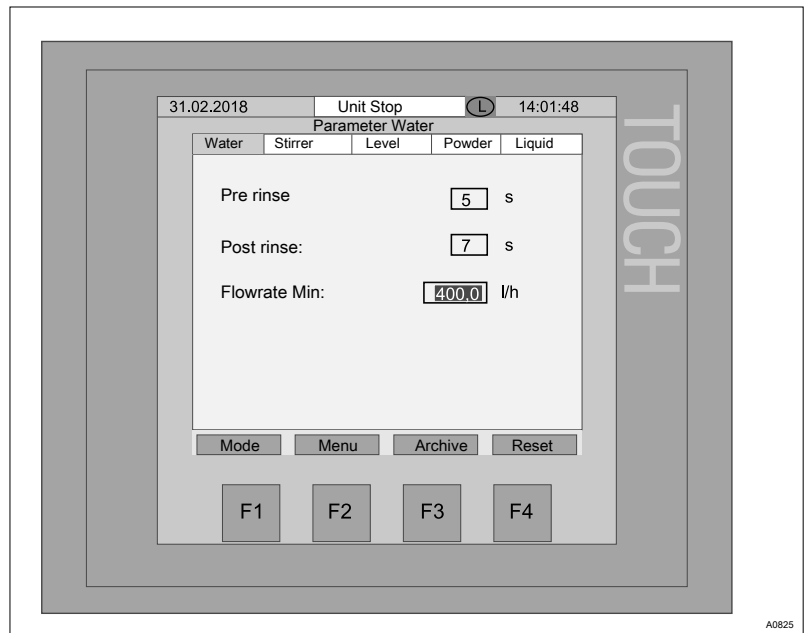


Fig. 21: Parameter [WATER]

Parameter	Factory setting	Setting range
Pre rinse	7 seconds	0 ... 30 seconds
Post-rinse period	5 seconds	0 ... 30 seconds
Min. water supply	See table ↪ <i>Table on page 43</i>	0 ... 200000 l/h

Ultromat	Water supply l/h	Minimum water supply l/h
400	600	400
1000	1500	1000
2000	3000	2000
4000	6000	4000
6000	9000	6000
8000	12000	8000

If the current water supply is lower than the set minimum water supply, the system generates a warning:  
*[Warning: Water supply too low.]*

If the current water supply remains lower than the set minimum water supply, then after 20 seconds the system generates a fault message: *[Fault: Water supply too low. Ultromat to stop]*. The Ultromat interrupts the batching operation.

### 8.1.2 Parameter [Stirrer]

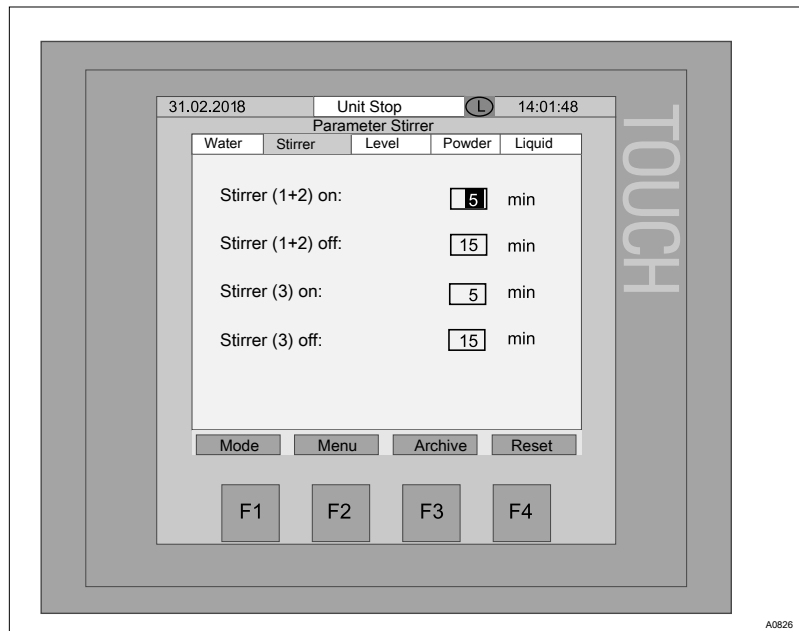


Fig. 22: Parameter [Stirrer]

After the batching operation, the stirrers can continue running in [Pulse/Pause mode]. Set the parameters for the switching on and off times as follows:

Parameter	Factory setting	Setting range
Stirrer (1+2) on	5 minutes	5 ... 60 minutes
Stirrer 1+2 off*	15 minutes	0 ... 60 minutes
Stirrer (3) on	5 minutes	5 ... 60 minutes
Stirrer 3 off*	15 minutes	0 ... 60 minutes

\* Continuous operation: Stirrer off = 0 minutes

## 8.1.3 Parameter [Powder]

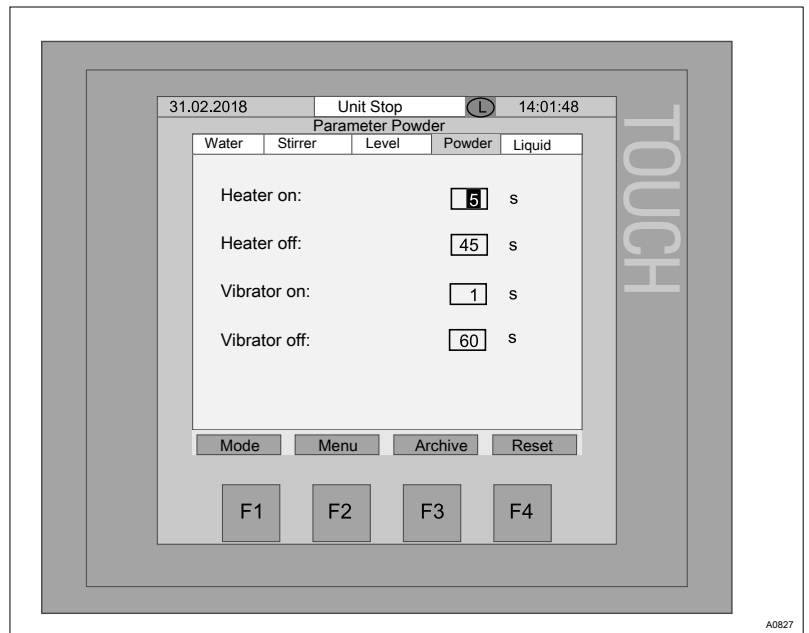


Fig. 23: Parameter [Powder]

A metering pipe heating system removes any moisture that has penetrated the unit and thus prevents any caking of the powder.

The vibrator prevents the forming of bridges in the dry feeder.

Parameter	Factory setting	Setting range
Heater on	5 seconds	1 ... 10 seconds
Heater off	45 seconds	30 ... 100 seconds
Vibrator on	1 seconds	0 ... 30 seconds
Vibrator off	60 seconds	0 ... 999 seconds

8.1.4 [Liquid] Parameter

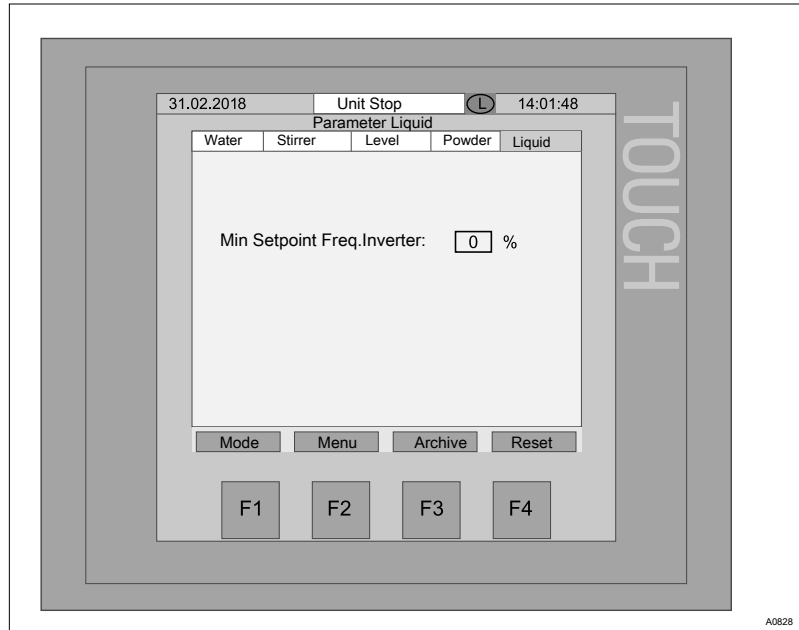


Fig. 24: [Liquid] Parameter

Parameter	Factory setting	Setting range
Min. setpoint frequency converter	0%	0 ... 50%



**Concentrate pump minimum frequency**

The liquid concentrate pump should be equipped with an external fan so that the pump can be operated without limitations in the range from 0 to 86 Hz.

If a liquid concentrate pump is used without an external fan, the winding of the pump motor must be protected against overheating at low speeds. Set the minimum frequency to a value e.g. 10 ... 20%. If the actual frequency of the liquid concentrate pump is lower than the set concentrate pump minimum frequency for a period > 5 seconds, then the system generates a fault message. [Warning: Liquid concentrate pump - min. capacity reached] and the liquid concentrate pump continues running at the set minimum frequency.

Counter measure: increase the water flow rate or the desired concentration.

## 8.1.5 [Level] Parameter

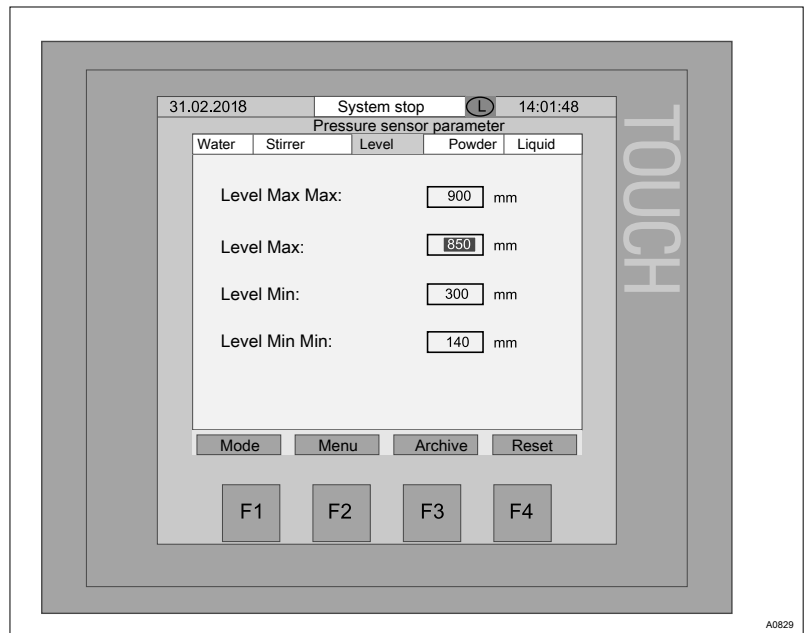


Fig. 25: [Level] Parameter

Parameter	Remark
Level Max Max	The [Level Max Max] is used to monitor overfilling. If overfilling occurs, an [Overfilling] alarm is signalled.
Level Max	If the [Level Max] is exceeded, Ultramat batching is stopped
Level Min	If the [Level Min] is undershot, Ultramat batching is started
Level Min Min	If the [Level Min Min] is undershot, an alarm message appears and the enable extraction signal is not longer issued.

Tab. 5: Switching level of the continuous flow system:

ULFa	400	1000	2000	4000	6000	8000
Max-Max	370	710	860	1320	1320	1310
Max	300	565	710	1105	1105	1105
Min	190	310	390	490	490	490
Min-Min	120	190	190	190	190	190
<b>All values in millimetres</b>						

## 8.1.6 Stirrer 1+2, Gentle Operation with the First Filling of the Storage Tank

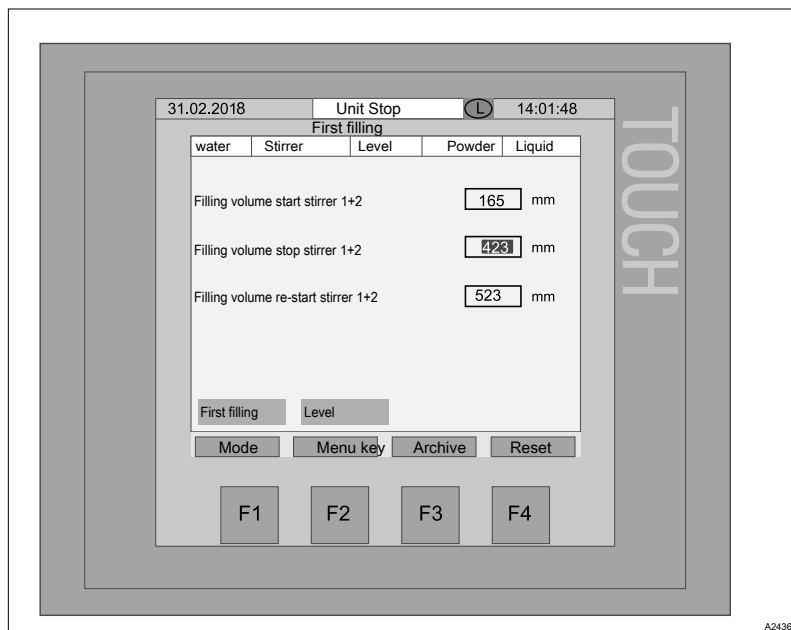


Fig. 26: First filling parameters

We have introduced the function “Gentle operation with first filling of the tank” to avoid what is known as “stirrer pass-through”, i.e. running stirrer propellers meeting a rising filling volume in the tank.

The stirrers are only switched on when chambers 1+2 have a sufficiently high liquid level. Please note that the two stirrers 1+2 have to be controlled in parallel.

The necessary parameters are set to guarantee the gentle operation of the stirrers when the system is tested in the manufacturer’s plant.

You can make customised adjustments to the start, switch off and switch on volumes, if required. You can select the adjustment function via the customer code.

- Parameter ➔ Level
  - Select the *[First filling]* view, see Fig. 26 and make the adjustments.



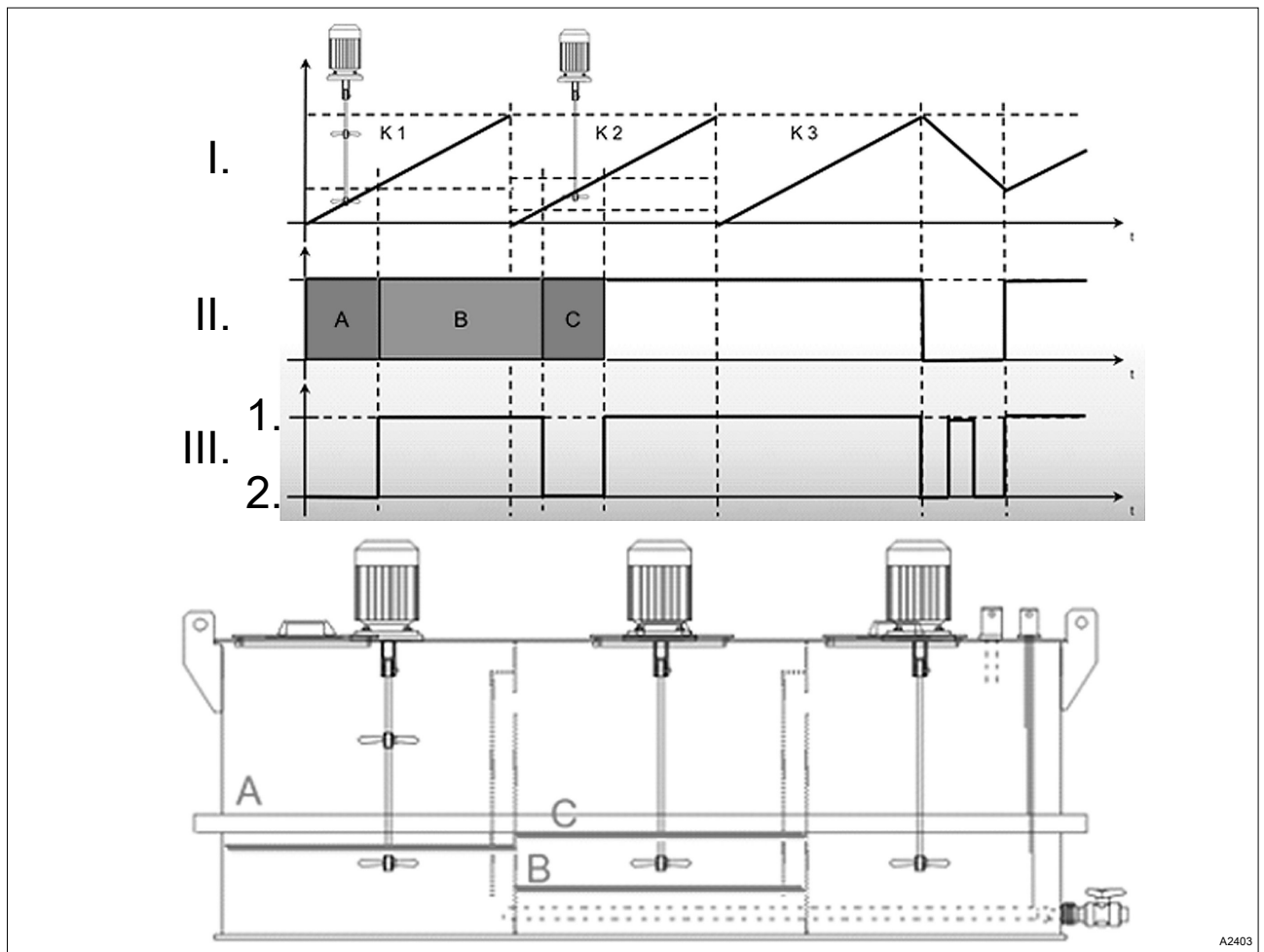


Fig. 27: Process diagram of the stirrers in gentle mode

- |                     |  |
|---------------------|--|
| 1. On               | III. Stirrer 1+2                       |
| 2. Off              | A Start volume of stirrers             |
| I. Liquid level     | B Stirrers run until switch-off volume |
| II. Water + polymer | C Switch-on volume of stirrers         |

## 8.2 Calibration

The Calibration menu is for calibration of the following fields:

- Calibration of powder
- Calibration of liquid
- Calibration of flow monitor
- Calibration of water

Calibrate the dry feeder and the liquid concentrate pump before first switching on the system in Automatic mode. Switch off the system during calibration. Unit *[Stop]*. If you have not yet calibrated the system and you switch the system to *[AUTO]* mode, then the following message appears on the display *[Fault: Dry feeder not calibrated]* or *Fault: [Liquid concentrate pump not calibrated]* and the system switches to *[FAULT]* mode.

## 8.2.1 Calibration of Powder

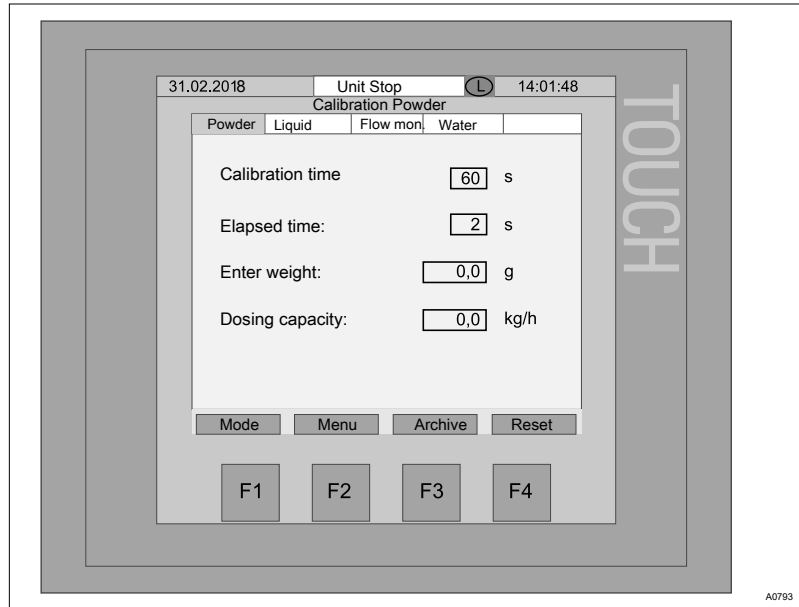


Fig. 28: Calibration of powder

Parameter	Factory setting	Setting range
Enter calibration time	60 seconds	0 ... 999 seconds
Enter weight	-	99999.9

### Performing calibration



#### **Interrupting calibration**

*End calibration at any time by pressing [STOP].*

Materials required:

- Weighing scales
- PE bag (min. fill volume 500 g)

1. ➤ Loosen the screw fastenings to remove the wetting cone
2. ➤ Hold a PE bag (min. fill volume 500 g) beneath the feeder screw pipe
3. ➤ Start calibration by pressing [START].
4. ➤ Wait until the calibration time has elapsed
5. ➤ Weigh the feed chemical collected in the PE bag
6. ➤ Enter the weight measured as the [ENTER WEIGHT] parameter in the control
  - ⇒ The capacity is recalculated and displayed as the [CAPACITY] parameter in [kg/h]
7. ➤ Refit the wetting cone once the dry feeder has been calibrated

## 8.2.2 Calibration of Liquid Concentrate

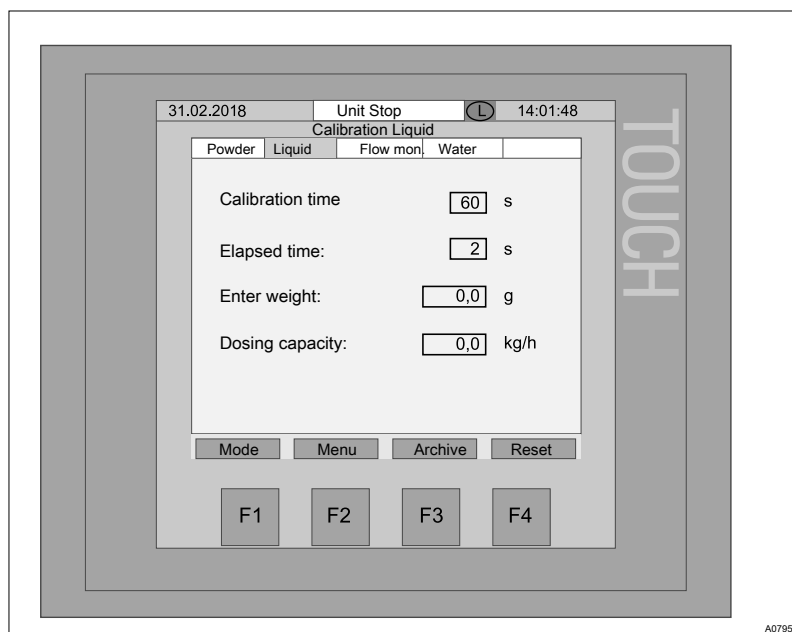


Fig. 29: Calibration of liquid concentrate

Parameter	Factory setting	Setting range
Enter calibration time	60 seconds	0 - 999 seconds
Enter weight	-	99999.9

## Performing calibration

**Interrupting calibration**

End calibration at any time by pressing [STOP].

Materials required:

- Weighing scales
  - Collecting vessel (minimum fill volume 1 litre).
1. Determine the net weight of the collecting vessel.
  2. Open the metering line at a suitable point.
  3. Hold the collecting vessel beneath the opening in the metering line.
  4. Start calibration by pressing [START].
  5. Wait until the calibration time has elapsed.
  6. Weigh the collected amount of liquid concentrate.
  7. Enter the weight ascertained as the [ENTER WEIGHT] parameter in the control.
    - ⇒ The capacity is recalculated and displayed as the parameter [CAPACITY] in [kg/h].
  8. Close the metering line so that it is once again leak-tight.

### 8.2.3 Calibration Flow Monitor ("Spectra" only)



Calibrate the liquid concentrate pump and then the flow monitor before first switching on the system in Automatic mode.

Switch off the system during calibration. Unit [Stop].

If you operate the system for longer than 20 seconds below the switching point for the minimum metering quantity, then the following message appears on the display [Fault: Check liquid concentrate flow sensor] and the system switches to [FAULT] mode.

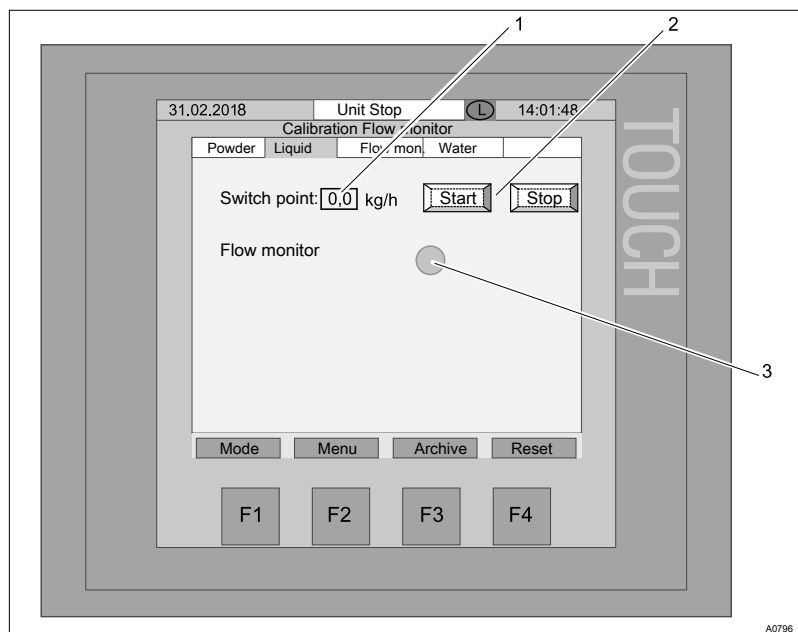


Fig. 30: Calibration of the flow sensor

- 1 Enter the metering volume in [kg/h].
- 2 [START/STOP] the liquid concentrate pump with the metering volume entered.
- 3 Display of the [flow sensor] signal; white=switch point under-shot // grey=switch point exceeded.

Parameter	Factory setting	Setting range
Switching point	-	0 to maximum capacity of the liquid concentrate pump

#### Performing calibration



#### Interrupting calibration

End calibration at any time by pressing [STOP].

1. Enter the metering volume which corresponds to the minimum metering quantity during standard operation in Text field (1).
2. Start the liquid concentrate pump using [START] (2).

3. ➤ When the liquid concentrate pump is running at the set frequency, you can set the switching point of the flow sensor using the potentiometer on the flow sensor.
  - ⇒ The flow sensor is set correctly, if the switching point is just below the minimum dosing quantity in standard operation. The *[Flow sensor]* signal display (3) changes from grey to white.
4. ➤ Stop the liquid concentrate pump using *[STOP]* (2).

## 8.2.4 Calibration of Water



*Adjust the Ultromat water supply during commissioning. Ultromats with one wetting cone have two water supply lines. Distribute these water supplies using needle valves so that the wetting cone is not over- or underfilled (1 cm below the lower overflow edge).*

Ultromat	Water supply l/h
400	600
1000	1500
2000	3000
4000	6000
6000	9000
8000	12000

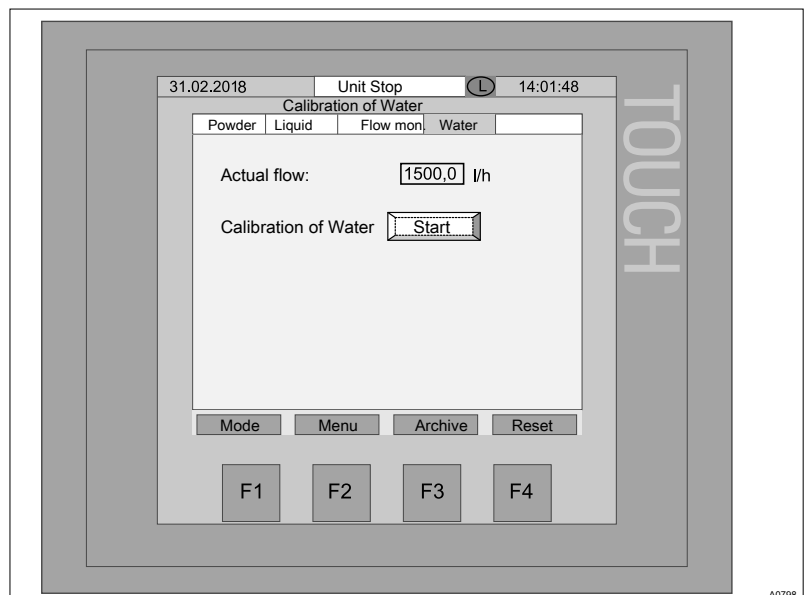


Fig. 31: Calibration of water

## Performing calibration



### **Interrupting calibration**

*Interrupt calibration at any time by tapping [STOP].*

1. Start calibration by tapping [START].  
⇒ The water solenoid valve opens.
2. Adjust the water supply so that the water supply value is displayed in  $[\text{L/h}]$  in the display.
3. Stop calibration using [STOP].  
⇒ The water solenoid valve is closed.

## 8.3 System

The "System" menu enables the following fields to be set:

- Language
- Date and time
- Touch panel
- Control

### 8.3.1 Changing the Language

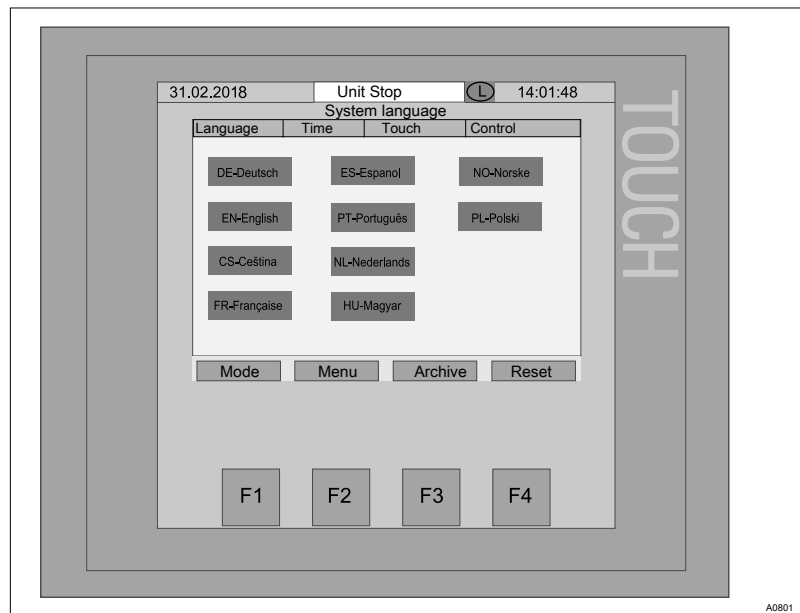


Fig. 32: Changing the language

Proceed as follows to change the language displayed:

1. Select the desired language.
2. Tap [Confirm language].  
⇒ The message [shutting down] is displayed.
3. Tap [Start].  
⇒ The selected language is active.

## Direct access to the Language menu

- ➔ Tap on the *[L]* symbol in the status bar of the touch panel.
- ⇒ The sub-menu *[Change language]* appears in the display.

A total of 10 different languages are available. Please contact the manufacturer's Service department should you not find the language you require. Another language package can then be retrofitted with ease.

## 8.3.2 Setting Date and Time

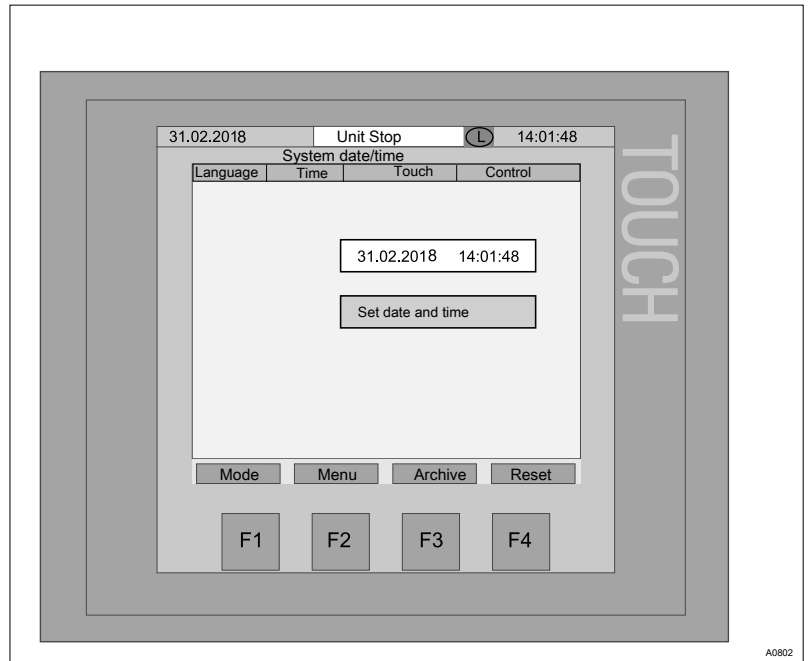


Fig. 33: Setting date and time

The date and time are set as follows:

1. ➔ Tap the button on which the time is displayed.  
⇒ The display changes to the value input view.
2. ➔ Press *[BSP]* to delete the displayed date.
3. ➔ Use the keys *[0 ... 9]* to enter the actual date in the format *[dd.mm.yyyy]*. Example: 31.02.2018.



*Decimal point = Key above the [0].*

4. ➔ To input empty spaces, tap the key to the right of *[0]*.
5. ➔ Enter the time in the format *[hh:mm:ss]*. Example: 14:01:48.



*Colon = press [+/\*] key, then confirm[:].*

*Number pad = Press key [0-9].*

6. ➔ Press Enter.
7. ➔ Tap *[Set date and time]*.  
⇒ The set time is accepted by the system.

### 8.3.3 Touch panel

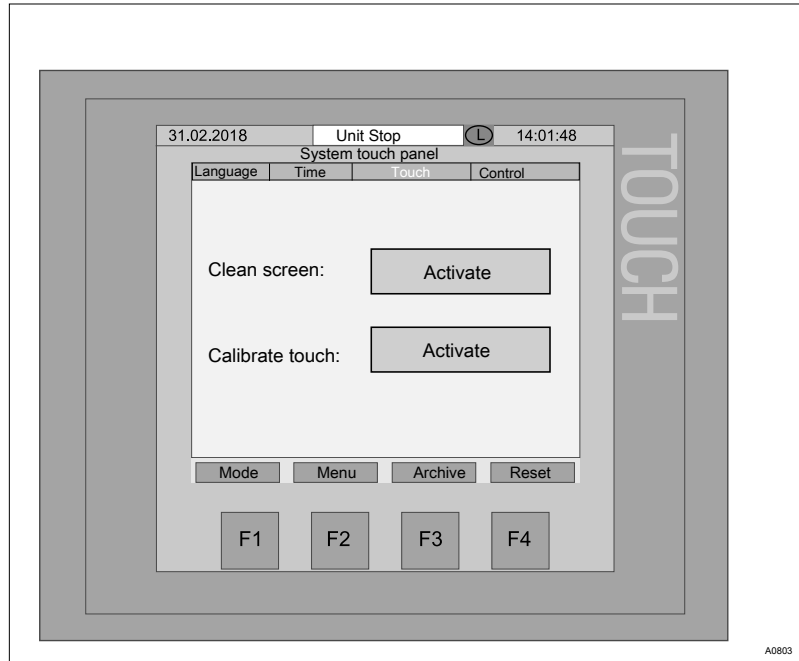


Fig. 34: Display [System]

#### Clean screen:



*The function [Clean screen] is available to enable the touch panel to be cleaned. Using the [Clean screen] function, the touch panel is deactivated for the set time and consequently the touch panel can be cleaned without inadvertently triggering functions.*

Use the [Activate] function to call up the [Clean screen] (touch panel).

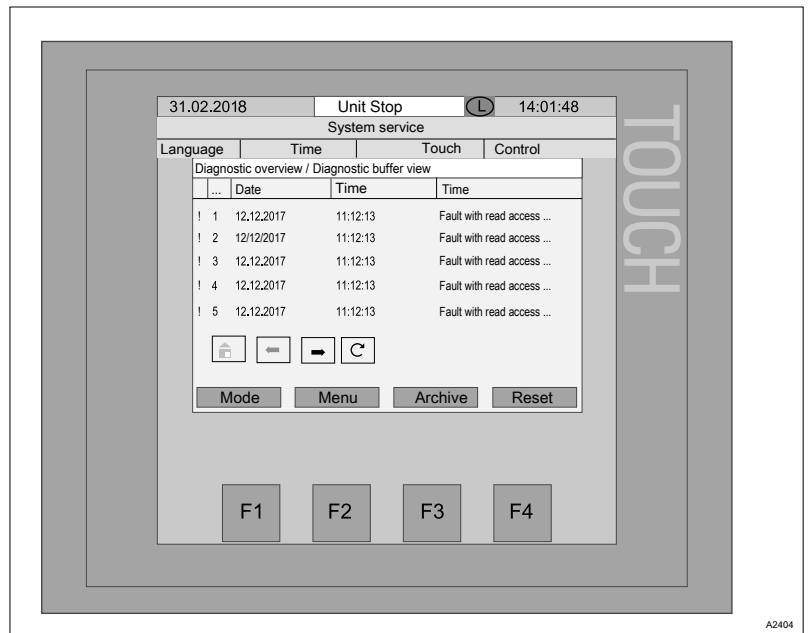
#### Calibrate touch:

Use [Activate] to call up the [Calibrate touch] function. This is for renewed calibration of the sensors if the touch function is insufficiently accurate.

1. ➤ Press [Activate].
2. ➤ Tap the cross displayed five times with your finger.
3. ➤ Tap the touch panel once more so that the calibration value is accepted.



## 8.3.4 Control



*Fig. 35: Control*

Detailed view of the last 100 changes to the control e.g.

- Changes of operating mode
- Parametrisation
- Concentration

This enables you to obtain a detailed diagnostic and trace changes to the system in the event of faults.

## 8.4 Concentration



If the PROFIBUS®, MODBUS® or PROFINET® are included in the scope of delivery, the [Concentration] and the [Internal] / [External] keys appear on the display. In [Internal] mode, the setpoints for the concentration (Powder and Liquid) are specified by the control panel. The process management system can only read data. In [External] mode, the setpoints for the concentration are specified by the process management system. Additionally in [External] mode, the Ultromat can be switched to Pause and a fault acknowledged using the PROFIBUS®. Further information is available in the supplementary PROFIBUS® or PROFINET® instructions. If the PROFIBUS®, MODBUS® or PROFINET® are not connected, select the [Internal] setting.

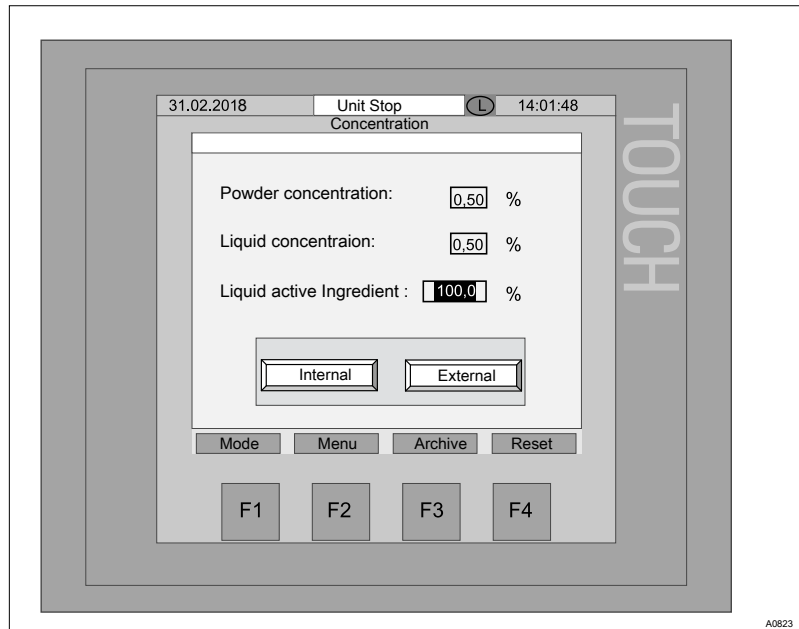


Fig. 36: Concentration of powder / liquid

Parameter	Factory setting	Setting range
Powder concentration	0.5 %	0.05 ... 2.00 %
Liquid concentration	0.5 %	0.05 ... 2.00 %
Liquid active ingredient	100 %	10 ... 100 %
PROFIBUS®/PROFINET®/MODBUS® (Internal/External)	Internal	Internal or External



The parameters [Concentration of powder/liquid] can be used to adjust the concentration of the batched polymer solution set in the Ultramat. The parameter [Liquid active ingredient] specifies the content of the active ingredient in the liquid polymer.



**Liquid active ingredient**

The liquid polymers are provided with different active ingredients. If the active ingredient content of the powder is 100%, then the active ingredient fraction of the liquid polymer is generally in a range below 50% (typically 40%).

In practice it is generally desirable to use the same concentration settings with the liquid polymer as for the powder product. Therefore the concentration of active ingredient in the liquid polymer (typically 40%) is entered in the control.

8.5 Information

8.5.1 Ultramat Identity Code

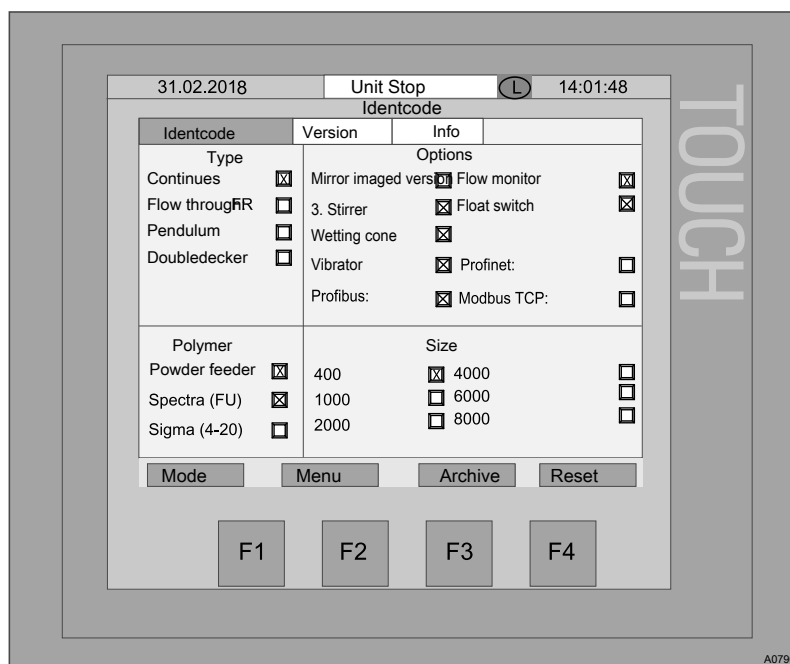


Fig. 37: Ultramat identity code

Pressing F2 [MENU]> [INFO] lets you access the [Identcode] screen. You can read the features with which the Ultramat is equipped.

Feature	Remarks
3rd stirrer	This option means the Ultramat has a stirrer in chamber 3.
Wetting cone	The wetting cone should improve the mixing of polymer and water.

Feature	Remarks
Vibrator	Only in the „dry feeder“ version. The vibrator is used to improve the sliding of the polymer.
Flow monitor	Only in the „Spectra (FC)“ version. Monitors the flow of liquid concentrate in the line.
Float switch	Only in the „Liquid“ version. Monitors the liquid level of the liquid concentrate in the storage tank.
Profibus/Profinet/ Modbus TCP	Interface for data exchange

### 8.5.2 Software Version



Fig. 38: Software version

In this display you can read off the version of the touch panel and the S7 project as well as its creation date. Likewise the system project number can be read off.

### 8.5.3 Operating Hour Counter of Installed Motors

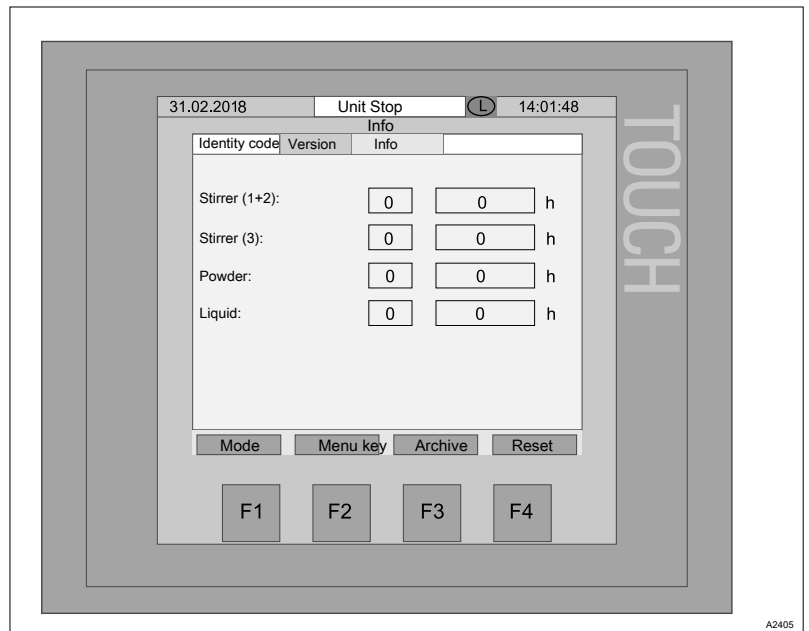


Fig. 39: Operating hour counter

Display in the first column – number of motor starts; second column operating hours in “h”:

- Stirrer 1+2 motors
- Stirrer 3 motor
- Powder feeder
- Liquid concentrate pumps

### 8.6 Service

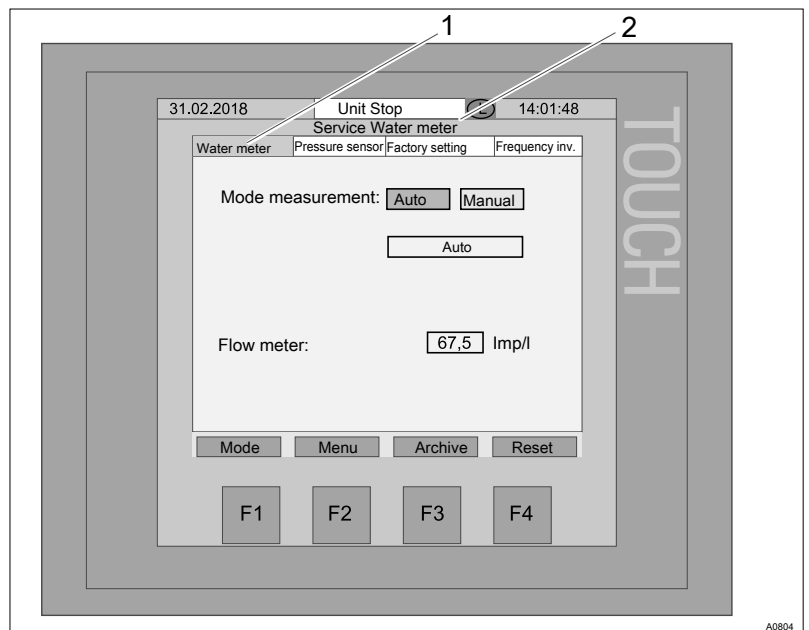


Fig. 40: Service

- 1 Button for jumping to the different service groups
- 2 Title of the current service group

### 8.6.1 Service - Water Meter

#### Manual flow entry:

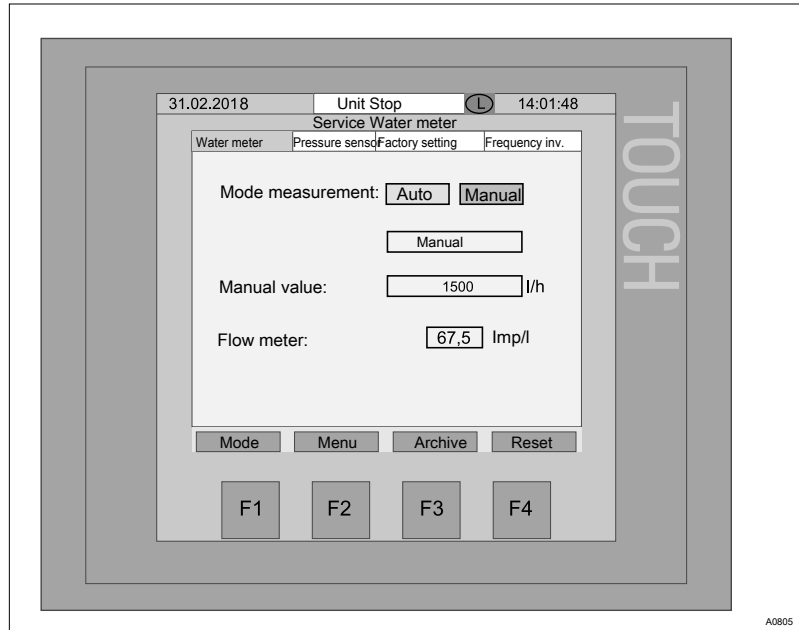


Fig. 41: Manual flow entry

In the event of failure of the automatic water flow measurement, you can switch to manual flow measurement for emergency operation. Manual flow measurement means that automatic measurement is out of service.

Manual flow measurement is helpful if the flow meter is faulty, but the system has to remain in operation until the function is restored. The value for the manual setting of the water flow is entered in [litres per hour] and is activated by the [Manual] key.

#### Flow meter:

The flow volume is measured using a pulse encoder. This encoder gives a number of pull/l [pulses per litre] of water. This field is used to enter the correct number of pulses when using different pulse encoders.

## 8.6.2 Service – Pressure Sensor

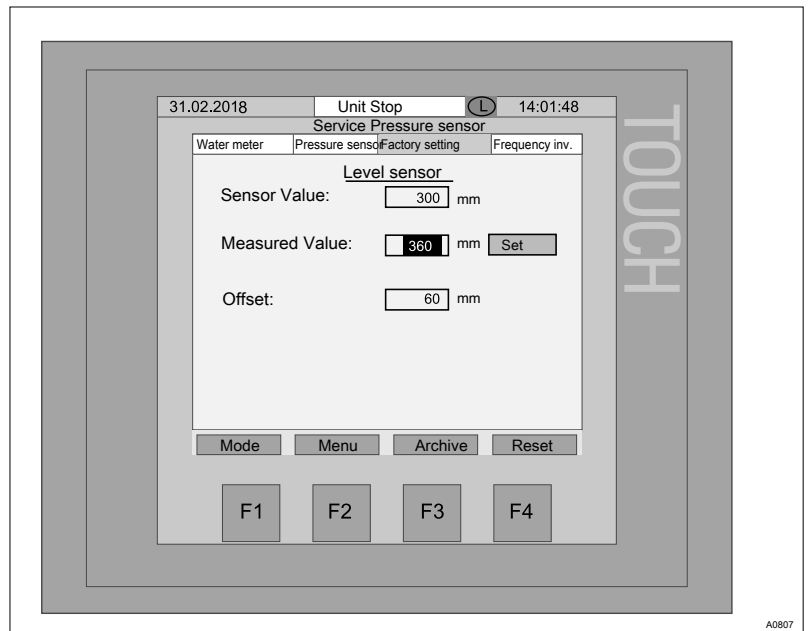


Fig. 42: Service – pressure sensor

**Sensor Value:**

The *[Sensor Value]* shows the filling height of the storage tank measured. The *[Sensor Value]* does not represent the actual filling height. To enable the correct filling height to be displayed, add the dead zone in the lower part of the storage tank (approx. 60 mm) to the *[Sensor Value]*.

**Measured Value:**

To determine the dead zone of the storage tank, fill the storage tank to at least 50%. Now you can measure the filling height with a dip stick. You must enter this value in *[mm]* in the text field *[Measured Value]*.

The offset is calculated by the pressing *[Set]*.

**Offset:**

Display of the current offset (offset = dead zone).

Measured Value = Sensor Value + Offset

### 8.6.3 Service – Factory Setting and Changing Identity Code

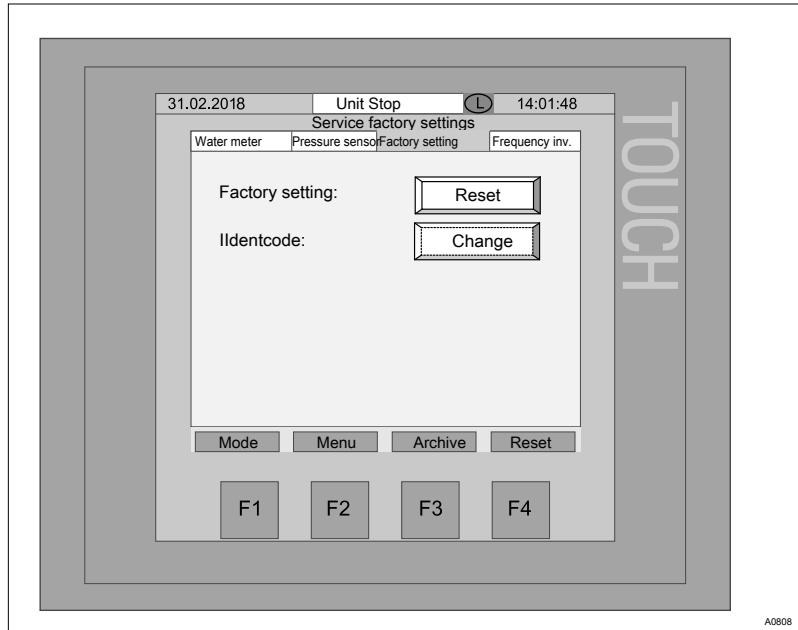


Fig. 43: Service – Factory setting and changing identity code

#### Factory setting:

Reset the parameters of the Ultramat to the factory settings using *[Reset]*.

#### Identcode:



#### NOTICE!

Incorrect functions can occur if the incorrect identity code (identity code) is entered.

The function is password-protected.

Change the identity code using *[Identcode]*.

The identity code is programmed in accordance with the factory setting. You can enter technically feasible extensions here to facilitate additional options. The resulting identity code is checked for feasibility and can only then be altered. For information on the identity code currently set, see [Chapter 8.5 „Information“ on page 59](#)



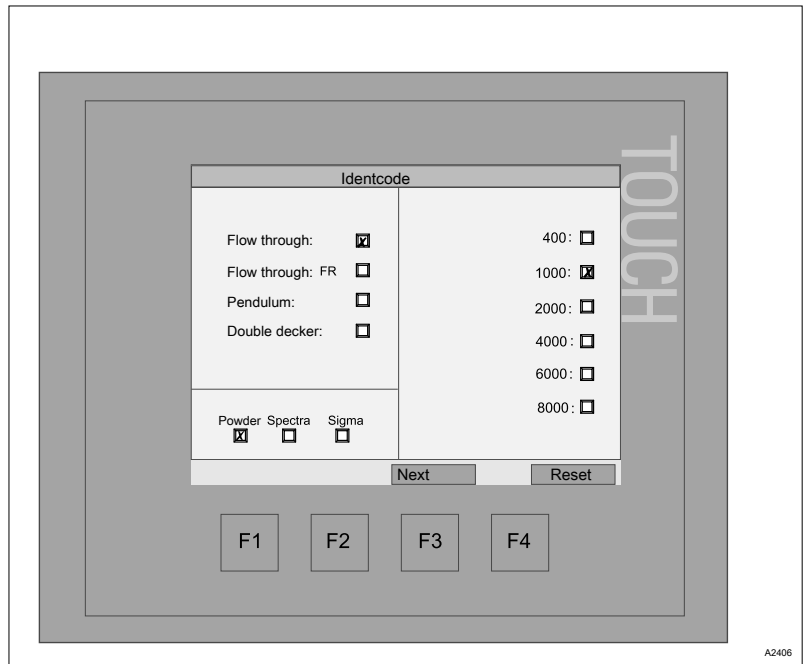


Fig. 44: Selection of Ultramat types

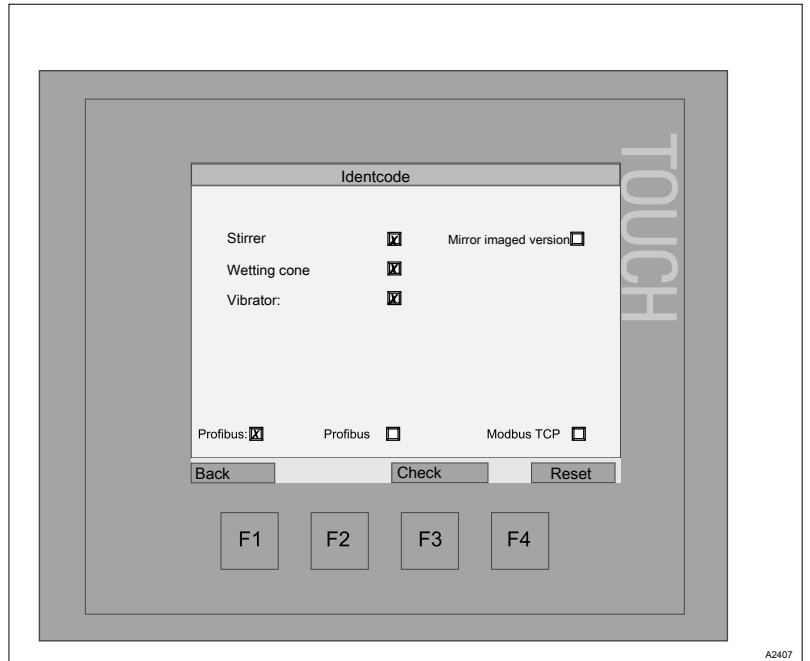


Fig. 45: Selection of options

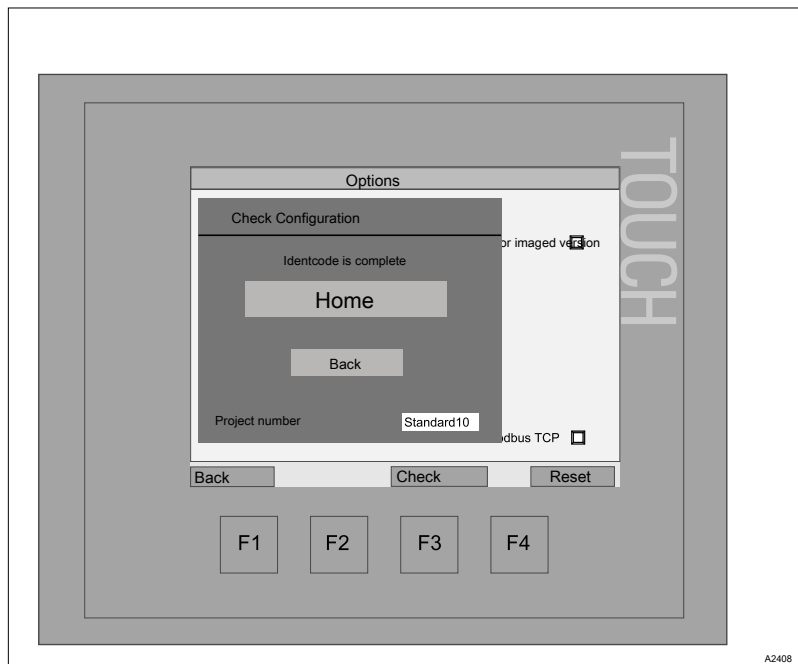


Fig. 46: Checking the configuration

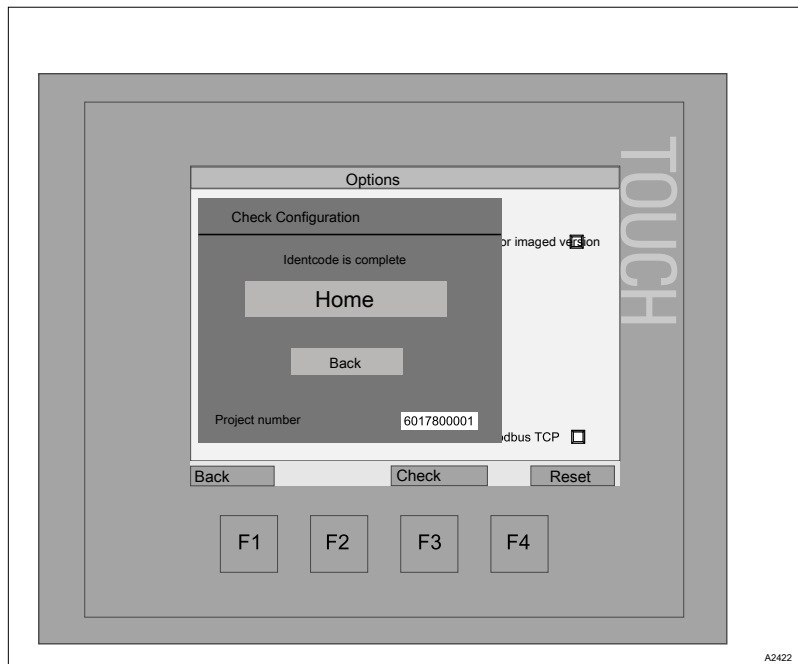
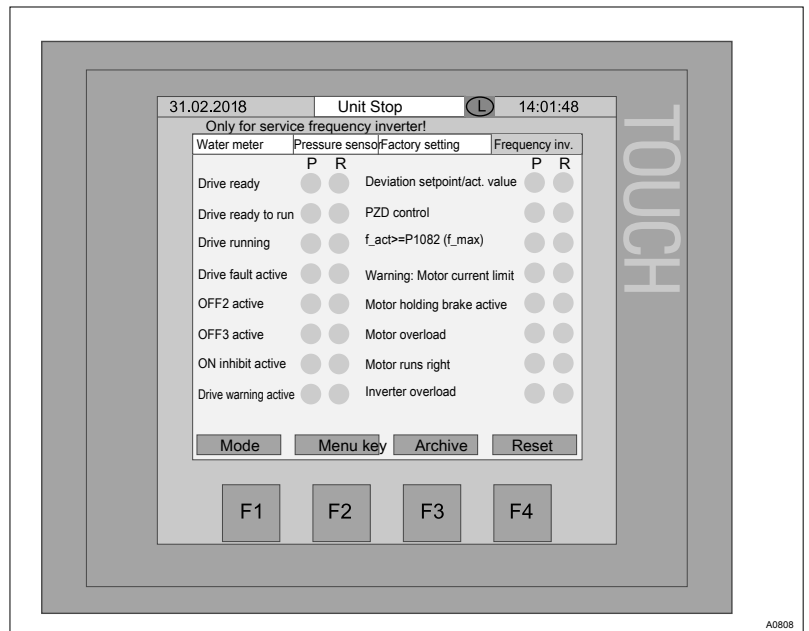


Fig. 47: Naming the project

1. The system automatically jumps to the Home menu if the test has been successfully completed.
2. With an incorrect or incomplete identity code, please go back one level and enter the necessary details.

## 8.6.4 Frequency Converter for Dry Feeder - Status Display



*Fig. 48: Status display*

Detailed display of the operating status of the frequency converter using green or red light points. You can diagnose errors more precisely and simply here.

## 9 Operation of the Sinamics G110 frequency converter

Frequency Converter = FC

### 9.1 Function of the operating elements

The parameters of the frequency converter are set in the factory using the dry feeders and liquid concentrate pumps used in the Ultramat. Once the liquid concentrate pump is connected (not contained in the scope of supply), the parameters must be checked locally and adjusted to match the liquid concentrate pump.



Fig. 49: Sinamics G110 frequency converter

	Function	Remarks
<b>I</b>	Starts the motor	Key deactivated
<b>O</b>	Stops the motor	Key deactivated
<b>↔</b>	Switches over the direction of rotation	Key deactivated
<b>Fn</b>	Key jumps to [r0000] Fault acknowledgement	
<b>P</b>	Access to parameters	
<b>▲</b>	Increase value	
<b>▼</b>	Reduce value	
<b>JOG</b>	Jog motor	Key deactivated

## 9.2 Adjustment of the frequency converter

The frequency converter parameters are set in the factory on the dry feeder and liquid concentrate pump.

Here, the following parameters differ from the standard parameters of the frequency converter (FC):

*Tab. 6: Settings for the dry feeder:*

Parameter G110	Dry feeder values
0003	3
0305	1.22 A
0307	0.18 kW
0311	1360 RPM
0700	5
1000	5
1082	100 Hz
1120	0.1 s
1121	0.1 s
1210	4
2000	100 Hz
2010	9
2011	1
2012	2
2013	4
2014	6000

*Tab. 7: Settings for the Spectra liquid concentrate pump:*

<b>Parameter G110</b>	<b>Spectra values</b>
0003	3
0305	1.9 A
0307	0.37 kW
0311	1380 RPM
0700	5
0731	4
1000	5
1082	83 Hz
1120	0.1 s
1121	0.1 s
1210	4
2000	83 Hz
2010	9
2011	2
2012	2
2013	4
2014	6000

## 10 Setting the additional components

### 10.1 Adjusting the Capacitive Sensor

The capacitive sensor for reporting a shortage of powder in the dry material feeder must be checked and possibly adjusted.

The sensor has a yellow LED at its cable end to indicate the switching state and also a sunken adjustment screw to adjust its sensitivity.

The sensor is checked and adjusted in 2 steps:

#### With an empty dry material feeder

1. ➤ The yellow LED on the sensor is not illuminated - the setting is correct.
2. ➤ The yellow LED on the sensor is illuminated:
  - ⇒ Reduce the sensitivity on the adjustment screw (turn anti-clockwise) until the LED goes out.

#### With a filled dry material feeder

1. ➤ The yellow LED on the sensor is not illuminated - the setting is correct.
2. ➤ The yellow LED on the sensor is illuminated:
  - ⇒ Increase the sensitivity on the adjustment screw (turn clockwise) until the LED is illuminated.

### 10.2 Setting the Sigma (Factory Settings)

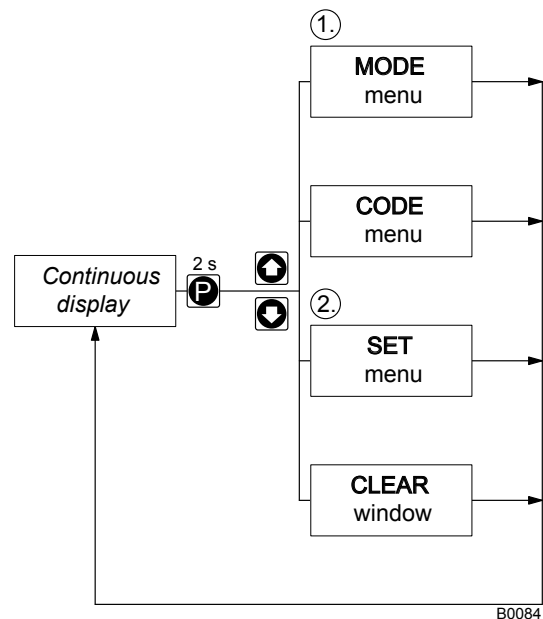


Fig. 50: Adjustment mode menus

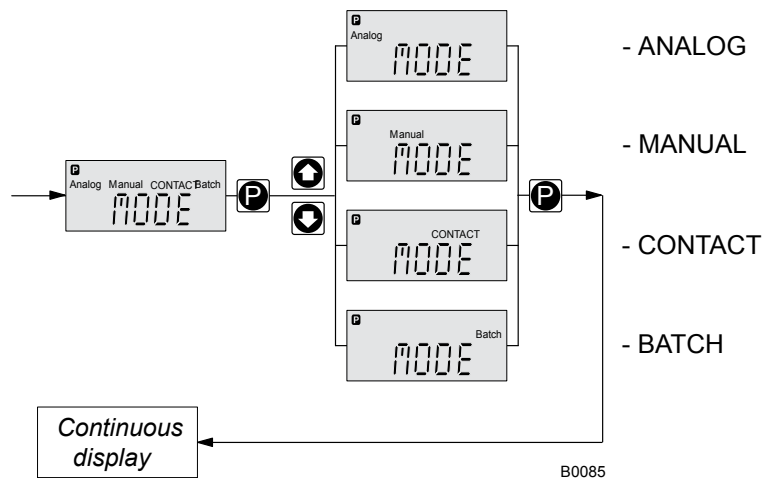


Fig. 51: Selecting the operating mode (MODE menu)

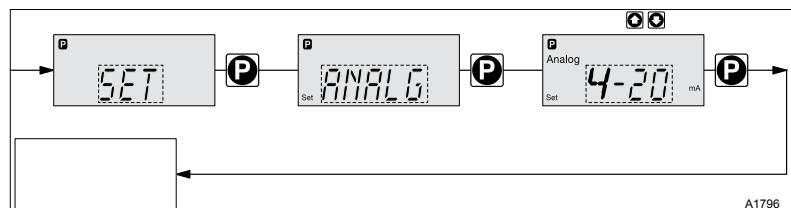


Fig. 52: [Analog] operating mode settings

### Setting "Analog" operating mode

1. ➤ Keep the [P] key pressed until the display flashes. Then release the [P] key
2. ➤ Press the arrow key until [MODE] appears on the display. Then press the [P] key
3. ➤ Keep the arrow key pressed until [ANALG] appears on the display. Then press the [P] key
  - ⇒ The pump is now operating in Analog mode.



If the red LED display lights up and [ANALG] appears on the display, then the pump is not receiving an analog signal.

### Setting the analog input 4 ... 20 mA

1. ➤ Keep the [P] key pressed until the display flashes. Then release the [P] key
2. ➤ Keep the arrow key pressed until [SET] appears on the display. Then press the [P] key
3. ➤ Keep the arrow key pressed until [ANALG] appears on the display. Then press the [P] key
4. ➤ Keep the arrow key pressed until [4...20 mA] appears on the display. Then press the [P] key
  - ⇒ The pump reacts proportionally to the current signal, 4 mA = 0 strokes/min., 20 mA = maximum rate.
5. ➤ Use the START/STOP key to start or stop the pump.



## 11 Operation of the system

User qualification, system operation: trained user, see [Chapter 2.3 „Users' qualifications“](#) on page 11



### WARNING!

#### Danger of slipping

Danger due to the escaping of water or polymer.

Mixtures of polymer and water are slippery

- Ensure that you have a secure foothold when filling the dry product hopper
- Immediately remove any spilled powdered polymer or leaked polymer solution
- Always observe the safety data sheet for the polymer used.



### WARNING!

#### Danger from hazardous substances!

Possible consequence: Fatal or very serious injuries.

Please ensure when handling hazardous substances that you have read the latest safety data sheets provided by the manufacture of the hazardous substance. The actions required are described in the safety data sheet. Check the safety data sheet regularly and replace, if necessary, as the hazard potential of a substance can be re-evaluated at any time based on new findings.

The system operator is responsible for ensuring that these safety data sheets are available and that they are kept up to date, as well as for producing an associated hazard assessment for the workstations affected.

### 11.1 Normal mode

#### 11.1.1 Prerequisites for correct and proper operation



### WARNING!

#### Danger due to system operation

The system may only be operated by instructed personnel

- The system can in principle be stopped and restarted in every operating phase
- The cause of a fault should be eliminated before the corresponding fault message is acknowledged. However, you can silence the horn by pressing the key „Horn off“.

Requirements:

- A reasonable operating parameter set-up
- An accurate calibration
- No unauthorised parameter changes to the frequency converter

### 11.1.2 Refilling the feed hopper with powdered polymer

If the feed hopper is not automatically filled by a small feed unit, the supply of powdered polymer must be continuously checked and refilled in good time.

This can be done while the system is operational. To do so, remove the cover of the feed hopper and carefully shake in powdered polymer.

### 11.1.3 Refilling the concentrate storage tank with liquid polymer

If the concentrate storage tank is not automatically refilled, the reservoir of liquid polymer must be continuously checked and refilled in good time.

## 11.2 Behaviour When Switching on Mains Power and in the Event of Mains Power Failure



### **WARNING!**

#### **Automatic start-up**

Each time mains power is switched on, the stirrers start up without regard to the system status measured

Each time mains power is switched on, preparation mode can commence.

Therefore keep all covers or inspection openings closed.

If it is necessary to work on the system, disconnect the system from the mains and secure it to prevent switching back on.

### Switching on mains power

Each time mains power is switched on, the stirrers start up without regard to the system status measured

By contrast, the system only starts in preparation mode if the Min. Switch point has been reached in reservoir 3. If there is a loss of mains power during preparation mode, even if only for a short period, once mains power is reconnected, preparation mode is not continued.

**Behaviour in the event of loss of mains power**

Following a mains power failure, or in the event of a longer loss of mains power, which results in the controller being restarted, the controller will unrestrictedly continue with the operation of the system based on the statuses measured. If the level of the storage tank is within the normal range, no preparation operation will be started even if a preparation process was running prior to the interruption.

**11.3 Decommissioning**



**WARNING!**

**System transportation**

Danger due to the high weight of the system.

If the system is to be moved, observe chapter without fail ↪ *Chapter 3 „Transporting and storing the system“ on page 15*

For a short period

➔ Press and hold key [F1], and select [Stop] mode.

For a longer period

1. ➔ Switch the main switch to „Off“
2. ➔ Lock the main switch to prevent the system from being switched on accidentally

For more than 2 days



**CAUTION!**

**The liquid end and the lines can become blocked**

When bringing back into service, the liquid polymer must not come into contact with rinsing water

Clear any rinsing water from the liquid end and lines

- Rinse the liquid end, the concentrate pump, the suction line and the discharge line
- Dismantle and dry the liquid end of the concentrate pump
- Clean the suction line and discharge line with suitable cleaning devices

1. ➔ Switch the main switch to „Off“
2. ➔ Lock the main switch to prevent unauthorised switching back on of the system
3. ➔ Pull out the mains plug
4. ➔ Completely empty the powder feeder
5. ➔ Empty the three chamber storage tank through the provided individual chamber connectors.
6. ➔ Carefully rinse the three chamber tank with water
7. ➔ Also rinse the rinsing apparatus (hopper and mixing device) once more with water
8. ➔ Carefully flush the line between the shut-off valve of chamber 3 and the feed pump. (Should an flushing connector have been installed, this will simplify flushing.)

## 11.4 Disposal of Used Parts

- **User qualification:** instructed user, see [Chapter 2.3 „Users' qualifications“](#) on page 11



### NOTICE!

#### Regulations governing the disposal of used parts

- Note the national regulations and legal standards that currently apply in your country

The manufacturer will take back decontaminated used units providing they are covered by adequate postage.

Decontaminate the unit before returning it for repair. To do so, remove all traces of hazardous substances. Refer to the Material Safety Data Sheet for your feed chemical.








A current Declaration of Decontamination is available to download on the ProMinent website.

## 12 Incorrect Operation of the System

- The incorrect position of the discharge valves can result in malfunction
- The incorrect position of the shut-off valves in the water supply line can result in malfunction
- Unauthorised persons must be prevented from entering or changing operating parameters. Enter the access code
- The preset parameter values for the frequency converter must not be changed. They are factory-set on the powder feeder
- When setting the concentration, the maximum viscosity limit of 1500 mPas must not be exceeded
- If you fail to refill the polymer reservoir, the system will stop
- If you do not clear the cause of a system-side fault and the enter key is pressed, incorrect device behaviour can result
- Further, more serious faults may occur should the system be operated without the original faults having been eliminated

## 13 Commissioning

Proceed as follows during commissioning:

Step	Task
1	Assembly and installation, see  <i>Chapter 6 „Assembly and Installation“ on page 26</i>
2	Adjust the capacitive sensors, see  <i>Chapter 10.1 „Adjusting the Capacitive Sensor“ on page 71</i>
3	Check the parameters, see  <i>Chapter 8.1 „Parameters“ on page 42</i>
4	Check date and time, see  <i>Chapter 8.3.2 „Setting Date and Time“ on page 55</i>
5	Perform calibration, see  <i>Chapter 8.2 „Calibration“ on page 49</i>
6	Adjust concentration, see  <i>Chapter 8.4 „Concentration“ on page 58</i>
7	Switch system to operating mode [AUTO], see  <i>„[AUTO] operating mode“ on page 32</i>



### CAUTION!

#### Water damage possible

Large volumes of water or polymer solution can escape from the system. Monitor the operation of the system in this start-up phase.





- Prior to starting the batching operation, ensure that the drain cocks are closed for all three chambers.
- Monitor in particular the correct switching operation of the liquid level sensor when it first reaches the switching point in question.



#### ***Fault message "Ultromat tank is empty"***

*The fault message [Ultromat tank is empty] is unavoidable, as all chambers are now empty. Acknowledge this fault.*

#### Requirements:

- You have checked the correct and proper assembly and installation of the system
  - The drainage cocks for the three chambers are closed
  - The feed hopper has been filled with the intended powdered polymer
  - The concentrate storage tank has been filled with the intended liquid polymer
1.  All the operating parameters have been set
  2.  All the necessary devices have been calibrated
  3.  Start the system by switching to AUTO operating mode, see  *„[AUTO] operating mode“ on page 32,*
    - ⇒ the system starts up and begins the automatic batching operation.

## 14 Maintenance

### 14.1 Inspect the powder feeder and wetting apparatus

Powder feeder

1. ➤ Inspect the powder feeder regularly during operation to ensure that it is working correctly

2. ➤ Check that the powdered polymer is being dosed correctly

Wetting equipment

3. ➤ Check whether the conical wetting area of the wetting cone is completely rinsed over with water and that no powder deposits form

### 14.2 Cleaning the filter insert in the pressure reducer



*You must clean the filter insert no later than when 2/3 of the throughput surface of the screen insert is dirty.*

1. ➤ To remove the filter insert, you must place the system in [Stop] mode by pressing the [F1] key.

2. ➤ Manually close the shut-off valve upstream of the pressure reducer

3. ➤ Details of the subsequent procedure, can be found in the manufacturer's instructions for the pressure reducer.

### 14.3 Checking and cleaning the solenoid valve



#### WARNING!

##### Danger of electric shock!

Possible consequence: Fatal or very serious injuries

The control cabinet must always be closed during operation

The main switch must be set to „0“ and secured against restart before any installation or maintenance work can begin.



#### CAUTION!

##### Possibility of incorrect system operation

- When handling the solenoid valve always be aware of the cable
- When assembling, take note of the correct position and layout of the parts



**NOTICE!**

**More information**

You can find more information and the corresponding drawing contained in the solenoid valve operating instructions in the appendix to this documentation.

1. Fully close the upstream shut-off valve
2. Undo the four socket cap screws on the housing and remove the valve cap together with the rinsing attachment
  - ⇒ Look out for the cable.
3. Remove the inserts
4. Check the diaphragm for damage
5. Clean the housing inner, especially the throttling port and the small pre-spill port in the valve outlet

## 14.4 Remove the flow meter (turboDOS) and test



**CAUTION!**

**Possibility of incorrect system operation**

- When handling the flow meter always be aware of the cable
- When refitting the flow meter, note the flow arrow on the housing

1. Start the system with the *[F1]* key *[Stop]* mode.
2. Close the stopcock in the water supply line
3. To remove the flow meter, undo the corresponding threaded connector in the water piping
4. Check the turbine wheel within the flow meter to ensure it rotates freely and clean as necessary
5. Fit the flow meter with the correct alignment in the water supply line (flow arrow)



## 14.5 Removing the cover of an inspection opening



### CAUTION!

**Propellers are rotating in the storage tanks!**

Slight or minor injuries.

Switch off the system and only then remove the screwed cover of an inspection opening.

As a matter of principle, the system must only be operated with the covers of the inspection openings tightly screwed in place. The covers may only be removed temporarily:

- To check the liquid level
- To check the liquid level sensors for correct switching operation
  - After the inspection work, replace all covers and secure

## 14.6 Cleaning the surface of the storage tank

From time to time clean the surface of the storage tank, as with time, a slippery film can form on it. Always observe the instructions on the safety data sheet for the polymer used.

## 15 Fault Messages

### 15.1 Troubleshooting

User qualification, troubleshooting: trained user, see ↪ *Chapter 2.3 „Users' qualifications“ on page 11*

User qualification, troubleshooting (unspecified faults): Customer service, see ↪ *Chapter 2.3 „Users' qualifications“ on page 11*



#### **WARNING!**

##### **Automatic start-up**

Each time mains power is switched on, the stirrers start up without regard to the system status measured

Each time mains power is switched on, preparation mode can commence.

Therefore keep all covers or inspection openings closed.

If it is necessary to work on the system, disconnect the system from the mains and secure it to prevent switching back on.



*Refer also to the operating instructions for purchased parts when troubleshooting.*

#### **Collective alarm**

A system fault/malfunction (collective alarm) is acoustically reported with a warning tone and visually by the red warning light on the control cabinet. The controller also displays a fault message. The warning tone can be switched off by pressing *[Reset F4]*.

The activation of the downstream feed pump (polymer solution) remains unaffected by the collective alarm.

#### **Acknowledgement**

The fault message must be acknowledged with the Reset key once the cause of the fault has been eliminated so that the system can restart operation following the fault.

#### **Unspecified faults**

Should a problem occur, which is not included in this list or should a listed fault not be remedied by the suggested troubleshooting measures, please contact ProMinent®-ProMaqua®Customer Services to remedy the problem.

#### **Sensors**

For every fault analysis it should first be considered that a capacitive proximity sensor or a concentrate flow sensor may possibly be incorrectly signalling a fault (because its sensitivity has been set too high or it is triggering/responding to suddenly changed ambient conditions).

## 15.2 General notes on fault messages



### Acknowledging fault messages

You must acknowledge fault messages.

If the system generates a fault message, optical and acoustic signalling of the fault is triggered. Simultaneously with the generation of the fault message a message about the type and time of the fault is output to the display of the operating panel.

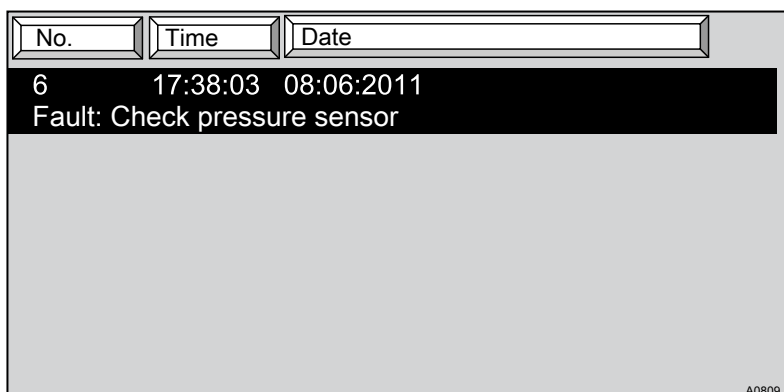


Fig. 53: Fault message on the display

The fault and the number of occurrences of the fault are signalled by the following fault symbol



Fig. 54: Fault

If you have cleared the fault, the optical and acoustic signalling is reset by pressing the key *[RESET]* (F4) and the fault message on the display is deleted.

If you have not cleared the fault, only the acoustic signalling is reset by pressing the key *[RESET]* (F4). The optical alarm display as does the fault message.

In parallel to the optical signalling of the alarm the fault switches the system output *[COLLECTIVE ALARM]*. If a fault occurs, the output *[COLLECTIVE ALARM]* is activated (switches from 0 to 1).

## 15.3 Faults - Cause - Remedy

Fault message	Cause	Remedy	Stop preparation Stop	Extraction blocked
Dry feeder is not calibrated	Dry feeder not yet calibrated	Calibrate the dry feeder	YES	NO
Check dry feeder frequency converter	Frequency converter defective	Check frequency converter	YES	NO
	Frequency converter parametrisation is incorrect	Check frequency converter parameters		
Powder feeder is empty	Feed hopper is empty	Fill the feed hopper	YES	NO
	Digital input defective	Check digital input		
	Powder sensor defective	Check powder sensor		

## Fault Messages

Fault message	Cause	Remedy	Stop preparation Stop	Extraction blocked
Dry feeder - max. capacity reached	Dry feeder calibration is faulty	Repeat dry feeder calibration	NO	NO
	Water supply too high	Reduce water supply		
	Concentration parameter too high	Reduce concentration parameter		
Liquid concentrate pump is not calibrated	Liquid concentrate pump is not yet calibrated	Calibrate the liquid concentrate pump		
Check liquid concentrate pump Sigma	Pump defective	Check pump	YES	NO
Check frequency converter liquid concentrate pump	Frequency converter defective	Check frequency converter	YES	NO
	Frequency converter parametrisation is incorrect	Check frequency converter parameters		
The liquid concentrate storage tank is empty	Storage tank is empty	Fill storage tank	YES	NO
	Float switch defective	Check float switch		
	Digital input defective	Check digital input		
Check liquid concentrate flow sensor	Storage tank is empty	Fill storage tank	YES	NO
	The flow sensor is not correctly adjusted	Calibrate flow sensor		
	Digital input defective	Check digital input		
Liquid concentrate pump - max. capacity reached	Liquid concentrate pump calibration is faulty	Repeat liquid concentrate pump calibration	NO	NO
	Water supply too high	Reduce water supply		
	Concentration parameter too high	Reduce concentration parameter		
Liquid concentrate pump - min. capacity reached	Concentration parameter too low	Increase concentration parameter	NO	NO
	Water supply too low	Increase water supply		
	Liquid concentrate pump calibration is faulty	Calibrate the liquid concentrate pump		
Water supply too low	Minimum water supply parameter too high	Check minimum water supply parameter	NO	NO
	Variations in the water supply	Check the water supply		
	Filter bowl blocked	Clean the filter bowl		
	Pressure reducer set incorrectly	Set pressure reducer correctly		
	Water meter defective	Check water meter		
	Digital input defective	Check digital input		

Fault message	Cause	Remedy	Stop preparation Stop	Extraction blocked
Water supply too low. Ultramat stop	Minimum water supply parameter too high	Check minimum water supply parameter	YES	NO
	Water supply failed	Check the water supply		
	Variations in the water supply	Check the water supply		
	Filter blocked	Clean the filter		
	Pressure reducer set incorrectly	Set pressure reducer correctly		
	Water meter defective	Check water meter		
	Digital input defective	Check digital input		
Wetting cone too full	Needle valves to the wetting cone not set correctly	Adjust the needle valves	YES	NO
	Wetting cone blocked	Clean the wetting cone		
	Sensor defective	Check sensors		
	Digital input defective	Check digital input		
Ultramat storage tank is empty	Extraction from the Ultramat is too high	Reduce extraction	NO	YES
	Water supply too low	Increase water supply		
	Pressure sensor defective	Check pressure sensor		
Ultramat reservoir too full	Post-rinse/flush period parameter too high	Check post-rinse/flush period parameter	YES	NO
	Solenoid valve defective	Checking the solenoid valve		
	Pressure sensor defective	Check pressure sensor		
Check pressure sensor	Sensor defective	Check sensors	YES	YES
	Analogue input defective	Check analogue input		
Stirrer motor protection switch triggered	Defective motor	Check motor	YES	NO
	Stirrer sluggish	Mechanically check stirrer		
	Motor protection switch set incorrectly	Check motor protection switch setting		
	Digital input defective	Check digital input		
Water low in the redilution unit	Water supply to redilution unit failed	Check water supply to redilution unit	NO	NO
	Limit switch defective	Check limit switch		
	Digital input defective	Check digital input		

## Fault Messages

Fault message	Cause	Remedy	Stop preparation Stop	Extraction blocked
1F2 fuse activated	Short circuit	Check for short circuit	YES	NO
	Connected devices defective	Check devices		
	Digital input defective	Check digital input		
1F6 fuse activated	Short circuit	Check for short circuit	YES	NO
	Connected devices defective	Check devices		
	Digital input defective	Check digital input		
PROFIBUS®	PROFIBUS® faulty	Check PROFIBUS®	YES	NO
	Cable defective	Check cable	YES	NO
	Plug defective	Check plug	YES	NO
	Address not correct	Check PROFIBUS® parameters	YES	NO
PROFINET®	PROFINET® faulty	Check PROFINET®	YES	NO
	Cable defective	Check cable	YES	NO
	Plug defective	Check plug	YES	NO
	IP address and PROFINET® name not allocated	Check allocation	YES	NO

## 16 Systems / Data Sheets

### 16.1 Logical Statuses

Tab. 8: Logical statuses of the digital inputs:

Input	Signal designation	Logical status*	Status description
DI A.0	Turbodos	-	
DI A.1	Fault voltage 230 V	1	Voltage OK
		0	Fault
DI A.2	Fault voltage 24 V	1	Voltage OK
		0	Fault
DI A.3	Fault stirrer	1	Stirrer OK
		0	Fault
DI A.4	Pause	1	Pause not active
		0	Pause active
DI A.5	Redilution pump	1	Chemical transfer pump on (water supply available)
		0	Chemical transfer pump off (water supply disconnected)
DI A.6	Redilution flow monitor	1	Flow present
		0	Flow not present
DI B.0	Lack of powder dry feeder	1	Powder present
		0	Powder not present
DI B.1	Overflow wetting cone	1	Wetting cone OK
		0	Wetting cone overflow
DI B.2	Float switch liquid concentrate	1	Liquid concentrate present
		0	Liquid concentrate empty
DI B.3	Liquid concentrate flow monitor	1	Liquid concentrate flow present
		0	Liquid concentrate flow not present
DI B.4	Liquid concentrate pump fault	1	Liquid concentrate pump OK
		0	Liquid concentrate pump fault

\*) 1 = 24 VDC; 0 = 0 VDC

*Tab. 9: Logical statuses of the digital outputs:*

Output	Signal designation	Logical status*	Status description
DQ A.0	Ready for batching	0	Ultromat not ready for batching
		1	Ultromat ready for batching
DQ A.1	Low flow contact (enable signals)	0	Dry run (chamber 3 is empty)
		1	Chamber 3 is full
DQ A.2	Collective alarm	0	No collective alarm
		1	Collective alarm active
DQ A.3	Horn	0	Horn off
		1	Horn on
DQ A.4	Solenoid valve	0	Solenoid valve closed
		1	Solenoid valve open
DQ A.5	Stirrer 1 and 2	0	Stirrer 1+2 off
		1	Stirrer 1+2 on
DQ A.6	Stirrer 3	0	Stirrer 3 off
		1	Stirrer 3 on
DQ A.7	Heating	0	Heater off
		1	Heater on
DQ B.0	Vibrator	0	Vibrator off
		1	Vibrator on

**\*) 1 = 24 VDC; 0 = 0 VDC**



## 16.2 Operating Menu with Overview of all Modes

### 16.2.1 Mode: Parameter

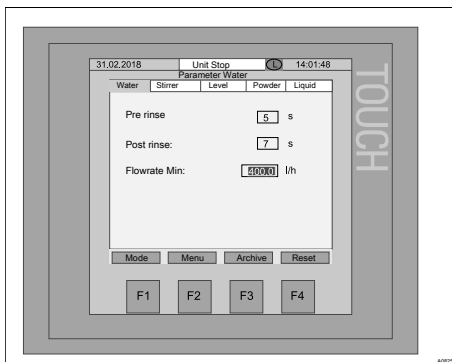


Fig. 55: Example: Parameter [WATER]

Tab. 10

Water:	
Pre rinse:	xx (s)
Post rinse:	xx (s)
Flowrate Min:	xx.xxx (l/h)
Stirrer:	
Stirrer 1+2 on:	xx (min)
Stirrer 1 +2 off:	xx (min)
Stirrer 3 on:	xx (min) (*)
Stirrer 3 off:	xx (min) (*)
Level:	
Max-Max:	xxxx (mm)
Max:	xxxx (mm)
Min:	xxxx (mm)
Min-Min:	xxxx (mm)
First filling:	
Input of 3 levels	
Powder: (*)	
Heater on:	xx (s)
Heater off:	xxx (s)
Vibrator on:	xx (s) (*)
Vibrator off:	xxx (s) (*)
(*) : Many operating menus are not installed depending on the design and setting supplied.	
(**) : First switch the control to "Stop mode".	
x = Input required.	

16.2.2 Mode: Calibration (\*\*)

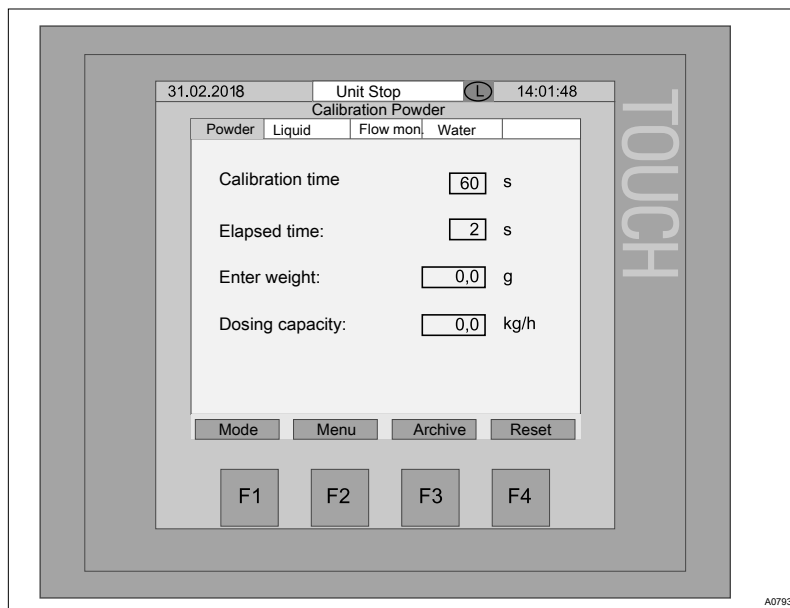


Fig. 56: Calibration of powder

Tab. 11

Powder (*)	
Calibration time:	xxx (s)
Elapsed time:	ddd (s)
Enter weight:	xxxxx.x (g)
Dosing capacity:	dddd.d //(kg/h)
Liquid: (*)	
Calibration time:	xxx (s)
Elapsed time:	ddd (s)
Enter weight:	xxxxx.x (g)
Dosing capacity:	dddd.d //(kg/h)
Flow monitor: (*)	
Switch point:	xx.x (kg/h)
Start/Stop (concentrate pump)	
Water:	
Actual flow:	dddd.d (l/h)
Calibration of water:	Start/Stop
(*) : Many operating menus are not installed depending on the design and setting supplied.	
(**) : First switch the control to "Stop mode".	
x = Input required.	

## 16.2.3 Mode: System

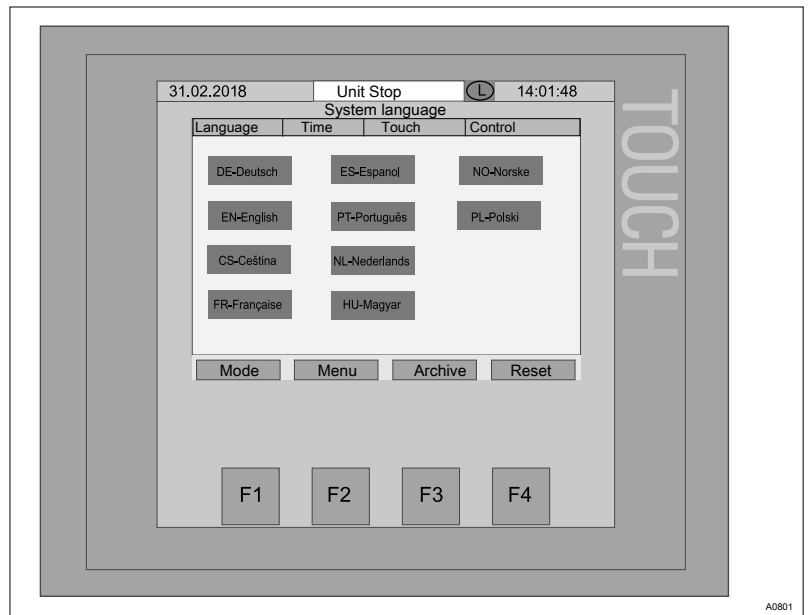


Fig. 57: Changing the language

Tab. 12

Language:

DE, EN, FR, ES, PT(\*)

Confirm language

Start

Time:

31.10.2012 14:01:49

Set date and time

(dd.mm.yyyy hh:mm:ss)

Touch:

Clean screen: Activate

Calibrate touch: Activate

(\*): Many operating menus are not installed depending on the design and setting supplied.

(\*\*): First switch the control to "Stop mode".

x = Input required.

16.2.4 Mode: Concentration

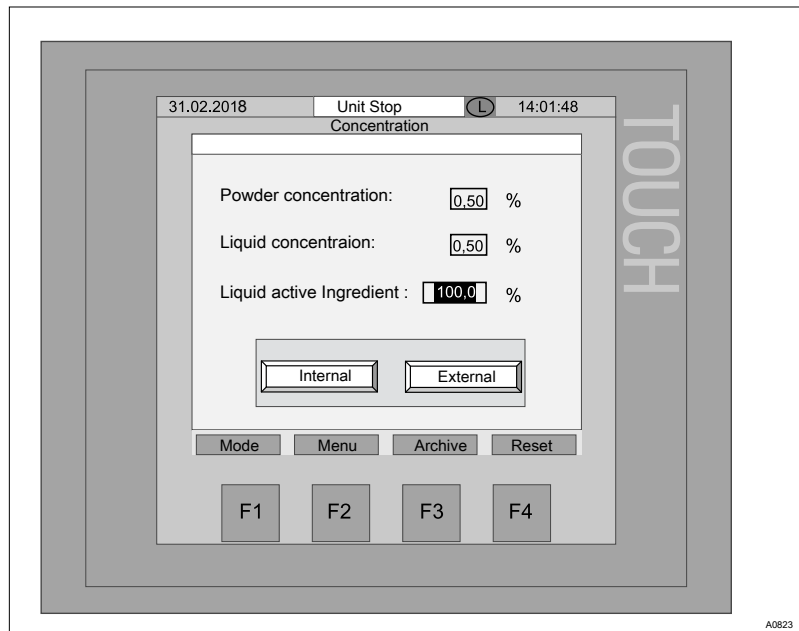


Fig. 58: Concentration of powder / liquid

Tab. 13

Concentration:
Powder: x.xx (%) (*)
Liquid: x.xx (%) (*)
Active substance li.: xxx.x %(*)
internal/external
(Profibus, Profinet, Modbus) (*)
(*): Many operating menus are not installed depending on the design and setting supplied.
(**): First switch the control to "Stop mode".
x = Input required.

## 16.2.5 Mode: Info

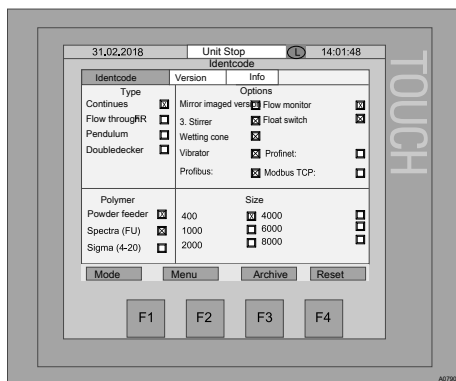


Fig. 59: Ultramat identity code

Tab. 14

Identicode:

Type: d

Size: d

Polymer: d

Options: d

Version:

Touch panel version: d

Creation date: d

Version of S7 project: d

Creation date: d

Project: d

Info:

Operating times

Stirrer 1+2

Stirrer 3

Powder feeder

Concentrate pump

(\*): Many operating menus are not installed depending on the design and setting supplied.

(\*\*): First switch the control to "Stop mode".

x = Input required.

16.2.6 Mode: Service

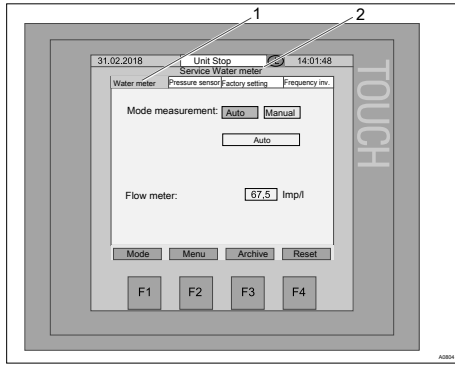


Fig. 60: Service

- 1 Button for jumping to the different service groups
- 2 Title of the current service group

Tab. 15

Water meter:	
Mode measurement:	Auto/Manual
Manual value:	xxxx (l/h)
Flow meter;	xx.x (pul/l)
Pressure sensor:	
Sensor Value:	ddd (mm)
Measured Value:	xxx (mm)
Offset:	ddd (mm)
Factory setting:	
Factory setting: Reset	
Identcode: Change	
Frequency inv.:	
Information on function	
Status	
Error messages	
(*) : Many operating menus are not installed depending on the design and setting supplied.	
(**) : First switch the control to "Stop mode".	
x = Input required.	

## 16.3 Comparison of Running Empty and Pause Functions

### General functionality

- Identical switching functionality for running empty and pause
- The *[Ultramat ready for batching]* (DQ A.0) output signal on the terminal strip of the switch cabinet is used to signal the status of the system to a higher-level control system.

	Running empty	"Pause" function
Activation of the function	On the touch panel	By an external signal.
How is it activated?	Switchover of operating mode by the operator.	Control Pause signal in the control cabinet.
Duration	Longer-term action.	Short-term action.
Polymer batching	Is interrupted.	Is ended.
No new polymer batching.	Yes	Yes
Extraction to level <i>[Min. Min.]</i> .	Yes	Yes
<i>[Ultramat ready for batching]</i> signal	0	0
<ul style="list-style-type: none"> <li>■ Logical switch status               <ul style="list-style-type: none"> <li>– “not ready for batching”</li> </ul> </li> </ul>		

## 16.4 Commissioning Report

### Ultromat® commissioning report

Ultromat® ULFa

400    
  1 000    
  2 000    
  4 000    
  6 000    
  8 000

---

Ident-Code:      Software Version: "/>     Project number:

Version Touchpanel:

---

Calibration settings / concentration:

Parameter:	Powde	Liquid
Concentration:		%
Active Ingredient:	-	%
Calibrated dosing capacity:		kg/h
Water supply:		l/h
Switching threshold flow monitor:		kg/h

Commissioning parameter settings	Default setting	Setting
Min. water supply flowrate Ultromat®	400	400 l/h
Min. water supply flowrate Ultromat®	1000	1 000 l/h
Min. water supply flowrate Ultromat®	2000	2 000 l/h
Min. water supply flowrate Ultromat®	4000	4 000 l/h
Min. water supply flowrate Ultromat®	6000	6 000 l/h
Min. water supply flowrate Ultromat®	8000	8 000 l/h
Heating switch-on time		5 s
Heating switch-off time		45 s
Vibrator on		1 s
Vibrator off		60 s
Supply lead-in time		7 s
Supply run-on time		5 s
Stirrer 1 + 2 on time		5 min
Stirrer 1 + 2 off time		15 min
Stirrer 3 on time		5 min
Stirrer (3) off time		15 min
Concentration pump minimum frequency		20 Hz

Powdered polymer trade name: \_\_\_\_\_ Supplier: \_\_\_\_\_

Liquid polymer trade name: \_\_\_\_\_ Supplier: \_\_\_\_\_

Customer: \_\_\_\_\_ Date: \_\_\_\_\_

Installation place: \_\_\_\_\_

A0824

Fig. 61: Commissioning Report

## 16.5 Lubricating plan

With the exception of the Spectra pump and the peristaltic pump, all Ultromat drives are maintenance free.



Units	Gear	Interval	Oil	Quantity
Stirrers	-	-	-	-
Sigma	-	-	-	-
Spectra	SK01-71L/4	10,000 h / 2 years	ISO VG 220	250 ml
Dry feeder	SK1 SD	Maintenance free	-	-
Peristaltic pump	Motovario HA 32 U	10,000 h / 2 years	ISO VG 220	250 ml

Units	Hose/rolls	Interval	Grease	Quantity	Part number
Peristaltic pump	lubricate well	every 200 h	Silicone	0.5 kg	1037255

## 16.6 Control sequence

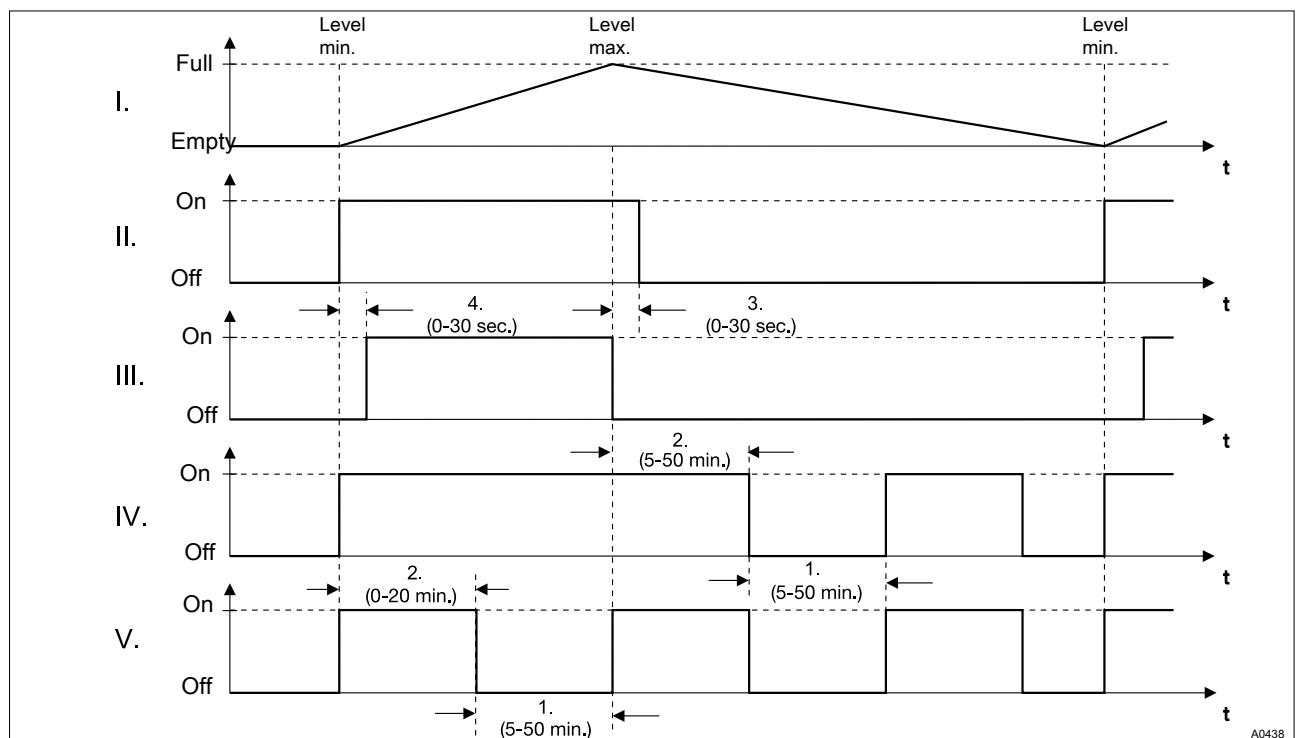


Fig. 62: Control sequence

- I. Liquid level Ultramat®
- II. Solenoid valve water supply
- III. Powder feeder
- IV. Stirrer 1 + 2
- V. Stirrer 3

- 1. Off time
- 2. On time
- 3. Post-rinse
- 4. Pre rinse

## 16.7 EC Declaration of Conformity for Machinery

In accordance with DIRECTIVE 2006/42/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL, Appendix I, BASIC HEALTH AND SAFETY REQUIREMENTS, section 1.7.4.2. C.

We,

- ProMinent Systems s.r.o.
- Fügnerova ul. 567
- CZ - 33601 Blovice

hereby declare that the product specified in the following, complies with the relevant basic health and safety requirements of the EC Directive, on the basis of its functional concept and design and in the version distributed by us. Any modification to the product not approved by us will invalidate this declaration.

Tab. 16: Extract from the EC Declaration of Conformity

Designation of the product:	Automatic polyelectrolyte preparation system
Type:	Ultromat
Serial number:	see nameplate on the device
Relevant EC/EU directives:	EC Machinery Directive (2006/42/EC) EU EMC Directive (2014/30/EU) Compliance with the protection targets of the Low Voltage Directive 2014/35/EU according to Appendix I, No. 1.5.1 of the Machinery Directive 2006/42/EC
Harmonised standards applied, in particular:	CSN EN ISO 12100:2011 CSN EN 60204-1 ed.2:2007 CSN EN 60349-1 ed.2:2010 CSN EN 61140 ed.2:2003 CSN EN 61000-2-4 ed.2:2003 CSN EN 61000-6-2 ed.3:2006 CSN EN 60529 + A2:2014
Place, Date:	Blovice, 09.02.2017

The EC Declaration of Conformity is available to download on the manufacturer's homepage.

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