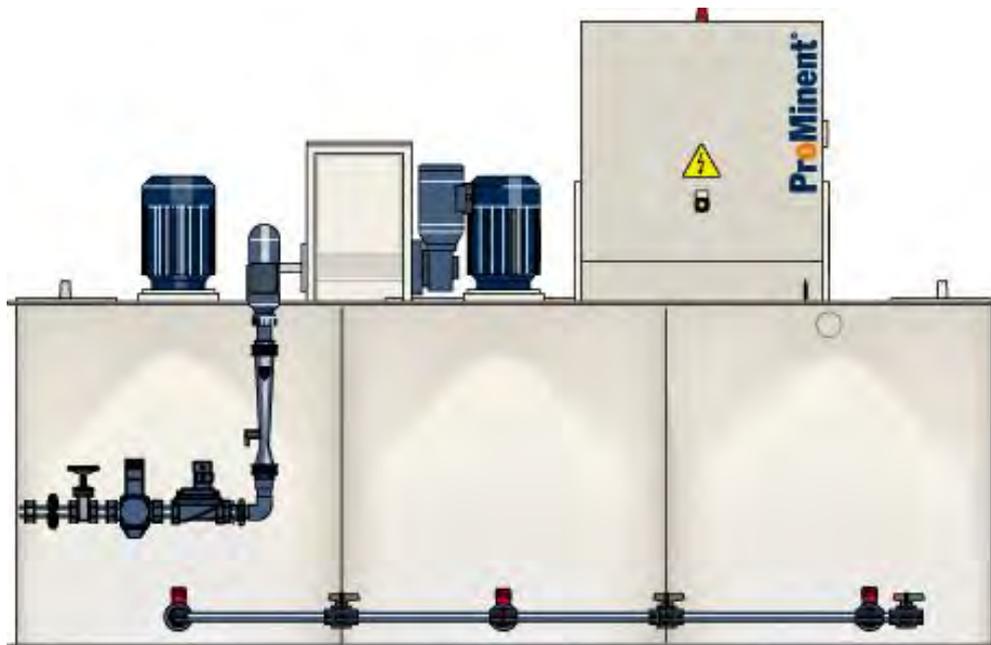


# Operating instructions

## Ultromat® ATR

### Flow System



**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!  
Technical changes reserved.**

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# 1 Product Identification - Ultromat®

## 1.1 Product Identification - Ultromat®

Ultromat® ATR	1033810	1033811	1033812
Type	ATR 400	ATR 1000	ATR 2000
Reservoir contents	400 l	1000 l	2000 l

## 1.2 Front View of Ultramat® ATR

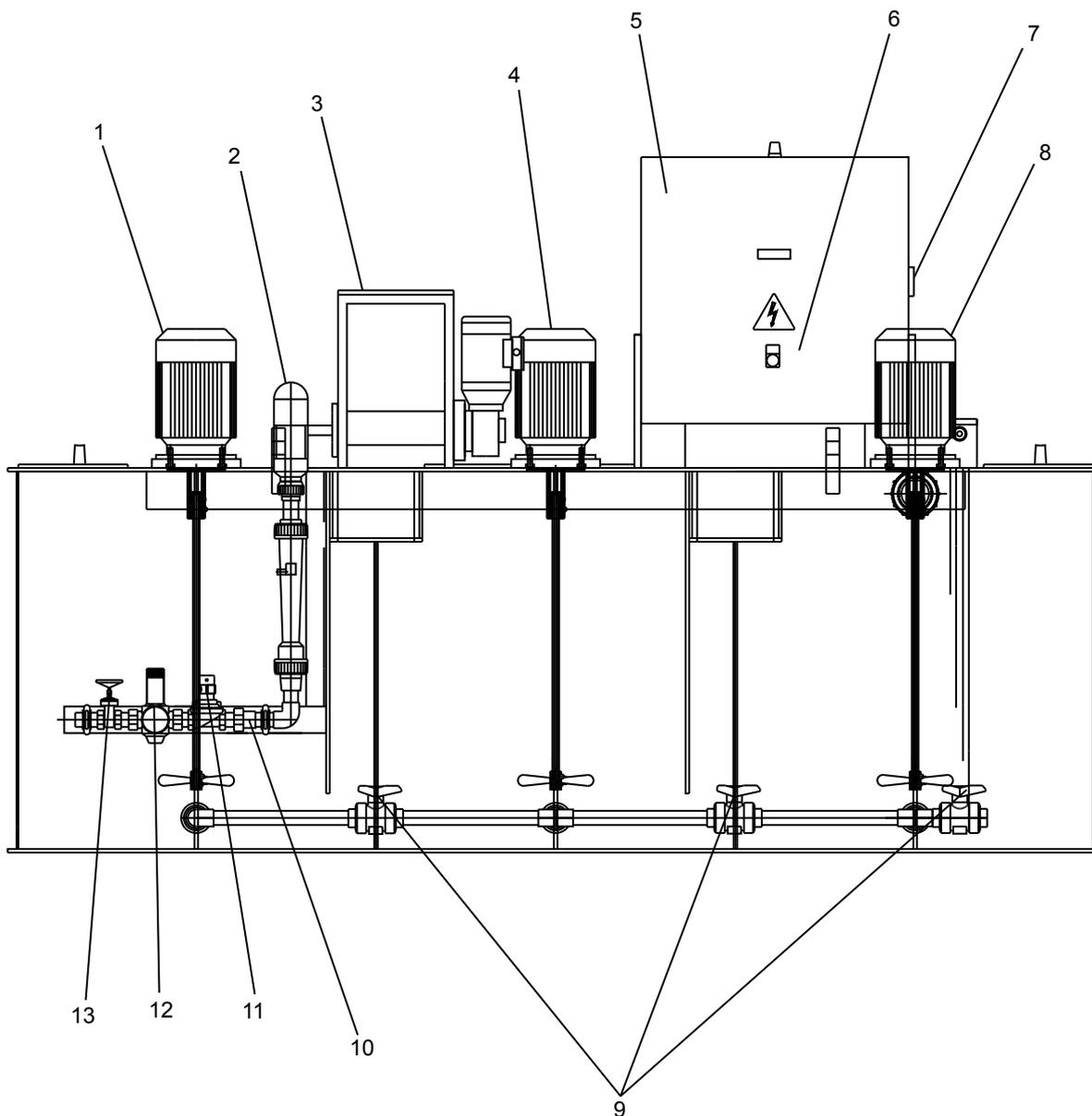


Fig. 1: ATR 1000\_frontal

1. Agitator reservoir 1	8. Agitator reservoir 3 (optional)
2. Y-Flush inlet	9. Shut-off valves
3. Dry material feeder with storage hopper	10. Flow meter
4. Agitator reservoir 2	11. Solenoid valve
5. Switching Cabinet	12. Pressure reducer
6. Operating panel	13. Shut-off fitting
7. Main switch	14. Discharge ball valve

1.3 Plan View of Ultromat® ATR

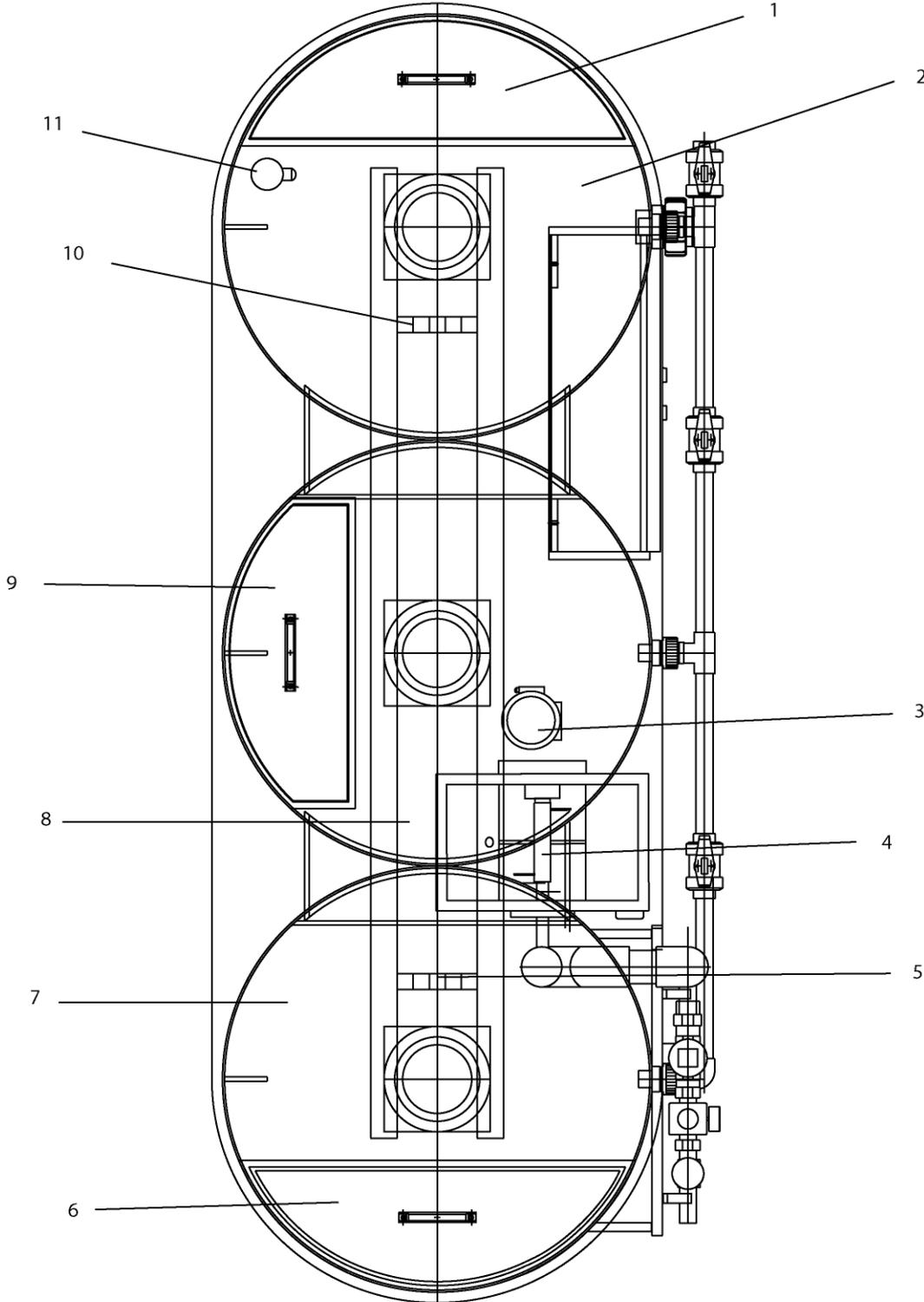


Fig. 2: ATR 1000\_Plan view

1. Inspection opening for reservoir 3	6. Inspection opening for reservoir 1
2. Reservoir 3	7. Reservoir 1
3. Motor for dry material feeder	8. Reservoir 2
4. Dry Material Feeder	9. Inspection opening for reservoir 2
5. Crane lifting lugs	10. Filling level gauge sensor

## 1.4 About This Product

The Ultromat® ATR from ProMinent is an automatic preparation system for polyelectrolytes.

The Ultromat® ATR can be used in any application where free-flowing, synthetic powder polymers have to be prepared.

## 2 Safety Chapter

Ultromat® ATR

### 2.1 Explanation of the safety information

#### Introduction

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

The safety 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

Danger!

- Denotes an immediate threatening danger. If this 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

Warning!

- Denotes a possibly hazardous situation. If this 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

Caution!

- Denotes a possibly hazardous situation. If this 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

Note!

- Denotes a possibly damaging situation. If this 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*

*Information!*

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

**2.2 Users' Qualifications**



**WARNING!**

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

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.

Activity	Training
Assembly / Installation	trained qualified personnel
Commissioning	technical experts
Operation	instructed personnel
Maintenance / Repair	Customer service department
Decommissioning / Disposal	technical experts
Troubleshooting	instructed personnel

Explanation of the terms:

- A technical expert is deemed to be a person who is able to assess the tasks assigned to him and recognise possible hazards based on his/her technical training and experience, as well as knowledge of pertinent regulations.  
Note: A technical qualification is typically proven by the required completion of a technical training course. The assessment of a person's technical training can also be based on several years of work in the relevant field.
- A qualified employee is deemed to be a person who is able to assess the tasks assigned to him and recognise possible hazards based on his/her technical training, knowledge and experience, as well as knowledge of pertinent regulations.  
Note: The assessment of a person's technical training can also be based on several years of work in the relevant field.
- 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.
- 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!*

## 2.3 Information in the Event of an Emergency

**WARNING!****Information in the Event of an Emergency**

Possible consequence: Fatal or very serious injuries

Switch off the system with the red-yellow main switch.

Red-yellow main switch is located on the right-hand side of the switching cabinet!

## 2.4 Description and Testing of Safety Equipment

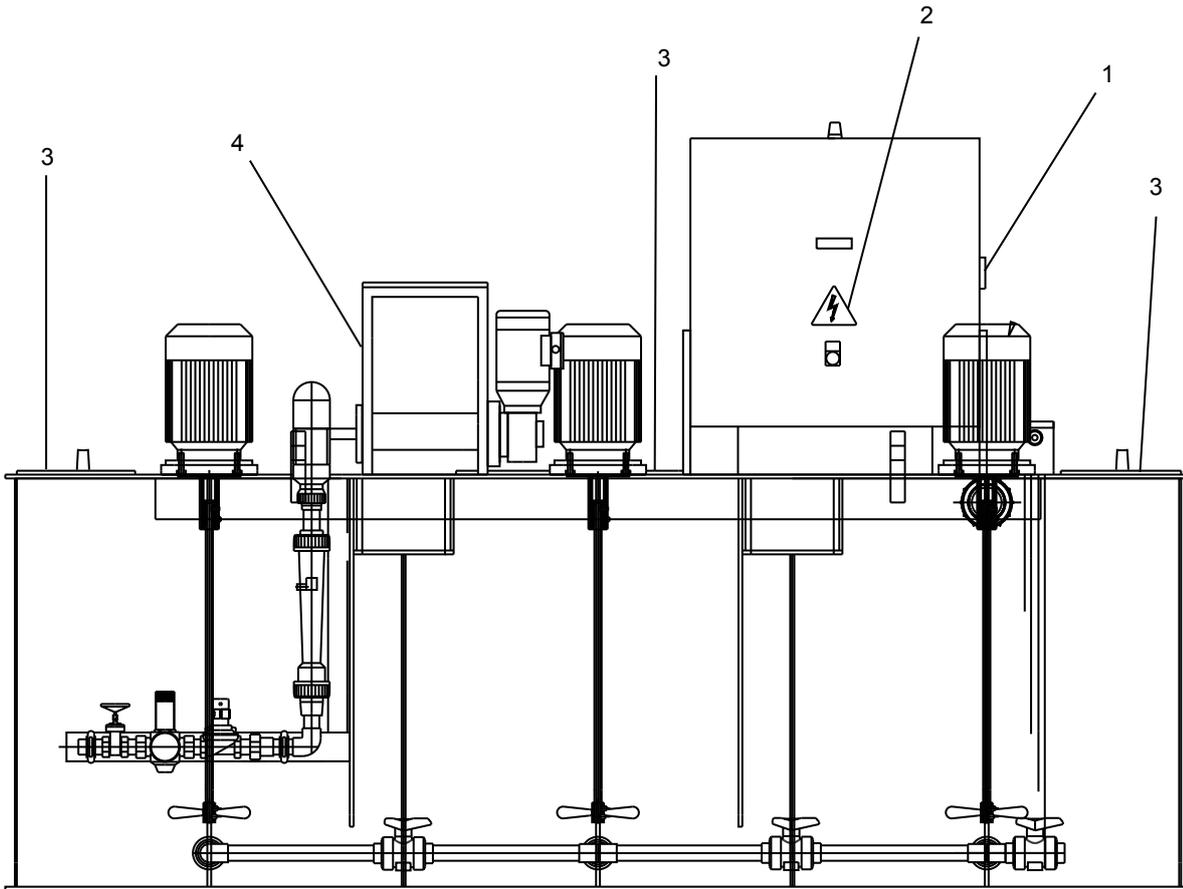


Fig. 3: Safety equipment

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

### Main switch

The red-yellow main switch on the right-hand side of the switching cabinet disconnects the unit and any connected units. Test: While all parts of the system are operational, switch the main switch to "0" - all of the parts should stop - all of the lights should go out.

### Covers of inspection openings

The screw covers of the inspection openings prevent persons injuring themselves on the rotating propellers of the agitators. Test: Check that the covers of the inspection openings are being used and are secured with screws.

Warning labels	
	Warning of hazardous electrical voltage
	Warning of injury to hands
	Warning of hot surfaces

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

## 2.5 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!

## 2.6 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 Transport and Storage of the System

### 3.1 Transport and Storage of the System



#### CAUTION!

Fractures in plastic material may result from incorrect loading

- Only move the Ultromat® system when empty
- The reservoir wall may not be subjected to point loads
- Avoid heavy vibrations 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 three-chamber reservoir
- If a crane is used, fit the transport belts such that shear stress is avoided, even if lifting lugs exist
- The support must be able to carry the weight of the system

Ambient conditions for storage and transport

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

Humidity: none

Other: No dust, no direct sunlight

## 4 Information on the System

### 4.1 Application

The Ultromat® ATR from ProMinent is an automatic preparation system for polyelectrolytes.

The Ultromat® ATR can be used in any application where free-flowing, synthetic powder polymers have to be prepared.

### 4.2 Design

Almost all commercially available polymers can be used.

Concentrations of 0.05 to 0.5 % can be set. The viscosity of the polymer solution produced may not exceed 1500 mPas. Please refer to the application data sheets of the polymer suppliers 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 chamber. 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 discharge quantity and the volumetric capacity of the Ultromat® and is approximately 60 minutes at a maximum discharge rate.

### 4.3 System Dimensions

#### Ultromat® ATR

Ultromat® ATR	1033810	1033811	1033812
Type	ATR 400	ATR 1000	ATR 2000
Reservoir contents	400 l	1000 l	2000 l
Solution concentration	0,05 - 0,5 %	0,05 - 0,5 %	0,05 - 0,5 %
Dimensions LxWxH (mm)	2164x883x1216	2464x983x1566	2950x1157x1716
Weight when empty	130 kg	150 kg	180 kg
Total weight	530 kg	1150 kg	2180 kg
Overflow connection	DN 40	DN 50	DN 50
Discharge connection	DN 25	DN 25	DN 32
Water supply for redilution	1"	1"	1"
Recommended water supply rate	1,500 l/h	1,500 l/h	3000 l/h
Electrical rating	1.5 kW	2.6 kW	3.2 kW

<b>Ultromat® ATR</b>	<b>1033810</b>	<b>1033811</b>	<b>1033812</b>
External fuse	20 A	20 A	20 A
Controller	Siemens logo	Siemens logo	Siemens logo

<b>Agitators:</b>	<b>1031374</b>	<b>1031375</b>	<b>1031376</b>
Agitator output	0.18 kW	0.55 kW	0.75 kW
Agitator speed (50 Hz)	750 rpm	750 rpm	750 rpm
Propellers	1	1	1
Propeller diameter	120 mm	170 mm	200 mm
Length of agitator shaft	430 mm	720 mm	790 mm
Voltage	400 VAC	400 VAC	400 VAC
Nominal current	0.84 A	2.3 A	3.1 A
Weight	12 kg	21 kg	26 kg

<b>Powder feeder:</b>	<b>1020800</b>	<b>1020800</b>	<b>1020800</b>
Type	TGD 18.13	TGD 18.13	TGD 18.13
Maximum metering power (100 Hz)	18 kg/h	18 kg/h	18 kg/h
Drive unit power	0.18 kW	0.18 kW	0.18 kW
Voltage	230 VAC	230 VAC	230 VAC
Nominal current	1.10 A	1.10 A	1.10 A
Speed of conveying screw at 100 Hz	200 rpm	200 rpm	200 rpm
Weight	15 kg	15 kg	15 kg

## 5 Design and Function

### 5.1 Description of the Component Assemblies

#### 5.1.1 Three-Chamber Reservoir

The PP reservoir is divided into three separate chambers, so that a sufficient maturing time for the polymer solution can be ensured. The division of the reservoir largely prevents the matured and freshly prepared solution from mixing and ensures continuous discharge.

The fill level of reservoir 3 is monitored by a fill level gauge. The system is equipped with a minimum and maximum contact to start or stop the automatic preparation process, as well as an empty contact to prevent it from running dry.

#### 5.1.2 Dry Material Feeder

Please refer to the separate operating instructions entitled "Dry Material Feeder" for detailed information about the design and function of this equipment. The heating for the metering pipe and the minimum fill level sensor for the dry material hopper are fitted as standard. The dry material feeder is activated by a frequency inverter to meter 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.

#### 5.1.3 Agitators

The Ultromat® ATR is fitted as standard with two electrical agitators. A third agitator for reservoir 3 can be supplied as an option. The agitators ensure that the solution is gently agitated in the reservoir chambers. The agitators can start up suddenly as soon as they are supplied with mains power!

#### 5.1.4 Switching Cabinet

All of the electrical control and command devices required to operate the system are accommodated in the switching cabinet.

#### 5.1.5 Power Socket for the Connection of a Conveyor Unit

The Ultromat® is fitted with a power socket to connect a conveyor unit. The power socket is fitted to the side of the switching cabinet and is secured electrically by a circuit breaker.

### 5.1.6 Remote Operation

This function enables the system to be remote controlled if required. The Ultromat® can be switched to Automatic or "0" mode via an external switch.

### 5.1.7 Crane Lifting Lugs

A suitable hoisting device can be attached to the two crane lifting lugs.

### 5.1.8 Analysis of Insufficient Water for the Redilution Unit

The redilution unit is used to redilute the prepared polymer solution. To do so, a transfer pump (the transfer pump is not included as standard with the Ultromat® ATR ) conveys the polymer solution from reservoir 3 of the Ultromat® to the redilution unit.

The dilution water is fed into the redilution unit via a solenoid valve. A flow meter float with a minimum contact monitors the dilution water. The minimum contact of the rotameter is monitored by the "Analyse Redilution Unit" function. Should the minimum contact display insufficient water, the Ultromat® goes into fault mode and the transfer pump stops the polymer solution.

The Ultromat® switches the transfer pump off when the level of the polymer solution in reservoir 3 drops below the dry run level.

## 5.2 Operating Modes

### 5.2.1 Automatic Mode

Once it has reached the minimum level in reservoir 3, the Ultromat® starts up the preparation process. The solenoid valve on the water supply opens and the dry material feeder begins to feed in the powdered polymer once the time delay has elapsed. Once the maximum level has been reached, the control unit firstly switches off the dry material feeder and closes the solenoid valve on the water supply once the run-on time has been completed.

### 5.2.2 Calibration Mode

When calibrating the dry material feeder, the solenoid valve on the water supply remains closed and the dry material feeder is enabled and activated independently of the water supply. When the water supply stops, the dry material feeder remains switched off.

## 5.3 Ultromat® Options

The following additional accessories are available for the Ultromat® :

### 5.3.1 Agitator for Reservoir 3 (Agitator 3)

The Ultromat® is fitted as standard with two electrical agitators. A third agitator for reservoir 3 can be supplied as an option.

### 5.3.2 Overflow Protection for Reservoir 3

The overflow protection reports an overflow in reservoir 3 of the Ultromat® and triggers a collective alarm.

### 5.3.3 Vibrator

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

## 5.4 Ultromat® Accessories

The following additional accessories are available for the Ultromat® :

### 5.4.1 Powder Storage Container

The powder storage container serves as intermediate storage for powdered polymers, which are delivered in a Big Bag container.

### 5.4.2 Powder Storage Container with Sack Tilting Device

The powder storage container with sack tilting device acts as intermediate storage for powdered polymers, which are delivered in 25 kg containers.

### 5.4.3 Redilution Unit

Ultromat® units can be operated with high concentrations. Thus it is an option in many cases to prepare a higher concentration of polymer solution and subsequently redilute it. Polymer solutions with higher concentrations last longer and the downstream dilution process increases the discharge capacity of the entire system. The viscosity of the polymer solution may not exceed 1500 mPas.

### 5.4.4 50 l, 75 l and 100 l Add-On Hopper (with / without Adapter Connection for Powder Conveyor Unit)

Should an extended supply of metered material be required, add-on hoppers with an additional volumetric capacity of 50, 75 and 100 litres are available.

### **5.4.5 Powder Conveyor Unit for Automatic Refilling**

A powder conveyor unit can be used for the automatic filling of the powder hopper with powdered polymer. A powder conveyor unit can be mounted directly onto the dry material feeder by means of an adapter plate.

The installation of a 50 l add-on hopper with an adapter connection is recommended to bypass short periods of service work on the powder conveyor or where there is a high consumption of powder.

## 6 Assembly and Installation

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

### 6.1 Assembly



#### **WARNING!**

- High fill weight in the system - the system can be damaged! The system must stand on a level, horizontal and load-bearing surface appropriate to the dimensions and high operational weight of the system
- The system must be easily accessible at all times for operation, maintenance and filling



#### **Ambient conditions**

- *Permissible ambient temperature: 5 °C to 40 °C*
- *The system may not be exposed to condensation or rain*
- *The system may not be exposed to direct sunlight*

### 6.2 Hydraulic Installation



#### **Prerequisites**

- *The preparation water must be of drinking water quality and must be free of solids and suspended particles*
- *Entering water pressure: 3 - 5 bar*
- *The preparation water, overflow and discharge lines must have the correct dimensions*



#### **CAUTION!**

**Damage to the environment by the polymer solution is possible!**

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



**NOTICE!**

The overflow and discharge lines must be laid on a gradient and be operable without counter-pressure!

- Connect the preparation water line to the water fitting
- Connect the feed pump to the discharge line
- Connect up the discharge lines and lead into a suitable drain
- Connect the overflow line to the overflow union and lead into a suitable drain

## 6.3 Electrical Installation



**WARNING!**

- The electrical installation may only be performed by a qualified electrician!
- Always disconnect the system from the mains power supply and prevent it from being re-connected before undertaking any work on the electrical connections!

### 6.3.1 Mains Power Connection



**WARNING!**

Ensure that the terminals are assigned correctly when connecting the units



**CAUTION!**

**Danger of malfunction!**

- Ensure that the motors are rotating in the right direction when connecting the agitators, dry material and motor pumps!

Pass the mains power cable through the relevant opening in the switching cabinet to the system and wire it to the terminal strip provided for this, as per the terminal wiring diagram.

## 7 Controller

The Ultramat® ATR controller is located in the switching cabinet of the Ultramat® ATR.

### 7.1 Design and Function

The Ultramat® ATR control unit consists of a Siemens LOGO 24, an Altivar 11 frequency inverter, a potentiometer for setting the dry material feeder and the operating elements on the door of the switching cabinet.

#### 7.1.1 Display and Operating Elements

The operating elements are accessible from outside in the door of the switching cabinet of the Ultramat® ATR.

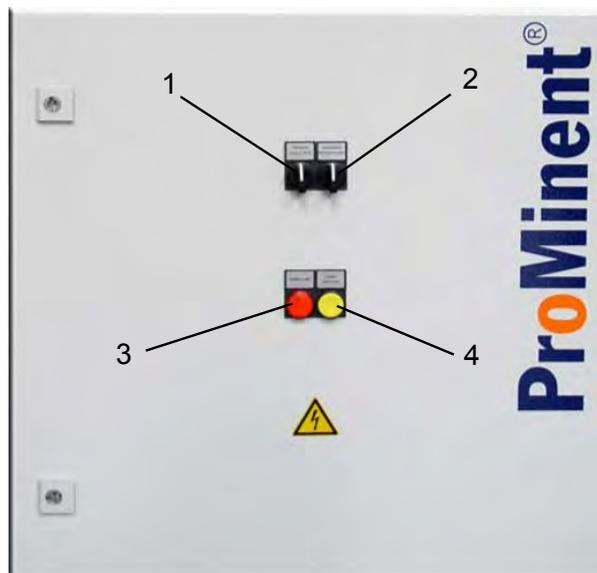


Fig. 4: Display and Operating Elements

1. "Prepare" selector switch
2. "Calibrate" selector switch
3. "Collective alarm" indicator light
4. "Reset Fault" key

#### 7.1.2 Calibration

Once the "Prepare" (1) switch has been switched to "CALIBRATE" it is possible to calibrate the dry material feeder or adjust the flow rate of the water supply. The "Calibrate" (2) switch in the door of the switching cabinet is used to start the dry material feeder or the electromagnetic valve for the water supply.

### 7.1.2.1 "CALIBRATE POWDER – 0 – WATER"

Once the "Calibrate" switch has been switched over to "CALIBRATE-POWDER", the frequency inverter on the dry material feeder starts up. The frequency can be adjusted between 0 - 100 Hz by means of a potentiometer in the switching cabinet.

Once the "Calibrate" switch has been switched to "CALIBRATE WATER", the electromagnetic valve at the inlet opens up the water supply.

### 7.1.3 Mode: Prepare "0"

Once the "Prepare" switch has been switched to Prepare "0", the electrical heating in the metering pipe continues to be active.

The agitators continue to be active.

The preparation of the polymer solution is stopped.

It is still possible to remove the polymer solution from reservoir 3, even when the switch is set to "0", providing that there is still polymer solution in reservoir 3.

### 7.1.4 Mode: Prepare "Auto"

When the level falls below the minimum level (LSL) in reservoir 3, the controller starts up the preparation operation. The electro valve on the water supply opens and the dry material feeder starts to discharge the powder once the delay time has expired.

The following screen appears in the display of the Siemens LOGO 24 controller:

***"MAKING UP STOCK"***

Once the maximum level (LSH) in reservoir 3 has been reached, the controller firstly switches off the dry material feeder and, once the run-on time has finished, closes the solenoid valve in the water supply.

The following screen appears in the display of the Siemens LOGO 24 controller:

***"DISCHARGE STOCK"***

### 7.1.5 Mode: Prepare "Remote Control Mode"

Material preparation can be switched on and off by a potential-free contact when the system is in "PREPARE - AUTO" mode. The status display of the "PREPARE - AUTO" switch is provided on the terminal strip in the switching cabinet. The metering process is fully automatically controlled, even when the system is remotely controlled by the Siemens LOGO 24 controller.

## 7.1.6 Setting Control Parameters

### 7.1.6.1 Output Screen

All of the parameters needed to operate the system are entered into the controller in PREPARE - "0" mode.

Once the system has been switched to PREPARE - "0" mode, only the electrical heating of the metering pipe on the dry material feeder and the cycle switch of the agitators remain active. The output screen is shown on the Siemens OGO 24 controller display:

***“PREPARATION AUTO OFF”***

***“MAKING UP STOCK”***

***“DISCHARGE STOCK”***

### 7.1.6.2 Selecting and Modifying Parameters

Proceed as follows to move to the parameter setting (Set Param) menu:

- Press key  $\nabla$  once (Time/Date system screen appears)
- Press ESC once (System screen showing Set Param menu appears)
- Press key  $\nabla$  once (Select Set Param menu)
- Press OK once (move to system parameter screens - seven screens in all)

Selecting and Modifying Parameters

- Parameter selection  $\blacktriangle$  or  $\blacktriangledown$
- Press OK to change the parameter
- Change the value using  $\blacktriangleright$  or  $\blacktriangleleft$
- Change the value using  $\blacktriangle$  or  $\blacktriangledown$
- Press OK to confirm (save) the parameter
- Press ESC to exit the parameter without confirming it (saving)

### 7.1.6.3 Configurable System Parameters

#### 7.1.6.3.1 Parameter STIR\_1+2

- Parameter TH sets the switching-on time of agitators 1 and 2 in minutes
- Parameter TH sets the switching-on time of agitators 1 and 2 in minutes

***‘STIR\_1+2’***

***‘TH=15:00 min’***

***‘TH=15:00 min’***

Ta= currently elapsed process time

### 7.1.6.3.2 Parameter PRE\_RINS

Parameter "T" sets the lead time for switching on the water supply. In doing so, the switching on of the electromagnetic valve is affected by the fact that the water supply is activated before the dry material feeder.

*'PRE\_RINS '*

*'T=03:00 s'*

Ta= currently elapsed process time

### 7.1.6.3.3 Parameter RINS\_DEL

Parameter "T" sets the run-on time of the electromagnetic valve for the water supply once the dry material feeder has been switched off.

*'RINS\_DEL '*

*'T=03:00 s'*

Ta= currently elapsed process time

### 7.1.6.3.4 Parameter WATER\_LO

Parameter T sets the time delay, with which the preparation process is interrupted when there is a lack of water.

*'WATER\_LO '*

*'T=20:00 s'*

Ta= currently elapsed process time

### 7.1.6.3.5 Parameter VIBRATOR

Parameter "TH" sets the switching-on time of the vibrator and parameter "TL" the switching-off time of the vibrator.

*'VIBRATOR'*

*'TH=05:00 s'*

*'TL=45:00 s'*

Ta= currently elapsed process time

### 7.1.6.3.6 Parameter HEATER

Parameter "TH" sets the switching-on time of the heating and parameter "TL" the switching-off time of the heating.

*'HEATER '*

*'TH=05:00 s'*

*'TL=45:00 s'*

Ta= currently elapsed process time

### 7.1.6.3.7 Parameter STIR\_3

Parameter TH sets the switching-on time and parameter TL the switching-off time of agitator 3.

*'STIR\_3'*

*'TH=05:00 min'*

*'TL=10:00 min'*

Ta= currently elapsed process time

To return from the parameter setting menu (Set Param) to the output screen (if the cursor is not flashing):

- Press ESC twice (Time/Date system screen appears)
- Press key < once (Output screen appears)

## 7.1.7 Fault Messages

Should a fault occur during preparation or discharge of flocculants, the "COLLECTIVE ALARM" indicator will light up on the switching cabinet and the collective alarm relay will open. The nature of the fault will be displayed on the LOGO controller display in the switching cabinet.

Once the fault has been eliminated, it can be acknowledged using the "RESET FAULT" key.

### 7.1.7.1 LOGO Controller Fault Messages

#### 7.1.7.1.1 "STIRRERS FAULT" Fault Message

"STIRRERS FAULT!"

Probable cause:

- Defective motor
- Phase failure
- Motor protection switch set incorrectly

Delay: 1 s

Remedial measures:

- Check motor and replace if necessary
- Check that all phases are present
- Check power setting on motor protection switch

#### 7.1.7.1.2 "INVERTER FAULT" Fault Message

"INVERTER FAULT"

Probable cause:

- Voltage failure on frequency inverter
- Internal frequency inverter fault

Delay: 5 s

Remedial measures:

- Check voltage supply to frequency inverter
- In the event of a fault with the frequency inverter, identify the cause based on the frequency inverter fault message
- Check and possibly replace dry material feeder drive

#### 7.1.7.1.3 "LACK OF POWDER" Fault Message

##### "LACK OF POWDER"

Probable cause:

- Lack of powder in the storage reservoir
- Defective filling level gauge

Delay: 3 s

Remedial measures:

- Add powder to storage container
- Check filling level gauge is working correctly - and possibly replace

#### 7.1.7.1.4 "WATER FLOW LOW" Fault Message

##### "WATER FLOW LOW"

Probable cause:

- Pressure fluctuations in the water supply line
- Defective limit flow rate sensor
- Electromagnetic valve on water supply not open

Settable delay – Parameter WATER\_LO: 20 sec after electromagnetic valve has been opened

Remedial measures:

- Check pressure of supply water
- Check electromagnetic valve and limit flow rate sensor - and possibly replace

#### 7.1.7.1.5 "STOCK OVERFILL" Fault Message (Optional)

##### "STOCK OVERFILL"

Probable cause:

- Defective LSH level measurement in the Ultromat reservoir
- Parameter RINS\_DEL too high
- Supply water electromagnetic valve has not closed
- Water flow rate too high

Delay: 1 s

Remedial measures:

- Check LSH level measurement in reservoir 3
- Reduce parameter RINS\_DEL
- Check electromagnetic valve
- Check water flow rate

#### 7.1.7.1.6 "STOCK LEVELS FAULT" Fault Message

##### "STOCK LEVELS FAULT"

Probable cause:

- Defective level measurement in reservoir 3

Delay: 5 s

Remedial measures:

- Check level measurements in reservoir 3

#### 7.1.7.1.7 "DILUTION FAULT" Fault Message

##### "DILUTION FAULT"

Probable cause:

- Defective limit switch for water supply to the redilution unit
- Electromagnetic valve in the water supply to the redilution unit not open
- Water flow rate in the redilution unit too low

Delay: 3 s

Remedial measures:

- Check limit gauge (the limit switch is closed if water is flowing in)
- Check electromagnetic valve for the water supply to the redilution unit
- Check and possibly reset water supply flow rate to the redilution unit

## 8 Commissioning

### 8.1 Assembly, Preparatory Work



#### WARNING!

- It is essential that the mechanical and electrical connections are checked to ensure that they are correct prior to initial commissioning
- Ensure that the voltage, frequency and current type applied in the switching cabinet match the data on the specification label
- Observe the handling and set-up information described in [Chapter 3.1 'Transport and Storage of the System'](#) on page 15 and [Chapter 6 'Assembly and Installation'](#) on page 22 during installation



#### NOTICE!

- Preparation water, discharge and overflow lines must be fitted and checked for leakage and correct operation
- Provide adequate resources in the aforementioned quality

### 8.2 Settings for Commissioning

When the unit is delivered, the parameters have the following default settings:

Parameter	Default value	Range
Heating switch-on time	5 s	1 - 10 s
Heating switch-off time	35 s	30 - 100 s
Supply lead-in time	7 s	0 - 30 s
Supply run-on time	5 min	0 - 30 min
Agitator 1 and 2	Switch-on time 15 min	5 - 50 min
Agitator 1 and 2	Switch-off time 15 min	5 - 50 min
Agitator 3	Switch-on time 5 min	0 - 20 min
Agitator 3	Switch-off time 10 min	5 - 50 min

The parameters can be adapted to the process during commissioning.

### 8.2.1 Water Supply Setting

The water supply should be set to the following values:

Type	Water supply
Ultromat® 400	1,500 l/h
Ultromat® 1000	1,500 l/h
Ultromat® 2000	3,000 l/h

Set the pressure reducer in such a way that the flow meter float has adequate flow

### 8.2.2 Calibrating the Dry Material Feeder

The quantity of powder required is based on the requirements of the process.

Materials required:

- Weighing scales
- PE bag (capacity min. 500 g)

1. ➤ Loosen the screw couplings to dismantle the flush fitting
2. ➤ Set the potentiometer in the switching cabinet to 100 %
3. ➤ Hold the PE bag (min. capacity 500 g) under the metering pipe and fill for 1 minute
4. ➤ Weigh the volume of powder discharged
  - ⇒ This is the volume of "Grammes per minute when the potentiometer is set at 100%".
5. ➤ Set the potentiometer to the percentage required for the process
6. ➤ Refit the flush fitting once the dry material feeder has been calibrated

ATR 400/1000:

Water supply	Concentration	Powder
1,500 l/h	0,5 %	7.5 kg/h
1,500 l/h	0,4 %	6.0 kg/h
1,500 l/h	0,3 %	4.5 kg/h

ATR 400/1000:		
Water supply	Concentration	Powder
1,500 l/h	0,2 %	3.0 kg/h
1,500 l/h	0,1 %	1.5 kg/h

ATR 2000		
Water supply	Concentration	Powder
3000 l/h	0,5 %	15.0 kg/h
3000 l/h	0,4 %	12.0 kg/h
3000 l/h	0,3 %	9.0 kg/h
3000 l/h	0,2 %	6.0 kg/h
3000 l/h	0,1 %	3.0 kg/h

### 8.2.3 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.

Materials required:

- 1 small screwdriver

The sensor is checked and adjusted in 2 steps:

With an empty dry material feeder:

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

## 8.3 Setting the Altivar 11 Frequency Inverter

### 8.3.1 Operating Element Functions

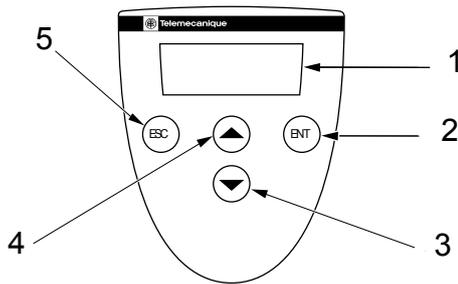


Fig. 5: Altivar operating element

1. Three 7-segment displays
2. Call up a menu or parameter or save a parameter or displayed value
3. Change to the next menu or parameter or reduce the displayed value
4. Change to the previous menu or parameter or increase the displayed value
5. Exit a menu or parameter or return from the value displayed to the previously saved value

### 8.3.2 Parameter Settings

The frequency inverter is factory-preset to the following default values:

#### Setting parameters - Level 1

Parameter	Value	Description	Range
'bFr'	50	Motor frequency (Hz) This parameter is only visible when switching on for the first time and it can be changed at any time in the "FUn" menu	50 / 60
'ACC'	0,1*	Run-up time (s)	0.1 - 99.9 s
'dEC'	0,1*	Run-out time (s)	0.1 - 99.9 s
'LSP'	0	Low speed at 4 mA (Hz)	
'HSP'	100*	High speed at 20 mA (Hz)	
'ItH'	1,5*	Thermal motor protection (A)	0 - 3,1
'SP2'	10	2. preselected frequency (Hz)	0 - 200
'SP3'	25	3. preselected frequency (Hz)	0 - 200

\* These settings deviate from the values, which are entered as default values following resetting of factory settings using parameter >FCS= InI<.

## Setting parameters - Level 1

Parameter	Value	Description	Range
'SP4'	50	4. preselected frequency (Hz)	0 - 200
'Alt / ACT'	4A*	Configuration of analogue input (4-20 mA)	

\* These settings deviate from the values, which are entered as default values following resetting of factory settings using parameter >FCS= InI<.

## "drC" Menu

Parameter	Value	Description	Range
'UnS'	230	Nominal voltage of motor (specification label) (V)	100 - 500
'FrS'	50	Nominal frequency of motor (specification label) (Hz)	40 - 200
'StA'	20	Stability of frequency inverter (%)	0 - 100
'FLG'	20	Strength of frequency regulator (%)	0 - 100
'UFr 5'	0	Ri compensation (%)	0 - 200
'nC'r	1,5*	Nominal current of motor read off rating plate	0,5 - 3,1
'CLI'	1,5*	Motor limit current	1,0 - 3,1
'nSL'	0*	Nominal slip rate of motor (Hz)	0 - 10
'SLP'	0*	Slip compensation (%)	0 - 150
'COS'	0,78*	Cos Phi of motor (specification label)	0,50 - 1,00

\* These settings deviate from the values, which are entered as default values following resetting of factory settings using parameter >FCS= InI<.

## "FUn" Menu

Parameter	Sub-menu	Value	Description
'tCC'			Type of control
	'Act'	'2C'	2-wire control
	'tCt'	'LEL*'	Type of 2-wire control
'rrS'		'no*'	Anti-clockwise rotation
'PS2'			Preselected frequencies

\* These settings deviate from the values, which are entered as default values following resetting of factory settings using parameter >FCS= InI<.

"FUn" Menu			
Parameter	Sub-menu	Value	Description
	<i>'LiA'</i>	<i>'no'</i>	Assignment of input LIA
	<i>'Lib'</i>	<i>'no'</i>	Assignment of input LIb
<i>'tLS'</i>		<i>'0,0'</i>	
<i>'PI'</i>		<i>'no'</i>	
<i>'rSF'</i>		<i>'no'</i>	Switch on again in the event of a fault
<i>'rP2'</i>			Second ramp
	<i>'LI'</i>	<i>'no'</i>	Assignment of the input for controlling the second ramp
<i>'LC2'</i>			2. Power limitation
	<i>'LI1'</i>	<i>'no'</i>	
<i>'nSt'</i>		<i>'no'</i>	
<i>'StP'</i>		<i>'no'</i>	Managed run-out in the event of power failure
<i>'brA'</i>		<i>'no*'</i>	Adjustment of run-out ramp
<i>'AdC'</i>			Automatic infeed direct current
	<i>'Act'</i>	<i>'yes'</i>	Operating mode
	<i>'tdC'</i>	<i>'0,5'</i>	Infeed time
	<i>'SdC'</i>	<i>'1,4'</i>	Infeed current
<i>'SFt'</i>			Pulse frequency
	<i>'Act'</i>	<i>'LF'</i>	Frequency range
	<i>'SFr'</i>	<i>'4'</i>	Pulse frequency (kHz)
<i>'FLr'</i>		<i>'no'</i>	Alignment in operation
<i>'d0'</i>			Analogue output
	<i>'Act'</i>	<i>'no*'</i>	Assignment
<i>'Atr'</i>		<i>'yes*'</i>	Automatic restart
<i>'bFr'</i>		<i>'50'</i>	Motor frequency (Hz)
<i>'SCS'</i>		<i>'yes'</i>	Save configuration
<i>'FCS'</i>			Call up configuration
	<i>'no'</i>		Function inactive

\* These settings deviate from the values, which are entered as default values following resetting of factory settings using parameter >FCS= InI<.

"FUn" Menu			
Parameter	Sub-menu	Value	Description
	'rEC'		Call up saved configuration
	'InI'		The factory setting becomes the current configuration

\* These settings deviate from the values, which are entered as default values following resetting of factory settings using parameter >FCS= InI<.

## 8.4 Operation of the System



### CAUTION!

- Large volumes of water or polymer solution can escape from the system!
  - Prior to the start of the preparation process, ensure that the discharge valves are closed for all three reservoirs!
- Monitor the operation of the system in this start-up phase!
  - Monitor in particular the correct switching operation of the level sensors when they first reach their respective switching points!

### PREREQUISITES:

- Correct and proper assembly and installation of the system has been checked
  - The drainage valves for the three reservoirs are closed
  - The storage hopper has been filled with the intended powdered polymer
1. ➤ Set all operating parameters
  2. ➤ Calibrate all of the necessary equipment
  3. ➤ Start up the system
    - ⇒ The system starts up and begins the automatic preparation process.

## 9 Operation of the System

### 9.1 Normal Mode

#### 9.1.1 Prerequisites for Correct and Proper Operation

Prerequisites:

- Correct setting of operating parameters
- No unauthorised parameter changes on frequency inverter



#### **WARNING!**

The system may only be operated by instructed personnel!

- The system can in principle be stopped and restarted in every operating phase
- As a rule, the cause of a fault should be eliminated before the relevant fault message has been acknowledged

#### 9.1.2 Feeding the Storage Hopper with Powdered Polymer



#### **CAUTION!**

##### **Danger of slipping!**

Mixtures of polymer and water are slippery!

- Ensure that you have a secure foothold when filling the powder hopper!
- Immediately remove any spilled powdered polymer or leaked polymer solution!

If the storage hopper is not automatically filled, the supply of powdered polymer has to be continuously checked and refilled in time. This can be done while the system is operational. To do so, remove the lid of the storage hopper and carefully add in powdered polymer.

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

#### a) Switching on mains power

- Each time mains power is switched on, the agitators start up without regard to the system status measured
- In contrast, the system only starts up with preparation once the minimum switching-on point in reservoir 3 has been reached

#### b) Switching off mains power

- Following power failure, which results in the controller being restarted, the controller will unrestrictedly continue with the operation of the system based on the status measured
- If the level of the storage container is within the regular range, no preparation operation will be started even if a preparation process was running prior to the interruption

### 9.3 Decommissioning



#### WARNING!

It is imperative that the following is noted should the system have to be moved or stored: ↪ *Chapter 3 'Transport and Storage of the System' on page 15.*

For a short period

➔ Switch to Prepare "0"

For a longer period

1. ➔ Set the main switch to "0"
2. ➔ Lock the main switch to prevent the system from being switched on accidentally

For more than two days

1. ➔ Set the main switch to "0"
2. ➔ Lock the main switch to prevent the system from being switched on accidentally
3. ➔ Disconnect the mains supply
4. ➔ Completely empty the dry material feeder
5. ➔ Empty the three-chamber reservoir through the connections on the individual reservoirs provided for this
6. ➔ Carefully flush the reservoirs with water
7. ➔ Additionally flush fittings (hopper and mixing equipment)
8. ➔ Carefully flush the line between the shut-off fitting on reservoir 3 and the feed pump

### 9.4 Disposal



#### CAUTION!

- Please observe the currently applicable local regulations (specifically with regard to electronic waste)!
- Please also read the operating instructions for the other equipment (dry material feeder, pumps ...)!

For Germany: The cleaned used parts can be disposed of at municipal waste collection points.

## 10 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
- The preset parameter values for the frequency inverter may not be changed as they are factory-set on the dry material feeder
- When setting the concentration, the maximum viscosity limit of 1500 mPas may not be exceeded
- Failure to refill the polymer storage container will stop the system
- Further more serious faults may occur should the system be operated without the original faults having been eliminated

## 11 Troubleshooting

**CAUTION!**

Danger of sudden start-up!

- The agitators and propellers may start up suddenly

**NOTICE!**

The operating instructions for additional parts should be read when eliminating functional faults!

**Collective alarm**

A system fault/malfunction (collective alarm) is acoustically reported with a warning sound and visually by the red warning light on the switching cabinet. The controller also displays a fault message. The activation of the downstream feed pump (polymer solution) remains unaffected by the collective alarm.

**Acknowledgement**

The error message has to be acknowledged with the Quit key once the cause of the fault has been eliminated so that the system can restart its operation following the fault.

**Unspecified malfunctions**

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 Customer Services without delay.

## 12 Maintenance

### 12.1 Inspecting the Dry Material Feeder

Dry Material Feeder

- Inspect the dry material feeder regularly during operation to ensure that it is working correctly
- Check whether the powdered polymer is being metered correctly

### 12.2 Cleaning the Screen Insert in the Pressure Reducer

Clean the screen insert at the latest when 2/3 of the throughput surface of the screen insert is dirty.

1. ➤ Switch the "Prepare" switch to "0" to dismantle the screen insert
2. ➤ Manually close the shut-off valve upstream of the pressure reducer
3. ➤ Please refer to the manufacturer's instructions in the Appendix for further steps

### 12.3 Dismantling the Cover of an Inspection Opening



**WARNING!**

**Propellers are rotating in the reservoirs!**

- Set the main switch to "0" and ensure that it cannot be switched on again
- Remove the screwed cover of an inspection opening

The system must only be operated in principle when the inspection openings are tightly screwed. The covers may only be removed temporarily. After the inspection work, replace all covers and screw closed!

### 12.4 Cleaning the Surface of the Ultromat®

If necessary, clean the surfaces of the Ultromat®, as a slippery film can build up on them in time.

## 13 Spare Parts and Accessories

### 13.1 Spare Parts

Spare parts can be purchased from our Customer Service department.

### 13.2 Accessories

Accessories can be purchased from our Customer Service department.

# 14 Declaration of Conformity

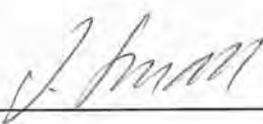
<b>EC Declaration of Conformity</b>	
We,	<b>ProMinent Dosiertechnik GmbH Im Schuhmachergewann 5 - 11 D - 69123 Heidelberg</b>
hereby declare that, on the basis of its functional concept and design and in the version brought into circulation by us, the product specified in the following complies with the relevant, fundamental safety and health stipulations laid down by EC regulations. Any modification to the product not approved by us will invalidate this declaration.	
Product description :	<i>Polyelectrolyte preparation system, Ultramat</i>
Product type:	<i>ULTa..., AF, AT, ATF, AFP, ATP, ATPF, AFD, ATD, ATFD ATR, AFK, MT</i>
Serial number:	<i>see type identification plate on device</i>
Relevant EC regulations :	<i>EC - machine directive (98/37/EC) EC - low voltage directive (2006/95/EC) EC - EMC - directive (2004/108/EC)</i>
Harmonised standards used, in particular	<i>EN ISO 12100-1, EN ISO 12100-2, EN 809, EN 60335-1, EN 60335-2-41, EN 50106, EN 55014, EN 61000-3-3, EN 61000-4-2/3/4/5/6/11, EN 61000-6-1/2</i>
Date/manufacturer's signature :	<i>28.11.2008</i> 
The undersigned :	<i>Joachim Schall, Head of R&amp;D</i>

Fig. 6: EC Declaration of Conformity

## 15 Commissioning Report

## Inbetriebnahmeprotokoll Ultramat® ATR

## Ultramat® Typ:

ATR  400  1 000  2 000

## Software Version:

/	

## Projekt-Nummer (auf Typschild):

## Einstellungen Kalibrierung:

Parameter:	Pulver	Flüssig	
Kalibrierte Dosierleistung:			g/min
Wasserzulauf:			l/h

## Einstellungen Inbetriebnahme

Parameter	Grundeinstellung	Einstellung
Heizung Einschaltzeit	5 s	
Heizung Ausschaltzeit	35 s	
Zulauf Vorlaufzeit	7 s	
Zulauf Nachlaufzeit	5 s	
Rührwerk 1 + 2 Einschaltzeit	15 min	
Rührwerk 1 + 2 Ausschaltzeit	15 min	
Rührwerk 3 Einschaltzeit	5 min	
Rührwerk 3 Ausschaltzeit	10 min	

Pulverpolymer Handelsname: \_\_\_\_\_ Lieferant: \_\_\_\_\_

Kunde: \_\_\_\_\_ Datum: \_\_\_\_\_

Aufstellungsort: \_\_\_\_\_