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RTC112 SD-Module
Real Time Control System for Sludge Dewatering

User manual

07/2013, Edition 1A

Table of contents

Section 1 Technical data

These are subject to change without notice.

Embedded PC (compact industrial PC)	
Processor	Pentium®[1], MMX compatible, 500 MHz clock rate
Flash memory	2 GB compact flash card
Internal working memory	256 MB DDR-RAM (not expandable)
Interfaces	1× RJ 45 (Ethernet), 10/100 Mbit/s
Diagnostic LED	1× power, 1× LAN speed, 1× LAN activity, TC status, 1× flash access
Expansion slot	1× CompactFlash type II slot with ejector mechanism
Clock	Internal, battery-buffered clock for time and date (battery can be replaced)
Operating system	Microsoft Windows®[2] CE or Microsoft Windows Embedded Standard
Control software	TwinCAT PLC Runtime or TwinCAT NC PTP Runtime
System bus	16 bit ISA (PC/104 standard)
Power supply	Via system bus (through power supply module CX1100-0002)
Max. power loss	6 W (including the system interfaces CX1010-N0xx)
Analog inputs	0/4 to 20 mA for input of the feed flow rate and the polymer flow rate
Number of inputs	One-channel: 2 (KL3011) Two-channel: 4 (KL3011)
Internal resistance	80 ohm + diode voltage 0.7 V
Signal current	0/4 to 20 mA
Common mode voltage (U_{CM})	35 V max.
Measurement error (for entire measurement range)	< ± 0.3 % (from end value of measurement range)
Voltage surge resistance	35 V DC
Electrical isolation	500 V_{eff} (K-bus/signal voltage)
Analog outputs	Output of the polymer dosing, output of the feed flow rate
Number of outputs	One-channel: 2 (KL4012) Two-channel: 4 (KL4012)
Supply voltage	24 V DC via the power contacts (Alternatively, 15 V DC with bus termination KL9515)
Signal current	0/4 to 20 mA
Working resistance	<500 ohm
Measurement error	± 0.5 LSB linearity error ± 0.5 LSB offset error ± 0.1 % (relative to the measuring range end value)
Resolution	12 bit
Conversion time	Approximately 1.5 ms
Electrical isolation	500 V_{eff} (K-bus/field voltage)

Digital outputs	Control of polymer pump: feed flow rate and fault messages
Number of outputs	One-channel: 4 (KL2134) Two-channel: 8 (KL2408)
Nominal load voltage	24 V DC (–15 % / +20 %)
Load type	ohmic, inductive lamp load
Max. output current	0.5 A (short-circuit proof) per channel
Reverse polarity protection	Yes
Electrical isolation	500 V_{eff} (K-bus/field voltage)
Equipment properties	
Dimensions (W × H × D)	One-channel: 191 × 120 × 96 mm (7.52 × 4.72 × 3.78 in) Two-channel: 227 × 120 × 96 mm (8.94 × 4.72 × 3.78 in)
Mass	Approximately 0.9 kg (approximately 1.98 lb)
Environmental conditions	
Working temperature	0 to 50 °C (32 to 122 °F)
Storage temperature	–25 to +85 °C (–13 to 185 °F)
Relative humidity	95 %, non-condensing
Miscellaneous	
Pollution Degree **Protection Class** **Installation Category** **Maximum Altitude**	2 1 II 2000 m (6,562 ft.)
Protection class	IP20
Installation	DIN rail EN 50022 35 × 15.0

[1] Pentium is a registered trademark of the Intel Corporation.

[2] Microsoft Windows is a brand name for operating systems of the Microsoft Corporation.

1.

Section 2 General information

2.1 Safety information

Please read the entire manual carefully before unpacking, assembling or operating the instrument. Pay attention to all hazard and warning notices. Failure to do so could result in serious injury to the operator or damage to the instrument.

To prevent damage to or impairment of the device's protection equipment, the device may only be used or installed as described in this manual.

2.1.1 Hazard notices in this manual

⚠DANGER

Indicates a potentially or imminently hazardous situation that, if not avoided, can result in death or serious injury.

⚠WARNING

Indicates a potentially or imminently dangerous situation that, if it is not avoided, can lead to death or to serious injuries.

⚠CAUTION

Indicates a possible dangerous situation that can have minor or moderate injuries as the result.

NOTICE

Indicates a situation that, if it is not avoided, can lead to damage to the device. Information that requires special emphasis.

Note: *Information that supplements points in the main text.*

2.1.2 Warning labels

Observe all labels and tags attached to the instrument. Failure to do so may result in personal injury or damage to the instrument.

	This symbol may be attached to the device and refers to operation and/or safety notes in the user manual.
	This symbol may be found on an enclosure or barrier within the product and indicates a risk of electric shock and/or death by electrocution.
	Electrical equipment marked with this symbol may no longer be disposed of in unsorted domestic or industrial waste in Europe after August 12, 2005. In conformity with the provisions in force (EU Directive 2002/96/EC), consumers in the EU must return old electrical devices to the manufacturer for disposal from this date, at no charge to the consumer. ***Note:*** *You obtain instructions on the correct disposal of all (marked and not marked) electrical products that were supplied or manufactured by Hach-Lange at your relevant Hach-Lange sales office.*

2.2 Areas of application

The RTC112 SD-Module (Real Time Controller for Sludge Dewatering) is an open and closed-loop control unit for universal applications. It can be used by mechanical sludge dewatering devices, such as centrifuges in wastewater treatment plants.

The RTC112 SD-Module

- Optimizes polymer consumption
- Uniformly manages the concentration of solids in dewatered sludge

Table 1 Versions of the RTC112 SD-Module

1-channel	Open/closed-loop controller for one dewatering system
2-channel	Open/closed-loop controller for two dewatering systems

NOTICE

The use of an RTC Module does not release the operator from the responsibility of maintaining the system. No guarantees as to the functionality or operational safety of the system.

In particular, the operator must make sure that instruments connected to the RTC open/closed-loop controller are always fully functional.

To make sure these instruments supply correct, reliable measurement values, regular maintenance work (for example, cleaning of the sensor and laboratory comparative measurements) is essential! (Refer to the user manual for the relevant instrument.)

2.3 Scope of delivery

NOTICE

The combination of pre-assembled components supplied by the manufacturer does not represent a standalone functional unit. In accordance with EU guidelines, this combination of pre-assembled components is not supplied with a CE mark, and there is no EU declaration of conformity for the combination.

However, the conformity of the combination of components with the guidelines can be proved through technical measurements.

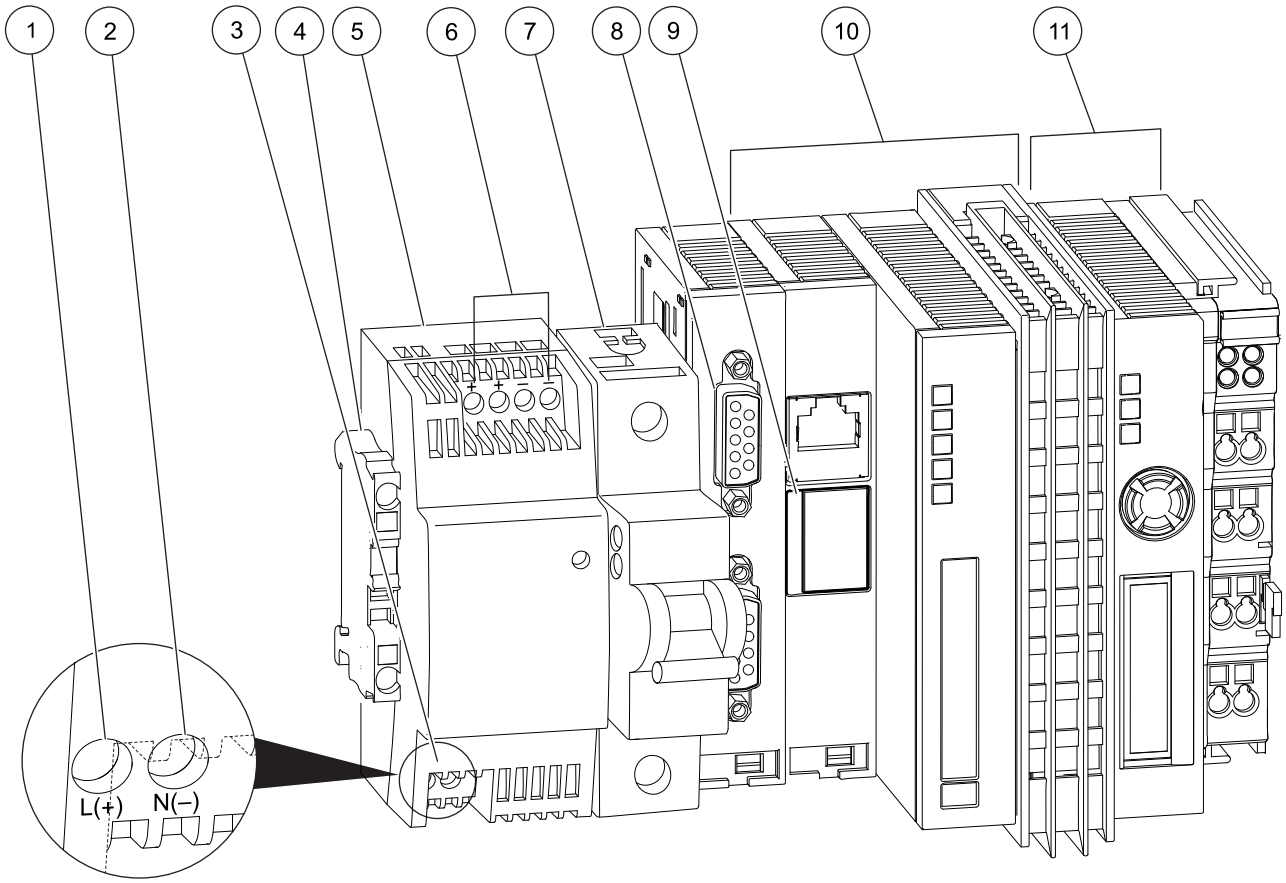
Each RTC Module is supplied with:

- SUB-D connector (9 pin)
- User manual
- Ferrite core

Check that the order is complete. All listed components must be present. If anything is missing or damaged, contact the manufacturer or distributor immediately.

2.4 Instrument overview

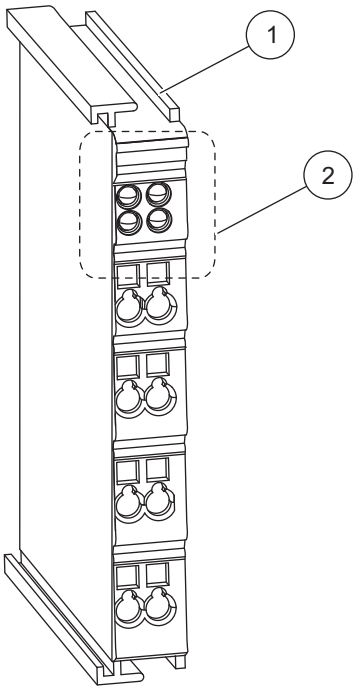
Figure 1 Base module RTC 100-240 V version



1	L(+)	**7**	Automatic circuit breaker (ON/OFF switch for item 10 and 11 without fuse function)
2	N(–)	**8**	sc1000 connection: RS485 (CX1010-N041)
3	Input AC 100–240 V / Input DC 95 V–250 V	**9**	Battery compartment
4	PE (protective earth)	**10**	CPU base module, consisting of Ethernet port with battery compartment (CX1010-N000), CPU module with CF card (CX1010-0021) and passive aeration element
5	24 V transformer (Specification section 3.1.1, page 17)	**11**	Power supply module, consisting of bus coupler (CX1100-0002) and terminal module 24V.
6	Output DC 24 V, 0,75 A		

Note: *All components are pre-wired.*

Figure 2 Design of the analog and digital input and output modules



1	Input- or Output- Module or Bus Termination Module analog or digital	**2**	LED area with installed LEDs or free LED installation spaces

Note: *The number of green LEDs indicates the number of channels.*

2.5 Theory of operation

2.5.1 Theory of operation of the RTC Module

The RTC112 SD-Module outputs analog (0/4–20 mA) and digital (0/24 V) signals for the polymer dosing rate or the feed flow rate of mechanical sludge dewatering devices. Digital fieldbus signals from sc1000 communication cards can also be used.

2.5.2 Input signals

The most important input signals are:

- Sludge influent TSS concentration (concentration of solids)
- Feed flow rate of the dewatering system
- Thickened sludge TSS concentration (optional)
- Status of the thickened sludge pump (on/off)

2.5.3 Parameters for configuration

The most important parameters for configuration are:

- The required specific polymer dosing [g polymer/kg TSS]
- The target TSS concentration in dewatered sludge or
- The target TSS concentration in centrate

NOTICE

In a closed-loop circuit, TSS measurement is required in centrate or dewatered sludge. The program of the RTC112 SD-Module has to be adjusted to the type of measurement location that is being used for the closed loop part of the RTC. This is done by executing *.bat files on the CF card of the RTC. Make_Filtrate.bat has to be executed for applications where centrate TSS is measured and Make_Effluent for applications where dewatered/thickened sludge is measured.

Note: *Never retrieve the CF-card from the RTC unit while power is on!*

2.5.4 Operating modes

The RTC112 SD-Module can be operated as a combined open-loop and closed-loop controller. Several variants can be configured.

1. Configuration of a fixed polymer rate [L/h] with a fixed feed flow rate [m^3/h].
2. Configuration of a specific polymer dosing rate [g polymer/kg TSS]. One of the following settings is adjusted:

   a. The polymer flow rate according to the TSS concentration and the feed flow rate (Figure 3).

   - Based on the actual feed flow rate [L/h] and TSS concentration [g/L] in the feed flow, the polymer dosing rate [L/h] is calculated for the required specific dosing rate.

   Or:

   b. The feed flow rate according to the specified polymer dosing rate and the measured TSS concentration of the influent (Figure 4).

   - Based on the measurement value of the TSS concentration from the influent [g/L] and the configurable specified polymer dosing rate [L/h], the feed flow rate [m^3/h] is calculated such that it corresponds to the pre-defined specific polymer dosing rate [g/kg].
3. Both variants 2a and 2b can be combined with one of the closed-loop controllers described below:

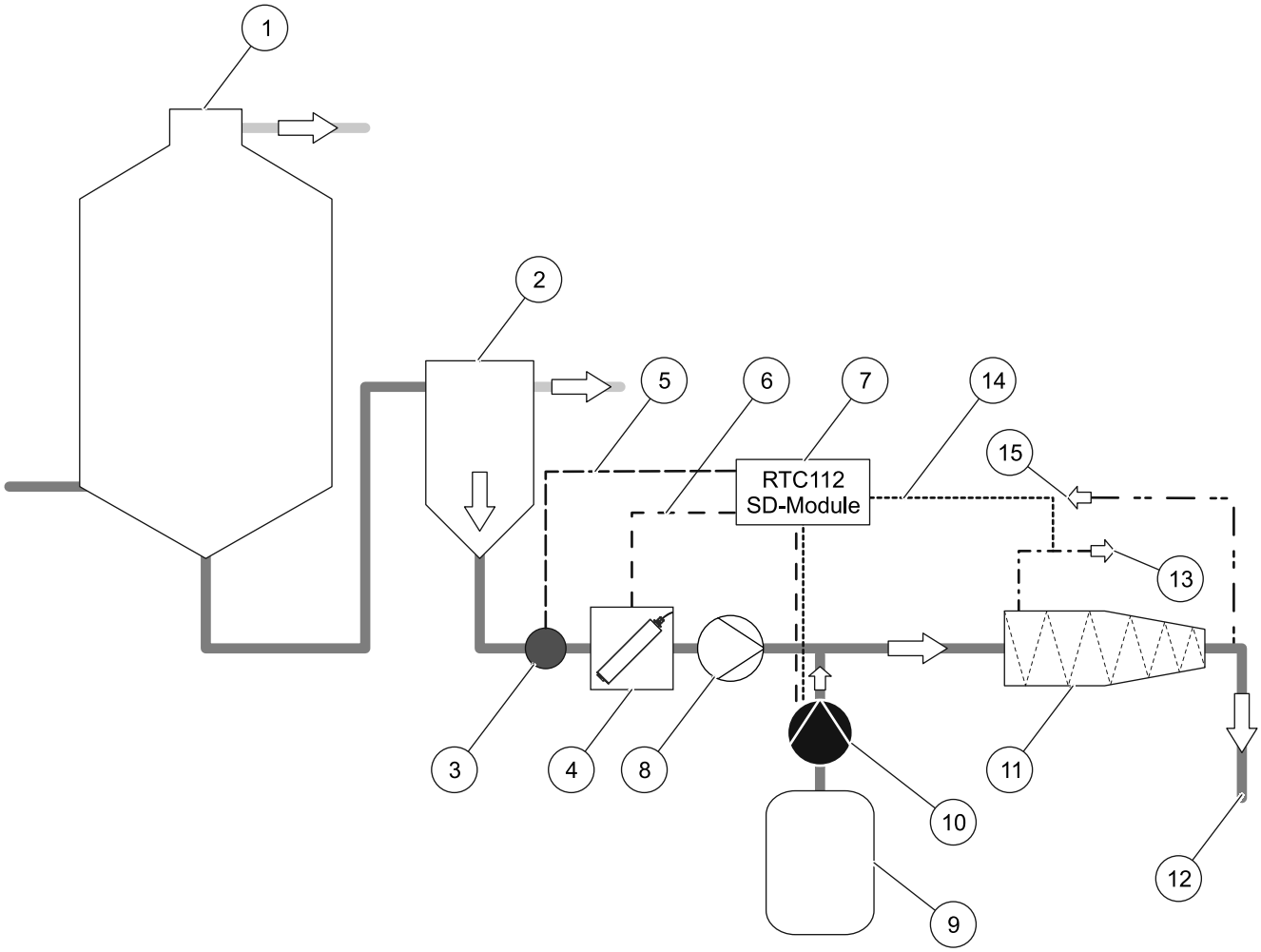
   a. Closed-loop control of the TSS concentration in the dewatered sludge

   - The specific polymer dosing rate is adjusted according to the difference between the target and actual TSS concentration in the dewatered sludge. Higher TSS concentrations lead to a reduction of the dose and lower concentrations will lead to higher dose rates than preset in the open-loop part of the RTC.

   b. Closed-loop control of the TSS concentration in the centrate or filtrate

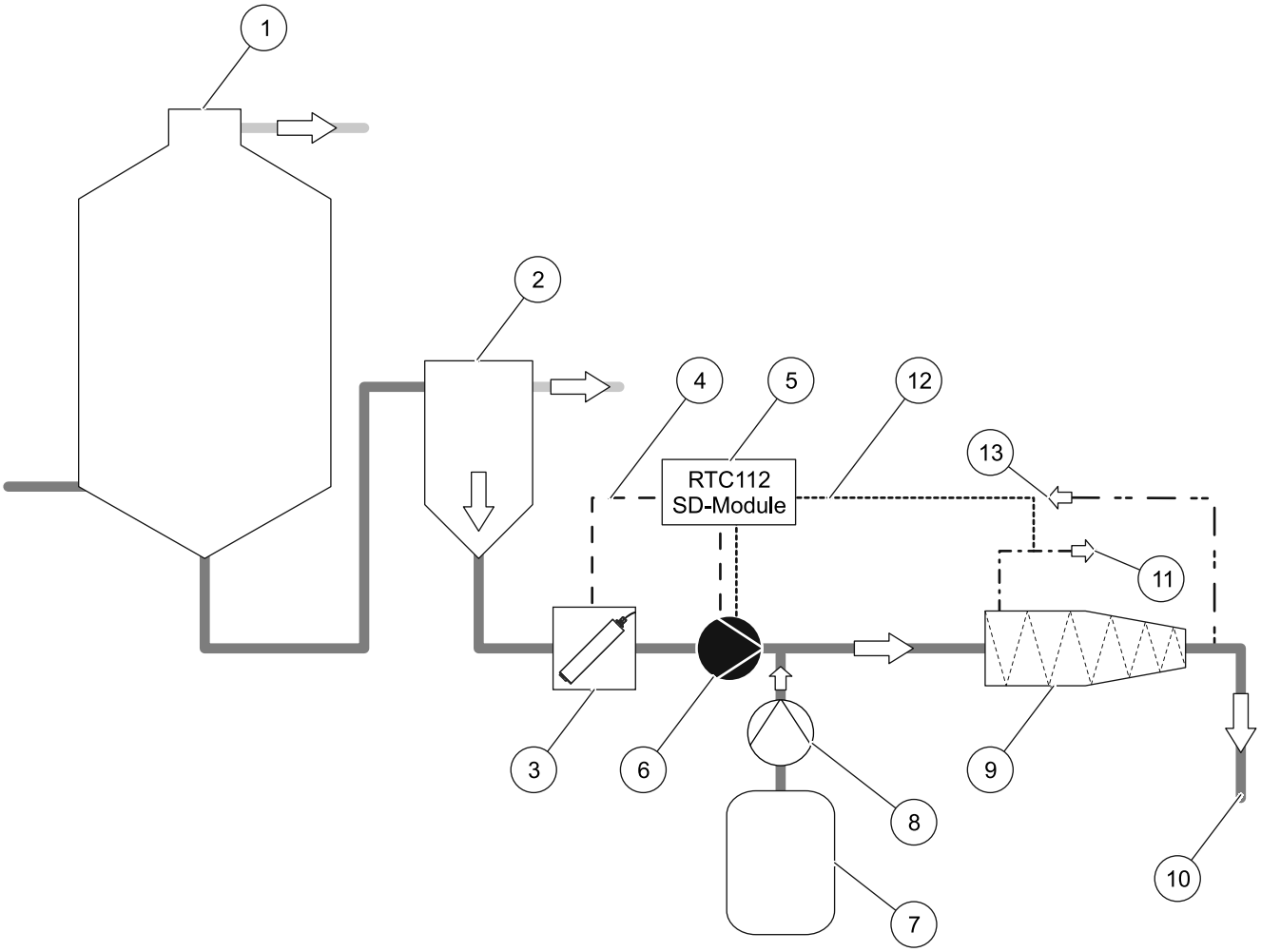
   - The specific polymer dosing rate is adjusted according to the difference between the target and actual TSS concentration in the centrate. Higher TSS concentrations lead to an increase of the dose and lower concentrations will lead to a decrease of the dose rates preset in the open-loop part of the RTC.

Figure 3 Adjustment of the polymer dosing rate to the influent TSS load



1	Digester	**9**	Polymer supply
2	Static thickener	**10**	Pump for open-loop control of the polymer dosing rate
3	Measurement of the feed flow rate	**11**	Mechanical sludge dewatering device
4	TSS measurement from the influent	**12**	Dewatered sludge
5	Open-loop control of the polymer dosing rate (feed flow rate measurement value)	**13**	Centrate
6	Open-loop control of the polymer dosing rate (influent TSS concentration measurement value)	**14**	Option: Measurement of the TSS concentration in the centrate
7	RTC112 SD-Module	**15**	Option: Measurement of the TSS concentration in the dewatered sludge instead of centrate
8	Pump for the feed flow rate (constant)		

Figure 4 Adjustment of the feed flow rate to fixed polymer dosing rate



1	Digester	**8**	Pump for polymer dosing (constant)
2	Static thickener or sludge storage	**9**	Mechanical sludge dewatering device
3	TSS measurement from the influent	**10**	Dewatered sludge
4	Open-loop control for the feed flow rate	**11**	Centrate
5	RTC112 SD-Module	**12**	Option: Measurement of the TSS concentration in the centrate
6	Pump for open-loop control of the feed flow rate	**13**	Option: Measurement of the TSS concentration in the dewatered sludge instead of centrate
7	Polymer supply		

⚠ DANGER

Only qualified experts may perform the tasks described in this section of the manual, while adhering to all locally valid safety regulations.

⚠ CAUTION

Always lay cables and hoses so that they are straight and do not pose a tripping hazard.

⚠ CAUTION

Before the power supply is switched on, refer to the instructions in the relevant manuals.

3.1 Installation of the RTC Module

Only install the RTC Module on a DIN rail. The module must be attached horizontally, with at least 30 mm (1.2 in.) space at the top and bottom to make sure that the passive aeration element can function correctly.

When used indoors, the RTC Module must be installed in a control cabinet. When used outdoors, the RTC Module requires a suitable enclosure that provides the technical specifications indicated in Section 1.

The RTC Module is operated via the sc1000 controller (see the user manual for the sc1000 controller).

Note: *The software version of the sc1000 controller must be V3.20 or above.*

3.1.1 Supply voltage of the RTC Module

Table 2 Supply voltage of the RTC Module

Voltage	24 V DC (–15 % / +20 %), max. 25 W
Recommended fuse	C2
With 110–230 V option	110–230 VAC, 50-60 Hz, approximately 25 VA

Note: *An external deactivation switch is recommended for all installations.*

3.2 Connection of process measurement instruments for the TSS concentration

The measurement signals of the sc sensors for the measurement of the concentration of solids (e. g. SOLITAX sc) are provided to the RTC112 SD-Module via the RTC communication card (YAB117) in the sc1000 probe module.

3.2.1 Power supply of the sc sensors and the sc1000 controller

See operating instructions of the respective sc sensors and the sc1000 controller.

3.3 sc1000 controller connection

Connect the SUB-D plug supplied to a dual-core, sheathed data cable (signal or bus cable). For additional information regarding the data cable connection, refer to the enclosed assembly instructions.

3.4 Connection to the automation unit on the plant side

The one-channel and two-channel versions of the RTC112 SD-Module are equipped with various modules that must be connected to the plant automation system.

- The feed flow rate must be provided to the RTC112 SD-Module as a 0/4 to 20 mA signal.
- The polymer flow rate must be provided (on both versions) to the RTC112 SD-Module as a 0/4 to 20 mA signal.
- The polymer pump can be operated in pulse/pause mode (PWM).
- The status signals and fault indications are output as 0 V/24 V signals.
- Measurement errors are shown 5 minutes after the error occurs. In the event of a new startup (return of power supply), the unit is set back to ON (24 V) after approximately 1 minute and 40 seconds if there are no measurement errors.
- In the event of a new startup (return of power supply), the RTC operating signal is set back to ON (24 V) after approximately 1 minute and 25 seconds.

Table 3 Connections for the 1-channel RTC112 SD-Module

Module	Name	Connection	Signal	Function
4x digital output[1]	KL2134	1	+24 V/0 V	Polymer pump on/off (24 V/0 V); (LED a)
		5	+24 V/0 V	Closed-loop control of the feed flow rate active/inactive (24 V/0 V); (LED c)
		4	+24 V/0 V	Input signals OK (24 V), input signal faulty (0 V); (LED b)
		8	+24 V/0 V	RTC operational (24 V), RTC faulty (0 V), (LED d)
2x analog output	KL4012	1(+) - 3(-)	0/4 to 20 mA	Output of the polymer pump flow rate
		5(+) - 7(-)	0/4 to 20 mA	Output of the feed flow rate
1x analog input	KL3011	1(+) - 2(-)	0/4 to 20 mA	Input of the feed flow rate
1x analog input	KL3011	1(+) - 2(-)	0/4 to 20 mA	Input of the polymer flow rate
Bus termination	KL9010			Bus termination

[1] Ground to connection 3 and 7 or to the supply voltage connections

Table 4 Connections for the 2-channel RTC112 SD-Module

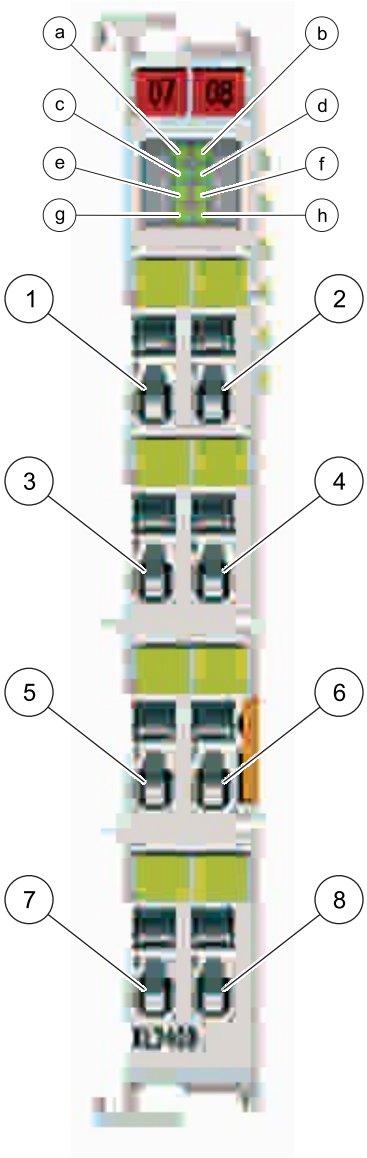
Module	Name	Connection	Signal	Channel	Function
8x digital output[1]	KL2408	1	+24 V/0 V	1	Polymer pump on/off (24 V/0 V) (LED a)
		5	+24 V/0 V	1	Closed-loop control of the feed flow rate active/inactive (24 V/0 V) (LED e)
		2	+24 V/0 V	1	Input signals OK (24 V), input signal faulty (0 V) (LED b)
		6	+24 V/0 V	1	RTC operational (24 V), RTC faulty (0 V) (LED f)
		3	+24 V/0 V	2	Polymer pump on/off (24 V/0 V) (LED c)
		7	+24 V/0 V	2	Closed-loop control of the feed flow rate active/inactive (24 V/0 V) (LED g)
		4	+24 V/0 V	2	Input signals OK (24 V), input signal faulty (0 V) (LED d)
		8	+24 V/0 V	2	RTC operational (24 V), RTC faulty (0 V) (LED h)
2x analog output	KL4012	1(+) - 3(-)	0/4 to 20 mA	1	Output of the polymer pump flow rate
		5(+) - 7(-)	0/4 to 20 mA	1	Output of the feed flow rate

Table 4 Connections for the 2-channel RTC112 SD-Module

Module	Name	Connection	Signal	Channel	Function
2x analog output	KL4012	1(+) - 3(-)	0/4 to 20 mA	2	Output of the polymer pump flow rate
		5(+) - 7(-)	0/4 to 20 mA	2	Output of the feed flow rate
1x analog input	KL3011	1(+) - 2(-)	0/4 to 20 mA	1	Input of the feed flow rate
1x analog input	KL3011	1(+) - 2(-)	0/4 to 20 mA	1	Input of the polymer flow rate
1x analog input	KL3011	1(+) - 2(-)	0/4 to 20 mA	2	Input of the feed flow rate
1x analog input	KL3011	1(+) - 2(-)	0/4 to 20 mA	2	Input of the polymer flow rate
Bus termination	KL9010				Bus termination

[1] Ground to connection to the supply voltage connections

Figure 5 Connections and corresponding LEDs for digital output card KL2408 (2 channel option only)



a	LED a	**e**	LED e
b	LED b	**f**	LED f
c	LED c	**g**	LED g
d	LED d	**h**	LED h
1	Connector 1	**9**	Connector 5
2	Connector 2	**10**	Connector 6
3	Connector 3	**11**	Connector 7
4	Connector 4	**12**	Connector 8

Section 4 Parameterization and operation

4.1 Operating the sc controller

The RTC Module can only be operated via the sc1000 controller in conjunction with the RTC communication card. Before the RTC Module is used, the user must be familiar with the functionality of the sc1000 controller. Learn how to navigate through the menu and perform the relevant functions.

4.2 sc1000 setup

1. Open the **MAIN MENU**.
2. Select **RTC MODULES / PROGNOSYS** and confirm.
3. Select **RTC MODULES** and confirm.
4. Select **RTC** and confirm.

4.3 Menu structure

4.3.1 DIAGNOSIS

DIAGNOSIS		
RTC		
ERROR LIST	Possible error messages: **RTC MISSING, RTC CRC, CHECK CONFIG, RTC FAILURE**	
WARNING LIST	Possible warning messages: **MODBUS ADDRESS, PROBE SERVICE**	
REMINDER LIST		

Note: *Refer to Section 6 Troubleshooting, page 39 for a list of all possible error and warning messages together with a description of all necessary countermeasures to be taken.*

4.4 Configuration of RTC112 SD-Module parameters on the sc1000 controller

The following menu items are in the SC1000 SETUP menu.

4.4.1 RTC112 SD-Module open and closed-loop controller

RTC MODULES / PROGNOSYS		
RTC MODULES		
RTC		
CONFIGURE		
SELECT SENSOR	Select the sensors installed for the open/closed-loop controller (refer to section 4.5, page 26).	

4.4.1 RTC112 SD-Module open and closed-loop controller (Continued)

RTC MODULES / PROGNOSYS		
RTC MODULES		
RTC		
PRESELECT PROG.		
CHANNEL 1		
POLYMER DOSING CONTROL	Based on the feed flow rate [m³/h] and measured TSS concentration [g/L] from the influent, the polymer dosing rate [L/h] is calculated such that it corresponds to the target specific polymer dosing rate [g/kg].	Activation/ deactivation
FEED FLOW CONTROL	Based on the measured TSS concentration [g/L] and a fixed polymer dosing rate [L/h], the feed flow [m^3/h] is calculated such that it corresponds to the specific polymer dosing rate [g/kg].	Activation/ deactivation
CLOSED-LOOP EFFLUENT CONTROL	If activated, the specific polymer dosing rate FACTOR POLYMER DOSING is adjusted based on the difference between the target and actual TSS concentration in the dewatered sludge. The change in the specific dosing rate affects the polymer dosing rate [L/h] in the POLYMER DOSING CONTROL module or affects the feed flow rate in the FEED FLOW CONTROL module.	Activation/ deactivation
CLOSED-LOOP FILTRATE CONTROL	If activated, the specific polymer dosing rate FACTOR POLYMER DOSING is adjusted based on the difference between the target and actual TSS concentration in the filtrate/centrate. The change in the specific dosing rate affects the polymer dosing rate [L/h] in the POLYMER DOSING CONTROL module or affects the feed flow rate in the FEED FLOW CONTROL module. ***Note:*** *Activation and deactivation of CLOSED-LOOP EFFLUENT CONTROL and CLOSED-LOOP FILTRATE CONTROL have to be prepared by executing the relevant *bat-files on the RTC CF-card (see section 2.5.3).*	Activation/ deactivation
CHANNEL 2	As per channel one	
CONTROL PARAMETER		
CHANNEL 1		
FACTOR POLYMER DOSING	Required specific polymer dosing [g/kg]. This parameter determines how many grams of polymer per kilogram of TSS are fed by the machine.	g/kg
POLYMER CONCEN-TRATION	Polymer concentration [g/L] fed via the polymer pump.	g/L
MANUAL POLYMER DOSING	The RTC outputs the polymer flow rate [L/h] if • FEED FLOW CONTROL is activated • No open-loop control mode (see above) is activated • The TSS measurement from the influent reports an error, or • The flow measurement from the influent reports an error.	L/h
MANUAL FEED FLOW	The RTC outputs the feed flow rate [m³/h] if • POLYMER DOSING CONTROL is activated • No open-loop control mode (see above) is activated • The TSS measurement from the influent reports an error, or • The flow measurement from the influent reports an error	m³/h

4.4.1 RTC112 SD-Module open and closed-loop controller (Continued)

RTC MODULES / PROGNOSYS

RTC MODULES

RTC

MAX DECREASE CLOSED L	This value defines the maximum decrease of the specific polymer dosing rate FACTOR POLYMER DOSING [g/kg] if CLOSED-LOOP EFFLUENT CONTROL is selected.	g/kg
MAX INCREASE CLOSED L	This value defines the maximum increase of the specific polymer dosing rate FACTOR POLYMER DOSING [g/kg] if CLOSED-LOOP EFFLUENT CONTROL is selected.	g/kg
SET-POINT TSS	Required setpoint of the TSS concentration in the thickened sludge. ***Note:*** *This parameter is only considered if CLOSED-LOOP EFFLUENT CONTROL is activated.*	g/L
P GAIN TSS	Proportional gain for the PID closed-loop controller for the TSS concentration in the thickened sludge. ***Note:*** *This parameter is only considered if CLOSED-LOOP EFFLUENT CONTROL is activated.P GAIN TSS [L/g] is divided by 100 before it is multiplied by the deviation of the actual TSS concentration [g/L] from the required TSS setpoint [g/L] .*	L/g
INTEGRAL TIME TSS	Integral time for the PID closed-loop controller for the TSS concentration in the thickened sludge. ***Note:*** *This parameter is only considered if CLOSED-LOOP EFFLUENT CONTROL is activated. INTEGRAL TIME TSS is set to "0" to deactivate the integral part of the PI open-loop controller.*	min
DERIVATIVE TIME TSS	Derivative time for the PID closed-loop controller for the TSS concentration in the thickened sludge. ***Note:*** *This parameter is only considered if CLOSED-LOOP EFFLUENT CONTROL is activated.*	min
SET-POINT FILT	Required setpoint of the TSS concentration in the centrate/filtrate. ***Note:*** *This parameter is only considered if CLOSED-LOOP FILTRATE CONTROL is activated.*	g/L
P GAIN FILT	Proportional gain for the PID closed-loop controller for the TSS concentration in the centrate/filtrate. ***Note:*** *This parameter is only considered if CLOSED-LOOP EFFLUENT CONTROL is activated.* *P GAIN FILT [L/g] is divided by 100 before it is multiplied by the deviation of the actual TSS concentration from the required TSS setpoint.*	L/g
INTEGRAL TIME FILT	Integral time for the PID closed-loop controller for the TSS concentration in the centrate/filtrate. ***Note:*** *This parameter is only considered if CLOSED-LOOP EFFLUENT CONTROL is activated.* *INTEGRAL TIME TSS is set to "0" to deactivate the integral part of the PID open-loop controller.*	min

4.4.1 RTC112 SD-Module open and closed-loop controller (Continued)

RTC MODULES / PROGNOSYS			
RTC MODULES			
RTC			
	DERIVATIVE TIME FILT	Derivative time for the PID closed-loop controller for the TSS concentration in the centrate/filtrate. ***Note:*** *This parameter is only considered if CLOSED-LOOP FILTRATE CONTROL is activated.*	min
	CHANNEL 2	As per channel one	
	INPUT/OUTPUT LIMITS		
	CHANNEL 1		
	FEED FLOW LOW	Feed flow rate input signals below this value [m^3/h] are set to this value (to avoid low flow peaks).	m^3/h
	FEED FLOW HIGH	Feed flow rate input signals above this value [m^3/h] are set to this value (to avoid high flow peaks).	m^3/h
	FEED FLOW SMOOTHING	Feed flow measurement values are smoothed in line with this parameter.	min
	LIMIT TSS IN LOW	TSS measurement values from the influent that are below this value [g/L] are set to this value (to avoid low peaks).	g/L
	LIMIT MAX TSS IN HIGH	TSS measurement values from the influent that are above this value [g/L] are set to this value (to avoid high peaks).	g/L
	TSS IN SMOOTHING	The TSS measurement values from the influent are smoothed in line with this parameter.	min
	LIMIT TSS OUT LOW	The TSS values of the dewatered sludge or centrate sludge that are below this value [g/L] are set to this value (to avoid low peaks).	g/L
	LIMIT TSS OUT HIGH	The TSS values of the dewatered sludge or centrate sludge that are above this value [g/L] are set to this value (to avoid high peaks).	g/L
	TSS OUT SMOOTHING	The TSS measurement values from the effluent are smoothed in line with this parameter.	min
	POLYMER DOSING MINIMUM	When FEED FLOW CONTROL is activated, measurement values for the polymer dosing rate that are below this value [m^3/h] are set to this value (to avoid low peaks in the dosing flow).	L/h
	POLYMER DOSING MAXIMUM	Any RTC calculation above this value [g/L] is set to this value and delivered to the polymer pump. When FEED FLOW CONTROL is activated, measurement values for the polymer dosing rate that are above this value [m^3/h] are set to this value (to avoid high peaks in the dosing flow).	L/h
	CHANNEL 2	As per channel one	

4.4.1 RTC112 SD-Module open and closed-loop controller (Continued)

RTC MODULES / PROGNOSYS		
RTC MODULES		
RTC		
INPUTS		
CHANNEL 1		
MIN FEED FLOW	Minimum flow rate [m³/h] from the influent in accordance with the 0/4 mA measurement signal.	m³/h
MAX FEED FLOW	Maximum flow rate [m³/h] from the influent in accordance with the 20 mA measurement signal.	m³/h
0/4...20mA	Transfer range of 0/4 to 20 mA current loop (as set in connected flow measuring instrument).	
MIN POLYMER FLOW	Minimum polymer dosing in [L/h] in accordance with the 0/4 mA measurement signal.	L/h
MAX POLYMER FLOW	Maximum polymer dosing in [L/h] in accordance with the 20 mA measurement signal.	L/h
0/4...20mA	Transfer range of 0/4 to 20 mA current loop (as set on connected flow measuring instrument).	
CHANNEL 2	As per channel one	
OUTPUTS		
CHANNEL 1		
MIN FEED FLOW	Minimum feed flow rate [m³/h] in accordance with 0/4 mA.	m³/h
MAX FEED FLOW	Maximum feed flow rate [m³/h] in accordance with 20 mA.	m³/h
0/4...20mA	Transfer range of 0/4 to 20 mA current loop (as set on connected flow measuring instrument).	
MIN POLYMER FLOW	Minimum polymer pump delivery rate in accordance with 0/4 mA.	L/h
MAX POLYMER FLOW	Maximum polymer pump delivery rate in accordance with 20 mA.	L/h
0/4...20mA	Transfer range of 0/4 to 20 mA current loop (as set on connected flow measuring instrument).	
CONTROL CYCLE	Pulse/pause mode for the polymer pump open-loop control for dosing rates beneath the minimum polymer flow rate (MIN POLYMER FLOW). The on/off duration in pulse/pause mode can be affected by the duration of the CONTROL CYCLE. For example, with a CONTROL CYCLE of 100 seconds and a dosing control value of 60 %, the polymer pump is regularly switched on for 60 seconds and switched off for 40 seconds. Short cycle times increase the switching frequency but enable more precise adaptation to individual requirements. CONTROL CYCLE should be divisible by MIN RUNTIME and produce a whole number.	s
MIN RUNTIME	The minimum ON time in pulse/pause dosing mode. The pump is not activated for periods shorter than this. The MIN RUNTIME must be shorter than the duration of the CONTROL CYCLE.	s
CHANNEL 2	As per channel one	

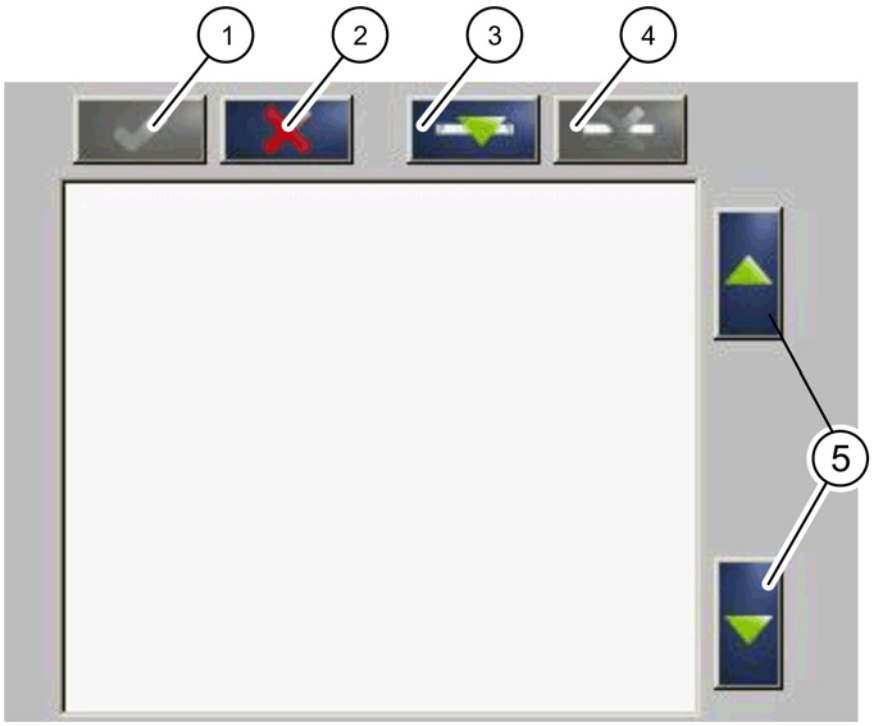
4.4.1 RTC112 SD-Module open and closed-loop controller (Continued)

RTC MODULES / PROGNOSYS			
RTC MODULES			
RTC			
	MODBUS		
		ADDRESS	Start address of an RTC within the MODBUS network. Default setting: 41–61
		DATA ORDER	Specifies the register order within a double word. Presetting: NORMAL
	DATALOG INTRVL		Indicates the interval in which the data is saved in the log file. [min]
	SET DEFAULTS		Restores the factory settings.
	MAINTENANCE		
	RTC DATA		
		RTC MEASUREMEN	Specifies the value measured by the RTC, e. g. the influent measurement.
		RTC ACTUAT VAR	Specifies the variable calculated by the RTC, e. g. whether the aeration should be switched on or off.
	DIAG/TEST		
		EEPROM	Hardware test
		RTC COMM TO	Communication time-out
		RTC CRC	Communication check sum
		MODBUS ADDRESS	Address displayed where the communication actually takes place. Presetting: 41

4.5 Select sensors

1. To select sensors and their sequence for the RTC Module, press RTC > CONFIGURE > SELECT SENSOR.

Figure 6 Select sensor



1	**ENTER** — Saves the setting and returns to the CONFIGURE menu.	4	**DELETE** — Removes a sensor from the selection.
2	**CANCEL** — Returns to the CONFIGURE menu without saving.	5	**UP/DOWN** — Moves the sensors up or down.
3	**ADD** — Adds a new sensor to the selection.		

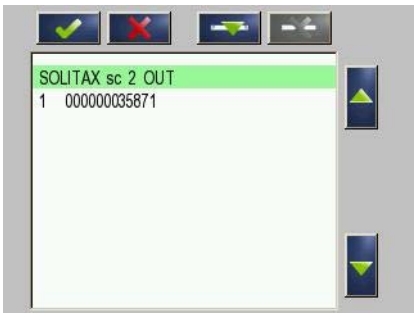
2. Press **ADD** (Figure 6, item 3).

   A selection list of all subscribers to the sc1000 network opens.

3. Press the required sensor for the RTC Module and confirm by pressing **ENTER** below the selection list.

   Sensors in black type are available for the RTC Module. Sensors in red type are not available for the RTC Module.

   Note: *Sensors marked (p) are available for PROGNOSYS if these sensors have been selected in conjunction with an RTC (refer to the PROGNOSYS user manual).*



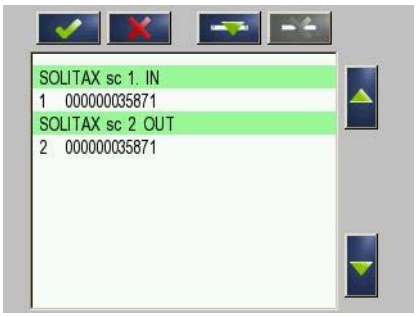
4. The selected sensor is shown in the sensor list.
Press **ADD** (Figure 6, item 3) to open the selection list again.

5. Select the second sensor for the RTC Module and confirm by pressing **ENTER** below the selection list.

Note: *Previously selected sensors are shown in gray.*

The selected sensors are shown in the sensor list.

6. To sort the sensors in the order specified for the RTC Module, press the sensor and use the arrow keys to move it (Figure 6, item 5).
Press **DELETE** (Figure 6, item 4) to remove an incorrect sensor from the sensor list again.



7. Press ENTER (Figure 6, item 1) to confirm the list once it is finished.

4.6 PRESELECT PROG

4.6.1 POLYMER DOSING CONTROL

Based on the measured feed flow rate [m³/h] and the measured TSS concentration [g/L] from the influent, the polymer dosing rate [L/h] is calculated such that the setpoint corresponds to the specific polymer dosing rate [g/kg].

Note: *This open-loop control mode can only be activated if FEED FLOW CONTROL is deactivated.*

Note: *The polymer flow rate is controlled via the RTC.*

4.6.2 FEED FLOW CONTROL

Based on the measured TSS concentration [g/L] and the specified polymer dosing rate [L/h], the feed flow rate is calculated such that it corresponds with the specific polymer dosing rate [g/kg] (FACTOR POLYMER DOSING).

Note: *This open-loop control mode can only be activated if POLYMER DOSING CONTROL is deactivated.*

Note: *The feed flow rate is controlled via the RTC.*

4.6.3 CLOSED-LOOP EFFLUENT CONTROL

If activated, the specific polymer dosing rate FACTOR POLYMER DOSING is adjusted based on the difference between the target and actual TSS concentration in the dewatered sludge.

If FEED FLOW CONTROL is activated, the TSS load fed with the sludge thickening is adjusted based on the difference between the target and actual TSS concentration in the filtrate.

Note: *This closed-loop control can only be activated if POLYMER DOSING CONTROL (section 4.6.1) or FEED FLOW CONTROL (section 4.6.2) is activated.*

4.6.4 CLOSED-LOOP FILTRATE CONTROL

If activated, the specific polymer dosing rate FACTOR POLYMER DOSING is adjusted based on the difference between the target and actual TSS concentration in the filtrate/centrate.

The change in the specific dosing rate affects the polymer dosing rate [L/h] in the POLYMER DOSING CONTROL module or affects the feed flow rate in the FEED FLOW CONTROL module.

Note: *Activation and deactivation of CLOSED-LOOP EFFLUENT CONTROL and CLOSED-LOOP FILTRATE CONTROL have to be prepared by executing the relevant *bat-files on the RTC CF-card (see section 2.5.3).*

4.7 CONTROL PARAMETER

4.7.1 FACTOR POLYMER DOSING

Required specific polymer dosing [g/kg]. This parameter determines how many grams of polymer per kilogram of TSS are fed by the system.

4.7.2 POLYMER CONCENTRATION

Polymer concentration [g/L] fed via the polymer pump.

4.7.3 MANUAL POLYMER DOSING

The RTC outputs the polymer dosing rate [L/h] if

- FEED FLOW CONTROL is activated
- No open-loop control mode (section 4.6.1 to section 4.6.3) is activated
- The TSS measurement from the influent reports an error, or
- The flow measurement from the influent reports an error.

4.7.4 MANUAL FEED FLOW

The RTC outputs the feed flow rate [m^3/h] if

- POLYMER DOSING CONTROL is activated
- No open-loop control mode (section 4.6.1 to section 4.6.3) is activated
- The TSS measurement at the inlet reports an error, or
- The flow measurement from the influent reports an error.

4.7.5 MAX DECREASE CLOSED L

This value defines the maximum decrease of the specific polymer dosing rate FACTOR POLYMER DOSING [g/kg] if CLOSED-LOOP EFFLUENT CONTROL is selected.

4.7.6 MAX INCREASE CLOSED L

This value defines the maximum increase of the specific polymer dosing rate FACTOR POLYMER DOSING [g/kg] if CLOSED-LOOP EFFLUENT CONTROL is selected.

4.7.7 SET-POINT TSS

Required setpoint of the TSS concentration in the dewatered sludge.

Note: *· This parameter is only considered if CLOSED-LOOP EFFLUENT CONTROL (section 4.6.3) is activated.*

4.7.8 P GAIN TSS

Proportional gain for the PID closed-loop controller for the TSS concentration in the dewatered sludge.

Note: *P GAIN TSS [L/g] is divided by 100 before it is multiplied by the deviation of the actual TSS concentration from the required TSS setpoint.*

4.7.9 INTEGRAL TIME TSS

Integral time for the PID closed-loop controller for the TSS concentration in the dewatered sludge.

Note: *INTEGRAL TIME TSS is set to "0" to deactivate the integral part of the PI open-loop controller.*

4.7.10 DERIVATIVE TIME TSS

Derivative time for the PID closed-loop controller for the TSS concentration in the dewatered sludge.

4.7.11 SET-POINT FILT

Required setpoint of the TSS concentration in the centrate/filtrate.

Note: *This parameter is only considered if CLOSED-LOOP FILTRATE CONTROL is activated.*

4.7.12 P GAIN FILT

Proportional gain for the PID closed-loop controller for the TSS concentration in the centrate/filtrate.

Note: *This parameter is only considered if CLOSED-LOOP EFFLUENT CONTROL is activated.*
P GAIN FILT [L/g] is divided by 100 before it is multiplied by the deviation of the actual TSS concentration from the required TSS setpoint.

4.7.13 INTEGRAL TIME FILT

Integral time for the PID closed-loop controller for the TSS concentration in the centrate/filtrate.

Note: *This parameter is only considered if CLOSED-LOOP EFFLUENT CONTROL is activated.*
INTEGRAL TIME TSS is set to "0" to deactivate the integral part of the PID open-loop controller.

4.7.14 DERIVATIVE TIME FILT

Derivative time for the PID closed-loop controller for the TSS concentration in the centrate/filtrate.

Note: *This parameter is only considered if CLOSED-LOOP FILTRATE CONTROL is activated.*

4.8 INPUT/OUTPUT LIMITS

4.8.1 FEED FLOW LOW

Feed flow rate input signals below this value [m^3/h] are set to this value. This means that very low feed flow rates can be avoided.

4.8.2 FEED FLOW HIGH

Feed flow rate input signals above this value [m^3/h] are set to this value. This avoids load peaks.

4.8.3 FEED FLOW SMOOTHING

Feed flow measurement values are smoothed in line with this parameter.

SMOOTHING = 1: The signal for the flow rate measurement is not smoothed.

SMOOTHING = 2: Smoothing is performed over 3 minutes.

SMOOTHING = 3: Smoothing is performed over 5 minutes.

SMOOTHING = 5: Smoothing is performed over 12 minutes.

SMOOTHING = 10: Smoothing is performed over 25 minutes.

Example:

With the setting SMOOTHING = 2, it takes 3 minutes for the smoothed value to reach 95 % of the final value after an abrupt change in the feed flow rate.

4.8.4 LIMIT TSS IN LOW

TSS measurement values from the influent that are below this value [g/L] are set to this value (to avoid low peaks).

4.8.5 LIMIT MAX TSS IN HIGH

Measurement values from the influent that are above this value [g/L] are set to this value (to avoid high peaks).

4.8.6 TSS IN SMOOTHING

TSS measurement values from the influent are smoothed in line with this parameter.

SMOOTHING = 1: The signal is not smoothed.

SMOOTHING = 2: Smoothing is performed over 3 minutes.

SMOOTHING = 3: Smoothing is performed over 5 minutes.

SMOOTHING = 5: Smoothing is performed over 12 minutes.

SMOOTHING = 10: Smoothing is performed over 25 minutes.

4.8.7 LIMIT TSS OUT LOW

TSS measurement values for the dewatered sludge or centrate that are below this value [g/L] are set to this value (to avoid low peaks).

4.8.8 LIMIT TSS OUT HIGH

TSS measurement values for the dewatered sludge or centrate that are above this value [m^3/h] are set to this value (to avoid high peaks).

4.8.9 TSS OUT SMOOTHING

TSS measurement values from the effluent are smoothed in line with this parameter.

SMOOTHING = 1: The signal is not smoothed.

SMOOTHING = 2: Smoothing is performed over 3 minutes.

SMOOTHING = 3: Smoothing is performed over 5 minutes.

SMOOTHING = 5: Smoothing is performed over 12 minutes.

SMOOTHING = 10: Smoothing is performed over 25 minutes.

4.8.10 POLYMER DOSING MINIMUM

RTC calculations below this value [g/L] are set to this value and transferred to the polymer pump.

Note: *When FEED FLOW CONTROL is activated, measurement values for the polymer dosing rate that are below this value [m^3/h] are set to this value (to avoid low peaks in the dosing flow).*

4.8.11 POLYMER DOSING MAXIMUM

RTC calculations above this value [g/L] are set to this value and transferred to the polymer pump.

Note: *When FEED FLOW CONTROL is activated, measurement values for the polymer dosing rate that are above this value [m^3/h] are set to this value (to avoid high peaks in the dosing flow).*

4.9 INPUTS

4.9.1 MIN FEED FLOW

Minimum flow rate [m^3/h] from the influent in accordance with the 0/4 mA measurement signal.

4.9.2 MAX FEED FLOW

Maximum flow rate [m^3/h] from the influent in accordance with the 20 mA measurement signal.

4.9.3 0/4...20 mA

Transfer range of the 0/4 to 20 mA current loop (as set in connected flow measuring instrument).

4.9.4 MIN POLYMER FLOW

Minimum polymer dosing in [L/h] in accordance with the 0/4 mA measurement signal.

4.9.5 MAX POLYMER FLOW

Maximum polymer dosing in [L/h] in accordance with the 20 mA measurement signal.

4.9.6 0/4...20 mA

Transfer range of the 0/4 to 20 mA current loop (as set in connected flow measuring instrument).

4.10 OUTPUTS

4.10.1 MIN FEED FLOW

Minimum feed flow rate [m³/h] in accordance with 0/4 mA.

4.10.2 MAX FEED FLOW

Maximum feed flow rate [m³/h] in accordance with 20 mA.

4.10.3 0/4...20 mA

Transfer range of 0/4 to 20 mA current loop (as set in connected flow measuring instrument).

4.10.4 MIN POLYMER FLOW

Minimum polymer pump delivery rate in accordance with 0/4 mA.

4.10.5 MAX POLYMER FLOW

Maximum polymer pump delivery rate in accordance with 20 mA.

4.10.6 0/4...20 mA

Transfer range of 0/4 to 20 mA current loop (as set in connected flow measuring instrument).

4.10.7 CONTROL CYCLE

Pulse/pause mode for the polymer pump open-loop control for dosing rates beneath the minimum polymer flow rate (MIN POLYMER FLOW). The on/off duration in pulse/pause mode can be affected by the duration of the CONTROL CYCLE. For example, with a CONTROL CYCLE of 100 seconds and a dosing control value of 60 %, the polymer pump is switched on for 60 seconds and switched off for 40 seconds. Short cycle times increase the switching frequency but enable more precise adaptation to individual requirements.

Note: *CONTROL CYCLE must be divisible by MIN RUNTIME and produce a whole number.*

4.10.8 MIN RUNTIME

Minimum ON time in pulse/pause dosing mode. The pump is activated for this runtime at the very least. The MIN RUNTIME must be shorter than the duration of the CONTROL CYCLE.

4.11 Displayed measurement values and variables

The following measurement values and variables are shown on the sc1000 display and transferred via fieldbus (refer to section Appendix B).

RTC112 SD-Module, one-channel	Parameter	Unit	Description
Measurement 1	Qin 1	m^3/h	Flow rate from the influent
Measurement 2	Qavg 1	m^3/h	Average flow rate
Measurement 3	Qdos1	L/h	Polymer flow rate
Measurement 4	TSin 1	g/L	TSS concentration from the influent
Measurement 5	TSef 1	g/L	TSS concentration from the effluent
Actuat var 6	Pdos1	L/h	Polymer dosing
Actuat var 7	Fact 1	g/kg	Specific polymer dosing
Actuat var 8	Feed 1	m^3/h	Feed flow rate

RTC112 SD-Module, two-channel	Parameter	Unit	Description
Measurement 1	Qin 1	m^3/h	Flow rate from the influent 1
Measurement 2	Qavg 1	m^3/h	Average flow rate
Measurement 3	Qdos 1	L/h	Polymer flow rate 1
Measurement 4	TSin 1	g/L	TSS concentration from the influent 1
Measurement 5	TSef 1	g/L	TSS concentration in the effluent 1
Measurement 6	Qin 2	m^3/h	Flow rate from the influent 2
Measurement 7	Qavg 2	m^3/h	Average flow rate
Measurement 8	Qdos 2	L/h	Polymer flow rate 2
Measurement 9	TSin 2	g/L	TSS concentration from the influent 2
Measurement 10	TSef 2	g/L	TSS concentration in the effluent 2
Actuat var 11	Pdos 1	L/h	Polymer dosing 1
Actuat var 12	Fact 1	g/kg	Specific polymer dosing 1
Actuat var 13	Feed 1	m^3/h	Feed flow rate 1
Actuat var 14	Pdos2	L/h	Polymer dosing 2
Actuat var 15	Fact 2	g/kg	Specific polymer dosing 2
Actuat var 16	Feed 2	m^3/h	Feed flow rate 2

Section 5 Maintenance

⚠ DANGER

Multiple hazards

Only qualified personnel must conduct the tasks described in this section of the manual.

5.1 Maintenance schedule

	Interval	Maintenance task
Visual inspection	Application-specific	Check for contamination and corrosion
Battery	5 years	Replacement by manufacturer's service department (Section 8, page 43)

Section 6 Troubleshooting

6.1 Error messages

Possible RTC errors are displayed by the sc controller.

Displayed errors	Cause	Resolution
RTC MISSING	No communication between RTC and RTC communication card	Supply RTC with voltage Test connection cable Reset the sc1000 and the RTC (switch so it is completely voltage free and switch back on)
RTC CRC	Interrupted communication between RTC and RTC communication card	Make sure +/- connections of the connector cable between RTC and RTC communication card in the sc1000 are installed correctly.
CHECK CONFIG	The sensor selection of the RTC was deleted by deleting or selecting a new sc1000 participant.	From **MAIN MENU > RTC MODULES / PROGNOSYS > RTC MODULES > RTC > CONFIGURE > SELECT SENSOR**, select the correct sensor for the RTC again and confirm.
RTC FAILURE	Brief general read/write error on the CF card, mostly caused by a brief interruption to the power supply.	Acknowledge error. If this message is shown frequently, eliminate the cause of the power disruptions. If necessary, inform the service team of the manufacturer (Section 8, page 43).
INFLOW1 NOT G.	Influent measurement signal faulty	Test sensor, check cable connections
INFLOW2 NOT G.	Influent measurement signal faulty	Test sensor, check cable connections

6.2 Warnings

Possible RTC sensor warnings are displayed by the sc controller.

Displayed warnings	Cause	Resolution
MODBUS ADDRESS	The RTC menu **SET DEFAULTS** was opened. This deleted the MODBUS address of the RTC in the sc1000.	Go to **MAIN MENU > RTC MODULES / PROGNOSYS > RTC MODULES > RTC > CONFIGURE > MODBUS > ADDRESS** and set the correct MODBUS address.
PROBE SERVICE	A configured sensor is in service status.	The sensor must exit service status.

6.3 Wear parts

Designation	Quantity	Service life
Battery	1	~5 years

Section 7 Replacement parts and accessories

7.1 Replacement parts

Description	Cat. No
DIN rail NS 35/15, punched according to DIN EN 60715 TH35, made of galvanized steel. Length: 35 cm (13.78 in.)	LZH165
Transformer 90–240 V AC/24 V DC 0.75 A, module for DIN rail assembly	LZH166
Terminal for 24 V connection without power supply	LZH167
Terminal for protective earth	LZH168
SUB-D connector	LZH169
C2 circuit breaker	LZH170
CPU base module with Ethernet port, passive ventilation element. (CX1010-0021) and RS422/485 connection module (CX1010-N031)	LZH171
Power supply module, consisting of a bus coupler and a 24 V terminal module (CX1100-0002)	LZH172
Digital output module 24 V DC (4 outputs) (KL2134)	LZH174
Analog output module (2 outputs) (KL4012)	LZH176
Analog input module (1 input) (KL3011)	LZH177
Digital input module 24 V DC (2 inputs) (KL1002)	LZH204
Digital output module 24 V DC (8 outputs) (KL2408)	LZH205
Bus termination module (KL9010)	LZH178
RTC communication card	YAB117
CF card type RTC-Module	LZY748-00
Ferrite core	LZH216

Section 8 Contact information

HACH Company
World Headquarters
P.O. Box 389
Loveland, Colorado
80539-0389 U.S.A.
Tel (800) 227-HACH
(800) -227-4224
(U.S.A. only)
Fax (970) 669-2932
orders@hach.com
www.hach.com

Repair Service in the United States:
HACH Company
Ames Service
100 Dayton Avenue
Ames, Iowa 50010
Tel (800) 227-4224
(U.S.A. only)
Fax (515) 232-3835

Repair Service in Canada:
Hach Sales & Service
Canada Ltd.
1313 Border Street, Unit 34
Winnipeg, Manitoba
R3H 0X4
Tel (800) 665-7635
(Canada only)
Tel (204) 632-5598
Fax (204) 694-5134
canada@hach.com

Repair Service in Latin America, the Caribbean, the Far East, Indian Subcontinent, Africa, Europe, or the Middle East:
Hach Company World Headquarters,
P.O. Box 389
Loveland, Colorado,
80539-0389 U.S.A.
Tel +001 (970) 669-3050
Fax +001 (970) 669-2932
intl@hach.com

HACH LANGE GMBH
Willstätterstraße 11
D-40549 Düsseldorf
Tel. +49 (0)2 11 52 88-320
Fax +49 (0)2 11 52 88-210
info@hach-lange.de
www.hach-lange.de

HACH LANGE LTD
Pacific Way
Salford
GB-Manchester, M50 1DL
Tel. +44 (0)161 872 14 87
Fax +44 (0)161 848 73 24
info@hach-lange.co.uk
www.hach-lange.co.uk

HACH LANGE LTD
Unit 1, Chestnut Road
Western Industrial Estate
IRL-Dublin 12
Tel. +353(0)1 460 2522
Fax +353(0)1 450 9337
info@hach-lange.ie
www.hach-lange.ie

HACH LANGE GMBH
Hütteldorfer Str. 299/Top 6
A-1140 Wien
Tel. +43 (0)1 912 16 92
Fax +43 (0)1 912 16 92-99
info@hach-lange.at
www.hach-lange.at

HACH LANGE GMBH
Rorschacherstrasse 30a
CH-9424 Rheineck
Tel. +41 (0)848 55 66 99
Fax +41 (0)71 886 91 66
info@hach-lange.ch
www.hach-lange.ch

HACH LANGE FRANCE S.A.S.
8, mail Barthélémy Thimonnier
Lognes
F-77437 Marne-La-Vallée
cedex 2
Tél. +33 (0) 820 20 14 14
Fax +33 (0)1 69 67 34 99
info@hach-lange.fr
www.hach-lange.fr

HACH LANGE NV/SA
Motstraat 54
B-2800 Mechelen
Tel. +32 (0)15 42 35 00
Fax +32 (0)15 41 61 20
info@hach-lange.be
www.hach-lange.be

DR. LANGE NEDERLAND B.V.
Laan van Westroijen 2a
NL-4003 AZ Tiel
Tel. +31(0)344 63 11 30
Fax +31(0)344 63 11 50
info@hach-lange.nl
www.hach-lange.nl

HACH LANGE APS
Åkandevej 21
DK-2700 Brønshøj
Tel. +45 36 77 29 11
Fax +45 36 77 49 11
info@hach-lange.dk
www.hach-lange.dk

HACH LANGE AB
Vinthundsvägen 159A
SE-128 62 Sköndal
Tel. +46 (0)8 7 98 05 00
Fax +46 (0)8 7 98 05 30
info@hach-lange.se
www.hach-lange.se

HACH LANGE S.R.L.
Via Rossini, 1/A
I-20020 Lainate (MI)
Tel. +39 02 93 575 400
Fax +39 02 93 575 401
info@hach-lange.it
www.hach-lange.it

HACH LANGE SPAIN S.L.U.
Edificio Seminario
C/Larrauri, 1C- 2ª Pl.
E-48160 Derio/Bizkaia
Tel. +34 94 657 33 88
Fax +34 94 657 33 97
info@hach-lange.es
www.hach-lange.es

HACH LANGE LDA
Av. do Forte nº8
Fracção M
P-2790-072 Carnaxide
Tel. +351 214 253 420
Fax +351 214 253 429
info@hach-lange.pt
www.hach-lange.pt

HACH LANGE SP. ZO.O.
ul. Krakowska 119
PL-50-428 Wrocław
Tel. +48 801 022 442
Zamówienia: +48 717 177 707
Doradztwo: +48 717 177 777
Fax +48 717 177 778
info@hach-lange.pl
www.hach-lange.pl

HACH LANGE S.R.O.
Zastrčená 1278/8
CZ-141 00 Praha 4 - Chodov
Tel. +420 272 12 45 45
Fax +420 272 12 45 46
info@hach-lange.cz
www.hach-lange.cz

HACH LANGE S.R.O.
Roľnícka 21
SK-831 07 Bratislava – Vajnory
Tel. +421 (0)2 4820 9091
Fax +421 (0)2 4820 9093
info@hach-lange.sk
www.hach-lange.sk

HACH LANGE KFT.
Vöröskereszt utca. 8-10.
H-1222 Budapest XXII. ker.
Tel. +36 1 225 7783
Fax +36 1 225 7784
info@hach-lange.hu
www.hach-lange.hu

HACH LANGE S.R.L.
Str. Căminului nr. 3,
et. 1, ap. 1, Sector 2
RO-021741 Bucureşti
Tel. +40 (0) 21 205 30 03
Fax +40 (0) 21 205 30 17
info@hach-lange.ro
www.hach-lange.ro

HACH LANGE
8, Kr. Sarafov str.
BG-1164 Sofia
Tel. +359 (0)2 963 44 54
Fax +359 (0)2 866 15 26
info@hach-lange.bg
www.hach-lange.bg

HACH LANGE SU ANALİZ SİSTEMLERİ LTD.ŞTİ.
Ilkbahar mah. Galip Erdem
Cad. 616 Sok. No:9
TR-Oran-Çankaya/ANKARA
Tel. +90312 490 83 00
Fax +90312 491 99 03
bilgi@hach-lange.com.tr
www.hach-lange.com.tr

Contact information

HACH LANGE D.O.O.
Fajfarjeva 15
SI-1230 Domžale
Tel. +386 (0)59 051 000
Fax +386 (0)59 051 010
info@hach-lange.si
www.hach-lange.si

HACH LANGE E.Π.E.
Αυλίδος 27
GR-115 27 Αθήνα
Τηλ. +30 210 7777038
Fax +30 210 7777976
info@hach-lange.gr
www.hach-lange.gr

HACH LANGE D.O.O.
Ivana Severa bb
HR-42 000 Varaždin
Tel. +385 (0) 42 305 086
Fax +385 (0) 42 305 087
info@hach-lange.hr
www.hach-lange.hr

HACH LANGE MAROC SARLAU
Villa 14 – Rue 2 Casa Plaisance
Quartier Racine Extension
MA-Casablanca 20000
Tél. +212 (0)522 97 95 75
Fax +212 (0)522 36 89 34
info-maroc@hach-lange.com
www.hach-lange.ma

HACH LANGE OOO
Finlyandsky prospekt, 4A
Business Zentrum “Petrovsky fort”, R.803
RU-194044, Sankt-Petersburg
Tel. +7 (812) 458 56 00
Fax. +7 (812) 458 56 00
info.russia@hach-lange.com
www.hach-lange.com

Section 9 Warranty and liability

The manufacturer warrants that the supplied product is free of material and manufacturing defects, and undertakes to repair or to replace any defective parts without charge.

The warranty period is 24 months. If a maintenance contract is taken out within 6 months of purchase, the warranty period is extended to 60 months.

With the exclusion of further claims, the supplier is liable for defects, including the lack of assured properties, as follows: all parts that, within the warranty period calculated from the day of the transfer of risk, can be demonstrated to have become unusable or that can only be used with significant limitations owing to circumstances prior to transfer of risk, in particular due to incorrect design, substandard materials or inadequate finish, shall be repaired or replaced at the supplier's discretion. The identification of such defects must be reported to the supplier in writing as soon as possible, but no later than 7 days after the discovery of the fault. If the customer fails to notify the supplier, the product is considered approved despite the defect. Further liability for indirect or direct damages is not accepted.

If device-specific maintenance- or inspection work prescribed by the supplier is to be performed within the guarantee period by the customer (maintenance) or by the supplier (inspection) and these requirements are not met, claims for damages that result from non-observance of these requirements are void.

Further claims, in particular for consequential damages, cannot be made.

Wear and damage caused by improper handling, incorrect installation or non-designated use are excluded from this clause.

The process instruments of the manufacturer have proven their reliability in many applications and are therefore often used in automatic control loops to enable the most economical and efficient operation of the relevant process.

To avoid or limit consequential damage, it is therefore recommended that the control loop be designed such that an instrument malfunction results in an automatic changeover to the backup control system. This guarantees the safest operating condition both for the environment and the process.

Appendix A MODBUS address setting

The same slave address must be set for MODBUS communication on the sc1000 controller display and in the RTC module. Since 20 slave numbers are reserved for internal purposes, the following numbers are available for assignment:

1, 21, 41, 61, 81, 101…

The start address 41 is preset at the factory.

NOTICE

If this address is to be or must be changed because, for example, it has already been allocated for another RTC, the changes must be made both on the sc1000 controller and on the CF card of the RTC module.

This can only be done by the manufacturer service department (Section 8)!

Appendix B Configuration of the network modules

B.1 RTC112 SD-Module Profibus/MODBUS telegram

Table 5 RTC112 SD-Module, one-channel

Register	Parameter	Unit	Description
MEASUREMENT 1	Qin 1	m^3/h	Flow rate in the inflow
MEASUREMENT 2	Qavg 1	m^3/h	Average flow rate
MEASUREMENT 3	Qdos1	L/h	Polymer flow rate
MEASUREMENT 4	TSin 1	g/L	TSS concentration in the inflow
MEASUREMENT 5	TSef 1	g/L	TSS concentration in the outflow
ACTUAT VAR 6	Pdos1	L/h	Polymer dosing
ACTUAT VAR 7	Fact 1	g/kg	Specific polymer dosing
ACTUAT VAR 8	Feed 1	m^3/h	Feed flow rate

Table 6 RTC112 SD-Module, two-channel

Register	Parameter	Unit	Description
MEASUREMENT 1	Qin 1	m^3/h	Flow rate in inflow 1
MEASUREMENT 2	Qavg 1	m^3/h	Average flow rate
MEASUREMENT 3	Qdos 1	L/h	Polymer flow rate 1
MEASUREMENT 4	TSin 1	g/L	TSS concentration in inflow 1
MEASUREMENT 5	TSef 1	g/L	TSS concentration in outflow 1
MEASUREMENT 6	Qin 2	m^3/h	Flow rate from the influent 2
MEASUREMENT 7	Qavg 2	m^3/h	Average flow rate
MEASUREMENT 8	Qdos 2	L/h	Polymer flow rate 2
MEASUREMENT 9	TSin 2	g/L	TSS concentration in inflow 2
MEASUREMENT 10	TSef 2	g/L	TSS concentration in outflow 2
ACTUAT VAR 11	Pdos 1	L/h	Polymer dosing 1
ACTUAT VAR 12	Fact 1	g/kg	Specific polymer dosing 1
ACTUAT VAR 13	Feed 1	m^3/h	Feed flow rate 1
ACTUAT VAR 14	Pdos2	L/h	Polymer dosing 2
ACTUAT VAR 15	Fact 2	g/kg	Specific polymer dosing 2
ACTUAT VAR 16	Feed 2	m^3/h	Feed flow rate 2

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