
CaMguard

Analyser for water hardness



Instruction Manual

Software version 0103 1.04

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Description of functions

The **CaMguard** analyser is used for fully automatic monitoring of the total hardness, carbonate hardness (plus m-value) or minus m-value of water.

The measurements can be carried out at programmed time intervals. A measurement can also be started manually via an external switch or can be started after a programmed through-flow quantity (water meter).

Indicators are used and these are set to fixed limit values. This method guarantees rapid, reliable and cost-effective monitoring of the limit value of water. These indicators can be kept for at least 2 years if stored correctly.

A indicator storage tank of 250 ml is built in. An analyses uses 0,07 ml of indicator liquid.

Every analysis begins with a variable flushing phase. The result of this is that the water from the water softening filter is analysed and not the water that has been standing in the tube since the last analysis.

Thereafter, a sample is taken. In order to exclude any possible contaminants, the optical value of the sample is first measured without addition of the indicator. (zero sample). After adding the indicator, a colour change occurs in the measurement chamber. The degree

of colour change is measured photo-electrically. The display then shows whether the quality of the sample is below or above the limit value set by the indicator.

Signalling equipment and shut-off valves can be activated. There is also the possibility to control programs for the regeneration of an ion exchanger.

In order to suppress undesirable hard water alarm signals, the first hard water alarm signals (1-4) can be ignored. The measurements after the first limit value breach can be carried out in shorter time intervals or after a lower through-flow quantity.

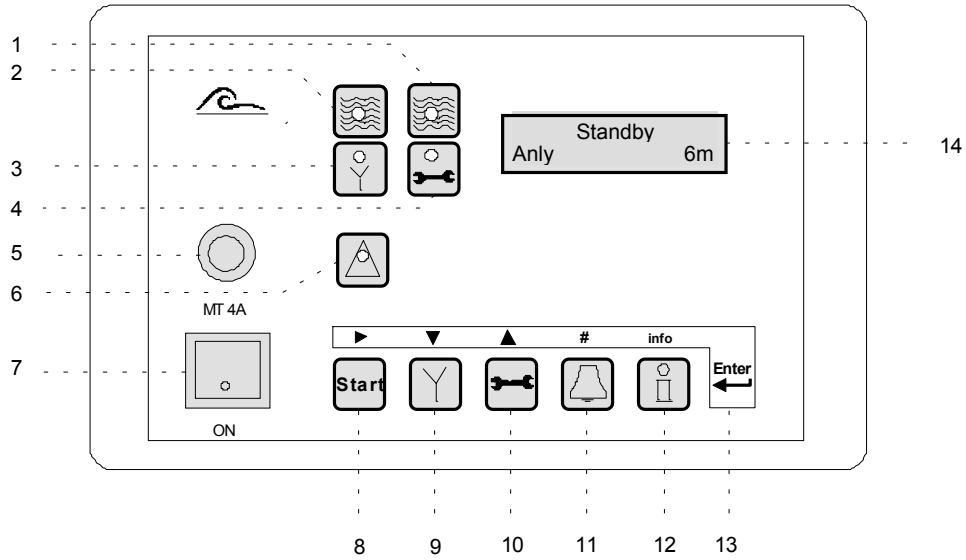
By incorporation of the optional "RC" board, a recorder can be connected. This displays the analysis results: above or below the limit value and indicates any fault.

The measurement chamber is flushed after the measurement. This prevents premature contamination of the measurement cell by the colour of the indicator.

The in-built intake valve is closed during pauses in the analyses, so avoiding unnecessary use of water.

"CaMguard"

Control CaMguard



- 1 LED Result
- 2 LED Result / Analyse
- 3 LED Rinse
- 4 LED Maintenance
- 5 Main fuse

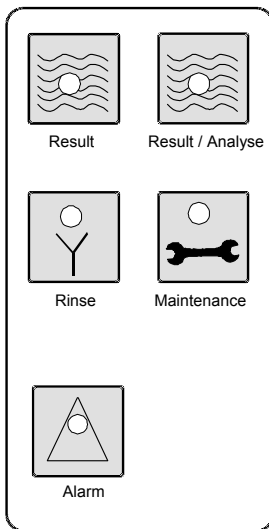
- 6 LED Message
- 7 Main power switch
- 8 Start analyse
- 9 Rinse
- 10 Maintenance

- 11 Reset
- 12 Information
- 13 Programming
- 14 LCD-Display



Displays

LED – pilot lamps



Coloured pilot lamps show the status of the most important functions:

Result (green)
Rinse (yellow)
Alarm (red)

Result / Analyse (green)
Maintenance (yellow)

During standby the left "result" led will indicate whether the analysis before the last one was good or bad (led on = result "good"). The right led will indicate the last result.

During an analysis the left led will indicate the result of the last analysis. The right led will blink.

If the output option MF=Alarm relay is chosen in program steps 4.1-4.3, the red pilot lamp "Alarm" signals that the corresponding output relay has been activated.

If the alarm output is not activated the alarm led will be used to indicate whether the last result is good (led off) or bad (led on).

Additional information is obtained from the LCD - display.

LCD - Display

First LCD - line

				S	t	a	n	d	b	y				
A	n	i	y									1	2	m

In the first line of the LCD display, the state of the controller is shown.

e.g. Standby, Analyse

If, for example, the symbol 2* appears on the upper right, this means the limit value has been considerably exceeded but two further samples are nevertheless being analysed. Only if these two analyses are bad is the corresponding programmed relay activated in order, for example, to initiate regeneration of the water softening plant.

Second LCD - line

				S	t	a	n	d	b	Y				
A	n	i	y									1	2	m

In the second line of the LCD display the following information is shown:

1. The time remaining to the next analysis.

*For example: **Anly 12m**
 The next analysis is in 12 minutes.*

2. If programmed for it, the display also shows the through-flow quantity to the next analysis

*For example: **Anly 0,43 m3**
 The next analysis will take place after 0.43 m3.*

3. During an analysis, the various phases and the remaining time are displayed: Rinse, Zero sample, Indicator, Mixing, Measuring.


Note!

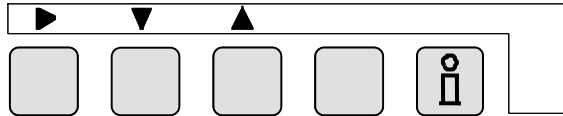
When required, a display of the various "Alarms" (see page 8) occurs in alternation with the displays described in this section.



INFO-displays

By using the information-button, various information and/or values can be scanned. As far as possible, changes are described in the programming section "Changing and scanning base settings". Only the Service telephone number can be changed by the info-button, if so needed.

Press the Information-button with the symbol . The first information is displayed. You obtain further information by repeatedly pressing the button.



If the INFO-button is pressed during programming, the full text of some abbreviated texts is shown in the LCD display.

Software version

S	o	f	t	w	a	r	e									
A	Q	5	0	5	0			0	0	0	2		1	.	0	3

The software is constantly being updated in the factory. When desired, changes are made in order to adapt the program for new knowledge and demands.

The version number of the currently incorporated software is displayed.

Input settings

			I	n	p	u	t	s							
S	T	A	R	T	-		S	T	O	P					

The current program settings and the switch settings of the inputs IN1 and IN2 are displayed.

A horizontal dash "-" next to the symbol means: input not active.

A vertical line "I" next to the symbol means: input active.

Output settings

				O	u	t	p	u	t	s					
I	M	-		P	2	-		M	F	-					

The current program settings and the switch settings of the outputs are displayed.

IM = Impulse signal AN = Analysis active

P1 = Permanent signal 1 MF = Alarm relay

P2 = Permanent signal 2

A horizontal dash "-" next to the symbol means: output not active.

A vertical line "I" next to the symbol means: output active.

Number of analyses

				S	O	F	T	:				1	4	6	0
				H	A	R	D	:						1	5

In the first line, the total number of completed analyses having the result: Water SOFT is displayed.

In the second line, the number of analyses with the result: Water HARD is displayed.

The maximum number is 9,999,999. The counter is then reset to zero.

Measurement and zero sample

A	c	t	.	M	e	a	s	.						6	0	
Z	e	r	o		s	a	m	p	l	e				2	5	5

In the first line, the actual value of the optical measurement is displayed (range 0-255).

In the second line, the average value of the last zero samples is displayed (range 0-255).

Results of the last analyses

A	n	a	l	y	s	e		r	e	s	u	l	t	s	
*	*		H	i		-	-		L	o		H	i		

The most left result (**) is the oldest result. The most right result is the last result.

** = no result

-- = error during analysis

Hi = hardness higher then limit

Lo = hardness lower then limit

Service telephone number

S	e	r	v	i	c	e		T	e	l	.	N	o	.	
0	0	3	1	/	7	3	/	4	4	3	7	5	5		

The service telephone number is displayed.

Changing the telephone number:

TO SELECT A DIGIT:

Press the button with the Symbol "▶".

TO RAISE THE DIGIT:

Press the button with the symbol "▲".

TO LOWER THE DIGIT:

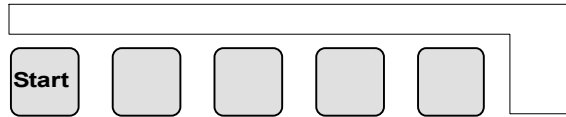
Press the button with the symbol "▼".



Manual control

Some button functions are delayed so that no events are unintentionally triggered. The current delay time is shown at the top right in the first LCD-line.

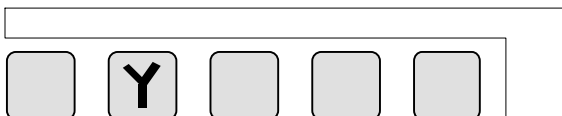
Starting an analysis



Press the Start button. After 4 seconds, a new analysis begins with the flushing step.

Note: A new analysis is also stopped when there is a fault signal. An analysis which is in progress is likewise discontinued and started anew.

Flushing Start/Stop



It is possible to initiate an additional flushing step. No current values such as (for example) the interval between analyses or the number of registered start-impulses are reset.

An additional flushing step is ended after a period of 10 seconds plus the flushing time entered in program step 1.1.

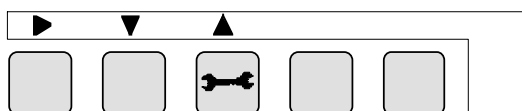
By pressing the flush-button once again, the additional flushing step can be prematurely terminated.

A flushing step at the start of a new analysis can also be prematurely terminated. Thereafter, the analysis is however continued with the "zero sample".

Note!

Inadequate flushing can cause an erroneous result.

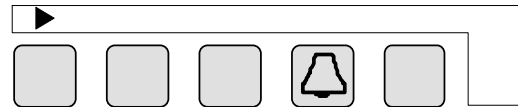
Maintenance



Press the button labelled Maintenance. After 5 seconds the Maintenance phase is initiated. You can now switch the dosing pump on and off. See also the Maintenance section on page 18.

Press the Maintenance button once again to return to normal analysis mode.

Quit Alarm



If the pilot lamp "ALARM" lights up, the button labelled can be pressed so switching off the following:

1. Switching off the Alarm relay, if the Alarm relay was programmed for the current alarm signal in program step 5.7.
2. Switching off the in-built acoustic signal sensor, if the acoustic signal sensor was programmed for the current alarm signal in program step 6.1.
3. Switching off the pilot lamp and clearing the fault signal in the LCD display.

Quit Permanent Relay



If the pilot lamp "ALARM" lights up and the question: "Switch off relay Yes/No" appears in the LCD display when the button labelled is pressed, then the output option "Permanent signal" has been activated.

If you want to deactivate relay 1 or 2, press the "▶" button to move the cursor under Yes.

Press the button labelled once again.

Note!

The relay can only be reactivated after the start of a new analysis.



Alarm signals

If the in-built “buzzer“ is activated by an alarm signal, it can be stopped by pressing the button

Indicator shortage alarm

		I	N	D	I	C	A	T	O	R			2	1
		r	e	f	i	l								

The indicator must be refilled. In the upper right, the number of analyses which are still possible is displayed. Thereafter, analyses are no longer automatically carried out.

Note: If the mains voltage is switched off when this alarm signal appears, then when the mains voltage is switched on again the following message appears immediately: Indicator Stop

Indicator shortage Stop

I	n	d	i	c	a	t	o	r		s	h	o	r	t	.
A	n	a	l	y	s	i	s		s	t	o	p			

No further analyses are automatically carried out.

Refill the indicator.

If an output relay is activated, you can stop it by pressing the button (see section on Manual Control).

Zero sample too low

				S	i	g	n	a	l						
B	l	a	n	k		v	a	l	u	e		f	a	i	l

No further analyses are automatically carried out.

Possible causes:

- Equipment or sample contaminated
- There was no flushing step
- Electrical defect

Limit value with Stop

If the limit value is breached then, according to

		B	a	d		w	a	t	e	r				
		A	n	a	l	y	s	i	s		S	t	o	p

the programming in program steps 5.3 or 5.5, no further analyses are carried out.

Manually start a new analysis.

Power supply failure

				S	i	g	n	a	l					
			S	u	p	p	l	y		f	a	i	l	.

There was no voltage supply to the system, or it had been switched off.

WARNING! If a power failure occurs, all of the programmed settings are retained.



Input options

Of the 4 available input options, a maximum of 2 can be programmed on the two inputs of the analysis instrument. Each option can only be used once.

In program step 2.3 one sets whether the inputs should be active for an open or closed contact.

Analyse Start

An analysis of the water can be started via this input when the instrument is in the waiting-position and indicator is available.

An analysis which is currently running is not stopped. During this time, the input is deactivated.

A delay time can be entered in program step 3.1.

The delay time is not reset. Several consecutive impulses are summed in time.

Example: Connection of a flow indicator

Program step 3.1 = 10 seconds

An analysis is stopped when the contact of the flow indicator is active for longer than 10 seconds.

An analysis is also stopped if the contact was active for 2 seconds 5 times in a row, because water was only taken up for a short time in each case.

Analysis Stop

If the input is activated, no automatic analyses (time interval and quantity interval) are started. The input "Analysis Start" and the manual-stop remain active.

A delay time can be entered in program step 3.2.

Applications:

If there is low-water or lack of pressure, no analyses should be carried out.

Analyses should only be carried out when a reservoir is full.

Analyses should only be carried out at prescribed times (external time switch).

Relay stop

There is the possibility using this input to switch off the relays of the output options "Alarm relay", "Permanent signal 1", "Permanent signal 2" and the in-built acoustic signal sensor from a control room.

A delay time can be entered in program step 3.3.

Note!

If the "Permanent signal 1" or "Permanent signal 2" relays are active, these are switched off at the first stop-impulse.

The "Alarm relay" and acoustic signal sensor will also be switched off.

The message in the LCD display can only be cleared by hand.

Water meter

An analysis can also be started after through-flow of a certain quantity of water. In order to do this, the through-flow quantity is entered in program step 3.4 and the Impulse interval of the water meter is entered in program step 3.5.

Note: Instead of the floating contact of the water meter, the corresponding floating relay contact of a quantity-dependent controlled program can also be used.



Output options

Of the 5 available output options, a maximum of 3 can be programmed on the outputs of the analysis instrument. The output option "Permanent Signal" is available twice (P1 and P2). For output option P2, the relay can also be activated when there is a fault.

The impulse-signal and permanent-signal generation can occur for hard water or for soft water, according to the programming in program step 1.3.

In program step 4.4 one sets whether the outputs are active when there is no electrical voltage or when there is an electrical voltage.

Impulse-Signal

The signal is used for controlling programs.

In program step 5.2 one programs the number of fault signals after which the signal is activated.

The impulse duration of between 1 and 999 seconds can be chosen in program step 5.1.

Permanent Signal 1

This signal is used to control valves, horns or signalling equipment which require a lasting contact during the breach of the limit value.

In program step 5.3 one programs whether the relay is again deactivated if the result "water good" is obtained for the next analysis or whether no further analyses should be carried out. In this case, switching off must be done manually or via the input "Switch off relay".

In program step 5.4 one programs the number of fault signals after which the signal is activated.

Permanent Signal 2

This signal is used to control valves, horns or signalling equipment which require a lasting contact during breach of the limit value.

The function-sequence is the same as for the output option "Permanent signal 1". The output relay can however additionally be activated when there are faults (Programming step 5.7).

A connected shut-off valve is then not only closed when there is hard water but also when there is a fault signal.

In program step 5.5 one programs whether the relay is again deactivated if the result "water good" is obtained for the next analysis or whether no further analyses should be carried out. In this case, switching off must be done manually or via the input "Switch off relay".

In program step 5.6 one programs the number of fault signals after which the signal is activated.

Analysis active

This output option is activated during an analysis, during a special flushing step.

Via this, valves or pumps can be controlled in order to supply the analysis instrument with water.

Alarm equipment or signalling equipment can also be connected.

Alarm relay

In program step 5.8 one sets for which fault signals this relay is activated.

Recorder connection

If the analysis instrument is equipped with the "RC" board, a dot printer or strip chart line recorder 0 (4)-20 mA can be connected to the recorder output RC 1. The instrument gives no measurement values proportional to the water hardness. Only the following states can be registered:

Analysis instrument in operation
Analysis result: Water soft
Analysis result: Water hard

Refill indicator
Fault

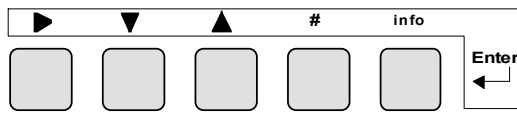


Changing and scanning base settings

General information about the programming and entering the national language

When brought into use, the analysis instrument is set to function in the desired way by entering base settings. These values can be changed and they are not cleared if there is a power failure.

- *Changing the base settings should only be undertaken by an authorised expert.*
- *Write the base settings in the vacant fields in the following sequence-diagrams and keep this handbook in a safe place for the operating and maintenance personnel.*
- *The base settings can be changed at any time. Some of the changed values only become active after leaving the programming mode.*
- *For the programming mode, the symbols*
- *"▶", "▼", "▲" and # above the buttons are*



valid.

1. Press the "Enter" button. If the question for a code number in program step 8.1 is answered with a Yes, then before calling up the program steps a code number must be entered using the "▶" and "#" buttons.

			C	o	d	e		n	u	m	b	e	r	:		
			*	*	*	*										

2. In order to prevent unwanted programming changes, you must press the "Enter" button in for 4 seconds before changing of the base settings is allowed.

In the LCD display the following text first of all appears:

	A	T	T	E	N	T	I	O	N	!			4	s	
P	r	o	g	r	a	m		c	h	a	n	g	e		

and after 4 seconds the display:

				S	T	A	R	T							
P	r	o	g	r	a	m		c	h	a	n	g	e		

NOTE! For the functions described under 3. and 4., the "Enter" button must remain pressed in.

3. Here you can change the language in the LCD display. This is done as follows:

Press the buttons "Enter" and "#".

By using the "▶" button, place the cursor under the national symbol of the desired language.

			D	E	U	T	S	C	H					
			E			F			D			N	I	

4. You get to the first and following program steps by pressing the "▼" button.

5. By using the "▲" button, you can move backwards stepwise.

Comment: The control is now in the programming mode. No longer keep the "ENTER" button depressed. You leave the programming mode if you once again press the "ENTER" button. Approximately 2 minutes after pressing the last button the programming mode is automatically exited.

6. You move the cursor using the "▶" button. For Yes/No decisions, you answer a question with YES if you place the cursor under the Y and with NO if you place the cursor under the N.

For numeric entries, mark the digit to be changed using the cursor.

7. By touching the "#" button you can change numerical values in the prescribed ranges if you have beforehand marked the values with the cursor.

8. By touching the "#" button, you alternate between the symbols "-" and "|" for questions requiring a selection.

9. If you press the Info-button during the programming, some abbreviated texts are shown in full in the LCD display.

NOTE! When switching on, if you simultaneously press the "ON" button then the control is in the phase "Stand-by Stop". In this phase all inputs are deactivated and the outputs are not controlled (see also the section "Manual control").



1. Course of an analysis

Rinse time

S	t	e	p	N	o	:						1	.	1
R	i	n	s	e	t	i	m	e				6	0	s

Before the sample is taken, the feed pipe is rinsed. Rinsing times from 33-999 seconds can be entered.

Analysis interval

S	t	e	p	N	o	:						1	.	2
I	n	t	e	r	v	a	l					1	0	m

Analyses can be carried out at fixed time intervals. Enter an analysis interval from 1 up to 9,999 minutes.

Note! The shortest time for an analysis is 3 minutes plus the flushing time entered in program step 1.1. If a value of 60 seconds is entered in program step 1.1 and 3 minutes in program step 1.2, the shortest possible analysis interval increases to 4 minutes.

Information:

When using a water meter, a quantity-dependent analysis series can also be chosen. For safety reasons, the time-dependent analysis series is always active. However if the input Analysis Stop is active, no analyses are automatically undertaken.

Limit value monitoring

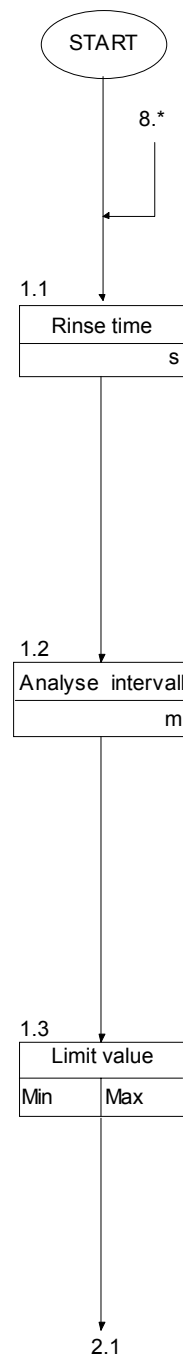
S	t	e	p	N	o	:						1	.	3
L	i	m	i	t					M	i	n	M	a	x

One can set whether values above or below the limit are signalled.

Information:

For monitoring an ion exchanger, one chooses the signalling of values above the limit value (MAX).

For monitoring a mixing-unit, the signalling of values below the limit value (MIN) can be programmed if one wants to control the lowest water hardness limit.





2. Selecting the programmable input options

Of the 4 available input options, a maximum of 2 can be programmed on the two inputs of the analysis instrument. Each input option can only be used once. In program step 2.3, one sets whether the inputs are active for an open or closed contact.

A description of the inputs can be found in the chapter on Input Options.

For each of the chosen inputs, additional parameters must still be entered.

INPUT: IN 1

S	t	e	p		N	o	:								2	.	1
S	t	a		S	t	o		R	e	s		W	a	M	e		

Select the desired input option for input IN 1.

Sta = Analysis Start Res = Switch off relay
 Sto = Analysis Stop WaMe = Water meter

INPUT: IN 2

S	t	e	p		N	o	:								2	.	2
S	t	a		S	t	o		R	e	s		W	a	m			

Select, according to 2.1, the desired input option for input IN 2.

Activating the input options

S	t	e	p		N	o	:								2	.	3
S	t	a				S	t	o									

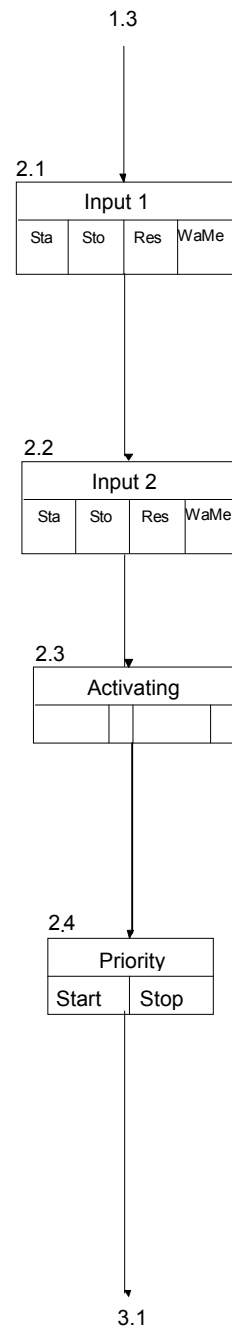
For the inputs selected in the above program steps, choose the method of activating the inputs.

"|" Activation of the selected input options for a closed contact (NO-contact)
 "-" Activation of the selected input options for an open contact (NC-contact)

Priority for input start and stop

S	t	e	p		N	o	:								2	.	4
S	t	a		S	t	o											

If the input functions "Start" and "Stop" are both programmed you can program which input has the highest priority.





3. Input option parameters

According to the choices in program steps 2.1 and 2.2, parameters must still be entered.

Delay Analysis Start

S	t	e	p	N	o	:					3	.	1
D	e	l	a	y	S	t	a	r	t			7	s

For the input "Analysis Start", enter a delay time from 1 to 99 seconds.

Delay Analysis Stop

S	t	e	p	N	o	:					3	.	2
D	e	l	a	y	S	t	o	p				3	s

For the input "Analysis Stop", enter a delay time from 1 to 99 seconds.

Delay Switch off Relay

S	t	e	p	N	o	:					3	.	3
D	e	l	a	y	R	e	s	e	t			3	s

For the input "Switch off Relay", enter a delay time from 1 to 99 seconds.

Water quantity

S	t	e	p	N	o	:					3	.	4		
W	a	t	e	r						1	.	0	0	m	3

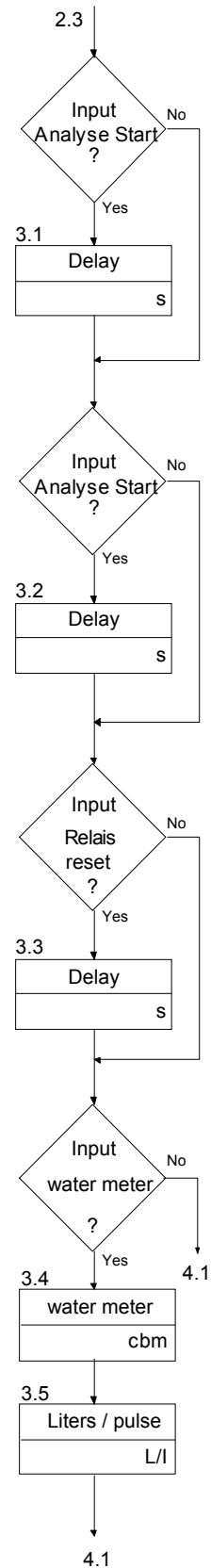
650.00 m3.

Enter after what quantity of water a new analysis should be started. You can select values from 0.01 to

Impulse interval of the water meter

S	t	e	p	N	o	:					3	.	5		
l	i	t	.	/	p	u	l	s		1	0	0	.	0	l

Enter the Impulse sequence for the water meter. You can enter values from 0.1 to 5000.0 liter.





4. Selecting the programmable output options

Of the 5 available output options, a maximum of 3 can be programmed on the outputs of the analysis instrument. The output option "Permanent Signal" is available twice (P1 and P2). For the output option P2, the relay can additionally be activated when there is a fault. In program step 4.4 one sets whether the outputs are active when there is no electrical voltage or when there is an electrical voltage. For some outputs, additional parameters must still be entered.

Output: OUT 1

S	t	e	p		N	o	:									4	.	1
I	M			P	1			P	2			A	N			M	F	

Select the desired output option for the output OUT1. A description of the outputs is given in the

chapter "Output options".

IM = Impulse-signal AN = Analysis running
 P1 = permanent signal 1 MF = Alarm relay
 P2 = permanent signal 2

Output: OUT 2

S	t	e	p		N	o	:									4	.	2
I	M			P	1			P	2			A	N			M	F	

Following program step 4.1, select the desired output option for the output OUT2.

Output: OUT 3

S	t	e	p		N	o	:									4	.	3
I	M			P	1			P	2			A	N			M	F	

Following program step 4.1, select the desired output option for the output OUT3.

Activating the output options

S	t	e	p		N	o	:									4	.	4
I	M			P	1			M	F	-								

For the outputs selected in program steps 4.1 to 4.3, select the method of activation of the output options.

tions.

"-" Activation of the selected output options for a deactivated relay.

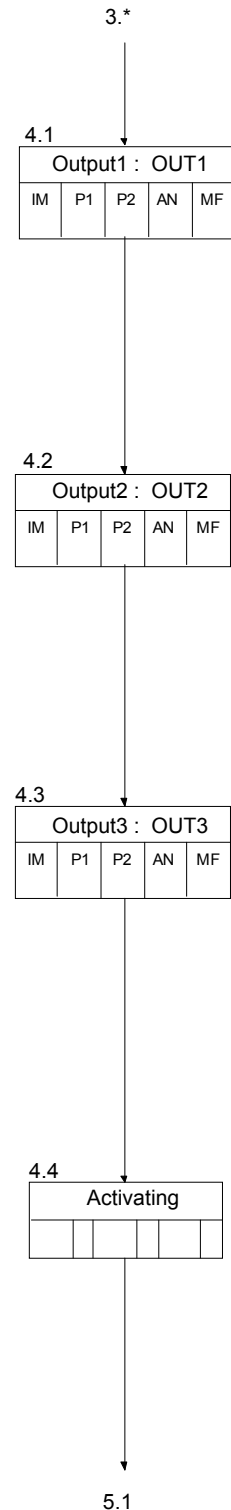
"|" Activation of the selected output options for an activated relay.

General information:

For deciding, for example, whether a valve is active or not under an electrical voltage (namely whether open or not) one considers the reaction of the water treatment plant when there is no flow. For this case, it ought not to lead to undesirable functioning of the plant.

Example for a flushing valve: When the analysis instrument is switched off, a flushing valve must not be open, even if it is controlled by an external voltage supply. Select a flushing valve that is open when there is a voltage and program it with the symbol "|".

Example for a fault signal: A fault signal should be given if an analysis instrument is disconnected electrically. Program it with the symbol "-".





5. Output option parameters

Output option: Impulse signal

Impulse duration

S	t	e	p	N	o	:					5	.	1
L	o	n	g	p	e	r	i	o	d	.	1	0	s

For the impulse duration of the signal, you can enter a time from 1 to 999 seconds.

Number of fault signals

S	t	e	p	N	o	:					5	.	2
N	u	m	b	e	r	b	a	d				1	*

You can programme after what number of fault signals the output option is activated. Values from 1 to

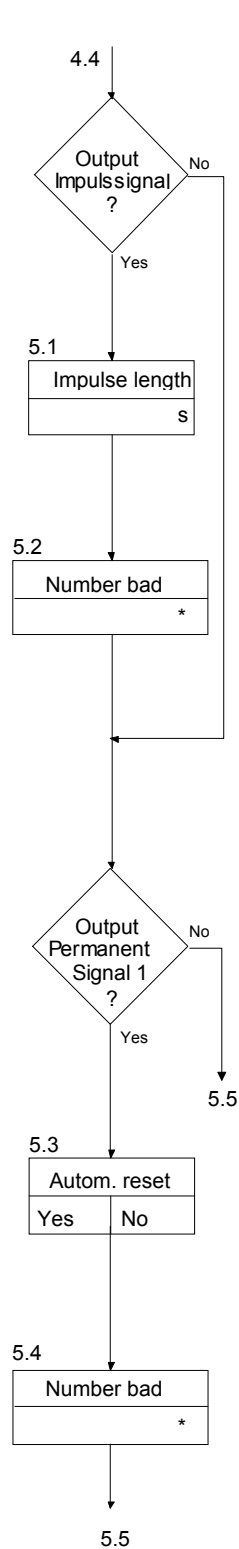
5 can be entered. For a value larger than 1, program steps 5.9 and 5.10 respectively set when the next analysis takes place.

Information:

The impulse output is always activated as soon as an analysis displays a breach of the limit value and if the number of consecutive limit value breaches is equal to or greater than the value entered in program step 5.2.

Note!

If the output option "Permanent Signal 1" or "Permanent Signal 2" is so programmed that the analysis instrument no longer carries out analyses before reaching the value entered in program step 5.2, an impulse signal can no longer be generated.



Output option: Permanent Signal 1

Activation only when there is breach of the limit value

Automatic clear function 1

S	t	e	p	N	o	:					5	.	3	
A	u	t	o	m	.	r	e	s	e	t		Y	/	N

You can program whether further analyses are undertaken after activation of the output relay. If further

analyses are carried out, the relay is automatically deactivated again if the result from one of the next analyses is "Water Good".

If analyses are no longer carried out, the relay must be switched off manually or via the input "Switch off relay". In addition, an analysis must be started anew.

Clear automatically Yes: Analyses continue, also after a limit value breach

Clear automatically No: Analysis stops if there is a limit value breach

Number of fault signals

S	t	e	p	N	o	:					5	.	4
N	u	m	b	e	r	b	a	d				2	*

You can program the number of fault signals (limit value breach) after which the output option is

activated. Values from 1 to 5 can be entered. For a value larger than 1, one enters in program steps 5.9 and 5.10 respectively when the next analysis takes place.

Output option Permanent Signal 2

Activation when there is a limit value breach and when there is a fault.

Automatic clear function 2

S	t	e	p	N	o	:						5	.	5	
A	u	t	o	m	.	r	e	s	e	t			Y	/	N

You can program whether further analyses are undertaken after activation of the output relay. If further analyses are

the relay is automatically deactivated again if the result from the next analyses is "Water Good".

If analyses are no longer being carried out, the relay must be switched off manually or via the input "Switch off relay". In addition, an analysis must be started anew.

Clear automatically Yes: Analyses continue, also after a limit value breach

Clear automatically No: Analyses stop if there is a limit value breach

Number of fault signals

S	t	e	p	N	o	:						5	.	6
N	u	m	b	e	r		b	a	d				3	*

You can program the number of fault signals (limit value breach) after which the output option is

activated. Values from 1 to 5 can be entered. For a value larger than 1, one enters in program steps 5.9 and 5.10 respectively when the next analysis takes place.

Activation by a fault

S	t	e	p	N	o	:						5	.	7
R	F	-	N	F	-	Z	L	-						

In contrast to output option "Permanent signal 1", you can set for output option "Permanent signal 2" the faults for which the relay is

activated, in addition to the limit value breach.

- RF = Refill indicator
- NF = No indicator (Stop)
- ZL = Zero sample too low

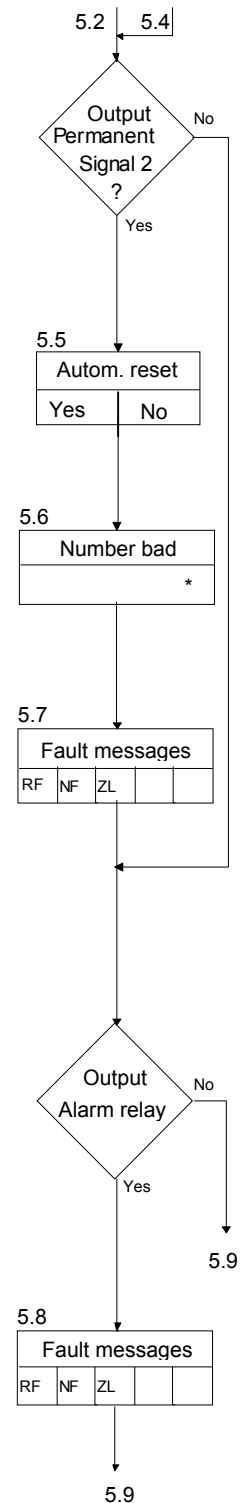
Output option: Alarm relay

Fault signals

S	t	e	p	N	o	:						5	.	8
R	F	-	N	F	-	Z	L	-						

You can program for what fault signals the relay of the output option "Alarm relay" is activated.

- RF = Refill indicator
- NF = No indicator (Stop)
- ZL = Zero sample too low



Analysis interval 2

S	t	e	p	N	o	:					5	.	9
I	n	t	e	r	v	a	l				5		m

If a value greater than 1 was entered in program steps 5.2, 5.4 or 5.6, then this sets that further analyses should be carried out after a breach of the limit value. This time interval should be smaller than the interval entered in program step 1.2 in order to rapidly determine the actual state of the water or examine the state of an ion exchanger. A time in the range 3 – 9,999 minutes can be entered.

Interval quantity 2

S	t	e	p	N	o	:					5	.	1	0		
W	a	t	e	r							0	.	1	0	m	3

If a value greater than 1 was entered in program steps 5.2, 5.4 or 5.6 and if the input option "Water meter" was also selected, you enter here the quantity 2 to the next analysis. This value should be smaller than the value which was entered in program step 3.4 in order to rapidly determine the actual state of the water or examine the state of an ion exchanger. A value in the range from 0.01 to 650.00 m3 can be entered.

6. Activation of the buzzer

S	t	e	p	N	o	:					6	.	1
R	F	-	Z	L	-	P	F	-	L	E	-		

Program the events for which the in-built buzzer should be activated.

- RF = Refill indicator
- ZL = Zero sample too low
- PF = Power failure low
- LE = Limit value breached

7. Recorder

S	e	G	o	B	a	I	n	M	a	7
5	1	0	1	5	1	8	2	0	m	A

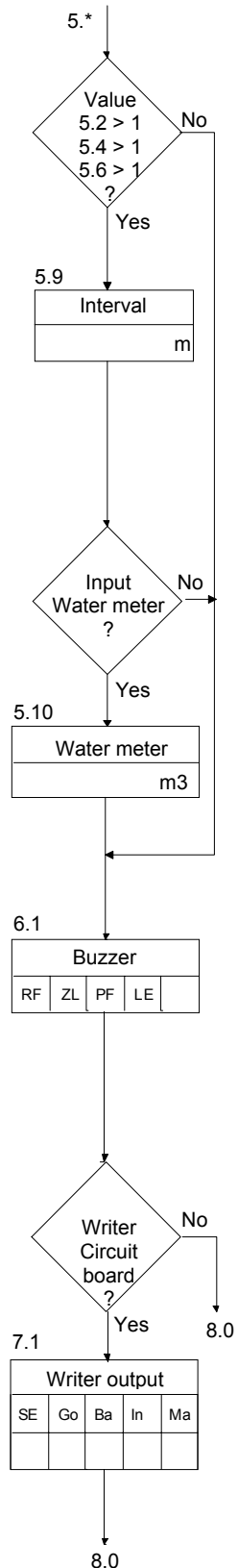
If the controller is equipped with the RC board, there is the option of connecting a recorder

or dot printer in order to record the function-sequence of the analysis instrument. Every function is assigned an analogue value in the range between 0 and 20 mA. For measuring instruments with a 4 to 20 mA input, values from 4 up to 20 mA must be programmed. The following functions can be registered:

- Se = Operation
- Go = Analysis: Soft water
- Ba = Analysis: Hard water
- In = Indicator shortage
- Ma = Measurement fault

Information: In the upper right, the display of the program step "7" appears.

Information: The various display values are selected using the "▼" and "▲" buttons and changed using the "#" button.





8. Entering a code number

S	t	e	p		N	o	:					8	.	0		
C	o	d	e		n	u	m	b	e	r		*	*	*	*	-

If a code number has already been defined for protection against unauthorised changing of the programming, then this

number must be entered before you can select step 8.1.

If you do not know the code number or do not want to introduce changes, you can continue in the program or discontinue the programming.

To prevent unauthorised persons changing values in the programming, you

S	t	e	p		N	o	:					8	.	1
C	o	d	e		n	u	m	b	e	r		Y	/	N

can define a personal code number. Enter "Code number = No" to delete the current code number.

NOTE! Write any newly entered code number in your documentation. After entering a new code number, this programming step can no longer be called up without knowledge of the new code number and so changed.

S	t	e	p		N	o	:					8	.	2		
C	o	d	e		n	u	m	b	e	r		*	*	*	*	-

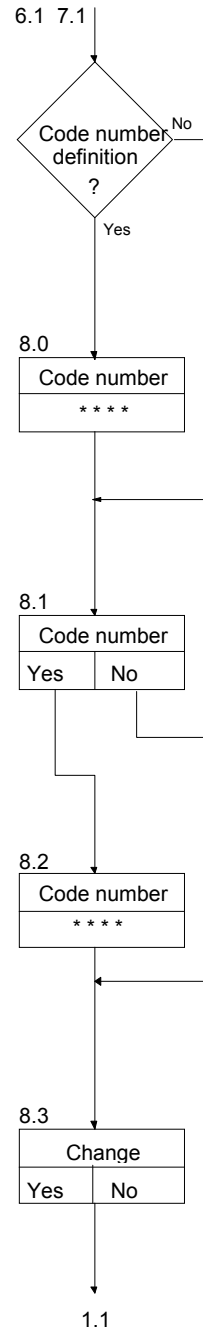
Enter your personal code in the range from 1 to 9,999.

S	t	e	p		N	o	:					8	.	3
C	o	d	e		n	u	m	b	e	r		Y	/	N

If you entered "No" in program step 8.1 in order to delete the code number or introduced changes in program step 8.2, you

must once again confirm that you really want to introduce the changes which have been made.

NOTE! Have you written down the code number?





Maintenance mode

The analysis instrument is switched into the "Maintenance mode" if the "Maintenance" button is pressed down for 5 seconds (see also "Manual control" on page 5). ics

Switch dosing pump on and off

		M	a	i	n	t	e	n	a	n	c	e			
I	n	d	i	c	a	t	o	r					Y	/	<u>N</u>

In this position it is possible to switch the dosing pump on and off in order to pump indicator into the measurement chamber. Other functions are not activated.

This procedure is necessary when there is air in the connecting tubes between the indicator bottle and the measurement chamber. Hence always when bringing into new operation or after replacing tubes. Due to the low output of the dosing pump, this procedure requires ca. 10 minutes when bringing into new operation.

Move the cursor under Y for Yes in order to switch the dosing pump on.

Note:

When refilling the indicator after activation of the indicator shortage display, this procedure must not be initiated as the instrument stops the automatic analysis series in good time.



Installation information and start-up

Installation of the instrument

1. Mounting the instrument
Drill four holes for placing the screw connections. Hangup the housing and make sure that the delivered rubbers are both at the outside and inside of the housing so the housing will not be damaged.
2. Connect the main power supply
3. Connect water intake
Fit a pressure-resistant tube having an internal diameter of 4 mm onto the quick connector and secure with a tube clamp.
The quick-connector has a valve. It is however recommended to fit an additional manual shut-off valve between the water treatment plant and the analysis instrument.
In order to keep the flushing quantity before an analysis small, the pipe to the water treatment plant must have a small cross-section and be as short as possible. Regarding the material for the feed pipe, **no copper tubing must be used under any circumstances**. Stainless steel or plastic tubes can be used.
Fix the quick-connector onto the counterpart at the analysis instrument.
4. Connect water discharge
Please do not reduce the ½ " connection.

Starting up the instrument

1. Fill the indicator tank with the desired indicator.
2. Switch on the instrument.
If there is a main switch for the power supply to the analysis instrument then switch this on. Turn on the analysis instrument power switch.

3. Indicator supply.

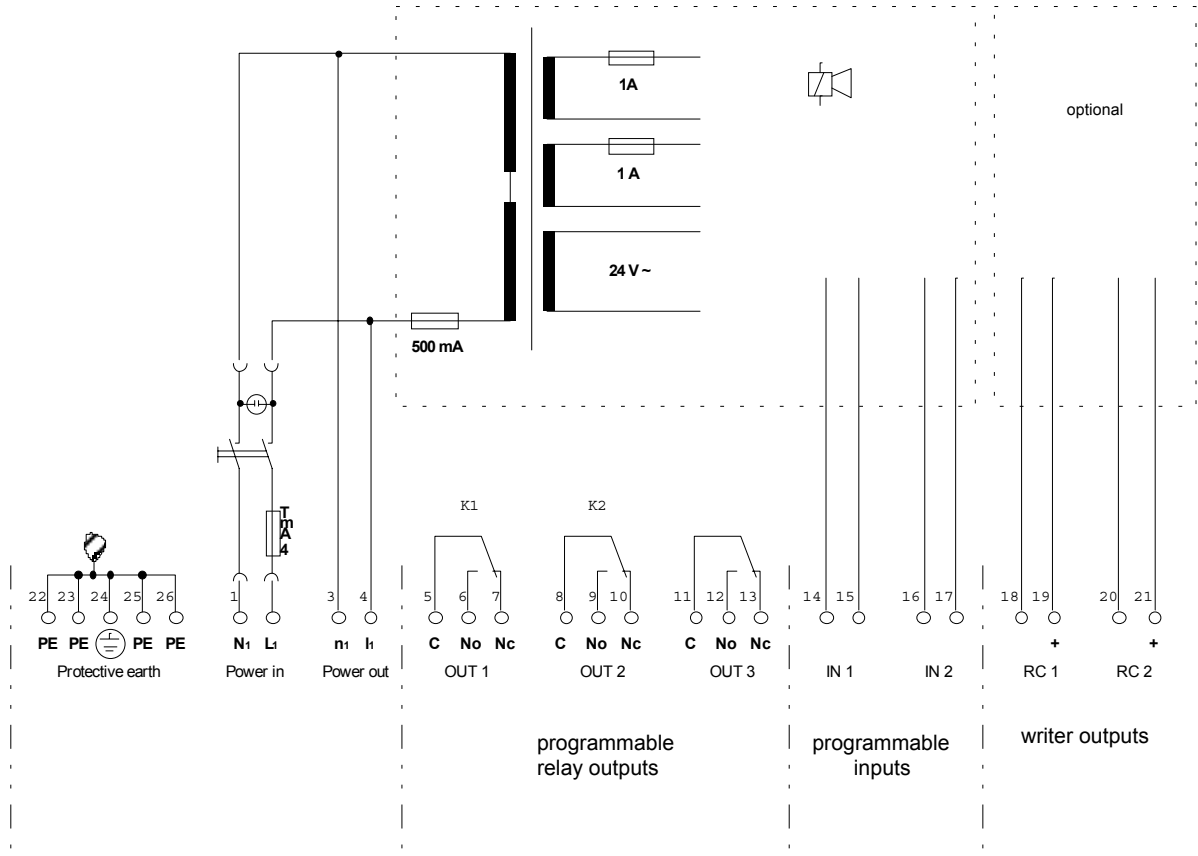
When starting up for the first time, the dosing pump must be kept switched on until the indicator flows into the measurement chamber. Follow the information on page 18 "Switching the dosing pump on and off" in the section on MAINTENANCE. Then you have to make a minimum of 5 analysis.

4. Program the instrument
After feeding the indicator, the MAINTENANCE button is pressed once again in order to exit the maintenance mode and start an analysis. The instrument is appropriately pre-programmed. Either now or at a later time, the instrument can be re-programmed to appropriate local conditions and requirements. Relevant information can be found on page 9.

Note!

If there are faults (e.g. defective tubing), water or indicator can spill out of the instrument. Ensure that this causes no further damage.

Terminal diagram



Technical information

Mains connection:	230V ± 10% 50-60 Hz fuse 4AT 115V ± 10% 50-60 Hz fuse 4AT
Power consumption of the analysis instrument:	9 VA
Max. current including connected components (Relays, valves and horns):	Max. 4 A
Floating outputs:	Load of the relay contacts: max. 250 V, 4A
Outputs:	Load of the switch contacts max. 9 V, 8 mA
Protection type:	IP 54
Temperature of the surroundings:	0 - 50 °C
Water temperature:	5 - 50 °C
Water pressure:	0.2 - 10 bar
Amount of indicator per analysis:	0.07 ml
Indicator storage tank:	250 ml
Weight:	ca. 17 Kg
Dimensions:	WxHxD = 400x500x218 mm

The instrument is non-resetting on power failure.