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# INDUSTRIAL WATER EQUIPMENT

## Electronic Controllers for Reverse Osmosis Plants



## Instruction Manual

Software version 2.01

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# Functional Description

The OS 3030 (wall-mounted) controllers are used for the fully automatic monitoring and control of water treatment plant, which operate on the basis of the process of reverse osmosis.

The controller can be expanded to include a programmable input and two programmable outputs using the IF plug-in card.

The following description relates to a standardised plant. Your existing plant can be adapted depending on its size, on the quality of the untreated water, on the use of demineralised water and on local requirements. In any event, pay particular attention to information and descriptions relating specifically to your plant.

The basic data programmed into your controller may be altered at any time. A code number can be set as a safeguard against unauthorised programming and calling up the maintenance function.

All of the program data is saved in the event of a power failure.

The installation can be switched off manually using the OFF switch. Its control will then switch to sleep mode (the "SLEEP" phase).

The controller differentiates between different phases, which are described below.

## PRODUCTION phase

The plant supplies treated water during the PRODUCTION phase. In general, the untreated water flows via the input valve to the pressure pump and on to the osmosis module. A salt-enriched part (concentrate) flows into the duct via the concentrated control valve. The other part, the demineralised water (permeate), flows into a reservoir or to the consumer.

The plant may come with different design features, such as multi-stage systems, concentrate recirculation or a permeate flush valve which is activated depending on conductivity.

Up to 3 stages, each lasting between 0 and 999 seconds, can be installed upstream of the PRODUCTION phase. A production phase is always ended by switching off the high-pressure pump for 3 seconds.

The following values are monitored during the PRODUCTION phase provided the controller is properly programmed, the IF plug-in card (available as an optional extra) is plugged in or the requisite sensors are connected to the inputs:

- Conductivity too low (programmable)
- Conductivity too high (programmable)
- Reservoir full input
- Reservoir empty input
- Stop input (programmable)
- Excess pressure input
- Concentrate throughput input
- External alarm switch input (programmable)
- Low-water input (programmable)
- Motor circuit-breaker input (internal)

An integrated elapsed-time meter records how long the PRODUCTION phase has been switched on to the precise minute, up to 65 000 hours".

## STANDBY phase

No treated water flows during the STANDBY phase.

A stages lasting between 0 and 999 seconds can be installed upstream of the STANDBY phase.

The following values are monitored during the STANDBY phase provided the controller is properly programmed, the IF plug-in card (available as an optional extra) is plugged in or the requisite sensors are connected to the inputs:

- Reservoir full input
- Reservoir empty input
- Motor circuit-breaker input (internal)

## "SLEEP" Phase

All in- and outputs are switched off in the "SLEEP" phase. This phase is activated by pressing the OFF button.

It can be taken out of sleep mode by pressing the ON button.



Rinse after production" phase, rinse during production" phase  
 "rinse during standby" phase, "stop during production" phase

## Rinse after production phase

The RINSE AFTER PRODUCTION phase serves to displace the concentrate at the end of a production cycle, for instance. It may comprise up to 3 stages, each lasting 0-9999 seconds.

The rinse cycle is always ended by switching off the high-pressure pump for 3 seconds.

Example of 2 stages:

The input valve and the concentrate flush valve are opened in stage 1.

The pressure pump kicks in stage 2. Untreated water flows via the input valve and via the pressure pump to the osmosis module. The main liquid flows into the duct via the concentrate flush valve and via the concentrate control valve.

The following values are monitored during the RINSE AFTER PRODUCTION phase provided the controller is properly programmed, the IF plug-in card (available as an optional extra) is plugged in or the requisite sensors are connected to the inputs:

Reservoir full input  
 Reservoir empty input  
 Stop input (programmable)  
 Excess pressure input  
 External alarm switch input (programmable)  
 Low-water input (programmable)  
 Motor circuit-breaker input (internal)

## Rinse during production phase

The RINSE DURING PRODUCTION phase serves to flush the water additionally during a lengthy production cycle if the water is heavily contaminated, for instance.

Cycle intervals of between 1 and 999 hours can be programmed.

The rinse cycle may comprise up to 3 stages, each lasting 0-9999 seconds.

The rinse phase is always ended by switching off the high-pressure pump for 3 seconds.

The following values are monitored during the RINSE DURING PRODUCTION phase provided the controller is properly programmed, the IF plug-in card (available as an optional extra) is plugged in or the requisite sensors are connected to the inputs:

Reservoir full input  
 Reservoir empty input  
 Stop input (programmable)  
 Excess pressure input  
 External alarm switch input (programmable)  
 Low-water input (programmable)  
 Motor circuit-breaker input (internal)

## Rinse during standby phase

The RINSE DURING STANDBY phase serves to counteract microbial contamination during lengthy periods of idle time, for instance.

Cycle intervals of between 1 and 999 hours can be programmed.

The rinse phase may comprise up to 3 stages, each lasting 0-9999 seconds.

The rinse phase is always ended by switching off the high-pressure pump for 3 seconds.

The following values are monitored during the RINSE DURING STANDBY phase provided the controller is properly programmed, the IF plug-in card (available as an optional extra) is plugged in or the requisite sensors are connected to the inputs:

Reservoir full input  
 Reservoir empty input  
 Stop input (programmable)  
 Excess pressure input  
 External alarm switch input (programmable)  
 Low-water input (programmable)  
 Motor circuit-breaker input (internal)

## Stop during production phase

The STOP DURING PRODUCTION phase is activated by the stop input.

It serves to switch off the osmosis system during the regeneration of an upstream softening system, for instance.

The following values are monitored during the STOP AFTER PRODUCTION phase provided the controller is properly programmed, the IF plug-in card (available as an optional extra) is plugged in or the requisite sensors are connected to the inputs:

Stop input (programmable)  
 Excess pressure input  
 External alarm switch input (programmable)  
 Low-water input (programmable)  
 Motor circuit-breaker input (internal)

## Stop during rinse phase

The STOP DURING RINSE phase is activated by the stop input.

It serves to switch off the osmosis system during the regeneration of an upstream softening system, for instance.

The activation of this can be programmed separately for each of the following phases: rinse after production, rinse during production and rinse during standby.

The following values are monitored during the RINSE DURING STANDBY phase provided the controller is properly programmed, the IF plug-in card (available as an optional extra) is plugged in or the requisite sensors are connected to the inputs:

- Stop input (programmable)
- Excess pressure input
- External alarm switch input (programmable)
- Low-water input (programmable)
- Motor circuit-breaker input (internal)

## Standby stop phase

The high-pressure pump, the valve outputs and the relay outputs are not activated during this phase.. It is shown automatically during initial start-up and when new versions of the software are installed so that the basic values can be programmed first of all. However, it can also be called up manually.

This function can also be called up in conjunction with the power failure signal.

Application: for technical reasons, the plant will not restart automatically after a power failure.

All of the inputs are deactivated during the STANDBY STOP phase.

## Maintenance phase

The plant can be switched on and off during the MAINTENANCE phase, in order to clean the osmosis modules with special solutions, for example. Two maintenance stages can be programmed. The max. switch on time per stage is 9999 minutes.

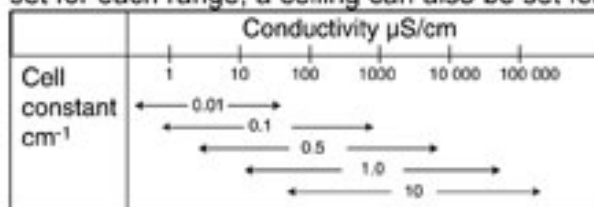
If the system requires maintenance, this can be displayed automatically (the maintenance interval can be set to 1-65,000 hours).

## Conductivity measurement

The controller is equipped with a conductivity meter, enabling the conductivity of the permeate to be measured and monitored.

The conductivity meter has been designed to support two measuring ranges and has an automatic measuring range switch function. The measuring ranges depend on the measuring cell used and range from high-purity water below 1  $\mu\text{S}/\text{cm}$  to highly saline waters of up to 100  $\text{mS}/\text{cm}$ .

In order to check that the conductivity measurement is working properly a threshold can be set for each range; a ceiling can also be set for



checking the quality of the permeate. If the reading drops below the threshold, the system is switched off after a fixed delay of 60 seconds. The user can program whether or not the system should cut out if the ceiling is overstepped, together with a delay.

If readings are below the threshold or above the ceiling, an alarm relay can be signalled externally with the aid of the acoustic signal sensor, if there is an IF plug-in card installed.

Calculating the measuring ranges:

$$\text{Range}_{\text{max}} = \text{cell constant} * 10\,000 \mu\text{S}$$

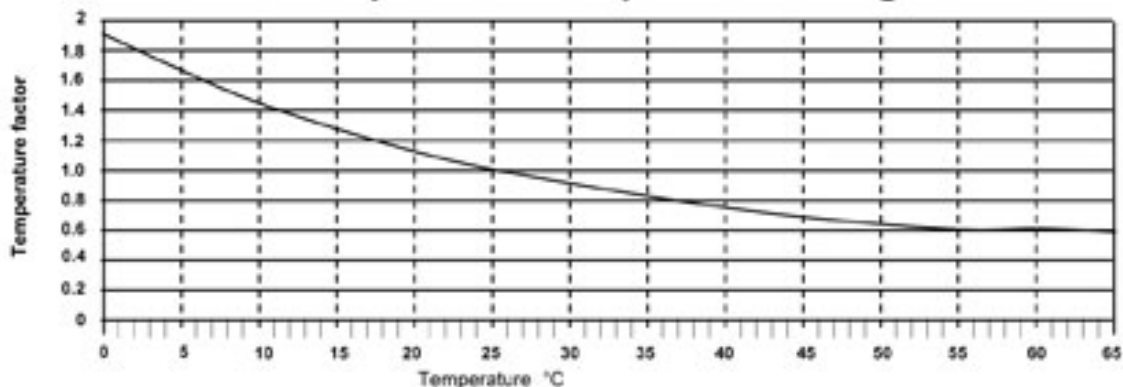
$$\text{Range}_{\text{min}} = \text{cell constant} * 10 \mu\text{S}$$

## Temperature compensation

The controller is not equipped with a thermometer and an automatic temperature compensation function for the conductivity measurement reading. However, the measurement reading can be compensated manually in line with the current water temperature by entering a fixed temperature, other than the standard reference

reference temperature of 25 °C. Refer to the diagram below for the correction factor used for the compensation procedure.

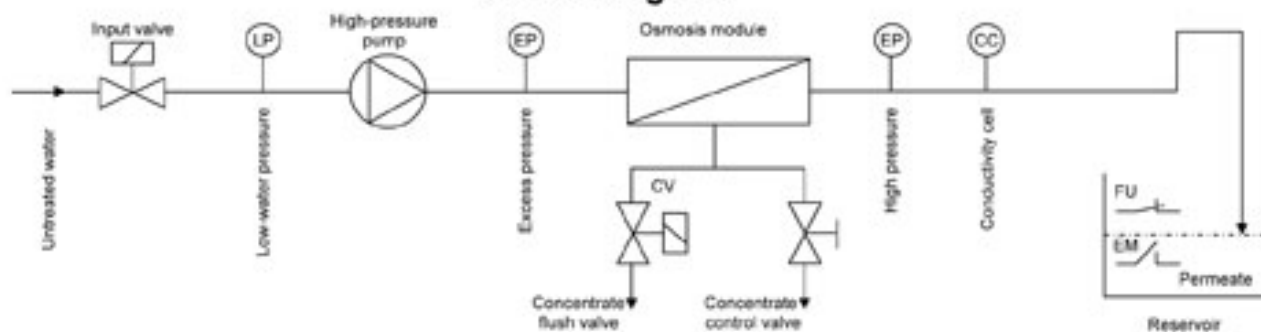
### Temperature compensation diagram



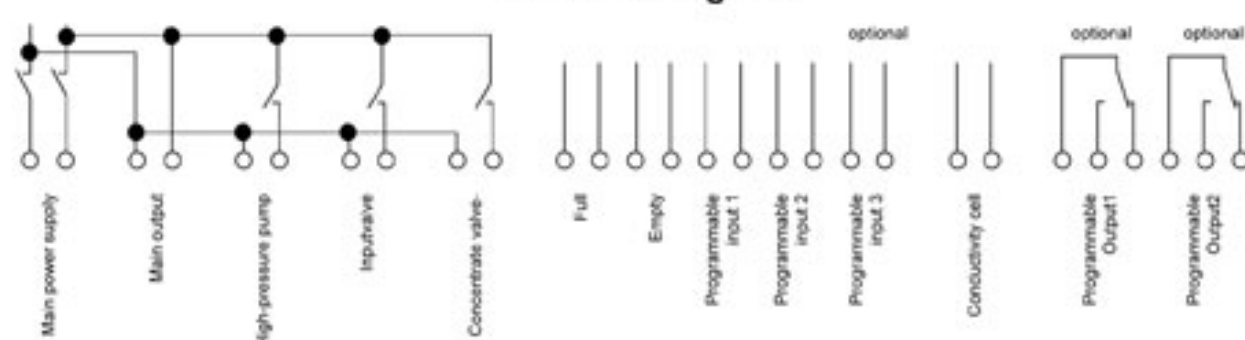
Example:

Water temperature setting:	T = 11° C
Measured conductivity:	C11 = 100µS/cm
Correction factor:	Cor = 1,4
Conductivity reading:	C25 = 140µS/cm

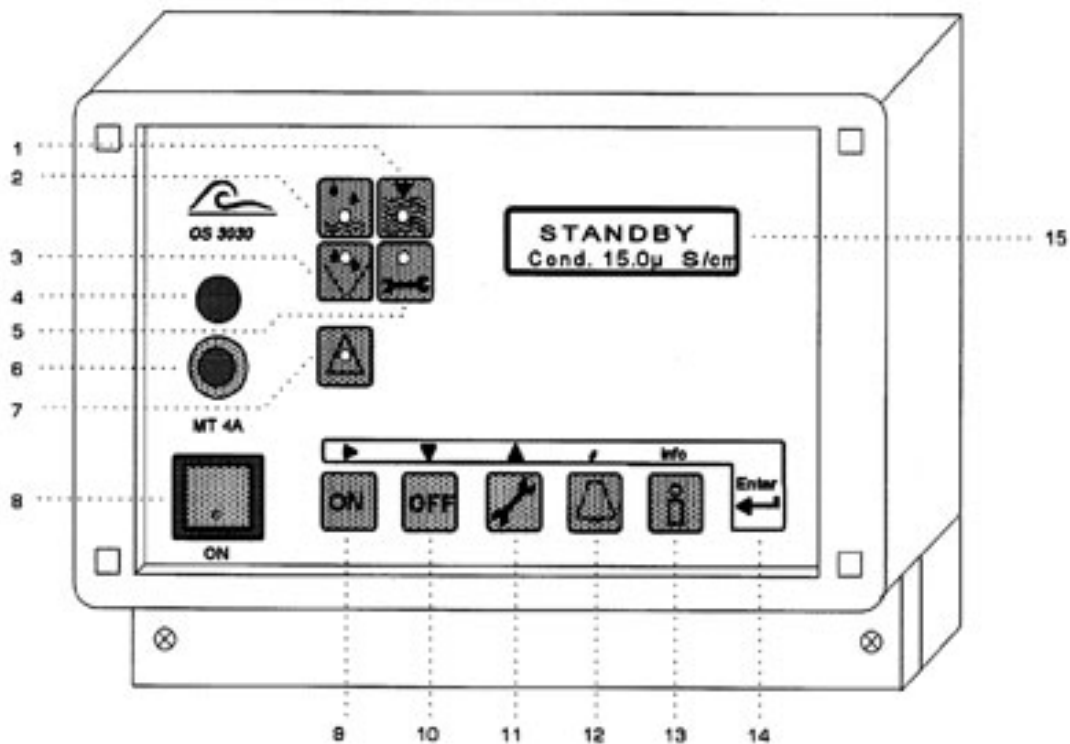
### Circuit diagram



### Terminal diagram



## CONSOLE UNIT MODELL OS 3030

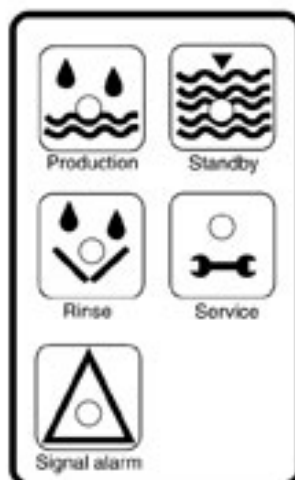


- |                               |                          |                |                  |
|-------------------------------|--------------------------|----------------|------------------|
| 1 LED "Standby" mode          | 5 LED "Maintenance" mode | 9 Production   | 13 Information   |
| 2 LED "Production" mode       | 6 Main fuse              | 10 Standby     | 14 Program       |
| 3 LED "Rinse" mode            | 7 LED "Alarm"            | 11 Maintenance | 15 LCD - display |
| 4 Thermal protection optional | 8 Main power switch      | 12 Reset       |                  |



# Measurement and Function Displays

## LED pilot lamps



Colour-coded pilot lamps signal the most important functional phases:

<b>Production</b> (green)	<b>Standby</b> (green)
<b>Rinse</b> (yellow)	<b>Maintenance</b> (yellow)
<b>Alarm</b> (red)	

Refer to the LCD for further information.

## LCD Display

### First line of the LCD

P	r	o	d	u	c	t	i	o	n	1			6	0	s
S	e	r	v	i	c	e	:			1	4	4	:	2	3

The system's current phase is shown in the first line of the LCD, for example: "Production 1", "Rinse 1", "STANDBY", "Stop maintenance" or "SLEEP"

**WARNING!** The remaining time is shown in the top right if time limits apply.

### Second line of the LCD

				S	T	A	N	D	B	Y					
S	e	r	v	i	c	e	:			1	4	4	:	2	3

The following information is alternated in the second line of the LCD:

The system's hours in operation (production time), e.g. 144 hours 23 minutes.

Alternatively, the conductivity of the system can be shown:

P	R	O	D	U	C	T	I	O	N							
C	o	n	d	.	:			1	5	.	0	μ	S	/	c	m

E.g.: 15.0 μS/cm


**Warning!**

If "**cond.: overflow**" is displayed, this indicates that the conductivity reading lies outside the measuring range.

**Warning!**

If necessary, the various alarm signal displays are alternated with the displays described in this section (see pages 12-14).

## INFO displays

Various information or settings can be scanned via the INFO button. Any changes that are possible are described in the section of the program on "Changing and scanning the basic settings". The maintenance tel. number is the only entry which can be changed when data is called up using the information button. Press the information button, which is marked . The first piece of information is displayed. Further information can be obtained by pressing this button repeatedly..



If the INFO button is pressed during programming, the complete versions of some abbreviated texts are shown on the LCD.

### Input statuses

			I	n	p	u	t	s							
F	U		E	M	-	L	P	-	S	T	-	E	P	-	

The current operational statuses of the inputs are displayed. The "FULL" and "EMPTY" inputs are shown in positions one and two, followed by the two programmable inputs IN1 and IN2, and, if there is an IF plug-in card installed, the IN3 input which is programmed with that card.

FU = Reservoir full      EM = Reservoir empty  
 ST = Stop                      EP = Excess pressure  
 CO = Concentrate      EX = External switch  
 LP = Low-water pressure

A horizontal stroke "-" beside the names indicates that the input is inactive.

A vertical stroke "|" beside the names indicates that the input is active.

### Outputs

				O	u	t	p	u	t	s					
P	U		I	V		C	V	-	P	V	-	M	F	-	

The current operational statuses of the outputs are displayed. The final two positions are only displayed if there is an IF plug-in card installed (OUT1 and OUT2 programmable outputs).

PU = High-pressure pump      IV = Input valve  
 AP = Additional program      DO = Dosing  
 PV = Permeate valve      MF = Alarm relay

A horizontal stroke "-" beside the names indicates that the output is inactive.

A vertical stroke "|" beside the names indicates that the output is active.

### Service tel. no.

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 tel. no. is displayed.

#### Changing the tel. no.:

##### **SELECTING A DIGIT:**

Press the button marked "▶".

##### *Increasing the digit:*

Press the button marked "▲".

##### *Lowering the digit:*

Press the button marked "▼".

### Software version

S	o	f	t	w	a	r	e		v	e	r	s	i	o	n
O	S	3	0	3	0			2	.	0	0	.	0	5	g

The software is continuously upgraded in the factory. Changes are made where necessary, in order to adapt the product in line with new findings and requirements.

The number of the version currently installed is displayed.

**Rinse after production**

R	i	n	s	e	.	a	.	p	r	o	d	u	c	t	.
		5	s			1	0	s			3	0	0	s	

The times input in programming steps 13.2, 13.4 and 13.6 are displayed: rinse after production.

**Rinse during standby**

R	i	n	s	e	.	d	.	S	t	a	n	d	b	y	.		
		2	4	h				1	6	0	m			3	0	0	s

The following settings are displayed for rinse during standby:

1. The rinse interval entered in programming step 14.2.
2. The time remaining until the rinse phase is activated.
3. The sum of the rinse times from programming steps 14.3, 14.5 and 14.7. Alternatively, the remaining rinse time is displayed during the rinse phase.

**Rinse during production**

R	i	n	s	e	.	d	.	p	r	o	d	u	c	t	.	
		8	h			4	8	0	m			3	0	0	s	

The following settings are displayed for rinse during production:

1. The rinse interval entered in programming step 15.2.
2. The time remaining until the rinse phase is activated.
3. The sum of the rinse times from programming steps 15.3, 15.5 and 15.7. Alternatively, the remaining rinse time is displayed during the rinse phase.

**Cell constant and temperature**

C	e	l	l	c	o	n	s	t	.	/	T	e	m	p	.	
		1	.	0	0			/	c	m			2	5	°	C

The cell constant entered in programming step 1.1 is displayed, together with the water temperature entered in programming step 2.1.

**Maintenance interval**

M	a	i	n	t	e	n	.	i	n	t	e	r	v	a	l	.
		5	0	0	h							1	0	h		

The following values are displayed for maintenance work:

1. The maintenance interval entered in programming step 16.6.
2. The time remaining until the next maintenance.

# Manual control

Some of the button actuation sequences are delayed in order to prevent unintended reactions. The current delay time is shown in the top right in the first line of the LCD.

The programmed rinse phases are switched on and off automatically. Manual operation is only necessary during maintenance work or when checking functions. Therefore, there are no separate buttons provided. However, the required start/stop functions can be activated by pressing the "STOP" and "HORN" buttons simultaneously.

## Starting the "production" phase



If the system has been fitted with a reservoir, it is switched on and off via the level contacts. If it does not have a reservoir or if the reservoir is not full, the system can be switched on manually.

Press the "ON" button. The "PRODUCTION" LED pilot lamp flashes on after 4 seconds. Up to 3 preliminary stages may be run through before the actual production process starts.

The remaining program times of production preliminary stages 1-3 are shown on the top right off the LCD.

If the production cycle is started from a rinse phase the "Rinse Stop" phase is shown for 3 seconds first of all.

**WARNING!** If the "Tank Full" contact is detected by the level switch on a reservoir, the message "Tank Full" appears in the LCD, and the production process cannot be started.

If the installation is switched to the "Sleep" phase, it will be switched back to automatic mode by pressing the ON button (for 1 second).

## Start "Sleep" phase



The installation can be put into sleep mode from any phase by pressing the OFF button for 1 second. The "Sleep" phase can be left again by pressing the ON button for 1 second.

## Starting the "rinse after production" phase

If the "rinse after production" phase has been programmed, it can be started by briefly switching the system off and on again.

The possible stages, 1-3, are displayed in sequence in the LCD, together with the time lapse.

## Stopping the "rinse after production" phase



If the system is in the "rinse after production" phase, it can be stopped by pressing the "OFF" and "HORN" buttons simultaneously.

## Starting the "rinse during standby" phase



If the "rinse during standby" phase has been programmed, it can be started if the system is in "standby".

Press the "OFF" and "HORN" buttons simultaneously.

The possible stages, 1-3, are displayed in sequence in the LCD, together with the time lapse.

## Stopping the "rinse during standby" phase



If the system is in the "rinse during standby" phase, it can be stopped by pressing the "OFF" and "HORN" buttons simultaneously.

## Starting the "rinse during production" phase



If the "rinse during production" phase has been programmed, it can be started if the system is in the "production" phase.

Press the "OFF" and "HORN" buttons simultaneously.

The possible stages, 1-3, are displayed in sequence in the LCD, together with the time lapse.

## Stopping the "rinse during production" phase



If the system is in the "rinse during production" phase, it can be stopped by pressing the "OFF" and "HORN" buttons simultaneously.

## "Standby Stop" phase

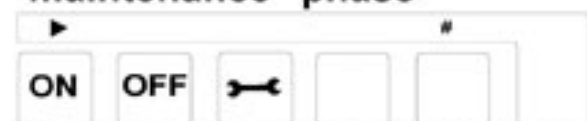
If the "ON" button is pressed at the same time as the mains switch is switched on, the system switches to the "Standby Stop". You can only exit this phase by switching the controller off and on without pressing any of the buttons simultaneously.

The following functions are possible in this phase:

1. Programming the controller
2. Starting/stopping the maintenance phase
3. Starting/stopping the "rinse after production" phase
4. INFO display

During programming, all of the inputs are deactivated, and none of the outputs are activated.

## Starting/stopping the "maintenance" phase



Switch the system to the "STANDBY" phase or to "Standby Stop".

Press the "maintenance" button

If no code number is defined during the basic programming, the "STANDBY" LED pilot lamp goes off after 5 seconds.

However, if a code number has been defined, enter the 4-digit code first of all using the "▶" and "#" buttons. Keep the "maintenance" button pressed during this sequence.

The maintenance procedure can be started and stopped using the "ON" and "OFF" buttons. Once the maintenance time programmed in maintenance steps 16.1 and 16.3 has elapsed, the maintenance procedure ends automatically.

You can switch the system back to the "STANDBY" phase by pressing the "maintenance" button again.

**WARNING!** The "MAINTENANCE" phase should be switched on by a properly trained operator.

## Acknowledging the "ALARM"



If the "ALARM" pilot lamp comes on, press the "bell" button. This will trigger off the following reactions:

1. It cancels the alarm relay if the alarm relay has been programmed for the current alarm in programming steps 7.9-7.11.
2. It switches off the integrated acoustic signal sensor if the acoustic signal sensor has been programmed for the current alarm in programming steps 8.1-8.3.
3. It cancels the pilot lamp and the fault alarm in the LCD.

**WARNING:** In the event of fault alarms which cause the system to cut out, the pilot lamp and the LCD cannot be cancelled until the fault has been rectified.


# Alarm signals

If a particular alarm signal is programmed to cause the system to shut down (e.g. MIN conductivity limit) or if shutting down is specified (e.g. motor circuit-breaker), the alarm signal cannot be cancelled in the LCD until the fault has been rectified.

There are some fault alarm signals which permit the system to be switched back on before the fault has been rectified. The fault alarm signal is cancelled, and the internal delay time for the alarm is reset. If the fault still exists once the delay time has elapsed, the alarm signal is repeated.

The system can be switched back on manually in the case of the "External Switch" and "Signal Stop" signals. The input affected is ignored until the next deactivation sequence.

If the integrated buzzer or an alarm relay have been programmed for a particular alarm signal, the fault display is not deleted automatically.

Cancel alarm signals by pressing  the button.

## MIN. conductivity limit

L	i	m	i	t	C	M	M	I	N			
u	n	d	e	r	v	a	l	u	e	d		

The value has been below the conductivity limit for over 60 seconds.

If the system cut-out has been programmed in programming step 1.4, it must be switched back on manually by pressing "ON".

Possible causes: Change in the quality of the water, air on the measuring probe, interruption in the power supply to the measuring probe.

## MAX. conductivity limit

L	i	m	i	t	C	M	M	A	X		
E	x	c	e	e	d	e	d				

Once the delay entered in programming step 1.8 has elapsed, the value is above the max. conductivity limit.

If the system cut-out has been programmed in programming step 1.7, it must be switched back on manually by pressing "ON".

Possible causes: Change in the quality of the water, the system settings have changed, the conductivity module is faulty, the measuring probe has short-circuited.

## Exceeded pressure signal

				S	i	g	n	a	l						
				O	v	e	r	p	r	e	s	s	u	r	e

The "exceeded pressure" input has been activated. The system has been switched off.

Switch the system back on manually by pressing "ON".

Possible causes: The system settings have been changed, the modules are soiled, the concentrate flush valve is closed.

Possible causes: No pressure in the untreated water, the pre-filter is blocked.

## Motor circuit-breaker signal

				S	i	g	n	a	l					
M	o	t	o	r	p	r	o	t	e	c	t	i	o	n

The motor circuit-breaker, which is integrated into the front panel, has been activated.

The system cuts out.

The system can be switched on straight away by pressing "ON".

Possible causes: The system settings have been changed, faults in the system, the motor has overloaded.

### Low-pressure signal 1

				S	i	g	n	a	l					2	*	
L	o	w	-	p	r	e	s	s	.	1				6	0	s

The "low-pressure" input has been activated. The system cuts out and is then switched back on again after the time shown in the bottom right. The number of switch-on attempts is shown in the top right.

The LCD and LED displays are cancelled once the "low-pressure" signal is cleared when the system is re-started.

The system can be switched on before the delay elapses by pressing "ON".

Warning! The buzzer and alarm relay, if one has been programmed, are not activated yet. Possible cause: The system settings have been changed.

### Low-pressure signal 2

				S	i	g	n	a	l							
L	o	w	-	p	r	e	s	s	u	r	e	2				

The "low-pressure" input has been activated. The system cuts out. The display is cancelled and the system switched back on once the "low-pressure" signal is cleared.

If the alarm relay or the horn has been activated, the alarm relay and the horn must be cancelled manually.

This is only displayed if 0 has been entered in step 5.6 of the basic programming procedure.

The system can be switched on manually by pressing "ON".

Possible causes: No pressure in the untreated water, the pre-filter is blocked.

### Low-pressure signal 3

				S	i	g	n	a	l							
L	o	w	-	p	r	e	s	s	u	r	e	3				

The "low-pressure" input has been activated. The system cuts out.

The system must be switched back on manually. The LCD cannot be cancelled before then. This signal is only displayed if the system has unsuccessfully tried to come back on automatically, despite the lack of water, or if 1 has been entered in step 5.6 of the basic programming procedure.

The system can be switched on straight away by pressing "ON".

Possible causes: No pressure in the untreated water, the pre-filter is blocked.

### Concentrate signal 1

				S	i	g	n	a	l					2	*	
C	o	n	c	e	n	t	r	.	1					5	0	s

The "concentrate" input has been activated. The system cuts out and is then switched back on again after the time shown in the bottom right. The number of switch-on attempts is shown in the top right.

The LCD and LED displays are cancelled once the "concentrate" signal is cleared when the system is re-started.

The system can be switched on before the delay elapses by pressing "ON".

Warning! The buzzer and alarm relay, if one has been programmed, are not activated yet. Possible cause: The system settings have been changed.

### Concentrate signal 2

				S	i	g	n	a	l							
				C	o	n	c	e	n	t	r	a	t	e	2	

The "concentrate" input has been activated. The system cuts out. The display is cancelled and the system switched back on once the "concentrate" signal is cleared.

If the alarm relay or the horn has been activated, the alarm relay and the horn must be cancelled manually.

This is only displayed if 0 has been entered in step 5.3 of the basic programming procedure.

The system can be switched on manually by pressing "ON".

Possible causes: The system settings have been changed.

### Concentrate signal 3

				S	i	g	n	a	l							
				C	o	n	c	e	n	t	r	a	t	e	3	

The "concentrate" input has been activated. The system cuts out.

The system must be switched back on manually. The LCD cannot be cancelled before then. This signal is only displayed if the system has unsuccessfully tried to come back on automatically, despite the lack of water, or if 1 has been entered in step 5.3 of the basic programming procedure.

The system can be switched on straight away by pressing "ON".

Possible causes: The system settings have been changed.

## Rinse permeate alarm signal

				F	I	U	S	H	I	N	G				
				P	E	R	M	E	A	T	E				

The conductivity limit specified in programming step 7.6 has been exceeded during the "production" phase, and the "permeate valve" connection has been activated.

The display is cancelled and the connection deactivated as soon as the value drops back below the limit.

## External alarm switch signal

				S	I	G	N	A	L						
	E	X	T	E	R	N									

The "external alarm switch" was activated during a phase programmed in step 5.12.

If the system cut-out was programmed in step 5.10, the system cuts out.

If the automatic switch on was set to "No" in programming step 5.11, the system must be switched back on manually.

Press "ON". The input signal is ignored until the next deactivation procedure.

Possible causes: Depends on the function of the external alarm switch.

## Tank FULL alarm signal

				T	A	N	K								
				F	U	L	L								

The reservoir is full.

This signal is also displayed if the operator attempts to start the production process even though the level sensor shows "Reservoir Full". Empty the reservoir in order to enable you to switch on the system.

## Tank EMPTY alarm signal

				T	a	n	k								
				E	M	P	T	Y							

The reservoir is empty.

Possible cause: Too much liquid has been drawn from the reservoir.

This signal is also displayed if the operator attempts to start the production process even though the level sensor shows "Reservoir Empty". Check the level sensor in the reservoir.

## Power-failure signal

				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 and the value on the elapsed time meter are retained.

If a power failure occurs during the maintenance phase, the controller switches back to the stop during maintenance" phase.

If a code number has been defined for the maintenance phase, this must be re-input.

## STOP signal

				S	I	G	N	A	L						
				S	T	O	P								

The stop input has been activated during a phase programmed in step 5.13, and any discharge of water has been interrupted.

The user specified in step 5.14 whether the system should come on automatically or should be switched on manually.

If you press "ON", the interrupted phase is restarted, and the stop input is ignored until the next deactivation procedure.

## Stop standby alarm signal

				S	T	O	P								
				S	T	A	N	D	B	Y					

The stop after power failure option was set to YES in programming step 5.15.

Press "ON" to switch the system back on.

## Manual start signal

				S	I	G	N	A	L						
				M	a	n	s	t	a	r	t				

The "STOP" input has been activated, and the stop manual start option has been set to YES in programming step 5.14.

Press "ON" to switch the system back on.

## Maintenance signal

				S	I	G	N	A	L						
				M	a	i	n	t	e	n	a	n	c	e	

The maintenance interval specified in programming step 16.6 has elapsed.

Notify your maintenance firm. The water supplied by the system is still O.K.





# Standard output functions

*"Pressure pump", "input valve" and "concentrate valve" outputs are standard features of the system.*

*The timing of the activation of the outputs is defined during the programming of the individual phases in programming steps 9 to 17.*

## Pressure pump

### Three-phase current contactor

The pressure pump is attached to connection point "PU". The supply voltage corresponds to the mains voltage connected to the controller. The power load of the controller and the connected solenoid valves may not exceed 6.3 A.

Larger systems require pumps with 3-phase current motors. They are activated via a 3-phase current contactor, which is connected to "PU".

This contactor must be installed outside the controller. If necessary, this control cabinet can house other 30-phase current contactors for other pressure pumps, thermal overload circuit-breakers, time-delay relays, star-delta connections, pilot and signal lamps, a main 3-phase current switch, etc.

## Input valve

The input valve is attached to connection point "IV". The supply voltage corresponds to the mains voltage connected to the controller.

## Concentrate flush valve

The concentrate flush valve is attached to connection point "CV". The supply voltage corresponds to the mains voltage connected to the controller.



# Additional output functions

*The IF card is available as an optional extra, providing you with another 2 programmable floating outputs. The functions described below (dosing, Additional program, permeate valve or alarm relay) can optionally be assigned to those outputs.*

*Each function only exists once. If one of the functions is programmed for both of the additional outputs, the two output relays operate in parallel.*

*You can specify in programming step 6.3 when the functions should be activated with the voltage switched on or off.*

## Dosing

The relay's floating contact can be used to control dosing systems or, depending on the wiring arrangement, to activate dosing pumps or valves directly.

The phases in which activation takes place can be defined in programming steps 9 to 17.

The dosing time can be limited to anything between 1 and 65,000 seconds. However, it may not be any longer than the selected phase. Moreover, pulsed dosing is also an option.

The appropriate values are entered in programming steps 7.1 to 7.3.

## Additional program

Any control functions can be defined using the floating contact.

The phases in which activation takes place can be defined in programming steps 9 to 17.

The dosing time can be limited to anything between 1 and 999 minutes. However, it is cancelled prematurely if it is longer than the current phase and has not been selected for the subsequent phase.

A pick-up delay of between 0 and 999 seconds can also be defined.

The appropriate values are entered in programming steps 7.4 and 7.5.

Warning! In the case of the MAINTENANCE phase, simply specify whether the relay is switched on or off.

## Permeate valve

If it is appropriately wired, the relay's floating contact can be used to activate a permeate valve. Depending on the installation of the valve, it can be used to block the line to the consumer or to flush the modules.

The permeate valve is only monitored, conductivity-dependent, during the "PRODUCTION" phase.

The permeate flush valve remains closed while the conductivity is below the defined limit. This limit and a drop-out and pick-up delay are entered in programming steps 7.6-7.8.

Define in programming steps 10 to 17 whether the valve should be open or closed in the case of the other phases. Conductivity-dependent monitoring does not occur.

## Alarm relay

The relay's floating contact can be used to activate control consoles or, depending on the wiring arrangement, to connect signal devices.

The events which should prompt an alarm signal can be programmed in programming steps 7.9 to 7.11.

# Input functions

The "FULL" and "EMPTY" inputs are standard features. Define whether the inputs are activated are activated when the contact is open or closed. This is defined in programming step 4.4.

Optionally, the controller can be equipped with a motor circuit-breaker for 1-phase high-pressure pumps. The break contact and a motor circuit-breaker alarm contact, if included, are connected internally on the PCB.

The "external switch" function must be used for the alarm contact for an external motor circuit-breaker.

## FULL and EMPTY

The level switch connections for automatically refilling a reservoir are marked "FU" (FULL) and "EM" (EMPTY).

If both alarm signals are activated, "FULL" has greater priority.

A reservoir can only be refilled via the (FULL) level switch. The (EMPTY) level switch is then used to signal that the reservoir has run dry.

Alternatively, the reservoir can be refilled via both level switches, ("FULL", "EMPTY") or manually. (See programming step 5.1)

The response time for the inputs is 4 seconds.

The "FULL" and "EMPTY" alarm signals can be connected to the alarm relay or to the buzzer.

The "FULL" and "EMPTY" alarm signals are shown in the LCD whenever the alarm relay or horn are activated, or if the inputs have only been programmed to act as full and empty alarm signals.

## Motor circuit-breaker

The alarm contact for the motor circuit-breaker is active when the contact is made.

The response time is 2 second.

The motor circuit-breaker alarm signal can be connected to the alarm relay or to the buzzer.

The motor circuit-breaker alarm signal is displayed in the LCD.

**WARNING!** The motor circuit-breaker has to be released following a fault alarm. The system is switched back on manually by pressing "ON".

*There are another two inputs (or three with the IF plug-in card) (IN1, IN2 and IN3) available for the system controller. These can be assigned the following functions, in accordance with the programming sequences in programming steps 4.1 - 4.3. In programming step 4.4, specify whether the functions are to be activated when the contact is made or broken.*

## STOP input

In programming step 5.13, specify the phases in which the ATOP input is scanned.

If the input is active, the outputs are connected to the positions programmed in the relevant programming steps, i.e. 10.1,10.2 and 17.1.

Furthermore, in programming step 5.14, you can specify whether the system should resume operation once the stop signal has been disabled or has to be restarted manually.

The stop function is used, for example, to switch off the osmosis plant during the regeneration of an upstream softening plant.

The system can be switched back on by pressing "ON", even while the stop signal is active.

The stop signal is ignored until the next deactivation sequence.

The response time for the input is 6 seconds.

The "STOP" alarm signal can be connected to the alarm relay or to the buzzer.

The "STOP" phase is displayed in the LCD.



## Excess pressure

The excess pressure function can be programmed for the IN1, IN2 or IN3 inputs.

Several excess pressure switches may be connected in series.

**WARNING!** Press "ON" to switch the system back on. If there is excess pressure, it cuts out again after 2 seconds.

The response time is 2 seconds.

The "excess pressure" alarm signal can be connected to the alarm relay or to the buzzer.

The "excess pressure" phase is displayed in the LCD.

## Low-pressure

The low-pressure function can be programmed for the IN1, IN2 or IN3 inputs.

The low-pressure function serves to prevent the high-pressure pump running dry.

A switch-on delay of between 1 and 999 seconds can be set in programming step 5.5. An automatic restart sequence of 0 to 9 attempts can also be set. Once this sequence is over, the system cuts out completely and can then only be switched back on manually by pressing "ON" (see programming steps 5.6 - 5.7).

In programming step 5.8, specify the phases in which the controls are activated.

The "low-pressure" alarm signal can be connected to the alarm relay or to the buzzer.

The "low-pressure" alarm signal is displayed in the LCD.

## Concentrate

The concentrate function can be programmed for the IN1, IN2 or IN3 inputs.

A flow monitor, for example, can be used to monitor the concentrate flow.

A switch-on delay of between 1 and 999 seconds can be set in programming step 5. An automatic restart sequence of 0 to 9 attempts can also be set. Once this sequence is over, the system cuts out completely and can then only be switched back on manually by pressing "ON" (see programming steps 5.3 - 5.4).

The "concentrate" alarm signal can be connected to the alarm relay or to the buzzer.

The "concentrate" alarm signal is displayed in the LCD.

## External alarm switch

The external alarm switch function can be programmed for the IN1, IN2 or IN3 inputs.

This function can be used for various fault signals, e.g. for the alarm contact on a 3-phase motor circuit-breaker.

In programming steps 5.9 - 5.12, set a delay time, specify whether the system cuts out, whether it can only be switched back on manually and in which phases the controls are activated.

The "external alarm switch" alarm signal can be connected to the alarm relay or to the buzzer.

The system can be switched back on by pressing "ON", even while the alarm signal is active. The alarm signal is ignored until the next deactivation sequence.

The "external alarm switch" alarm signal is displayed in the LCD.

## Conductivity probe

The connection for the conductivity probe is marked "CC". Ensure that the correct cell constants are entered in programming step 1.2.

# Changing and scanning the basic settings

## General instructions on programming and on defining the language setting

You can set the controller to the operating data of the treatment plant during start-up by inputting basic settings. These settings can be changed. They are retained if a power failure occurs.

- The basic settings should only be changed by a duly authorised expert.
- Take a note of the basic settings in the free fields in the following flow diagrams. Keep this manual safe for use by operating and servicing personnel.
- The basic settings may be changed at any time. Some of the changes do not become active until you exit programming mode.
- The symbols "▶", "▼", "▲" and # above the buttons are used in programming mode.



1. Press "Enter". If you have entered 2 or 3 in programming step 18.2 for the code number mode, you need to enter a code number before calling up the programming steps using the "▶" and "#" buttons.

			C	o	d	e	n	o	.	:				
			*	*	*	*								

2. In order to avoid accidental changes in programming settings, you need to press "Enter" for 4 seconds before you are given clearance to alter the basic settings.

The following warning is displayed in the LCD first of all:

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

and after 4 seconds the display changes to:

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

**WARNING!** You must keep the "Enter" button pressed for the functions described under 3 and 4.

3. You can change the language setting at this point in the LCD. The procedure is as follows:

Press "Enter" and "#".

Press "▶" to move the cursor to the national code for the language which you require.

			E	N	G	L	I	S	H						
D	N	I	E	F	E	s	I	C	z						

4. Press "▼" to go to the first and subsequent programming steps.

5. Press "▲" to go back a programming step.  
*N.B.: The controller is now in programming mode. Release "ENTER". You can exit the programming mode by pressing "ENTER" once again. The system exits programming mode automatically if none of the buttons have been pressed in approx. 2 minutes.*

6. Press "▶" to move the cursor. In the case of YES/NO decisions, move the cursor to Y to answer YES and to N to answer NO.

When entering figures, use the cursor to mark the digit being changed.

7. Press "#" to change numerical values, marked with the cursor, within the default ranges.

8. Press "#" to switch between the "-" and "]" options in multiple-choice queries.

9. If you press INFO during programming, the complete versions of some abbreviated texts are displayed on the LCD.

**WARNING!** If you press "ON" during the switch-on procedure, the controller switches to "standby stop" phase. In that phase all inputs are deactivated and no outputs are activated (also refer to the section on "Manual control").



1. Conductivity meter, 2. Manual Temperature compensation, 3. Conductivity correction factor

S	t	e	p	n	o	.	:					1	.	7
S	w	i	t	c	h	o	f	f				Y	/	N

You can also specify whether the system should cut out if the value rises above the MAX limit.

S	t	e	p	n	o	.	:					1	.	8	
D	e	l	a	y								1	8	0	s

The fault signal "value > MAX conductivity value" appears on the LCD after a programmable delay of between 1 and 9999

seconds if the MAX limit is exceeded. The system cuts out, if this action is programmed in programming step 1.7.

In programming steps 6.1 or 6.2 you can also define whether or not the alarm relay should kick in.

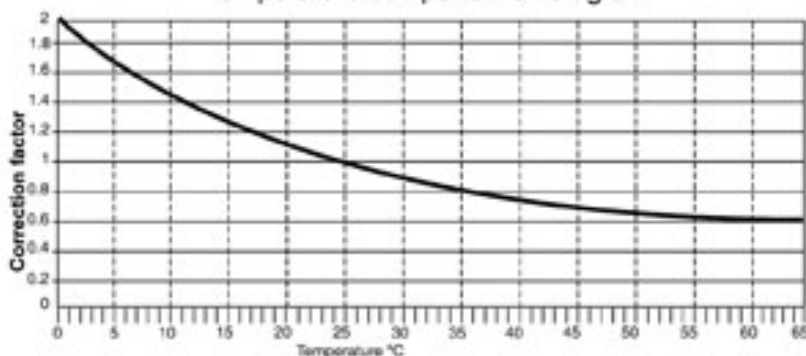
## 2. Manual temperature compensation

S	t	e	p	n	o	.	:					2	.	1	
T	e	m	p	e	r	a	t	u	r	e		2	5	°	C

If a water temperature below or above 25°C is entered, the conductivity reading shown can be compensated in line

with the current water temperature. The following graph shows the correction factor depending on the temperature selected.

Temperature compensation diagram



## 3. Conductivity correction factor

The conductivity measurement relates to a water temperature of 25°C. The value shown can be compensated manually at other temperatures.

Other measuring faults, brought about by polarisation, specific resistances or cable capacities can be compensated here by entering a correction factor, for a certain range at least.

A correction factor of 0.10 to 5.00 can be entered for a conductivity of 1, Calculating the conductivity correction factor:

Take a sample of water and measure the **target** conductivity using a high-precision meter.

Record the value displayed on the controller. This is the **actual** value.

You can then calculate the **correction factor** to enter as follows:

$$\frac{\text{Target}}{\text{Actual value}} = \text{Correction factor}$$



## 4. Selecting the programmable functions

The system features *FULL* and *EMPTY* inputs for the purposes of reservoir control. The functions of inputs *IN1*, *IN2* and, if there is a plug-in *IF* card installed, *IN3* are programmable.

You have a choice of 5 options. Each function may only be utilised once.

### INPUT 1 function

S	t	e	p	n	o	.	:					4	.	1
S	T	E	P	C	O	E	X	L	P					

Select your choice of input function for input *IN1*. The section on "Input functions" contains a description of the inputs.

Press *INFO* to see the meaning of the abbreviation in plain text.

*ST* = Stop

*EP* = Exceeded pressure

*CO* = Concentrate

*EX* = External switch

*LP* = Low-water pressure

### INPUT 2 function

S	t	e	p	n	o	.	:					4	.	2
S	T	E	P	C	O	E	X	L	P					

Select your choice of input function for input *IN2*, as described in 4.1.

### INPUT 3 function

S	t	e	p	n	o	.	:					4	.	3
S	T	E	P	C	O	E	X	L	P					

Select your choice of input function for input *IN3*, as described in 4.1 (only if you have an *IF* plug-in card installed).

General note:

If there is a thermal motor circuit-breaker installed in the front panel in 230 V models, the corresponding alarm contact is connected directly onto the PCB. An input is not required for that switch.

### Activating the input functions

S	t	e	p	n	o	.	:					4	.	4
E	U	-	E	M		L	P		S	T		E	P	-

Choose activation options for the *FU* and *EM* functions, as well as for the inputs selected in programming steps 4.1-4.3.

"|" Function is activated when the contact is closed (NO-contact)

"-" Function is activated when the contact is open (NC-contact)

Press *INFO* to see the meaning of the abbreviation in plain text.

*FU* = Tank full input

*EM* = Tank empty input

*ST* = Stop

*EP* = Exceeded pressure

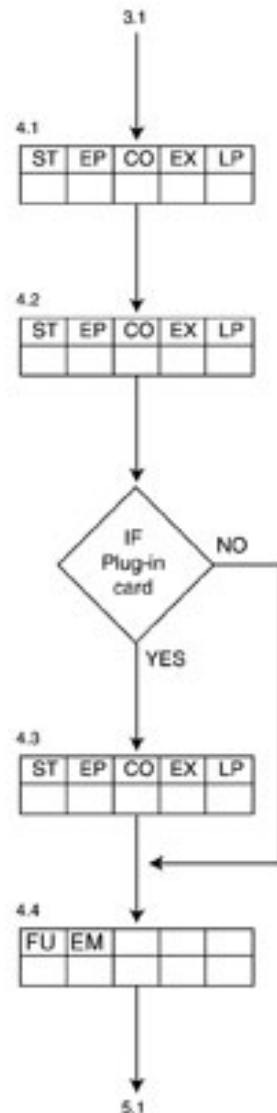
*CO* = Concentrate

*EX* = External switch

*LP* = Low-water pressure

General note:

In deciding between an NO-contact or an NC-contact, assume that a break in the power supply to the contact or non-closure of the contact are more likely faults. This will not result in damage to the system. Example: over-pressure switch. A faulty switch may result in damage to the module. Therefore, use a switch with an NC contact.





## 5. Input function parameters

Parameters still have to be input for some input functions. The "full/empty level switch" and "power failure" programming steps are always displayed. The others are only displayed if the function has been selected beforehand.

### Full/empty level switch

S	t	e	p	n	o	.	:					5	.	1
L	e	v	e	l	s	w	i	t	c	h				2

The reservoir can be re-filled via a (full) level switch. The system comes on immediately if the level

drops below FULL.

Advantage: the full reservoir capacity is available to the consumer all the time.

Select: **Level switch = 1.**

Alternatively, the reservoir may be filled via two level switches. The osmosis plant comes on when the reservoir runs dry. When the level in the reservoir rises to FULL, the osmosis plant cuts out.

Advantage: the system is switched on and off less frequently.

Select: **Level switch = 2.**

If there is no reservoir activated, the system can only be switched on and off manually.

Select: **Level switch = 0.**

General note:

The "Reservoir Empty" and "Reservoir Full" statuses are displayed on the LCD if the buzzer and the alarm relay have been activated, irrespective of the setting selected.

### Concentrate control

S	t	e	p	n	o	.	:					5	.	2
D	e	l	a	y	1							6	0	s

The response time for the concentrate control switch can be programmed to between 1 and 999 seconds.

seconds.

S	t	e	p	n	o	.	:					5	.	3
S	w	i	t	c	h	o	n						1	*

The controller can be programmed to allow a few more attempts to switch on the system on if the concentrate level is low before it cuts out completely. It can only then be switched

back on by pressing "ON". A setting of between 0 and 9 is permissible.

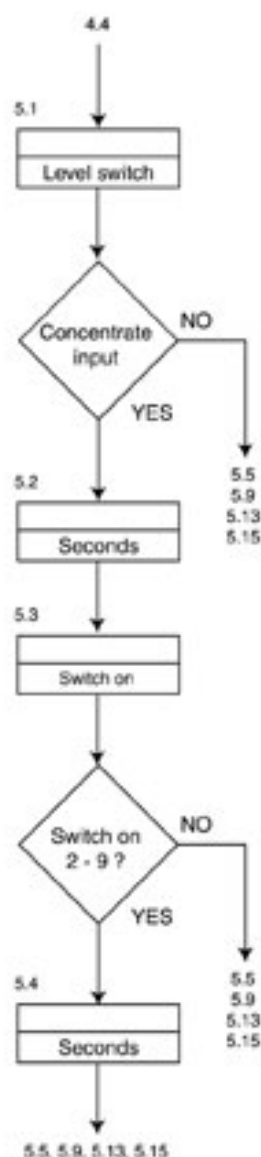
If you select 0, the system does not cut out completely. The system comes back on as soon as the flow of concentrate restarts and permeate is requested.

If you select 1, the system cuts out and must be restarted manually.

If you select values of between 2 and 9, the system makes 1-8 attempts to come back on, despite the current low-concentrate alarm signal. It then cuts out and must be restarted manually.

S	t	e	p	n	o	.	:					5	.	4	
D	e	l	a	y	2							3	0	0	s

If between 2 and 9 attempts to switch the system back on are programmed, the delay between automatic switch-on attempts must be set. You may specify a delay of between 1 and 999 seconds.















**Activation of alarm signal 2**

S	t	e	p	n	o	.	:					7	.	1	0
L	P		S	T	.										

Other events which should trigger off the alarm relay.

Press INFO to see the meaning of the abbreviation in plain text.

LP = Low-pressure

CO = Concentrate control

ST = Stop signal is active

EP = Exceeded pressure control

**Activation of alarm signal 3**

S	t	e	p	n	o	.	:					7	.	1	1
P	F	:	P	S		E	X	.							

Other events which should trigger off the alarm relay.

Press INFO to see the meaning of the abbreviation in plain text.

PF = Power failure

MT = Maintenance required

EX = External switch

PS = Motor circuit-breaker has been activated

**8. Activation of the buzzer****Buzzer****Activation of the buzzer 1**

S	t	e	p	n	o	.	:					8	.	1	
M	I		M	A		E	M	.	F	U	.				

Warning: You can only select the options for which limits have been set, an input function selected or appropriate input functions chosen in the previous programming steps. (Except for the motor circuit-breaker selection; this is always displayed).

In this and in the subsequent two steps, program the events which should trigger off the buzzer.

Press INFO to see the meaning of the abbreviation in plain text.

MI = Value < min. conductivity limit

EM = Tank is empty

MA = Value > max. conductivity limit

FU = Tank is full

**Activation of the buzzer 2**

S	t	e	p	n	o	.	:					8	.	2	
L	P		S	T	.										

Other events which should trigger off the buzzer.

Press INFO to see the meaning of the abbreviation in plain text.

LP = Low-pressure

CO = Concentrate control

ST = Stop signal is active

EP = Exceeded pressure control

**Activation of the buzzer 3**

S	t	e	p	n	o	.	:					8	.	3	
P	F	:	P	S		E	X	.							

Other events which should trigger off the buzzer.

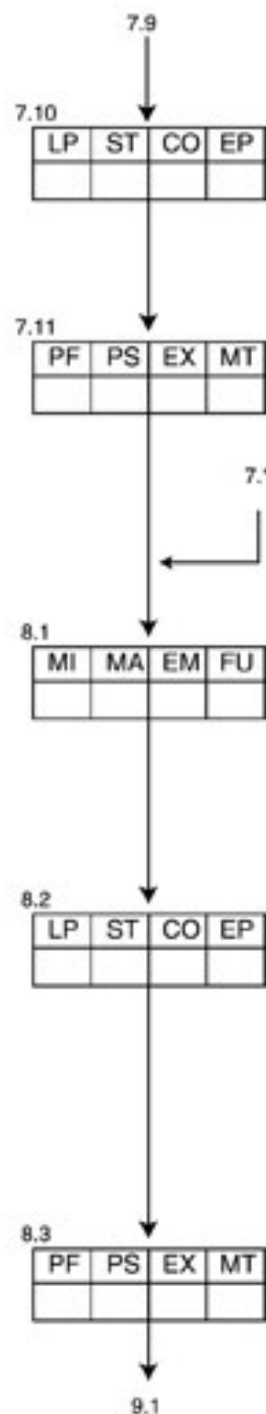
Press INFO to see the meaning of the abbreviation in plain text.

PF = Power failure

MT = Maintenance required

EX = External switch

PS = Motor circuit-breaker has been activated





## 9. "Production" phase

The production phase comprises 3 time-dependent stages which run in consecutive order. The system remains in the subsequent stage 4 position until the production phase has ended. If production is over and the pressure pump is in operation, the system remains in this position for a further 3 seconds before the pump starts running.

You define whether the input valve and the concentrate valve are open during these 4 stages, and when the pressure pump kicks in.

In the case of equipment with an iF plug-in card, you also specify whether the output relay is activated for each of the output functions selected in programming steps 6.1 and 6.2.

If the "permeate valve" function has been selected in step 9.7, the valve control is dependent on conductivity during the "production" phase.

S	t	e	p	n	o	.	:					9	.	1	
P	r	o	d	u	c	t	i	o	n	1			6	0	s

Set the time of the first stage. The permissible range is 0 to 999 seconds. If you select 0, the stage is

skipped.

S	t	e	p	n	o	.	:					9	.	2
P	U	:	I	V		C	V	-	P	V	-	D	O	.

Specify which valves are open, whether the high-pressure pump is running and whether the programmed OUT1 and OUT2 outputs, if present, are active. The functions programmed in programming steps 6.1 and 6.2 are active for these outputs.

Press INFO to see the meaning of the abbreviation in plain text.

PU = High-pressure pump

IV = Input valve

CV = Concentrate valve

PV = Permeate valve

DO = Dosing

AP = Additional program

S	t	e	p	n	o	.	:					9	.	3	
P	r	o	d	u	c	t	i	o	n	2				0	s

Set the time of the second stage. The permissible range is 0 to 999 seconds. If you select 0, the stage is

skipped.

S	t	e	p	n	o	.	:					9	.	4
P	U	:	I	V		C	V	-	P	V	-	D	O	.

Program the values in accordance with programming step 9.2

S	t	e	p	n	o	.	:					9	.	5	
P	r	o	d	u	c	t	i	o	n	3				0	s

Set the time of the third stage. The permissible range is 0 to 999 seconds. If you select 0, the stage is

skipped.

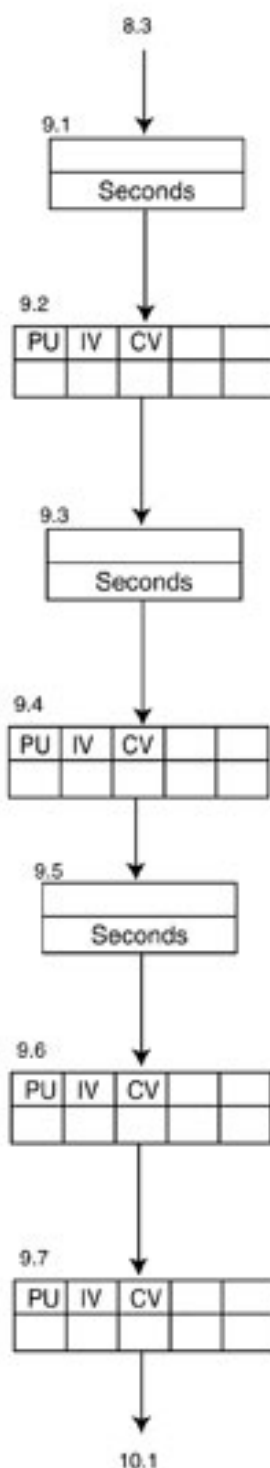
S	t	e	p	n	o	.	:					9	.	6
P	U	:	I	V		C	V	-	P	V	-	D	O	.

Program the values in accordance with programming step 9.2

S	t	e	p	n	o	.	:					9	.	7
P	U		I	V		C	V	-	P	V	-	D	O	.

Program the values in accordance with programming step 9.2.

The system remains in this position until production is over.



## 10. "Stop during production and during rinse" phases

If the input function *ST=stop* has been selected in any of programming steps 4.1 to 4.3 and this function is assigned to the production or rinse phases in programming step 5.13, in the following programming step, specify which phase the system switches to when the stop input is activated.

If standby 1 has been selected, the system switches to standby if the stop input is activated (programming step 12.3).

In the case of equipment with an IF plug-in card, you also specify whether the output relay is activated for each of the output functions selected in programming steps 6.1 and 6.2.

### Stop during production

S	t	e	p	n	o	.	:					1	0	.	1
				I	V	:	C	V	-	P	V	-	D	O	-

Specify which valves are open, whether the high-pressure pump is running and whether the programmed OUT1 and OUT2 outputs, if present, are active. The functions programmed in programming steps 6.1 and 6.2 are active for these output.

**WARNING!** The pressure pump always cuts out. Therefore, it cannot be programmed in this programming step.

Press INFO to see the meaning of the abbreviation in plain text.

IV = Input valve                                      AP = Additional program  
CV = Concentrate valve                              DO = Dosing  
PV = Permeate valve

### Stop during Rinse

S	t	e	p	n	o	.	:					1	0	.	2
				I	V	:	C	V	-	P	V	-	D	O	-

Specify which valves are open, whether the high-pressure pump is running and whether the programmed OUT1 and OUT2 outputs, if present, are active. The functions programmed in programming steps 6.1 and 6.2 are active for these outputs.

## 11. "Stop during alarm" phase

In the following programming step, specify which phase the system switches to if a fault occurs.

In the case of equipment with an IF plug-in card, you also specify whether the output relay is activated for each of the output functions selected in programming steps 6.1 and 6.2.

S	t	e	p	n	o	.	:					1	1	.	1
				I	V	:	C	V	-	P	V	-	D	O	-

Specify which valves are open, whether the high-pressure pump is running and whether the programmed OUT1 and OUT2 outputs, if present, are active. The functions programmed in programming steps 6.1 and 6.2 are active for these outputs.

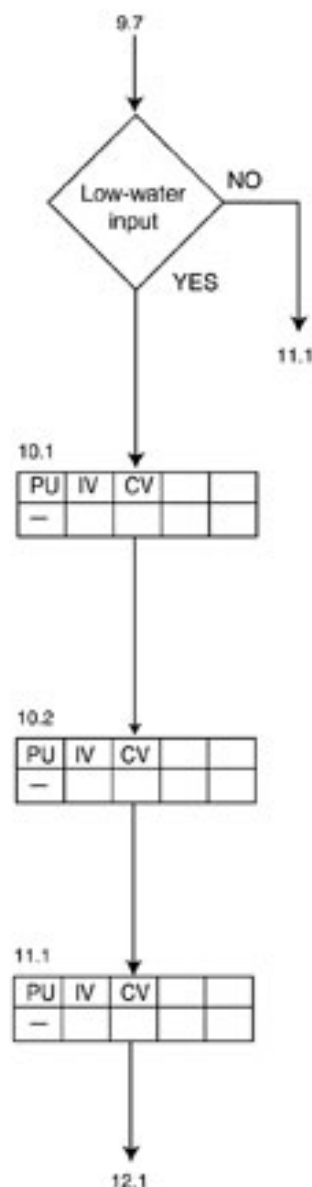
**WARNING!** The pressure pump always cuts out. Therefore, it cannot be programmed in programming steps 11.1 and 11.2.

Press INFO to see the meaning of the abbreviation in plain text.

IV = Input valve                                      AP = Additional program  
CV = Concentrate valve                              DO = Dosing  
PV = Permeate valve

Faults which can cause the system to cut out:

1. Value < min. conductivity ( see programming step 1.4): Low-water
2. Value > max. conductivity ( see programming step 1.7): Excess pressure
3. Concentrate control
4. External alarm switch
5. Motor circuit-breaker



## 12. "Standby" phase

The standby phase comprises two stages. The first time-dependent stage puts the system on standby. The system remains in stage 2 until the next production, rinse or maintenance phase.

You define whether the input valve and the concentrate valve are open during these 2 stages. The pressure pump can only be programmed in stage. It is always off in stage 2.

In the case of equipment with an IF plug-in card, you also specify whether the output relay is activated for each of the output functions selected in programming steps 6.1 and 6.2.

S	t	e	p		n	o	.	:				1	2	.	1
S	t	a	n	d	b	y						2	0		s

stage is skipped.

Set the time of the first stage. The permissible range is 0 to 999 seconds. If you select 0, the

### Standby 1

S	t	e	p		n	o	.	:				1	2	.	2
P	U	:	I	V		C	V		P	V	-	D	O	-	

Specify which valves are open, whether the high-pressure pump is running and whether the programmed OUT1 and OUT2 outputs, if present, are active. The functions programmed in programming steps 6.1 and 6.2 are active for these outputs.

Press INFO to see the meaning of the abbreviation in plain text.

PU = High-pressure pump

IV = Input valve

CV = Concentrate valve

PV = Permeate valve

DO = Dosing

AP = Additional program

### Standby

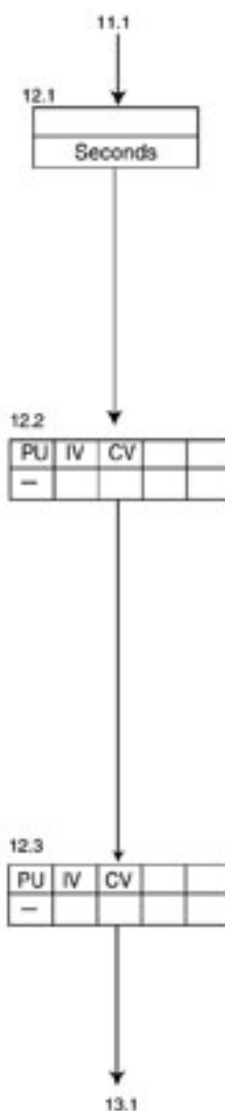
Program the values in accordance with programming step 12.2..

S	t	e	p		n	o	.	:				1	2	.	3
			I	V	:	C	V	-	P	V	-	D	O	-	

**WARNING!**

The high-pressure pump always cuts out. Therefore, it cannot be programmed in this programming step.

The system remains in this position until the standby position is over.





## 14. "Rinse during standby" phase

The "rinse during standby" phase comprises three time-dependent stages which run in consecutive order. If the rinse phase is over or interrupted and the pressure pump is in operation, the system remains in its current position for a further 3 seconds before the pump starts running.

You define whether the input valve and the concentrate valve are open during these 3 stages, and when the pressure pump kicks in.

In the case of equipment with an IF plug-in card, you also specify whether the output relay is activated for each of the output functions selected in programming steps 6.1 and 6.2.

S	t	e	p	n	o	.	:					1	4	.	1
R	i	n	s	e	s	t	a	n	d	b	y	Y	/	N	

Program whether the "rinse during standby" function has to be activated.

S	t	e	p	n	o	.	:					1	4	.	2
D	i	s	t	a	n	c	e					2	4	h	

Specify the time lapse between the final production or rinse phase and the switchover to this rinse function. A gap of between 1 and 999 hours can be entered.

S	t	e	p	n	o	.	:					1	4	.	3
R	i	n	s	e	1							5	s		

Set the time of the first stage. The permissible range is 0 to 9999 seconds. If you select 0, the stage is skipped.

S	t	e	p	n	o	.	:					1	4	.	4
P	U	:	I	V		C	V	-	P	V	-	D	O	-	

Specify which valves are open, whether the high-pressure pump is running and whether the programmed OUT1 and OUT2 outputs, if present, are active. The functions programmed in programming steps 6.1 and 6.2 are active for these outputs.

Press INFO to see the meaning of the abbreviation in plain text.

PU = High-pressure pump

PV = Permeate valve

IV = Input valve

DO = Dosing

CV = Concentrate valve

AP = Additional program

S	t	e	p	n	o	.	:					1	4	.	5
R	i	n	s	e	2							1	0	s	

Set the time of the second stage. The permissible range is 0 to 9999 seconds. If you select 0, the stage is skipped..

S	t	e	p	n	o	.	:					1	4	.	6
P	U	:	I	V		C	V		P	V	-	D	O	-	

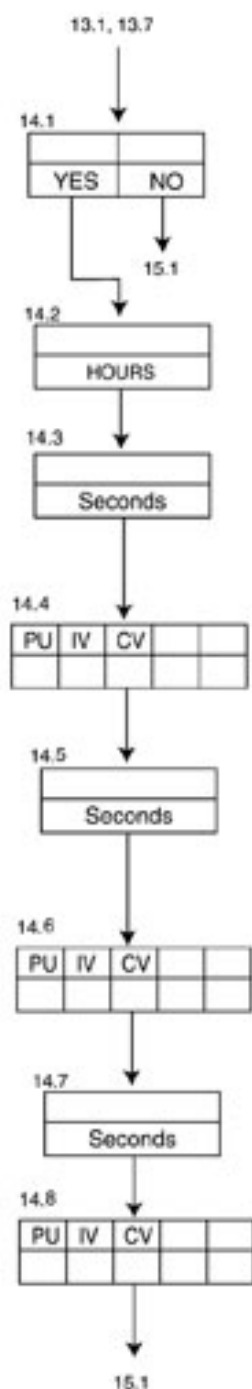
Program the values in accordance with programming step 14.4.

S	t	e	p	n	o	.	:					1	4	.	7
R	i	n	s	e	3							3	0	0	s

Set the time of the third stage. The permissible range is 0 to 9999 seconds. If you select 0, the stage is skipped..

S	t	e	p	n	o	.	:					1	4	.	8
P	U		I	V		C	V		P	V	-	D	O	-	

Program the values in accordance with programming step 14.4.



## 15. "Rinse during production" phase

The "rinse during production" phase comprises three time-dependent stages which run in consecutive order. If the rinse phase is over or interrupted and the pressure pump is in operation, the system remains in its current position for a further 3 seconds before the pump starts running.

You define whether the input valve and the concentrate valve are open during these 3 stages, and when the pressure pump kicks in.

In the case of equipment with an IF plug-in card, you also specify whether the output relay is activated for each of the output functions selected in programming steps 6.1 and 6.2.

S	t	e	p	n	o	.	:					1	5	.	1
R	i	n	s	e	p	r	o	d	u	c	t	Y	/	N	

Program whether the "rinse during production" phase should be activated.

S	t	e	p	n	o	.	:					1	5	.	2
D	i	s	t	a	n	c	e					8			h

Specify the time lapse between the final production or rinse phase and the switchover to this rinse function. A gap of between 1 and 999 hours can be entered.

S	t	e	p	n	o	.	:					1	5	.	3
R	i	n	s	e	1							2	0		s

Set the time of the first stage. The permissible range is 0 to 9999 seconds. If you select 0, the

stage is skipped.

S	t	e	p	n	o	.	:					1	5	.	4
P	U	:	I	V		C	V	-	P	V	-	D	O	-	

Specify which valves are open, whether the high-pressure pump is running and whether the programmed OUT1 and OUT2 outputs, if present, are active. The functions programmed in programming steps 6.1 and 6.2 are active for these outputs.

Press INFO to see the meaning of the abbreviation in plain text.

PU = High-pressure pump

PV = Permeate valve

IV = Input valve

DO = Dosing

CV = Concentrate valve

AP = Additional program

S	t	e	p	n	o	.	:					1	5	.	5
R	i	n	s	e	2							5			s

Set the time of the second stage. The permissible range is 0 to 9999 seconds. If you select 0, the stage is

skipped.

S	t	e	p	n	o	.	:					1	5	.	6
P	U	:	I	V		C	V		P	V	-	D	O	-	

Program the values in accordance with programming step 15.4.

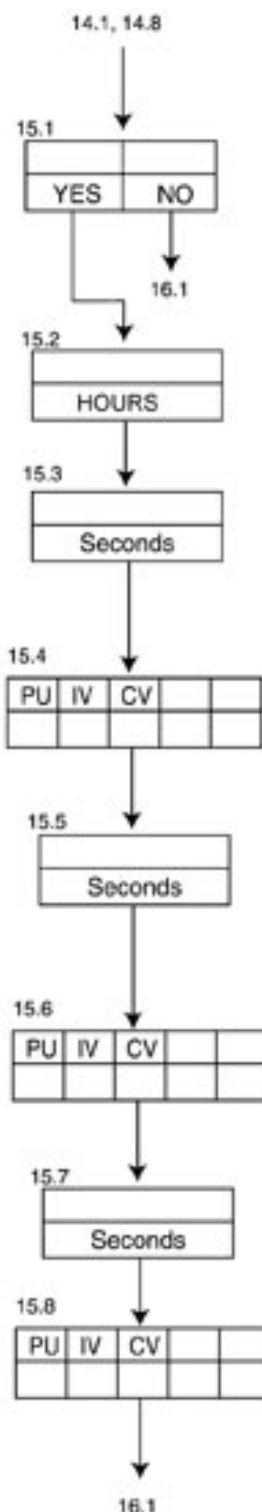
S	t	e	p	n	o	.	:					1	5	.	7
R	i	n	s	e	3							1	0	0	s

Set the time of the third stage. The permissible range is 0 to 9999 seconds. If you select 0, the stage is

skipped.

S	t	e	p	n	o	.	:					1	5	.	8
P	U		I	V		C	V		P	V	-	D	O	-	

Program the values in accordance with programming step 15.4.



## 16. Maintenance

S	t	e	p	.	:					1	6	.	0
C	o	d	e	n	u	m	b	e	r	*	*	*	*

If a code number has been defined in order to safeguard against unauthorised activation of the "MAINTENANCE" phase, you will have to enter this number before you can select step 16.1. If you do not know the code no., you can proceed within the program or interrupt the programming sequence.

The maintenance phase is started from the stop during maintenance phase. It comprises two time-dependent stages which run in consecutive order. Once this phase is over, the controller returns to the stop during maintenance phase.

You define whether the input valve and the concentrate valve are open during these 3 stages, and when the pressure pump kicks in.

In the case of equipment with an IF plug-in card, you also specify whether or not the OUT 1 and OUT 2 outputs are active.

**N.B.!**

If the "low-water", external alarm switch " or "stop" inputs are used, specify whether or not they are to be active during the maintenance phase. This is done in programming steps 5.8, 5.12 and 5.13 respectively. The conductivity limits are not queried. If a power failure occurs during the maintenance phase, the controller switches to the stop during maintenance phase when the power supply returns. If a code number has been defined for the "maintenance" phase, it must be re-entered.

### Stage 1

S	t	e	p	.	:					1	6	.	1	
M	a	i	n	t	e	n	a	.	1			2	0	s

stage is skipped.

Set the time of the first stage. The permissible range is 0 to 9000 seconds. If you select 0, the

S	t	e	p	.	:					1	6	.	2	
P	U	-	I	V	-	C	V		P	V	-	D	O	-

running and which outputs are active if there is a plug-in card installed.

In the case of the 1<sup>st</sup> stage, specify which valves are open, whether the high-pressure is running and which outputs are active if there is a plug-in card installed.

**N.B.!**

The OUT 1 and OUT 2 outputs are only switched on or off in line with these program settings, irrespective of the functions selected in programming steps 6.1 and 6.2.

This allows the outputs (AP, PV) to be used for another function (other than dosing) during the maintenance phase.

Press INFO to see the meaning of the abbreviation in plain text.

PU = High-pressure pump

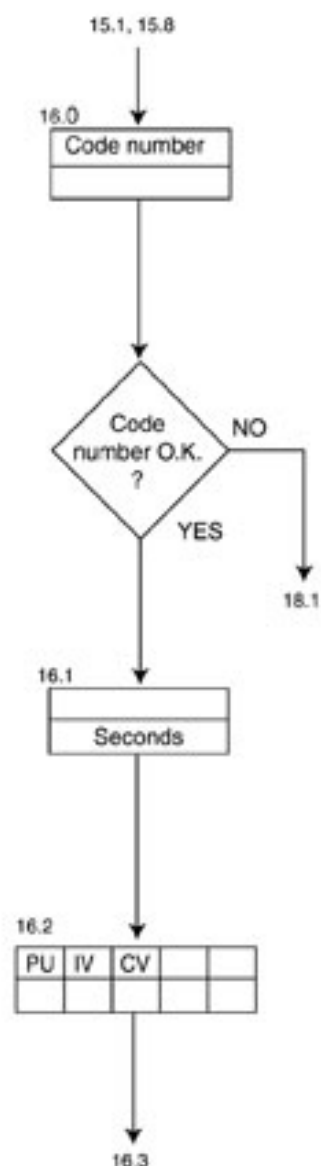
IV = Input valve

CV = Concentrate valve

DO = Dosing

AP = Additional program

PV = Permeate valve



## Stage 2

S	t	e	p	n	o	.	:					1	6	.	3
M	a	i	n	t	e	n	a	.	2			1	2	0	m

Set the time of the second stage. The permissible range is 1 to 9999 minutes.

S	t	e	p	n	o	.	:					1	6	.	4
P	U		I	V	-	C	V		P	V	-	D	O	-	

Enter the data for the second stage in accordance with step 16.2.

## Maintenance interval

S	t	e	p	n	o	.	:					1	6	.	5
I	n	t	e	r	v	a	i					Y	/	N	

If the system is serviced regular intervals, a length of time between maintenances can be programmed. The maintenance is not activated automatically. It must be started manually. The system works unrestricted until then.

S	t	e	p	n	o	.	:					1	6	.	6
I	n	t	e	r	v	a	i					5	0	0	h

You may set a maintenance interval of between 1 and 65,000 hours.

**WARNING!** The maintenance interval is automatically reset to the programmed interval as soon as the "MAINTENANCE ON" phase is selected manually or if the setting is changed in this programming step.

## 17. "Stop during maintenance" phase

In this programming step, specify the phase in which the system should be before and after the maintenance cycle (programming steps 16.1 to 16.4). This phase is also used when the "stop" input is activated during the maintenance cycle.

In the case of equipment with an IF plug-in card, you also specify whether the output relay is activated for each of the output functions selected in programming steps 6.1 and 6.2.

S	t	e	p	n	o	.	:					1	7	.	1
				I	V	-	C	V	-	P	V	-	D	O	-

Specify which valves are open and whether the OUT1 and OUT2 outputs, if present, are activated.

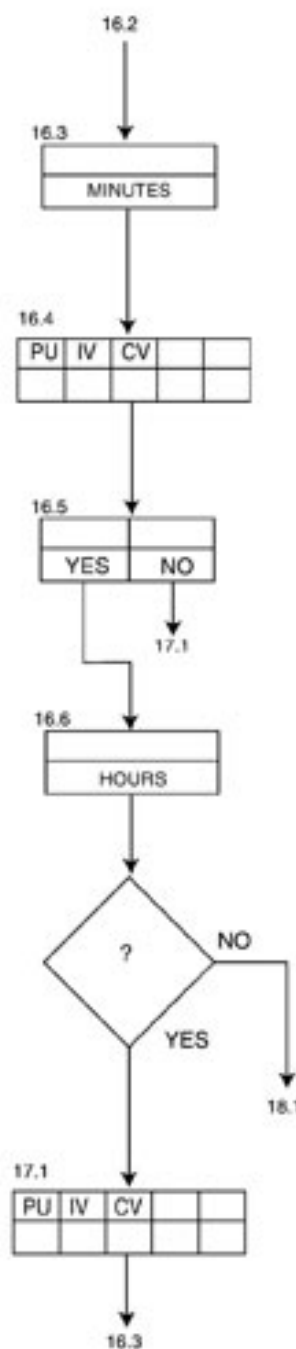
The functions programmed in programming steps 6.1 and 6.2 are shown for these outputs. Heed the warning shown after programming step 16.2.

The pressure pump cuts out. Therefore, it cannot be programmed in this stage.

Press INFO to see the meaning of the abbreviation in plain text.

PU = High-pressure pump  
IV = Input valve  
CV = Concentrate valve

PV = Permeate valve  
DO = Dosing  
AP = Additional program









# Central instrumentation & control

There are floating relay contacts to enable the osmosis plant to be monitored by a control console. Additional floating contacts can be created using external relays.

If there is an IF plug-in card installed, the OUT1 and OUT2 relay outputs can be assigned the following signals as signal or alarm outputs during the programming sequence:

- 1 MIN conductivity 1
- 2 MAX conductivity 1
- 3 Osmosis plant - stop
- 4 Tank - empty
- 5 Tank - full
- 6 Exceeded pressure
- 7 Low-water pressure
- 8 Concentrate flow
- 9 Motor circuit-breaker
- 10 Power failure
- 11 Maintenance required
- 12 "PRODUCTION" phase
- 13 "STANDBY" phase

A number of signals may be assigned to each relay.

**WARNING!** If the floating relay contacts are also needed for switching valves, lamps or horns, for example, you will have to use extra external relays to serve as floating contacts.

The following floating contacts can be created using extra external relays:

- PU = Pump (High-pressure pump running)
- IV = Input valve (System in operation)
- CV = Concentrate flush valve ("RINSE" phase)

## Installation instructions / Start-up

- ✓ Install the device at eye level and ensure that it is very accessible for the operator.
  - ✓ Do not install it under dripping pipes. Possibly attach a protective guard.
  - ✓ Slide the panel-mounted version into the control panel cut-out, 186 X 138, and secure it in place using the enclosed tightening clips.
  - ✓ Connect to the power supply. Comply with regulations issued by local power supply utilities and as well as with any factory standards which may apply.
  - ✓ Pay particular attention to ensuring that the safety-earth terminal is in perfect working order.
  - ✓ Keep all low-voltage control cables (terminals 11 – 22, i.e. connections for FU, EM, IN1, IN2, IN3 and CC) separate from mains power cables.
  - ✓ Fit suppressers to coils for contactors which are installed directly beside the system.
  - ✓ **WARNING!** The panel-mounted version is supplied without mains switches. Install an interrupting device in the control cabinet, for example.
  - ✓ Switch on the device and carry out the basic programming using these instructions and the technical information provided by the manufacturer of the system.
  - ✓ Start up the system in accordance with the manufacturer's instructions. Measure the conductivity of the permeate using the conductivity meter and compare this with the value shown on the LCD.
- ✓ **ATTENTION:** Some external relays, magnetic switches, magnetic valves, etc. can cause undesirable interference pulses when switching off. For this reason it is recommended to provide the components mentioned, in advance, with a "RC-network".  
Inquire at the supplier of the components mentioned for the correct type of RC-network.

### "STANDBY STOP" phase display during start-up

During initial start-up, the LCD reads:

				S	T	A	N	D	B	Y				
				S	T	O	P							

The high-pressure pump and the valves are not activated in this position.

#### Possible actions:

1. Programming the basic settings
2. Calling up the Info displays
3. Switching the "MAINTENANCE" position on and off
4. Starting a production cycle
5. Stopping a production cycle or starting a rinse cycle
6. Cancelling the fault or signal alarm relay

Once you have pressed "ON" to start production or "OFF" to stop production, the "STANDBY STOP" function is cancelled. The normal start procedure takes place the next time it is switched on at the mains. It generally starts with a rinse cycle.

### Activating the "STANDBY STOP" phase

The "STANDBY STOP" can be re-activated:

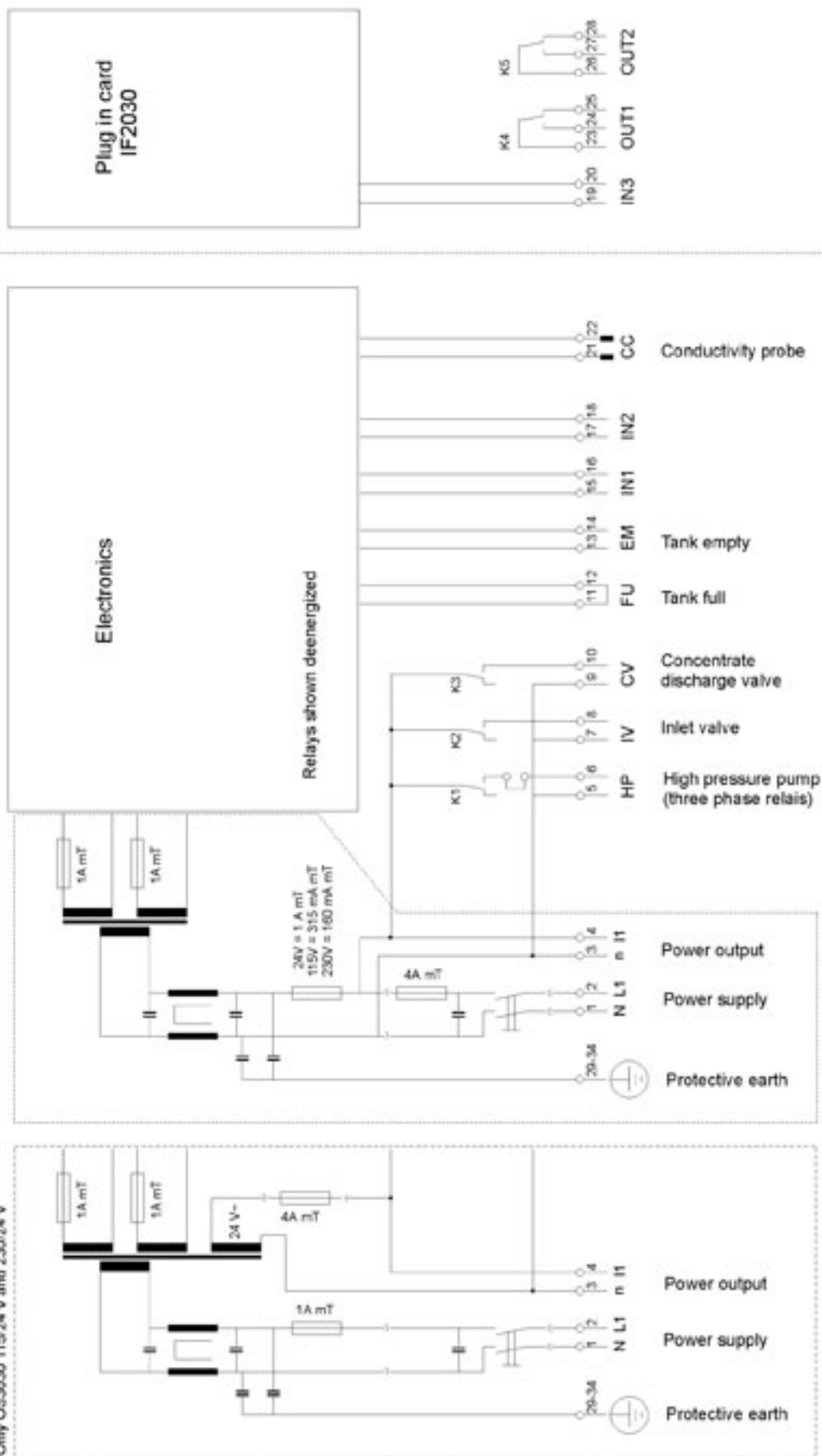
1. Press "ON" and switch it on at the mains.
2. After installing a new version of the software.
3. After a power failure if you have selected "Yes" for the Stop Manual Start option in programming step 5.14.  
Application: For technical reasons, the system does not restart automatically after a power failure.

# Connection terminals OS3030

Only earth terminal 29  
no control lamp in the main switch

OS3030 - 24 V :

Only OS3030 115/24 V and 230/24 V





# Technical data

**Main power supply:**

24V ± 10%	50-60 Hz, 4A fuse, slow-burning
115V ± 10%	50-60 Hz, 4A fuse, slow-burning
230V ± 10%	50-60 Hz, 4A fuse, slow-burning
115/24V ± 10%	50-60 Hz, 4A fuse, slow-burning
230/24V ± 10%	50-60 Hz, 4A fuse, slow-burning

**Controller power consumption:** 9 VA

**Powered outputs:**

24V, 115V, 230V	: Total continuous current 4 A
115/24V, 230/24V	: Total continuous current 2 A

**Dry contacts:** Relay contact load:  
max. 250V 4A

**Inputs:** Switching contact load:  
max. 9V 8 mA

**Degree of protection:** IP 65

**Ambient temperature:** 0 - 50° C

**Weight:** approx. 2.6 kg

**Dimensions:** W x H x D = 211 x 185 x 95

The device does not reset in the event of a power failure.