# UF2050
# UF2051

## Control for ultra filtration installations



# Instruction manual

Software version 2.00

# Contents

# 1. General description

## 1.1. General

The UF2050 is used for the automatic control and monitoring of ultra filtration installations.

The flexible, programmable software makes this control suitable for a large number of different applications in the field of water treatment.

**Overview of functionality**

- Menu-driven operating and programming of the control by means of keys and a 2-line display.
- Choice of language. (i.e. Dutch, English, German, French).
- Universally applicable to ultra filtration installations.
- Flexibly programmable for specific user requirements.
- Free programmable service phone number.
- Inputs: low level clean water tank / high level clean water tank ,
  low level raw water tank and exceeded pressure
- Outputs: programmable for individual valves and/or pumps and alarm
- Voltage drop-out protection program information, program information is saved without battery
- Produced according to EMC directives
- Housing suitable for wall mounting
- Available in 24/24V, 115/115V, 230/230V, 115/24V, 230/24V, 240/24V

## 1.2. List of abbreviations used

Herewith a list of frequently used abbreviations

| | | | |
|---|---|---|---|
| **STB** | Stand by | **HL** | High level switch clean water tank |
| **PFL** | Pre Flush | **LL** | Low level switch clean water tank |
| **FIL** | Filtration | **RW** | Low level switch raw water tank |
| **FI2** | Filtration 2 | **OP** | Over pressure switch |
| **AIR** | Air scour | | |
| **DRA** | Drain | **AL** | Alarm output |
| **BW1** | Back wash 1 | **OUT** | General output |
| **BW2** | Back wash 2 | | |
| **Soak** | Soak | | |
| **FFL** | Drain 2 | | |

## 1.3 Overview of phases

The control distinguishes different phases:

- Stand by — Installation is switched off so no water is produced
- Pre flush — Flushing before going from standby to filtration
- Filtration — Filtration in progress
- Filtration2 — For top/bottom mode of filtration
- Drain — Flush before back wash
- Backwash — Back wash
- Backwash2 — For top/bottom mode of Back wash
- Enhanced Backwash 1 — Back wash (e.g. with acid)
- Enhanced Backwash 2 — Back wash (e.g. with alkaline)
- Enhanced Backwash 3 — Back wash with chemicals
- Soak — Soak of chemicals
- Drain 2 — Flush after back wash

When one, two or three enhanced backwashes are activated (step 6.1 > 0) you can program if the controller should start an enhanced backwash depending on a time interval and/or number of "standard" backwashes. After a programmed number of "normal" back washes or after an interval time, the enhanced back wash cycle will be initiated.

If you program one enhanced backwash you can program "enhanced backwash 1" for your system.

Standard sequence for back wash :
Filtration – Air scour – Drain – Back wash 1 – Backwash 2 – Drain 2
Sequence for enhanced back wash 1 (see § 10.10 "Enhanced Backwash 1 steps" on page 26)
Filtration – Air scour – Drain – Back wash 1 – Backwash 2 – Soak - Drain 2

If you program more then one enhanced backwash steps, you have a choice for four modes of operation. In one mode ("Lnk" = linked) the complete enhanced backwash cycle will consist of two (or three) enhanced backwash steps which will run one after the other.

Standard sequence for back wash :
Filtration – Air scour – Drain – Back wash 1 – Backwash 2 – Forward Flush
Sequence for enhanced back wash
Filtration –
Air scour – Drain – Back wash 1 – Backwash 2 – Soak – Drain 2 (Enh. Backwash 1)
Air scour – Drain – Back wash 1 – Backwash 2 – Soak – Drain 2 (Enh. Backwash 2)
Air scour – Drain – Back wash 1 – Backwash 2 – Soak – Drain 2 (Enh. Backwash 3)

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Fil | BW | Fil | BW | Fil | CEB1 | CEB2 | Fil | BW | Fil | BW | Fil | CEB1 | CEB2 |

In an other mode ("Ser" = serial) the enhanced backwash cycle will consist of two or three cycles.
In the first cycle "Enhanced backwash 1" will be initiated. Then the system will go into filtration again and when the filtration time has passed the second cycle "Enhanced backwash 2" will be initiated.
If a 3rd enhanced backwash was programmed then the system will go into filtration again and when the filtration time has passed the third cycle "Enhanced backwash 3" will be initiated.
After the "Enhanced backwash 2" (or "Enhanced backwash 3") step the interval counters for time and number of "standard" backwashes will be reset again.

Standard sequence for back wash :
Filtration – Air scour – Drain – Back wash 1 – Backwash 2 – Drain 2
Sequence for enhanced back wash 1 (see § 10.10 "Enhanced Backwash 1 steps" on page 26)
Filtration – Air scour – Drain – Back wash 1 – Backwash 2 – Soak - Drain 2
Sequence for enhanced back wash 2 (see § 10.11 "Enhanced Backwash 2 steps" on page 27)
Filtration – Air scour – Drain – Back wash 1 – Backwash 2 – Soak - Drain 2
Sequence for enhanced back wash 3 (see § 10.12 "Enhanced Backwash 3 steps" on page 29)
Filtration – Air scour – Drain – Back wash 1 – Backwash 2 – Soak - Drain 2

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Fil | BW | Fil | BW | Fil | CEB1 | Fil | CEB2 | Fil | BW | Fil | BW | Fil | CEB1 | Fil | CEB2 |

In the mode (“Sep” = separate) the two (or three) enhanced backwash cycles will be initiated separately but always with a filtration in between.
In this case each cycle has its own interval time or interval number of standard backwashes.

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Fil | BW | Fil | BW | Fil | CEB1 | Fil | BW | Fil | BW | Fil | CEB1 | Fil | CEB2 |

In the mode (“Sep2” = separate) the two (or three) enhanced backwash cycles will be initiated separately and immediately after the last standard backwash. If enhanced backwash events are occurring at the same time, the enhanced backwashes will be initiated one after the other.
In this case each cycle has its own interval time or interval number of standard backwashes.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Fil | BW | Fil | BW | CEB1 | Fil | BW | Fil | BW | CEB1 | CEB2 |

“Top / Bottom” mode :

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Fi1 | BW1 | Fi2 | BW2 | Fi1 | BW1 | Fi2 | BW2 | CEB1 | Fi1 | BW1 | Fi2 | BW2 | Fi1 | BW1 | Fi2 | BW2 | CEB1 | CEB2 |

If a step has to be skipped you have to program a duration of 0 sec for that step.

**Attention !**
If a low level in the clean water tank is detected, all output as programmed in step 2.3 are switch off. So when this input (RC) is activated the state of the outputs could differ from the state as programmed for the actual phase.

**Attention !**
In case the “top/bottom” mode is programmed (step 5.1) the enhanced backwashes will always be in mode “Sep2”.

## 1.4 Phase “Standby”

During standby the low level (RW tank) and high level (CW tank) will be checked. When both are not activated the installation will switch to “Pre flush“ (if activated) and then to “Filtration“.

All outputs free programmable.

The following values are monitored:
- Low level, raw water tank
- High level, clean water tank

It is also possible to start the phase “Back wash” or one of the enhanced back washes, manually.
The enhanced backwashes should be activated (see § 10.9 “Enhanced Backwash” on page 24).
For more information about the manual control see § 7 “Manual mode of the installation” on page 12.

## 1.5 Phase “Filtration”

During filtration the low level (RW tank) and high level (CW tank) will be checked. When one or both are activated the installation will switch to standby.
After a programmed interval time the installation will switch to a back wash cycle.

All outputs free programmable.

The following values are monitored:
- Overpressure
- Low level, raw water tank
- High level, clean water tank

In step 5.1, you can program if the system needs a “top/bottom” mode for filtration and standard backwash.
In that case a complete filtration cycle will consists of :
Filtration 1 – Backwash 1 (step 6) – Filtration 2 – Backwash 2 (step 7)
In this case the enhanced backwashes will start immediately after “Backwash 2”.

## 1.6 Phase “Pre Flush”

The step “Pre flush” will be activated after switching power on (when program step 3.1 is programmed for ‘PFL)’ or when the installation will go to the “Filtration” step
after “Standby”.
After a programmed time the installation will go into “Filtration”.

All outputs free programmable.

The following values are monitored:
- Overpressure
- Low level, raw water tank
- High level, clean water tank

## 1.7 Phase “Air scour”

The installation will switch to “Air scour” after the “Filtration” time has passed.
You can also start “Air scour” manually by pressing the BW key during “Standby” or “Filtration”.
After a programmed time the installation will switch to “Drain”.

All outputs free programmable.

The following values are monitored:
- Overpressure

## 1.8 Phase “Drain”

The installation will switch to “Drain” after the “Air Scour” time has passed.
You can also start “Drain” manually by pressing the BW key during “Standby” or “Filtration”.
After a programmed time the installation will switch to “Backwash 1”.

All outputs free programmable.

The following values are monitored:
- Overpressure

## 1.9 Phase “Back wash 1”

The installation will switch to “Backwash 1” after the “Air scour” and/or “Drain” time has passed.
After a programmed time the installation will switch to “Backwash 2”, “Soak” (during enhanced backwash step), “Forward Flush” or “Filtration”.

All outputs free programmable.

The following values are monitored:
- Overpressure

## 1.10 Phase “Back wash 2”

The installation will switch to “Backwash 2” after the “Air scour”, “Drain” and/or “Backwash1” time has passed. After a programmed time the installation will switch to “Soak” (during enhanced backwash step), “Forward Flush” or “Filtration”.

All outputs free programmable.

The following values are monitored:
- Overpressure

## 1.11 Phase “Soak”

This step has to be activated in the steps for the enhanced backwash steps.
The installation will switch from Backwash to “Soak” after the “Back wash” time has passed.
During this step the membrane can soak in the injected chemicals.

All outputs free programmable.

The following values are monitored:
- Overpressure

## 1.12 Phase “Drain 2”

This step has to be activated in the steps for the (enhanced) backwash steps.
The installation will switch to “Drain 2” after the “Back wash” or “Soak” time has passed.
After a programmed time the installation will switch to “Filtration” or “Standby”
(depending on the state of the level switches).

All outputs free programmable.

The following values are monitored:
- Overpressure

## 1.13 Phase “Alarm”

The installation will switch to “Alarm” when there is a overpressure, a differential pressure situation or when program step 3.1 is programmed at “AL”.

Overpressure :
During alarm the over pressure switch and the Reset key will be checked.
When pressing the key and the pressure is ok, the installation will proceed the process step that was interrupted. The interval time for the flush and back wash steps will also proceed and not be reset.

All outputs will be deactivated.

The following values are monitored:
- Overpressure

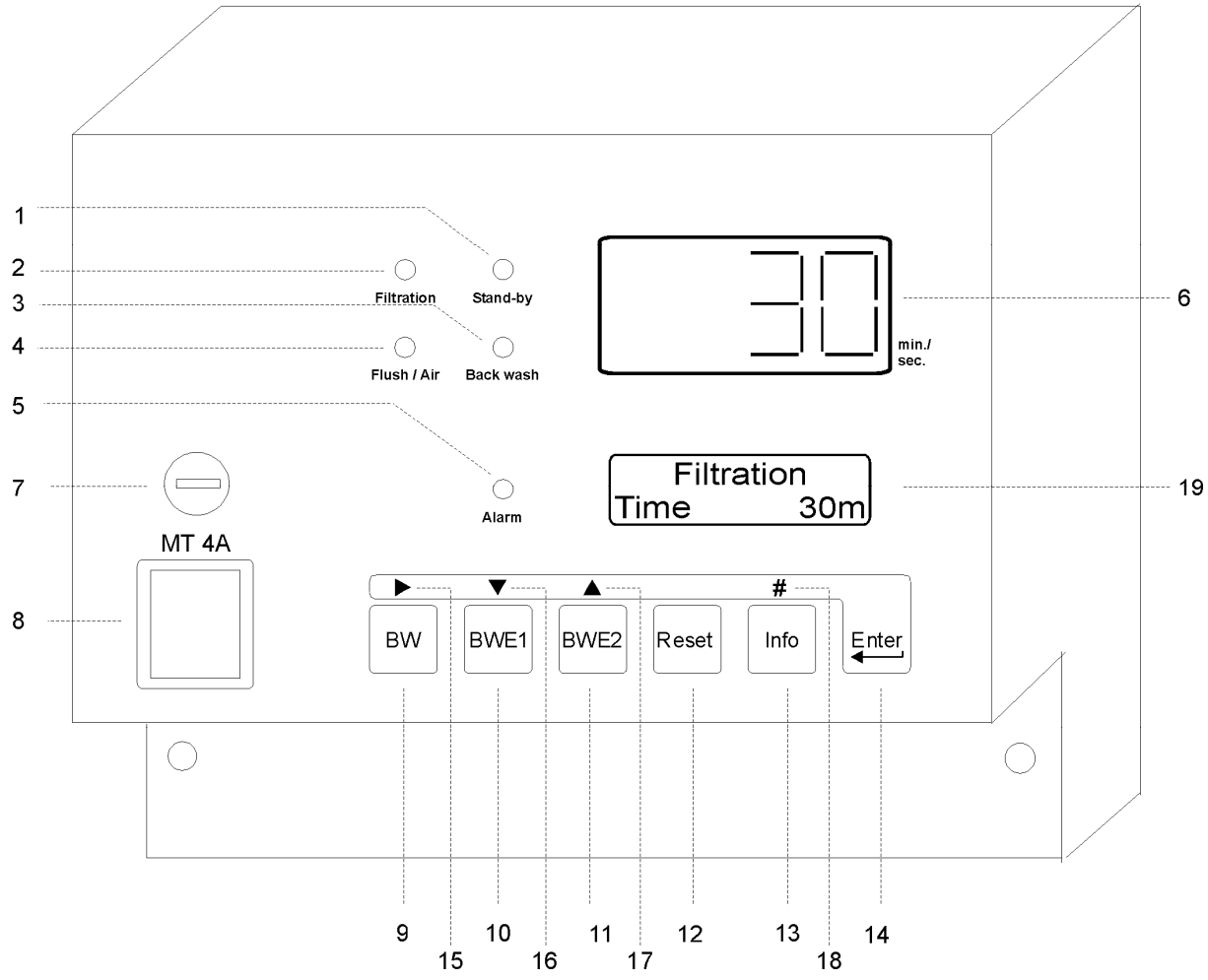
Differential pressure :
During alarm the Reset key will be checked.
When pressing the key, the installation will proceed with filtration or with standby depending on the state of the level switches.

All outputs will be deactivated.

The following values are monitored:
- Differential pressure

# 2 Picture front side

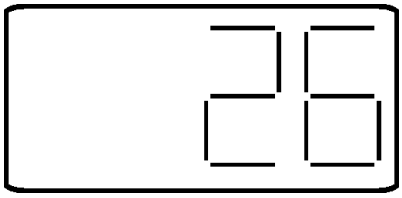
Wall mounting




1. LED “Standby”
2. LED “Filtration”
3. LED “Backwash”, “CEBx”
4. LED “Flush”, “Air Scour”
5. LED alarm
6. LED display
7. Fuse for output power
8. Main switch
9. Start Back wash
10. Start Enhanced Backw 1
11. Start Enhanced Backw 2
12. Reset
13. Info
14. Programming
15. Move cursor
16. Next program step
17. Last program step
18. Digital input
19. LCD display

# 3 Function display

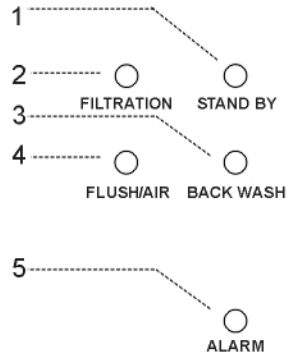
## 3.1 LED Display



In the LED display the remaining time for the current process phase will be displayed.

When the message "----" appears in the display, it means that there is no timer activated.
This will be the case in the phases "Stand-by" or "Alarm".

## 3.2 LED displays

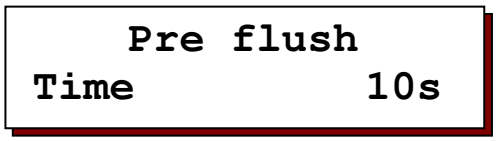



1 = LED for phase "Stand by"
2 = LED for phase "Filtration"
3 = LED for phase "Back wash"
(continuous) = normal back wash
(blinking) = "CEB 1", "CEB 2" of "CEB 3"
4 = LED for Flush phases / Air scour
(continuous) = "Pre Flush" / "Drain" or "Drain 2"
(blinking) = "Air scour"
5 = Alarm

During "Soak" no led will be activated.

## 3.3 LCD display

In the first line of the LCD display the actual status of the installation is always displayed.
In the second line of the LCD display various messages may appear depending on the status of the installation. Normally this will be the remaining time of the current process phase.




Example for phase "Pre Flush"

The information in the second line for the phases "Filtration", "Standby" and "Alarm" will differ and will be explained in the next chapters.

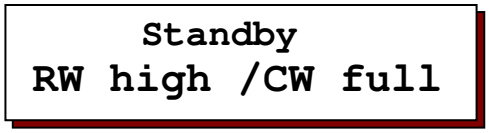
### 3.3.1 Display during "Filtration"



The second line indicates the remaining time for the phase "Filtration" will start.
When the start is within 60 seconds the remaining time will be displayed in seconds.

### 3.3.2 Display during “Standby”


Raw water tank empty and clean water tank not full.




Raw water tank not empty and clean water tank full.

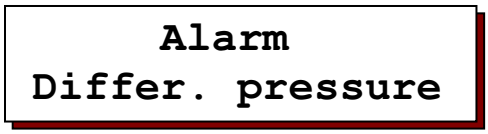

Raw water tank empty and clean water tank full.

### 3.3.3 Display during “Alarm”

The second line indicates the cause of the alarm situation.


“Overpressure” : Overpressure situation during flushing or backwash.


“Supply failure” : Controller switched on and step 1.1 programmed at “AL”.




“Differ. pressure” : Differential pressure situation after backwash.

# 4 Input functions

## 4.1 High level clean water tank

The input function ‘High level clean water tank’ (WM) is used for checking the level of water in the clean water tank. The controller will respond immediately when the contact is opened and will switch into the step “Standby”.

In step 2.4 you can program the delay for the installation to switch back the step “Filtration” (through the step “Pre flush”, if programmed in step 4.2).

The controller is detecting high level when the contact is open.

See also § 10.3 “Input functions” on page 17.

## 4.2 Low level clean water tank

The input function ‘Low level clean water tank’ (RC) is used for checking the level of water in the clean water tank. The controller will respond immediately when the contact is opened and will switch off all outputs as programmed in step 2.3.

The controller is detecting low level when the contact is open.

See also § 10.3 “Input functions” on page 17.

## 4.3 Low level raw water tank

The input function ‘Low level raw water tank’ is used for checking the level of water in the raw water tank. The controller will respond immediately when the contact is opened and will switch into the step “Standby”.

In step 2.1 you have to program the 3rd input (WA) for this function (RW).
In step 2.5 you can program the delay for the installation to switch back the step “Filtration” (through the step “Pre flush”, if programmed in step 4.2).

The controller is detecting low level when the contact is open.

See also § 10.3 “Input functions” on page 17.

## 4.4 Differential pressure

The ‘Differential pressure’ function is used to start a backwash when the input is activated.
If the input is still activated at the end of the backwash cycle the installation will switch into alarm state.

In step 2.1 you have to program the 3rd input (WA) for this function (DP).
In step 2.6 you can program the delay before the system is switched to “Alarm”.
You can leave the “Alarm” step by pressing the Reset key.

The input function is active when the contact is open.

See also § 10.3 “Input functions” on page 17.

## 4.5 Overpressure

The 'Over pressure' (RS) input is used to prevent the installation from to high pressures.

In step 2.7 you can program the delay before the system is switched to "Alarm".
You can leave the "Alarm" step by pressing the Reset key when the when over pressure situation is solved.

The input function is active when the contact is open.

See also § 10.3 "Input functions" on page 17.

## 4.6 Filtration Start

The input function 'Filtration Start' (FS) is used for checking if the installation should switched into Filtration or Standby. The controller will respond immediately when the contact is opened and will switch into the step "Standby".

In step 2.8 you can program the delay for the installation to switch back the step "Filtration" (through the step "Pre flush", if programmed in step 4.2).

When activating this function (Step 2.1 at FS und Step 5.6 at FS) you can use the level switch in the clean water tank for e.g. switching permeate valves between refill a clean water tank and supplying water to the end user. (Step 5.3 / 5.7 for "Filtration" and Step 5.4 / 5.8 for "Filtration 2").

The controller is detecting high level when the contact is open.

See also § 10.3 "Input functions" on page 17.

# 5 Output functions

In this chapter the various output functions are described, such as:
- General output
- Alarm

## 5.1 General output

The outputs A – J are general outputs. These state of these outputs can be programmed for each phase.

**Attention !**
The outputs B and E are, very shortly, powered during powering up. You have to take care that this will not damaged components or effect the installation.

## 5.2 Alarm

In case the alarm output function is activated (see § 10.2 "Output functions" on page 16) for several situations it can be programmed whether the alarm relay should be activated.

The deactivation of the alarm relay takes place by pressing the "RESET" key .
After the cause of the alarm has been remedied, this key can be pressed again to remove the message from the LCD screen.

# 6 General control

The control and programming of this control is executed by means of the 6 keys.
Below you will find an explanation of the general screen lay out, the meaning of various keys and an explanation of general control during the programming.

## 6.1 Main screen

In the main screen the various keys have a certain meaning, as follows:

BW = Manual start of backwash
BW + BWE1 = Manual start of backwash 2 (“Top/Bottom” Mode)
BWE1 = Manual start of enhanced backwash 1 (without reset of interval counter(s))
In combination with Reset to reset interval counter for number of backwashes
BWE2 = Manual start of enhanced backwash 2 (without reset of interval counter(s))
In combination with Reset to reset interval counter for number of backwashes
BWE1 + BWE2 = Manual start of enhanced backwash 3 (without reset of interval counter(s))
In combination with Reset to reset interval counter for number of backwashes
Reset = Reset alarm
Info = Require information
Enter = In combination with BWE1 access to programming
In combination with Info access to language setting

Additionally various other key combinations as will be discussed in
§ 7 “Manual mode of the installation” on page 12.

## 6.2 Menus

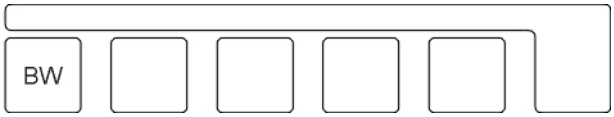
If one of the menus is activated (language or programming) the indications in the grey bar above the blue keys are valid:

▶ = moving the cursor to the next setting
▼ = next setting
▲ = last setting
# = raising or changing the number resp. indication where the cursor is placed under.

# 7 Manual mode of the installation

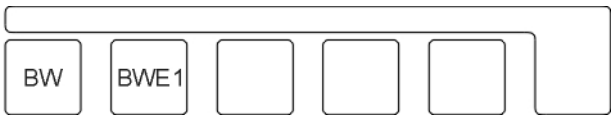
It is possible to access the installation process manually.
Below, the options are stated.

## 7.1 Manually start backwash



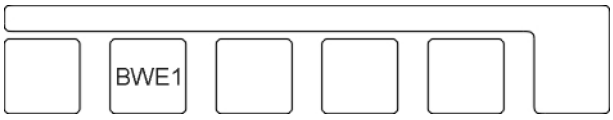

A “Backwash” can be started manually from the “stand by” phase by pushing the BW key.

## 7.2 Manually start backwash 2



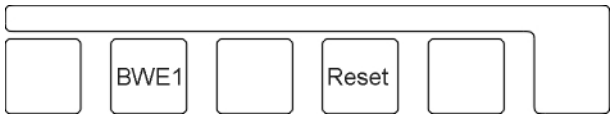

A “Backwash 2” can be started manually from the “stand by” phase by pushing the BW key and the BWE1 key. This option is only available in “Top/Bottom” filtration mode.

## 7.3 Manually start “Enhanced backwash 1” without reset



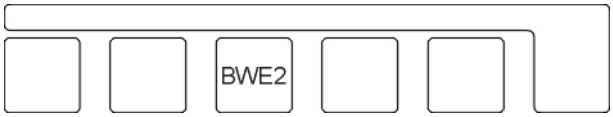

An “Enhanced Backwash 1” can be started manually from the “stand by” phase by pushing the BWE1 key. This process will start a normal sequence for “Enhanced Backwash 1”.
That means : Air scour – Drain – Backwash 1– Backwash 2 – Soak – Forward Flush. When a phase is not activated (time = 0) this step will be skipped.
The interval counter for enhanced backwashes will not be reset by this action.

## 7.4 Manually start “Enhanced backwash 1” with reset




See also § 7.3 “Manually start “Enhanced backwash 1” without reset” on page 12. In this case the interval counters for enhanced backwash 1 will be reset after this action. In case the operation mode is programmed for “serial” operation this manual option will not be available.
An “Enhanced Backwash 1” can be started manually from the “stand by” phase by pushing the BWE1 key and the Reset key at the same time.

## 7.5 Manually start “Enhanced backwash 2” without reset

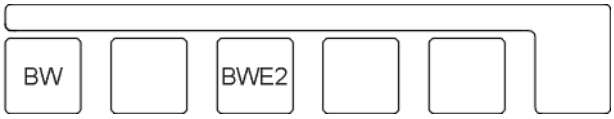



An “Enhanced Backwash 2” can be started manually from the “stand by” phase by pushing the BWE2 key. This process will start a normal sequence for “Enhanced Backwash 2”.
That means : Air scour – Flush 1 – Backwash – Enhanced Backwash 2 – Flush 2. When a phase is not activated (time = 0) this step will be skipped.
The interval counter for enhanced backwashes will not be reset by this action.

## 7.6 Manually start “Enhanced backwash 2” with reset

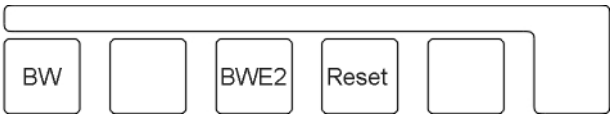

See also § 7.5 “Manually start “Enhanced backwash 2” without reset” on page 12. In this case the interval counters
for enhanced backwash 2 will be reset after this action. In case the operation mode is programmed for “linked” operation this manual option will not be available.
An “Enhanced Backwash 2” can be started manually from the “stand by” phase by pushing the BWE2 key and the Reset key at the same time.

## 7.7 Manually start “Enhanced backwash 3” without reset



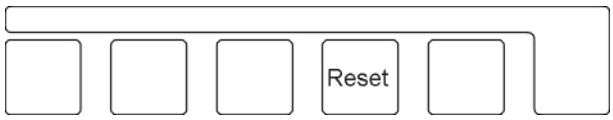

An “Enhanced Backwash 2” can be started manually from the “stand by” phase by pushing the BW key and the BWE2 key. This process will start a normal sequence for “Enhanced Backwash 3”.
That means : Air scour – Flush 1 – Backwash – Enhanced Backwash 2 – Flush 2. When a phase is not activated (time = 0) this step will be skipped.
The interval counter for enhanced backwashes will not be reset by this action.

## 7.8 Manually start “Enhanced backwash 3” with reset




See also § 7.7 “Manually start “Enhanced backwash 3” without reset” on page 13”. In this case the interval counters for enhanced backwash 3 will be reset after this action. In case the operation mode is programmed for “linked” operation this manual option will not be available.
An “Enhanced Backwash 3” can be started manually from the “stand by” phase by pushing the BW key, the BWE2 key and the Reset key at the same time.

## 7.9 Reset alarm




If an alarm indication and / or alarm output is activated then this can be reset by pressing the Reset key.
If an alarm output is activated the output will first be deactivated.
The alarm message disappears when the cause of the alarm has been cancelled and the key has been pressed again.
In some cases the output is automatically deactivated and the message on the LCD display disappears automatically as well. (See § 11 “Possible error messages” on page 31).

## 7.10 Filtration Stop / Leave Manual stop mode


The Filtration phase can be stopped manually, independent from the level switches.
During Standby there will be a message shown that the plant is switch into manual mode.
The plant will not be switching depending on the level switches.


Automatic operation can be entered again by pressing the same keys.
The manual mode will remain after power failure.

# 8 Information request

Via the information menu several data can be retrieved, such as the software version, the service telephone number, the status of the inputs and outputs and the enhanced backwash interval.
Via the Info key the whole information menu can be walked through.

## 8.1 Status inputs

```
   Input 1
HL- LL- RW- OP-
```

The actual switch positions of the inputs are displayed. A "|" next to the code means: input function active, a "-" means: input function not active.

HL = High level clean water tank
LL = Low level clean water tank
DP = Differential pressure
RW = Low level raw water tank
OP = Over pressure
FS = Filtration Start

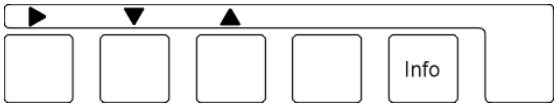
## 8.2 Status outputs

```
Out   ABCDEFGHIJK
      ----------
```

The actual switch positions of the outputs are displayed. Every relay is assigned a number. (see page 12 "Wiring diagram UF2050" on page 32), a horizontal line "-" underneath a number means: function not activated. A vertical line "|" means: function activated.

## 8.3 Service number

```
Service
0031 73 443755
```



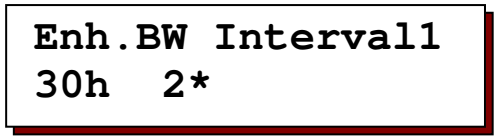

A service telephone number is shown. The number can be adjusted here as well.
Change telephone number:
Select number: ▶
Mark down: ▼
Mark up: ▲

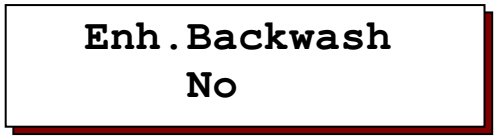
## 8.4 Software version

```
Softwareversion
UF2050  1.03.00
```

The software is kept up-to-date in the factory on a regular base. If necessary changes take place in order to adjust the product to new insights and requirements. On the display the version of the installed software is displayed.

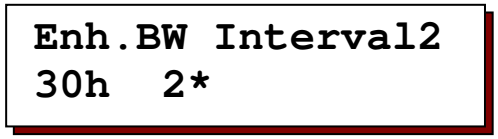
### 8.5 Enhanced back wash interval



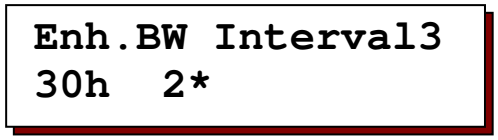

If the enhanced backwash is activated, the remaining interval time and / or remaining number of standard backwashes until the next enhanced backwash cycle, will be displayed.
When there is no enhanced backwash activated, “No” will be displayed.

### 8.6 Enhanced back wash interval 2




If two enhanced backwash steps are activated in “separate” mode, the remaining interval time and / or remaining number of standard backwashes for the 2nd enhanced backwash step will de displayed.

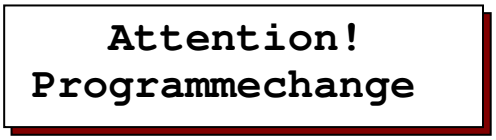
### 8.7 Enhanced back wash interval 3



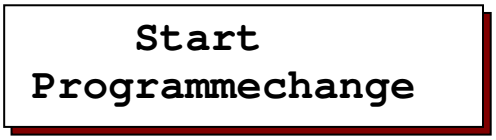

If three enhanced backwash steps are activated in “separate” mode, the remaining interval time and / or remaining number of standard backwashes for the 3rd enhanced backwash step will de displayed.

# 9 Change set language

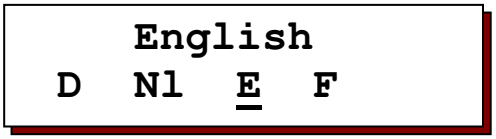
Press the “enter” key and keep it pressed for approx. 5 seconds. The following text shows on the display:




and after 5 seconds the text:




Press, after these 5 seconds, the “#” key as well and the set language is activated.
Both keys can be released.
The display shows:




You can change the language by pressing the▶ key.

The language setting can be left by pressing the “enter” key again.
When no key is pressed for approx. 2 minutes, you automatically leave the setting.

You can choose from the following languages: German, Dutch, English and French.

# 10 Programming

In the following chapters is described how to program the control.

**Attention:**
**Some windows cannot be accessed because of setting(s) made before.**

## 10.1 Entering program mode

Press the “enter” key and keep it pressed for approx. 5 seconds. The following text shows on the display:

```
Attention!
Programmechange
```

and after 5 seconds the text:

```
Start
Programmechange
```

Press, after these 5 seconds, the “▼” (BWE1) key as well and the programming mode is activated. Both keys can be released.

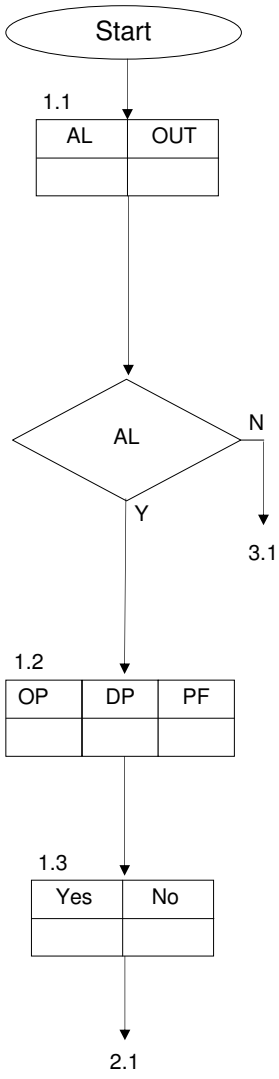
## 10.2 Output functions

```
Step no:      1.1
AL  OUT
```

Select the function for Output K.

AL = Alarm
OUT = General output

If the function for this output is programmed for alarm (AL) then this output will not be displayed in all steps where you can define the outputs for process step.




### 10.2.1 Alarm output

In the following program steps can be indicated in which situation(s) the alarm output should be activated. A horizontal line (“-“) means that the relevant situation does not lead to activation if the alarm output function is not activated.

```
Step no:      1.2
OP-DP-PF-
```

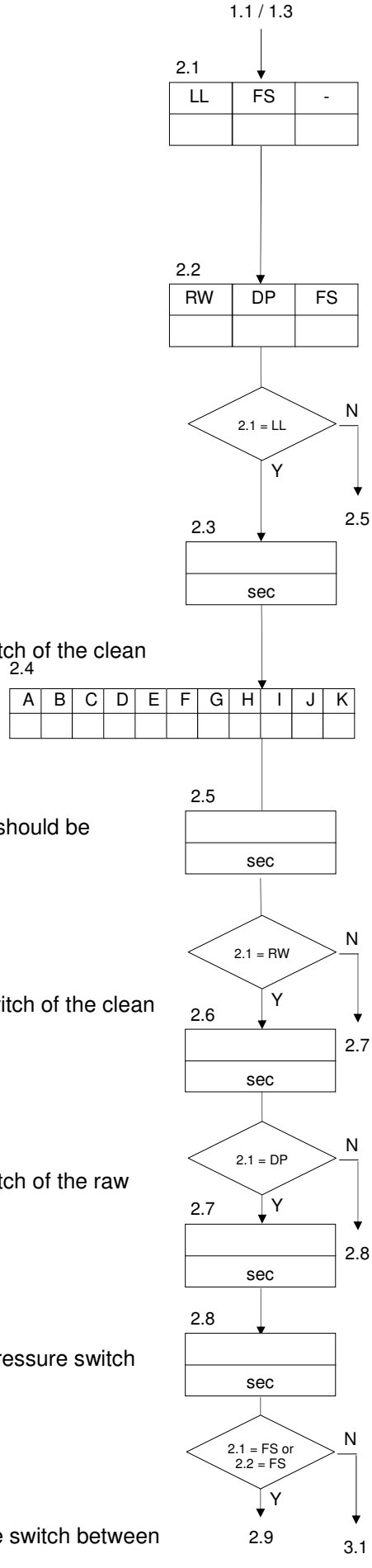
Select in which situation the alarm output should be activated.

*OP = Overpressure*
*DP = Differential pressure (Only when step 2.1programmed at DP)*
*PF = Power failure*

```
Step no:      1.3
Rel.energ.    Y/N
```

Here, you can program whether the alarm relay should be energized (Yes) or not (No) in case of a failure.

## 10.3 Input functions




In the following steps input functions can be defined.

```
Step no:      2.1
IN2 : LL  FS  --
```

Select the input function for input 2 (RC).

LL = Low level clean water tank
FS = Filtration start
-- = No function

```
Step no:      2.2
IN3 : RW  DP  FS
```

Select the input function for input 3 (WA).

RW = Level switch raw water tank
DP = Differential pressure switch
FS = Filtration start

```
Step no:      2.3
Delay LL      1s
```

In this program step you can program the delay for the low level switch of the clean water tank, between 1 and 999 seconds.

```
      ABCDEFGHIJK
BWP   --------|--
```

In this step you can program which outputs (e.g. Back wash pump) should be deactivated when the clean water tank is empty.

```
Step no:      2.5
Delay HL      1s
```

In this program step you can program the delay for the high level switch of the clean water tank, between 1 and 999 seconds.

```
Step no:      2.6
Delay RW      1s
```

In this program step you can program the delay for the low level switch of the raw water tank, between 1 and 999 seconds.

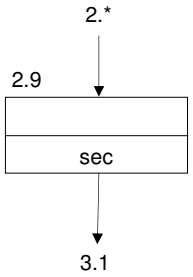
```
Step no:      2.7
Delay DP      1s
```

In this program step you can program the delay for the differential pressure switch between 1 and 999 seconds.

```
Step no:      2.8
Delay OP      1s
```

In this program step you can program the delay for the overpressure switch between 1 and 999 seconds.

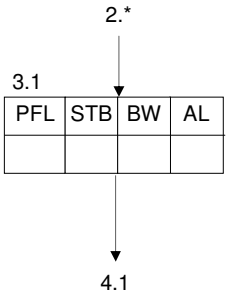
```
Step no:      2.9
Delay FS       1s
```




In this program step you can program the delay for the filtration start switch between 1 and 999 seconds.

## 10.4 Power up settings

```
Step no:      3.1
PFL STB BW  AL
```

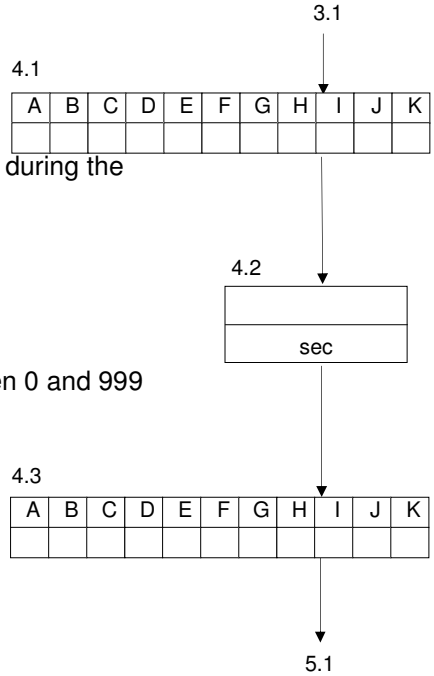



In this program step you program how the installation has to start after powering up.

PFL = Starting in step “Pre flush”
If this step is not activated in step 2.1, the installation will start up with the step “Filtration”.
STB = Starting in step “Standby”
BW = Starting in step “Air Scour” (so total flush will be made)
If step “Air Scour” is not activated, the installation will start up with the step “Drain”. If this step is also not activated in step 2.1, the installation will start with the step “Backwash 1”
AL = Starting in step “Alarm” with message “Supply failure”.

## 10.5 Proces steps

```
      ABCDEFGHIJK
STB   ----------
```




In this program step you can program which outputs are activated during the step “Standby”.

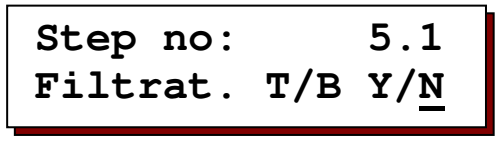
```
Step no:      4.2
Pre Flush     30s
```

In this program step you can program the “Pre Flush” time between 0 and 999 seconds.

```
      ABCDEFGHIJK
PFL   -|-|-||----
```

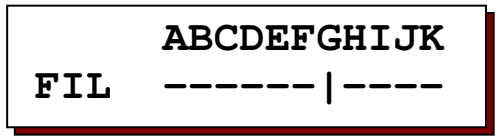
In this program step you can program which outputs are activated during the step “Pre Flush”.

## 10.6 Proces steps

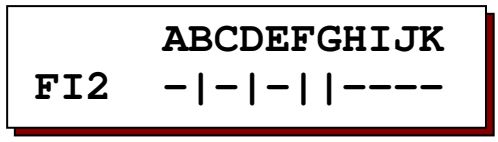



In this program step you can program if the installation has to operate in "Top/Bottom" mode. If so, you have to program which outputs are activated during phase "Filtration 2".
For more information see § 1.5 „Phase "Filtration"" on page 3.


In this program step you can program the filtration time between 1 and 999 minutes.




In this program step you can program which outputs are activated during the step "Filtration".

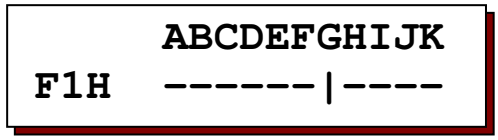



In this program step you can program which outputs are activated during the step "Filtration 2".

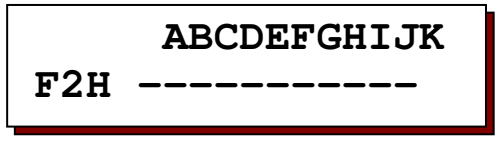

Here, you can program whether the remaining filtration time will be reset when the plant is switching to standby mode.
When set at "No", the remaining filtration time will also saved and kept in memory at power loss of the controller.


Here, you can program on what event the filtration should be started.

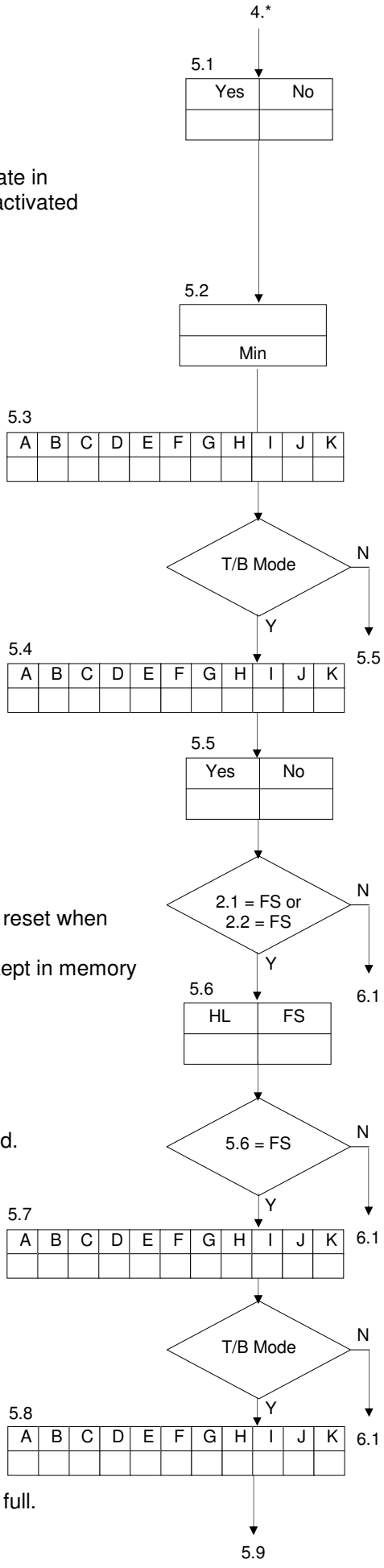
HL = Input for High level switch of clean water tank.
FS = Input filtration tank.



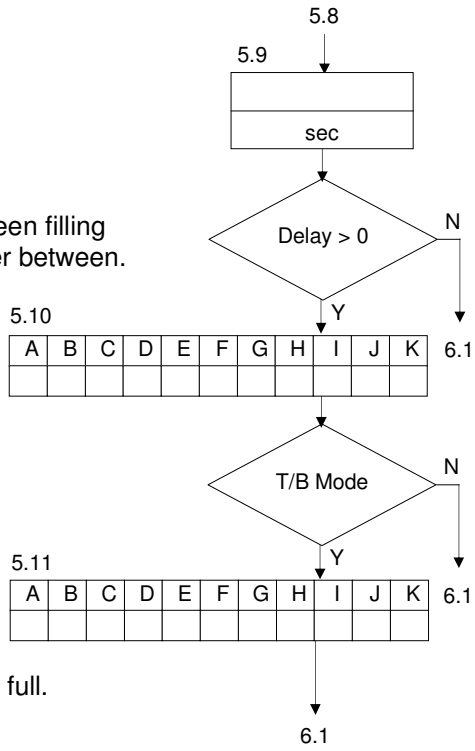

In this program step you can program which outputs are activated during the step "Filtration" when the clean water tank is full.




In this program step you can program which outputs are activated during the step "Filtration 2" when the clean water tank is full.



```
Step no:      5.9
Delay          0s
```




In this program step you can program the delay for switching between filling backwash tank and changing to permeate production for consumer between. 0 and 999 seconds.

```
      ABCDEFGHIJK
F1H2  ------|----
```

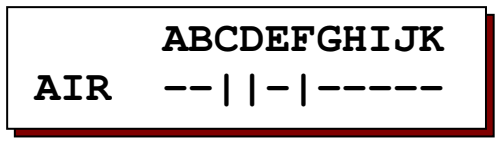
In this program step you can program which outputs are activated during the step “Filtration” when the clean water tank is full.

```
      ABCDEFGHIJK
F2H2  ----------
```

In this program step you can program which outputs are activated during the step “Filtration 2” when the clean water tank is full.

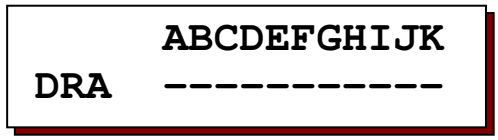
## 10.7 Standard Backwash step


In this program step you can program the “Air scour” time between 0 and 999 seconds..

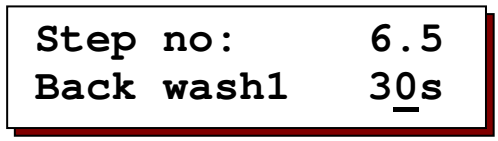



In this program step you can program which outputs are activated during the step “Air scour”.

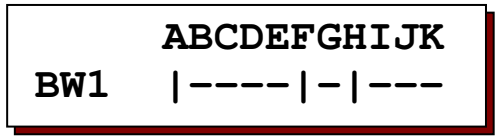

In this program step you can program the “Drain” time between 0 and 999 seconds..



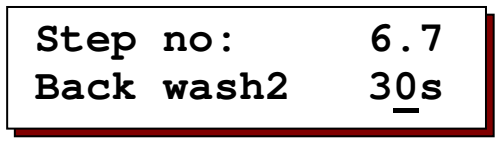

In this program step you can program which outputs are activated during the step “Drain”.



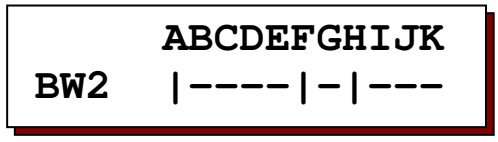

In this program step you can program the time for step “Back wash 1” between 1 and 999 seconds.



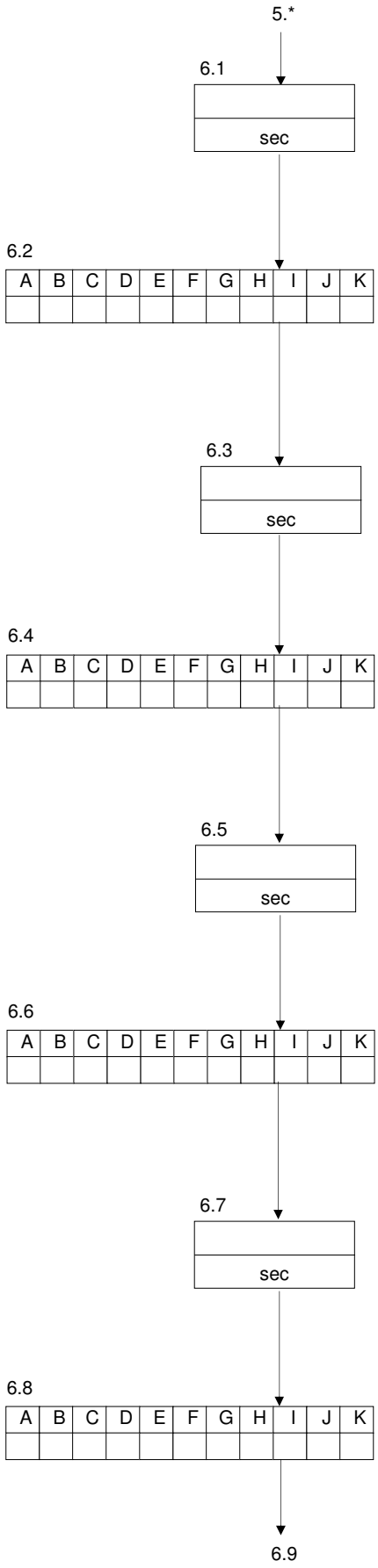

In this program step you can program which outputs are activated during the step “Back wash 1”.

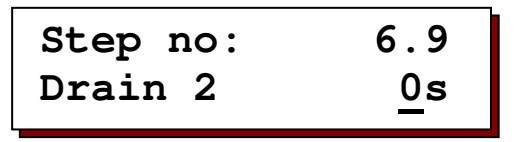



In this program step you can program the time for step “Back wash 2” between 0 and 999 seconds.

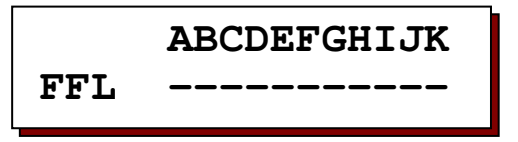



In this program step you can program which outputs are activated during the step “Back wash 2”.

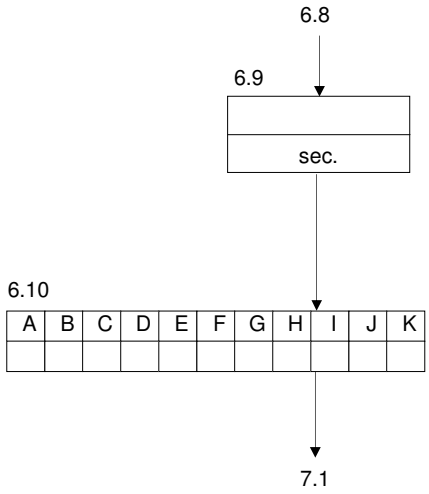





In this program step you can program the “Drain 2” time between 0 and 999 seconds..

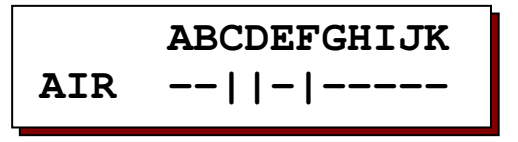



In this program step you can program which outputs are activated during the step “Forward Flush”.



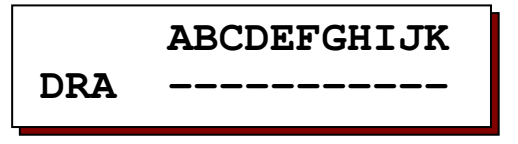

## 10.8 Standard Backwash step 2


In this program step you can program the “Air scour” time between 0 and 999 seconds..

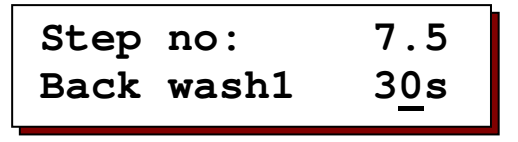



In this program step you can program which outputs are activated during the step “Air scour”.

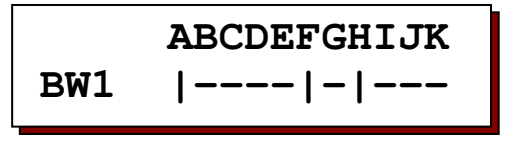

In this program step you can program the “Drain” time between 0 and 999 seconds..



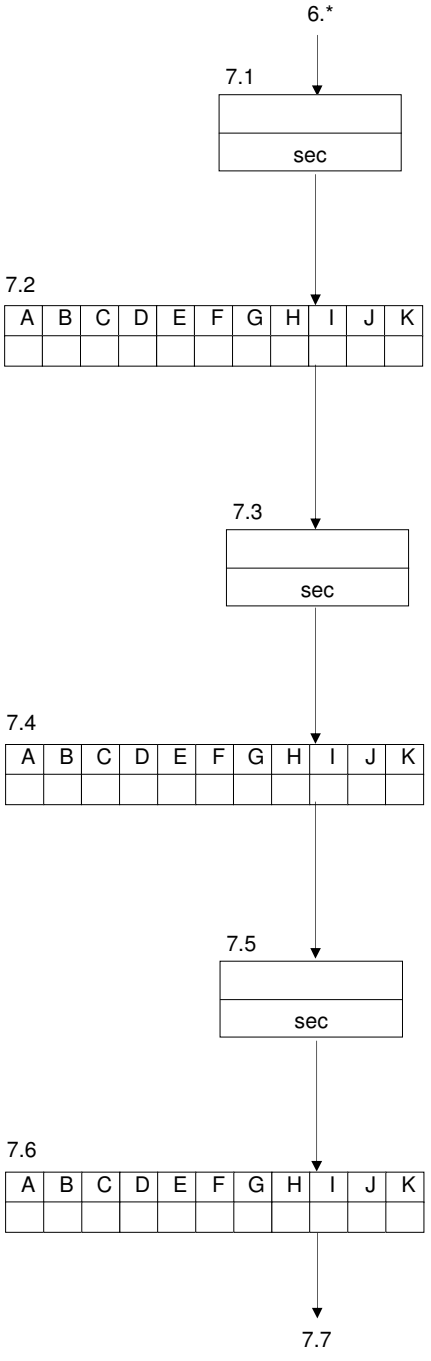

In this program step you can program which outputs are activated during the step “Drain”.




In this program step you can program the time for step “Back wash 1” between 1 and 999 seconds.




In this program step you can program which outputs are activated during the step “Back wash 1”.



```
Step no:      7.7
Back wash2    30s
```

In this program step you can program the time for step “Back wash 2” between 0 and 999 seconds.

```
        ABCDEFGHIJK
BW2     |----|-|---
```

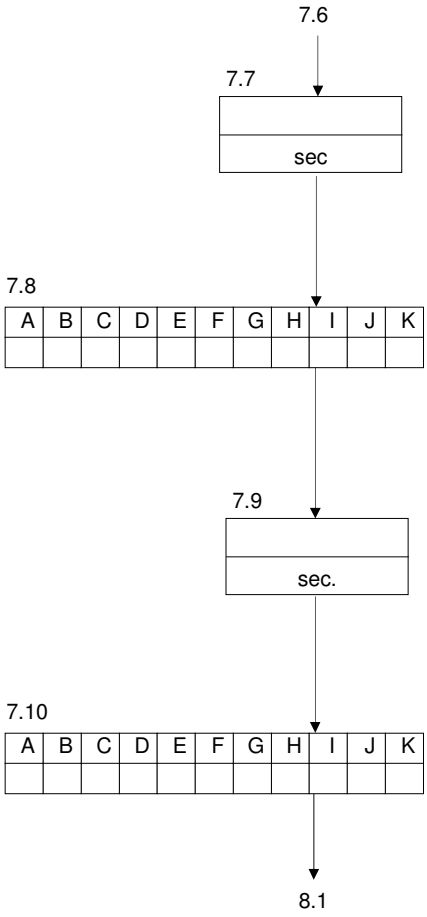
In this program step you can program which outputs are activated during the step “Back wash 2”.

```
Step no:      7.9
Drain 2        0s
```

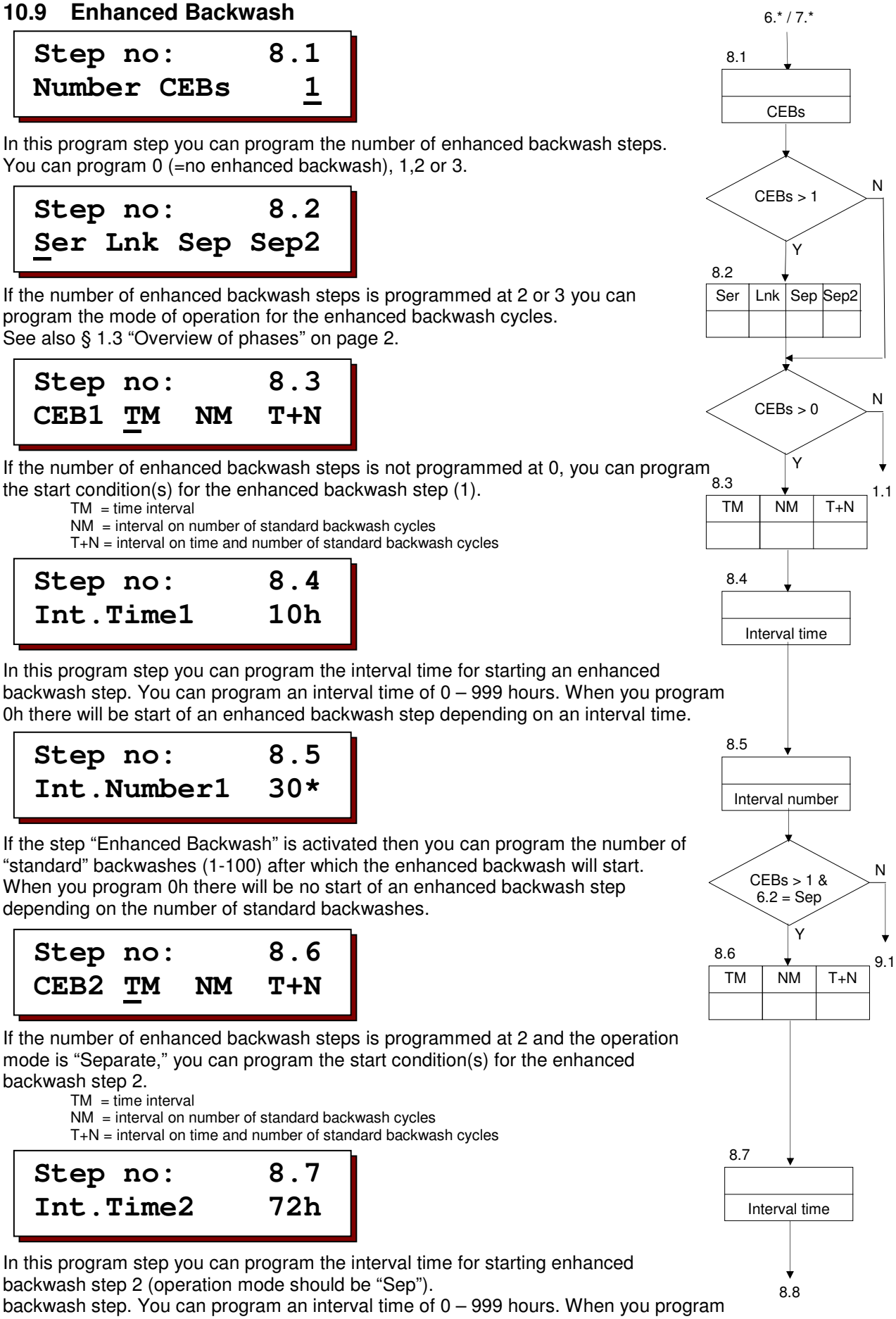
In this program step you can program the “Drain 2” time between 0 and 999 seconds..

```
        ABCDEFGHIJK
FFL     ----------
```

In this program step you can program which outputs are activated during the step “Forward Flush”.



## 10.9 Enhanced Backwash




```
Step no:      8.1
Number CEBs     1
```

In this program step you can program the number of enhanced backwash steps. You can program 0 (=no enhanced backwash), 1,2 or 3.

```
Step no:      8.2
Ser Lnk Sep Sep2
```

If the number of enhanced backwash steps is programmed at 2 or 3 you can program the mode of operation for the enhanced backwash cycles.
See also § 1.3 “Overview of phases” on page 2.

```
Step no:      8.3
CEB1 TM  NM  T+N
```

If the number of enhanced backwash steps is not programmed at 0, you can program the start condition(s) for the enhanced backwash step (1).

TM = time interval
NM = interval on number of standard backwash cycles
T+N = interval on time and number of standard backwash cycles

```
Step no:      8.4
Int.Time1     10h
```

In this program step you can program the interval time for starting an enhanced backwash step. You can program an interval time of 0 – 999 hours. When you program 0h there will be start of an enhanced backwash step depending on an interval time.

```
Step no:      8.5
Int.Number1   30*
```

If the step “Enhanced Backwash” is activated then you can program the number of “standard” backwashes (1-100) after which the enhanced backwash will start. When you program 0h there will be no start of an enhanced backwash step depending on the number of standard backwashes.

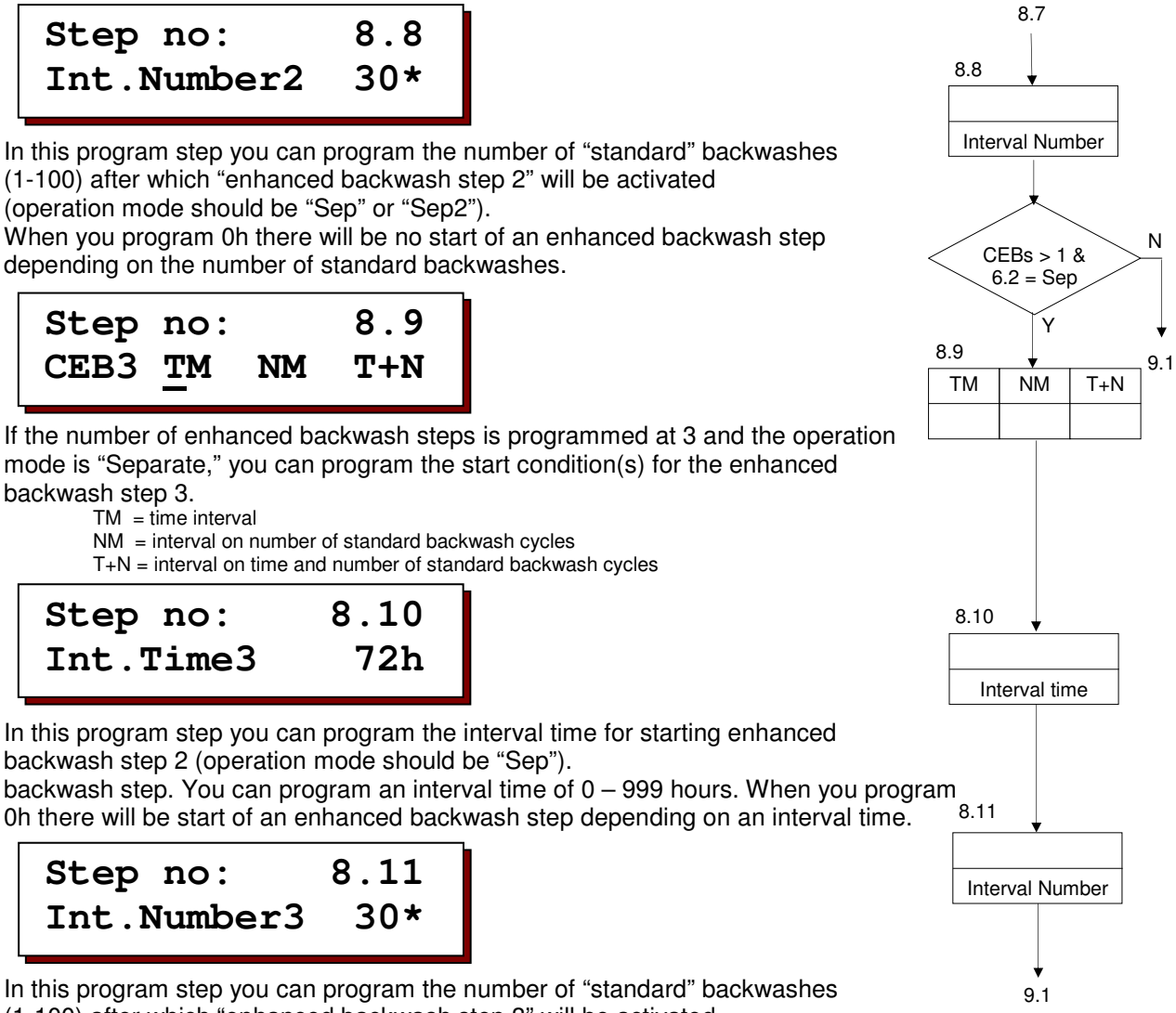
```
Step no:      8.6
CEB2 TM  NM  T+N
```

If the number of enhanced backwash steps is programmed at 2 and the operation mode is “Separate,” you can program the start condition(s) for the enhanced backwash step 2.

TM = time interval
NM = interval on number of standard backwash cycles
T+N = interval on time and number of standard backwash cycles

```
Step no:      8.7
Int.Time2     72h
```

In this program step you can program the interval time for starting enhanced backwash step 2 (operation mode should be “Sep”).
backwash step. You can program an interval time of 0 – 999 hours. When you program 0h there will be start of an enhanced backwash step depending on an interval time.




```
Step no:      8.8
Int.Number2   30*
```

In this program step you can program the number of “standard” backwashes (1-100) after which “enhanced backwash step 2” will be activated (operation mode should be “Sep” or “Sep2”).
When you program 0h there will be no start of an enhanced backwash step depending on the number of standard backwashes.

```
Step no:      8.9
CEB3 TM  NM  T+N
```

If the number of enhanced backwash steps is programmed at 3 and the operation mode is “Separate,” you can program the start condition(s) for the enhanced backwash step 3.

TM = time interval
NM = interval on number of standard backwash cycles
T+N = interval on time and number of standard backwash cycles

```
Step no:     8.10
Int.Time3     72h
```

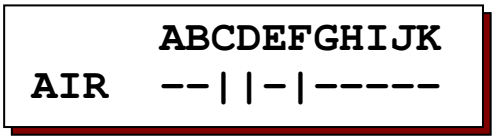
In this program step you can program the interval time for starting enhanced backwash step 2 (operation mode should be “Sep”).
backwash step. You can program an interval time of 0 – 999 hours. When you program 0h there will be start of an enhanced backwash step depending on an interval time.

```
Step no:     8.11
Int.Number3   30*
```

In this program step you can program the number of “standard” backwashes (1-100) after which “enhanced backwash step 3” will be activated (operation mode should be “Sep” or “Sep2”).
When you program 0h there will be no start of an enhanced backwash step depending on the number of standard backwashes.

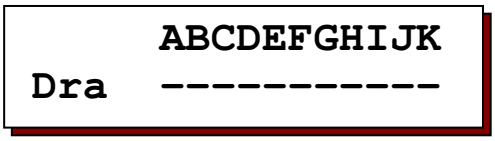
## 10.10 Enhanced Backwash 1 steps


In this program step you can program the “Air scour” time between 0 and 999 seconds..



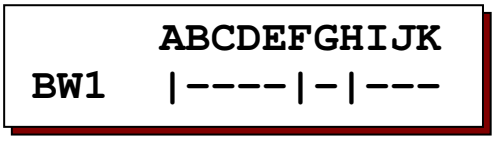

In this program step you can program which outputs are activated during the step “Air scour”.


In this program step you can program the “Drain” time between 0 and 999 seconds..

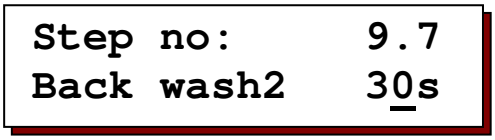



In this program step you can program which outputs are activated during the step “Drain”.

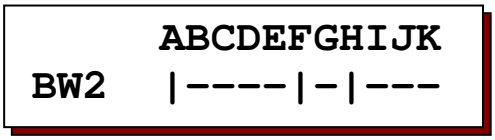

In this program step you can program the time for step “Back wash 1” between 1 and 999 seconds.



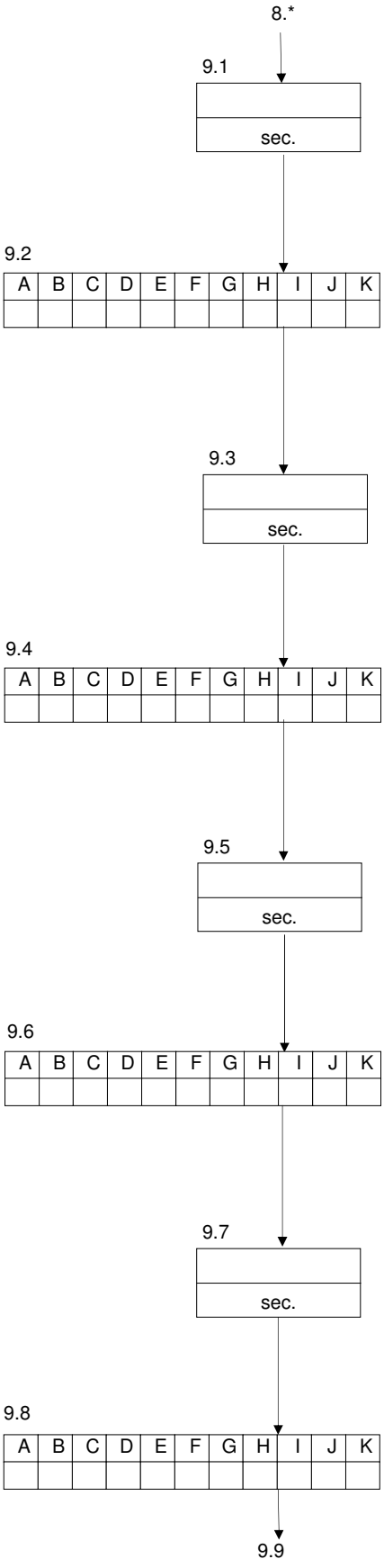

In this program step you can program which outputs are activated during the step “Back wash 1”.




In this program step you can program the time for step “Back wash 2” between 0 and 999 seconds.




In this program step you can program which outputs are activated during the step “Back wash 2”.



```
Step no:      9.9
Soak          10m
```

In this program step you can program the time for step “Soak” between 0 and 999 minutes.

```
      ABCDEFGHIJK
Soak  |----|-|---
```

In this program step you can program which outputs are activated during the step “Soak”.

```
Step no:     9.11
Drain 2       0s
```

In this program step you can program the “Drain 2” time between 0 and 999 seconds..

```
      ABCDEFGHIJK
FFL   ----------
```

In this program step you can program which outputs are activated during the step “Forward Flush”.

### 10.11 Enhanced Backwash 2 steps

```
Step no:     10.1
Air scour     20s
```

In this program step you can program the “Air scour” time between 0 and 999 seconds..

```
      ABCDEFGHIJK
AIR   --||-|-----
```

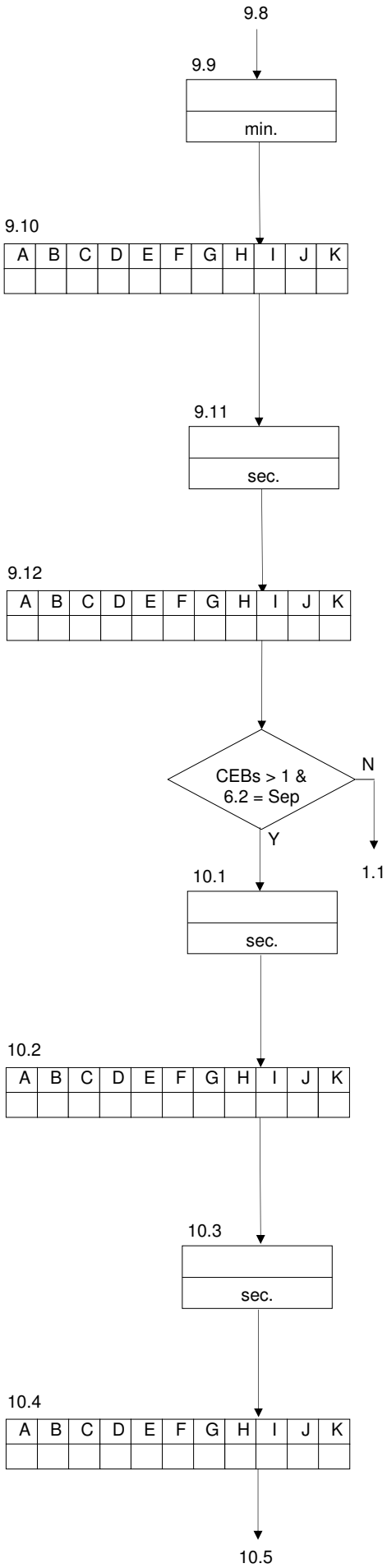
In this program step you can program which outputs are activated during the step “Air scour”.

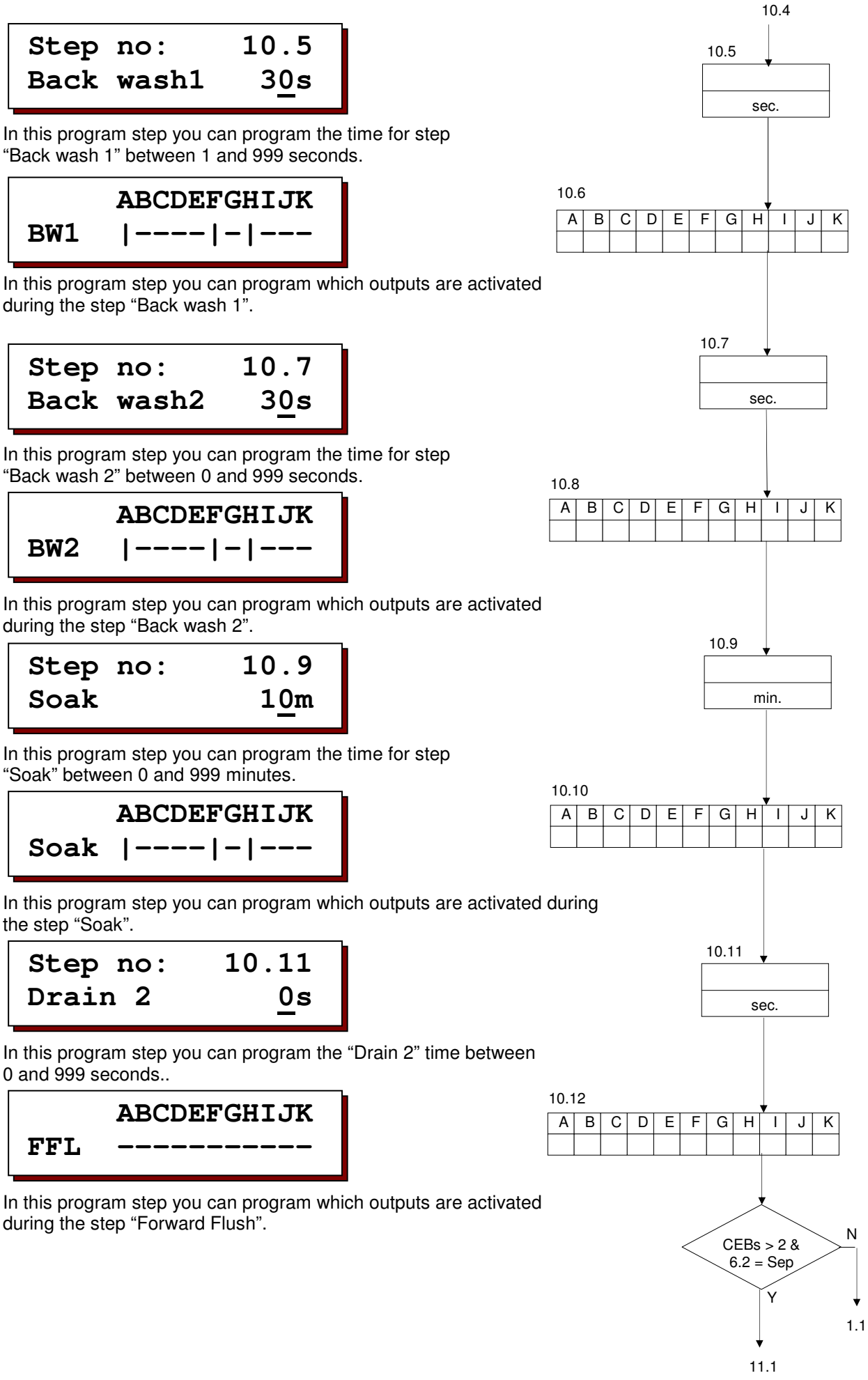
```
Step no:     10.3
Drain         20s
```

In this program step you can program the “Drain” time between 0 and 999 seconds..

```
      ABCDEFGHIJK
Dra   ----------
```

In this program step you can program which outputs are activated during the step “Drain”.






```
Step no:    10.5
Back wash1   30s
```

In this program step you can program the time for step “Back wash 1” between 1 and 999 seconds.

```
      ABCDEFGHIJK
BW1   |----|-|---
```

In this program step you can program which outputs are activated during the step “Back wash 1”.

```
Step no:    10.7
Back wash2   30s
```

In this program step you can program the time for step “Back wash 2” between 0 and 999 seconds.

```
      ABCDEFGHIJK
BW2   |----|-|---
```

In this program step you can program which outputs are activated during the step “Back wash 2”.

```
Step no:    10.9
Soak          10m
```

In this program step you can program the time for step “Soak” between 0 and 999 minutes.

```
      ABCDEFGHIJK
Soak  |----|-|---
```

In this program step you can program which outputs are activated during the step “Soak”.

```
Step no:   10.11
Drain 2       0s
```

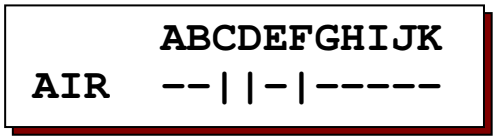
In this program step you can program the “Drain 2” time between 0 and 999 seconds..

```
      ABCDEFGHIJK
FFL   ----------
```

In this program step you can program which outputs are activated during the step “Forward Flush”.

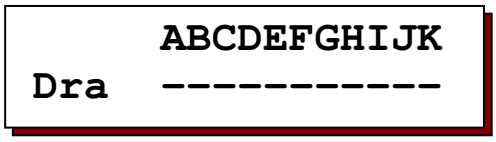
## 10.12 Enhanced Backwash 3 steps


In this program step you can program the “Air scour” time between 0 and 999 seconds..

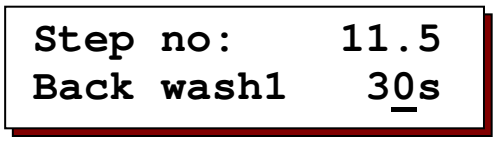



In this program step you can program which outputs are activated during the step “Air scour”.

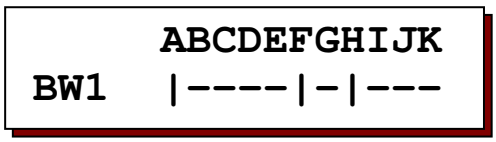

In this program step you can program the “Drain” time between 0 and 999 seconds..



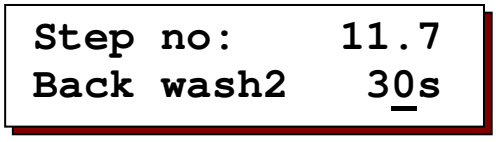

In this program step you can program which outputs are activated during the step “Drain”.



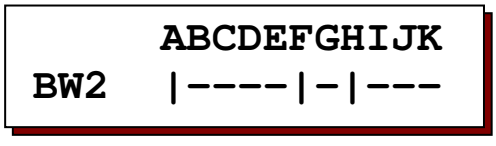

In this program step you can program the time for step “Back wash 1” between 1 and 999 seconds.



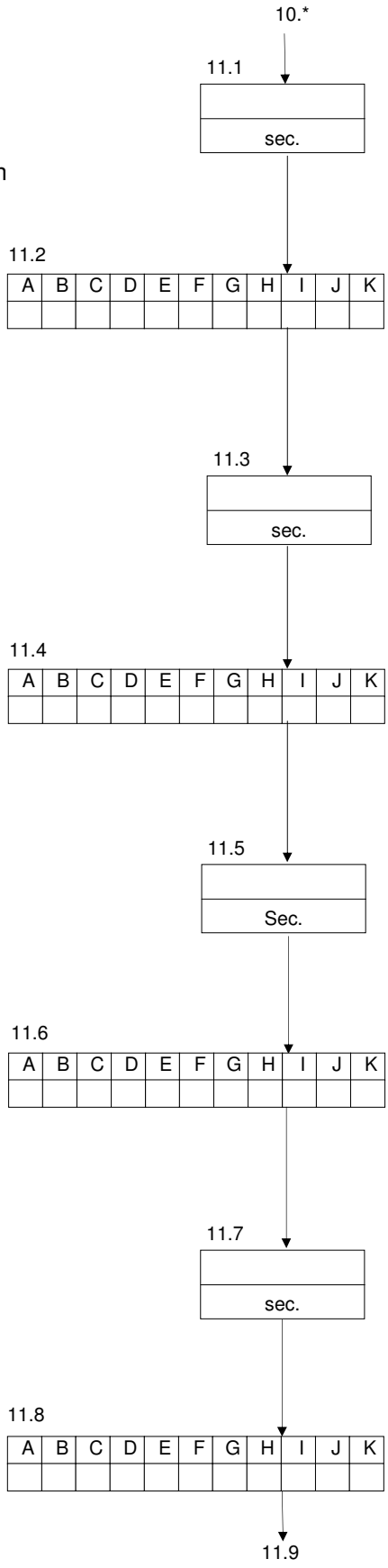

In this program step you can program which outputs are activated during the step “Back wash 1”.

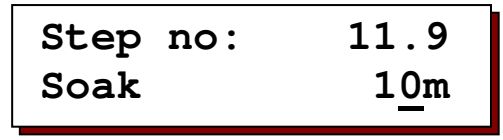



In this program step you can program the time for step “Back wash 2” between 0 and 999 seconds.

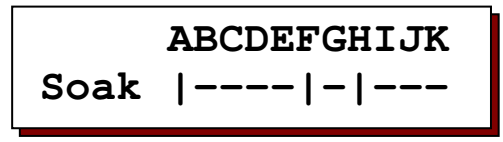



In this program step you can program which outputs are activated during the step “Back wash 2”.

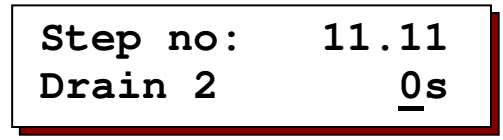




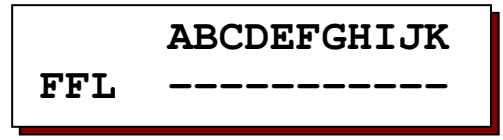

In this program step you can program the time for step “Soak” between 0 and 999 minutes.



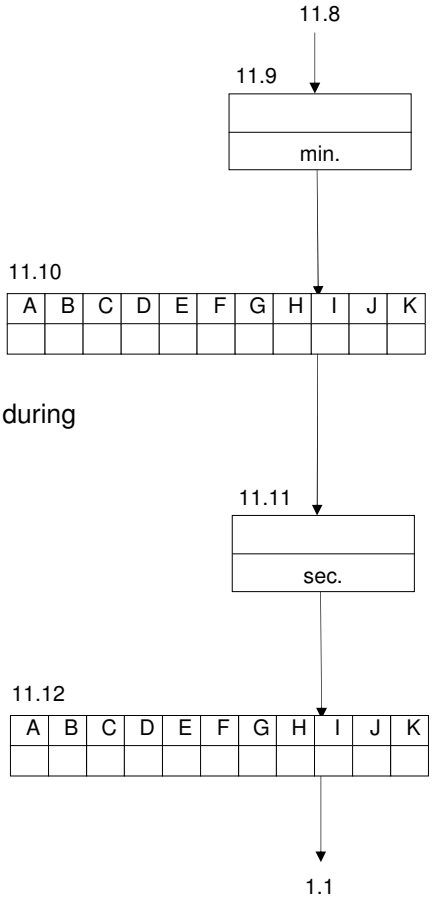

In this program step you can program which outputs are activated during the step “Soak”.




In this program step you can program the “Drain 2” time between 0 and 999 seconds..




In this program step you can program which outputs are activated during the step “Forward Flush”.



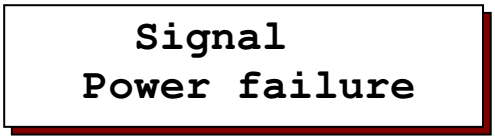
# 11 Possible error messages

Depending on the equipment and programming of the control, various signals can be given that can be signalled by the alarm output and be shown in the LCD display
The alarm output is programmable. This means it can be indicated which messages are passed on by the alarm output (see § 10.2 “Output functions” on page 16).
The alarm function can be activated in step 1.1 (see § 10.2 “Output functions” on page 16).

In case of an error message this will appear in the LCD display and, if the alarm function is activated for the relevant situation, the alarm output will be activated.

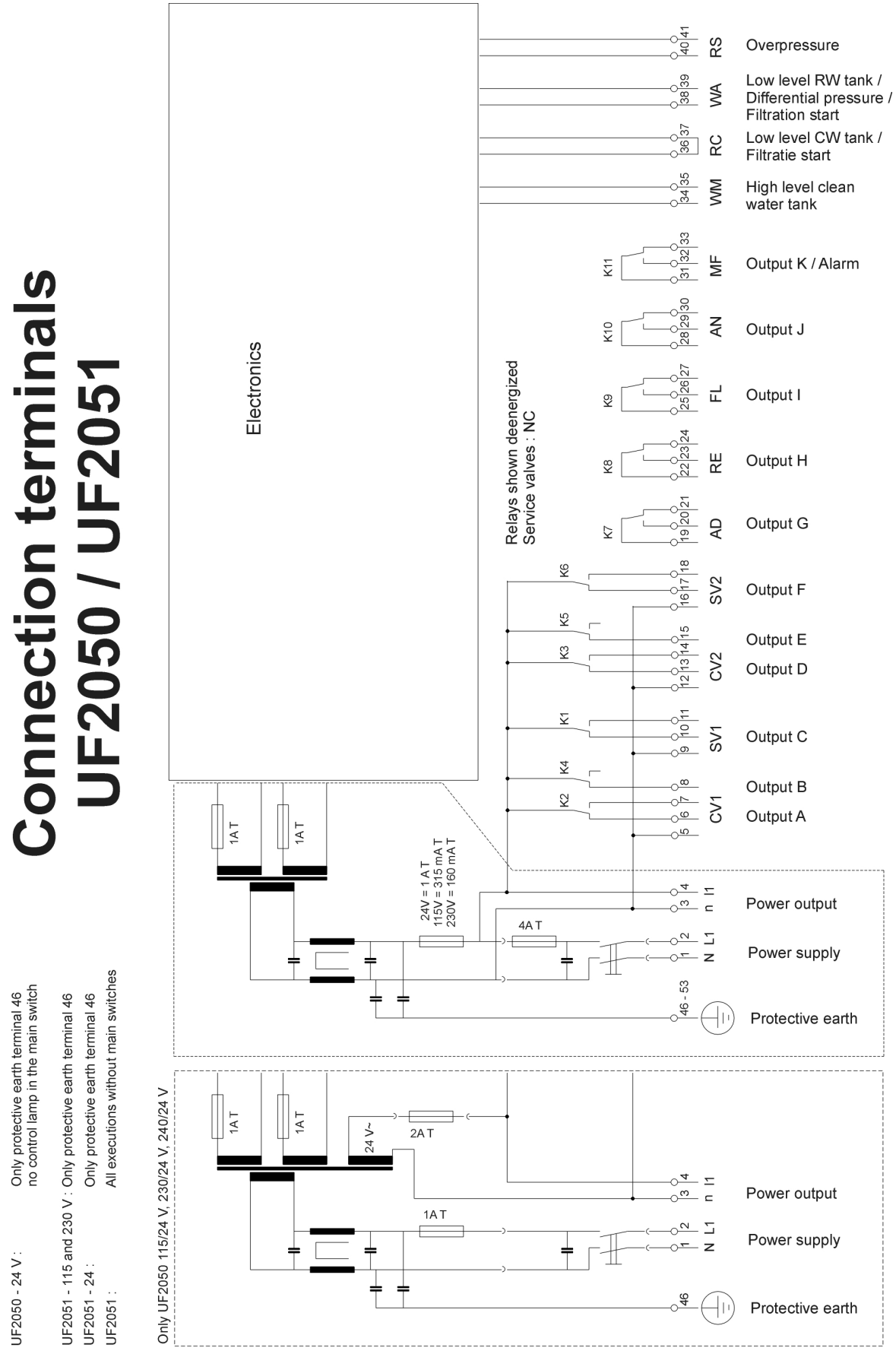
# Overview of possible alarm indications

## 11.1 Power failure




The message “power failure” appears when the control is switched on again and the alarm output is programmed for the “power loss” situation.
If the alarm output is activated this output can be switched off manually ( Reset ). The message on the LCD display disappears when the Reset key is pressed again.

# 12 Wiring diagram UF2050



# 13 Installation and commissioning requirements

## 13.1 General

Installation and commissioning of the control system may only be carried out by trained specialists who are familiar with these operating instructions and the applicable regulations on safe working practices and accident prevention. The instructions given in this manual must always be observed and followed.
To guarantee functional operation and safety, the instructions in this manual must be followed. The manufacturer accepts no liability for damage resulting from failure to follow the instructions.

Assembly

- Do not install under damp pipes. Fit shielding if necessary.
- Insert the flush-fit unit into the 186x138 panel opening and secure using the corresponding clamps and sealing ring.
- Install device at eye level and easily accessible to the user.

Connection

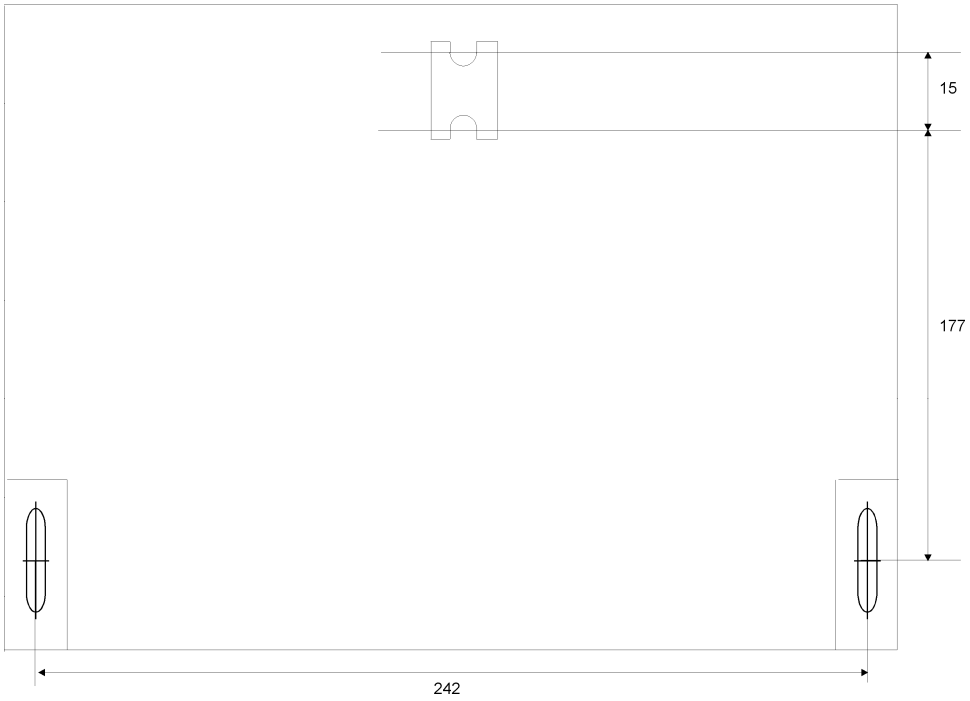
- Before carrying out connection work, always ensure the control unit is first disconnected from the power supply. Make sure that the power supply remains disconnected during connection work.
- Make electrical connections. Observe local regulations.
  Connect supply voltage and ground to the terminals shown in the wiring diagram.
- Make sure that the ground connection is faultless.
- The front panel is connected to ground via a plug connection which must not become disconnected during operation.
- If possible, keep all extra low voltage cabling (digital inputs, measurements) separate from the power supply cable.
- It is not permitted to connect the potential-free relays with a combination of 230 VAC and extra low voltage.
- The flush-fit unit is supplied without main switch. Install this main switch in the switch cabinet yourself.
- Some external relays, magnetic switches, solenoid valves, etc. can cause unwanted interference pulses when switched off.
  For this reason, it is recommended that the components mentioned should be equipped with a so-called RC network in advance.
  Ask the supplier of the mentioned components for the correct type of RC network.

Maintenance
The control system does not contain any user-serviceable parts. Unauthorised modifications and/or repairs to the control unit will void all warranty claims and the manufacturer's liability.

Commissioning

- Keep front lid closed at all times
- The control system may only be switched on if it is completely closed and all connections have been made correctly.

## 13.2 Assembly



# 14 Technical details

**Electrical supply:**

| | | |
|---|---|---|
| 24V | ± 10% | 50-60 Hz Main fuse 1AT |
| 115V | ± 10% | 50-60 Hz Main fuse 315mAT |
| 230V | ± 10% | 50-60 Hz Main fuse 160mAT |
| 115/24V | ± 10% | 50-60 Hz Main fuse 1AT |
| 230/24V | ± 10% | 50-60 Hz Main fuse 1AT |
| 240/24V | ± 10% | 50-60 Hz Main fuse 1AT |

Fuse for the purpose of outputs :
24V, 115V, 230V : 4 AT
115/24V, 230/24V : 2 AT

**Power input:** 11 VA

**Powered outputs:**
24V, 115V, 230V : Total resistive continuous current 4 A
115/24V, 230/24V : Total resistive continuous current 2 A

**Potential free outputs:** max. charge 250V, 4A (resistive)

**Inputs (digital):** charged with 12V, 8 mA

**Class of protection:** IP65

**Ambient temperature:** 0 – 40 °C

**Weight:**
approximately 2,8 kg (ES2050 : 24V, 115V, 230V)
approximately. 2,0 kg (ES2050 : 115/24V, 230/24V, 240/24V)
approximately. 1,6 kg (ES2051)

**Dimensions**
**Type ES 2050 (wall mounted):** W x H x D = 263 x 216 x 142

**Dimensions**
**Type ES 2051 (panel mounted):** DIN 43 700
front 192 x 144
mounting depth 122
panel opening 186 x $138^{+1,0}$

**Remarks:** Data is saved at loss of voltage.

# 15 Declaration of conformity

Declaration of conformity of the product with the essential requirement of the EMC directive 89 / 336 / EEC.

**Product description**

Product name : Controller for ultra filtration system
Product type : UF2050, UF2051
Manufacturer : EWS Equipment for Water treatment Systems International B.V.
Australiëlaan 12
NL-5232 BB 's-Hertogenbosch
The Netherlands

**Product environment**

This product is intended for use in residential en light industrial environments.

Emission standard : EN 61000-6-3, EN 55022
Immunity standard : EN 61000-6-2
Low voltage directive : 2006/95/EG

**Report**

Report numbers : EWS_ES2050_02 (UF2050)
EWS_ES2051_01 (UF2051)

**This declaration was issued by :**

Date : 11 - 03 - 2020

Name : V. Naeber

Signature :

# FIVE-YEAR CONTROLLER LIMITED WARRANTY

**LIMITED WARRANTY**
EWS International (hereafter EWS) warrants her products free from defects in material and workmanship under the following terms.
In this warranty, “Products” shall be taken to mean all devices that are supplied pursuant to the contract with exception of software.

**VALIDITY OF THE WARRANTY**
Labour and parts are warranted for five years from the date of the first customer purchase. This warranty is only valid for the first purchase customer.

Notwithstanding the warranty period of five years as mentioned above - while upholding the remaining provisions – a warranty period of three months applies to the supply of software.

**COVER OF THE WARRANTY**
Subject to the exceptions as laid down below, this warranty covers all defects in material or workmanship in the EWS products. The following are not covered by the warranty:

1) Any product or part not manufactured nor distributed by EWS. EWS will pass on warranty given by the actual manufacturer of products or parts that EWS uses in the product.
2) Any product, on which the serial number has been defaced, modified or removed.
3) Damage, deterioration or malfunction resulting from:
   a) Accident, misuse, neglect, fire, water, lightning or other acts of nature.
   b) Product modification or failure to follow instructions supplied by the products.
   c) Repair or attempted repair by anyone not authorized by EWS.
   d) Any shipment of the product (claims must be presented to the carrier)
   e) Removal or installation of the product
   f) Any other cause, which does not relate to a product defect.
   g) Cartons, equipment enclosures, cables or accessories uses in conjunction with the product.

**FINANCIAL CONSEQUENCES**
EWS will only pay for labour and material expenses for covered items, proceed from repairs and updates done by EWS at the EWS location. EWS will not pay for the following:

1) Removal or installations charges at customers and/or end user location.
2) Costs for initial technical adjustments (set-up), including adjustment of user controls or programming.
3) Shipping charges proceed from returning goods by the customer. (Shipping charges for returning goods to the customer are for the account of EWS).

All the costs which exceed the obligations of EWS under this Warranty, such as, but not limited to, travel and accommodation costs and costs for assembly and dismantling are for the account and risk of the customer.

**WARRANTY SERVICE**
In order to retain the right to have a defect remedied under this warranty, the customer is obliged to:

1) Submit complaints about immediately obvious errors related to the products delivered, in writing within eight days of the delivery of the products and submit complaints about shortcomings relating to the products delivered, which are not visible, within eight days of their being discovered.
2) Return defected products for account and risk of the customer. Costs for this shipment will not be reimbursed by EWS. The products may only be returned following express, written permission from EWS. Returning the products does not affect the obligation to pay the invoiced amounts.

3) Present the original dated invoice (or a copy) as proof of warranty coverage, which must be included in any [of the] return shipment of the product. Please include also in any mailing a contact name, company, address and a description of the problem(s).

**LIMITATION OF IMPLIED WARRANTIES**

Except where such disclaimers and exclusions are specifically prohibited by applicable law, the foregoing sets forth the only warranty applicable to the product, and such warranty is given expressly and in lieu of all other warranties, express or implied, or merchantability and fitness for a particular purpose and all such implied warranties which exceed or differ from the warranty set forth herein are hereby disclaimed by EWS.

**EXCLUSION OF DAMAGES**

EWS' liability for any defective products is limited to the repair or replacement of the product at our option. Except where such limitations and exclusions are specifically prohibited by applicable law EWS shall not be liable for:

1) Damage to other property caused by defects in the EWS product, damages based upon inconvenience, loss of use of the product, loss of time, commercial loss or:
2) Any damages, whether incidental, [consequential or otherwise] special, indirect or consequential damages, injury to persons or property, or any other loss.

Under no circumstances whatsoever shall EWS be obliged to provide compensation beyond the direct damage incurred by customer up to an amount not exceeding the payment receivable from the insurer of EWS in connection with the damage.

**APPLICABLE LAW AND DISPUTES**

1) Dutch law shall govern all offers made by EWS and all agreements concluded between EWS and customer. This warranty explicitly excludes application of the Vienna Sales Convention (CISG).
2) All disputes which may arise between the parties shall be dealt with exclusively by the competent court of law in the Netherlands under whose jurisdiction EWS falls. However, EWS reserves the right to submit any disputes to the competent court in the customer's location.