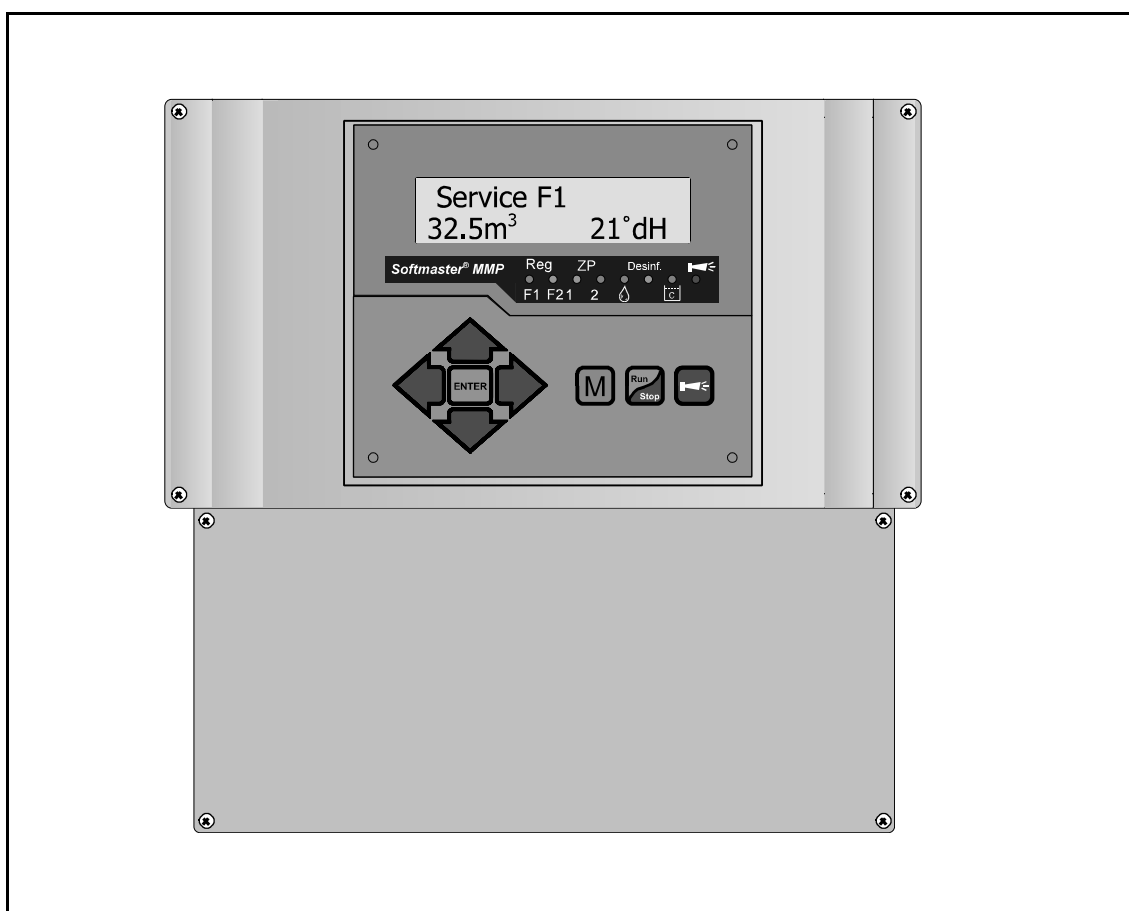


# Softmaster<sup>®</sup> MMP 2

**Microprocessor controller for softening plants**



Operating instructions

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# General notes

## Introduction

These operating instructions describe the installation, operation and programming of the Softmaster MMP 2 controller. We recommend that, while familiarising yourself with the operation of the instrument aided by these operating instructions, you have immediate access to the operable controller in order to perform the described functions and combinations. As certain functions are interrelated, it is advisable to follow the instructions in the given order.

Should problems or questions arise while operating the controller which are not described in these operating instructions and/or cannot be solved, our customer service is always at your disposal.

Try to identify the problem as accurately as possible and record the actions and conditions under which it occurred.

This will enable us to offer you swift effective assistance.

## Handling notes

Quick, repeated switching on/off of the controller should be avoided. Wait at least 5 seconds before switching 'on' or 'off' at the main switch.

Only operate the controller in compliance with the ambient conditions (e.g. temperature, moisture) stated in the Technical Data. Always protect the controller against moisture.

It should never come into contact with condensation or splash water.

The warranty shall not apply if the controller is tampered with, altered, modified or repaired contrary to the instructions described in this manual.

Before dismantling a defect controller, always write down the description of the error (failure effect).

The repair of a defective controller (irrespective of the warranty period) is only possible when the controller is dismantled and returned to us with a description of the error.

The maximum electrical load capacity of the relay outputs and the total power rating of the plant should never be exceeded.

The controller should only be used for its specified intended purpose.

## Safety instructions

Always adhere to the following safety instructions:

The controller must be installed and operated in compliance with relevant standards (e.g. DIN, VDE, UVV) or in accordance with regulations laid down by the respective country.

Some functions (e.g. manual filter change) allow direct manipulation of the plant (valves, pumps, etc.) without locking or monitoring. These functions should only be used by fully qualified personnel.

If you observe malfunctioning of the controller, switch it off immediately and inform the service personnel.

Do not attempt to repair the controller yourself (loss of warranty rights); instead always contact authorised service personnel. This is the only way to ensure reliable and safe operation of the plant.

After a protective circuit (fuse, motor protection switch) has been triggered, attempt to eliminate the cause of malfunctioning (e.g. clean the pump) before reactivating the protective circuit. Frequent triggering is always due to an error which, in certain circumstances, may also cause damage to the controller.

Non-adherence to these instructions can damage the controller as well as the plant and may result in a loss of warranty rights.

## Installation and commissioning

**Installation and commissioning should only be carried out by authorised technicians!**

The connecting cables to the sensors should be kept as short as possible and **clear** of power cables. Close proximity to strong electromagnetic radiators can lead to deviations of the display; in this case, separate interference suppression measures should be carried out.

After installation, program the instrument with the plant-specific features and data (e.g. switch functions, conductivity limit values, etc.). The data is permanently stored (also during power failure).

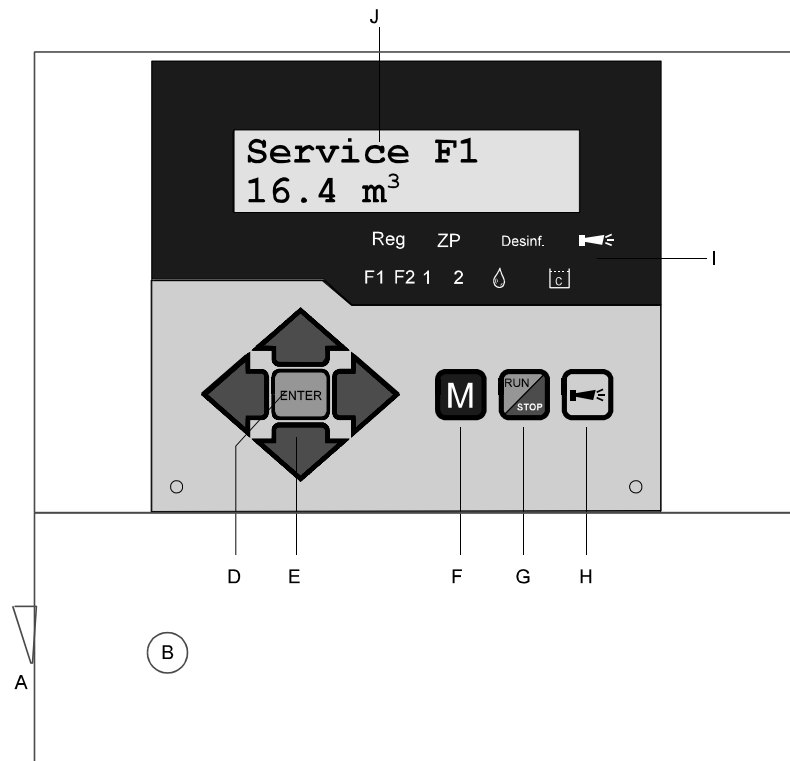
## Views of unit

Technical drawing of a square plate. The plate is shown with a central rectangular feature. The dimensions are indicated as follows:

- Horizontal dimension: 244mm
- Vertical dimension: 218mm

A diagram showing a rectangular area defined by a dashed line. The horizontal dimension is labeled 262mm and the vertical dimension is labeled 148mm. The dimensions are indicated by arrows pointing from a central intersection point to the dashed boundary lines.

## Description of display and operating features



### A On/Off switch

Only the wall-mounted variant is equipped with a lateral On/Off switch. Use this switch to switch the unit on or off.

### B Safety fuse, max. T6,3A

The safety fuse protects the outputs against overload or a short circuit. (Inside of the unit)

### D "ENTER" key

Confirm inputs and trigger functions with the ENTER key.

### E Arrow keys

Use these keys to operate the menu drive in the display and to enter values and programming data.

### F "M" key

Call the menu and return from submenu levels.

### G "Run/Stop" key ("Regeneration start/stop")

After pressing the key for 5 seconds, manual triggering of regeneration takes place (the filter in operation is regenerated) or a running regeneration is interrupted (depending on the type of plant, the filter goes into operation / ready position or reserve). If a regeneration stop is pending, regeneration is already started after pressing the key for a short period.

### H "Alarm" key (fault OFF)

Deletes the alarm signal at output 'AL' (Alarm); a fault display can only be deleted if the fault has been eliminated.

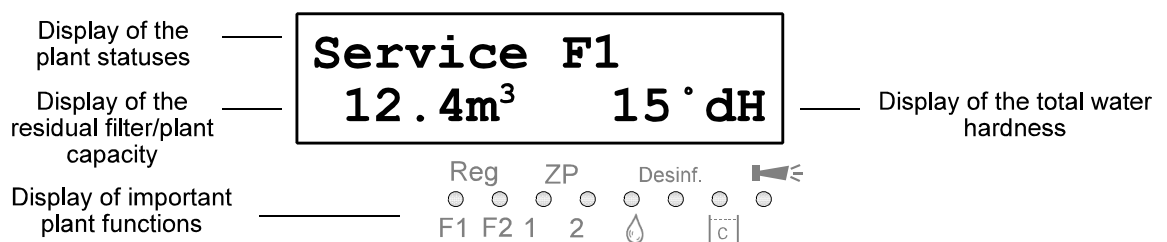
### I LED functions

LED symbols always signal the status of the plant, independent of the level (menu) being worked on.

### J LC display

Two lines, each line with 16 characters, backlit.

## Display functions



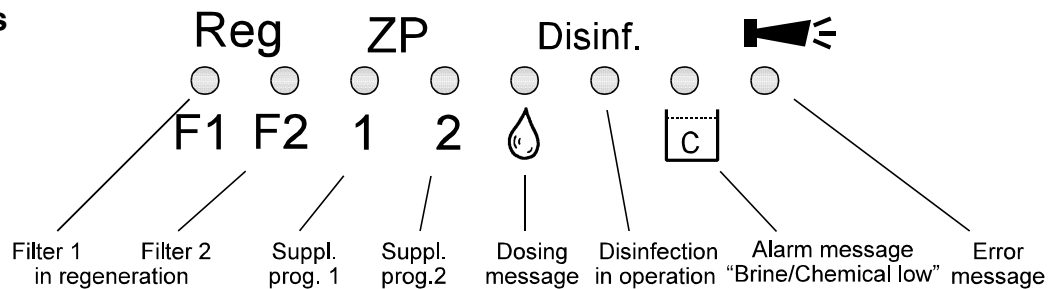
### Display - top line

The top line shows operating displays and error messages (described below).

### Display - bottom line

The display of the plant or filter residual capacity (still available quantity of soft water) and the raw water hardness (entered manually) occurs in the bottom line.

## LED displays



The LEDs display operating statuses, plant functions and pending error messages:

### Reg. F1 and Reg. F2 (green)

LED lights up: Filter 1 or filter 2 in regeneration.

LED flashes: A regeneration of the respective filter is triggered today at the set time (also see regeneration delay).

### ZP1 and ZP2 (green)

LED lights up: Supplementary program 1 or 2 active, relay PR1 or PR2 switched.

LED flashes (**only ZP2**): Relay ZP2 not switched, "OFF" phase of supplementary program 2 active.

### Dosing message (green)

LED lights up as long as the impulse output has been activated.

### Disinf. (green)

LED lights up: The disinfection facility has been activated (regeneration stage 'Salting').

### Warning message "Chemical low" (yellow)

LED lights up: The brine deficiency contact is active (also see PROG1 input).

### Error message "Alarm" (red)

LED lights up: Alarm relay activated, error message not confirmed yet and error still occurring.

LED flashes: Alarm relay not active any more, error message has been confirmed but the error is still occurring.

As long as an error is still occurring, it is shown alternately with the operating display.

## Operating displays

Each status change is stored in the status registration (e.g. manual regeneration, filter change).

Service F1  
12.3m<sup>3</sup> 21.4 °dH

Filter 1 in operation with 12.3m<sup>3</sup> of residual capacity (still available soft water quantity) and 21.4 °dH of current total water hardness.  
Display occurs with single-filter and double-filter plants.

or:

Operation F2

Filter 2 in operation

Operation F1 + F2

Filter 1 and filter 2 in operation (parallel or serial mode, filter 1 is first)

Operation F2 + F1

Filter 2 and filter 1 in operation (only serial mode, filter 2 is first)

Reg F1, R2: 43m  
12.3m<sup>3</sup> 21.4 °dH

Example: Filter 1 in regeneration: with regeneration stage R2 and remaining stage time of 43 minutes. LED Reg. F1 lights up.

or:

Reg F2, R1: 7m

Example: Filter 2 in regeneration: with stage R1 and remaining stage time of 7 minutes.

ZP1 on: 10m  
12.3m<sup>3</sup> 21.4 °dH

Supplementary program ZP1 active prior to regeneration, remaining time of 10 minutes. LEDs Reg. F1 and ZP 1 light up.

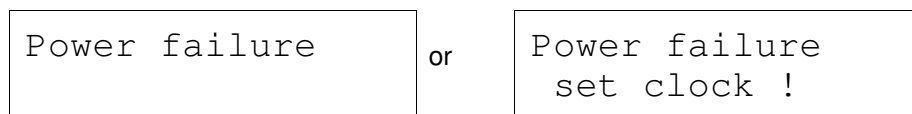
Reg. STOP  
12.3m<sup>3</sup> 21.4 °dH

Regeneration stopped via STOP input or regeneration start delayed. Continue regeneration by pressing the "Run/Stop" key.

## Error messages

In addition to the displayed error messages, the red LED “Alarm” lights up or flashes.  
Alternate display of all error messages and operating displays.  
Each occurred error is stored in the error registration.

### Error message “Power failure”



Message after each switching on “Power failure”. Check the time and, if necessary, set the time if “set clock !” is displayed. After this, the unit is without a real-time clock (plug-in card RTC/RS232).

After switching on or after voltage recovery, the controller starts with the last active status. A running regeneration continues.

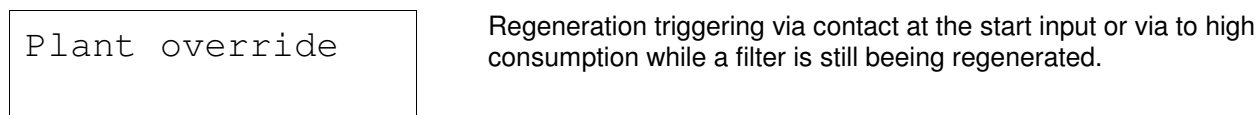
Check the plant for possible negative results due to power failure (e.g. exhaustion caused by washing for too long in the regeneration stage “Wash out”).

All stored values remain stored even during a power failure.

Confirm the fault display with the “Horn” key.

---

### Error message “Plant override”



In multi-filter plants it can occur that a filter is in regeneration and a second filter is also waiting to be regenerated. This status can occur if the soft water consumption is very high, e.g. when filling a swimming pool. If this scenario occurs, the plant will only provide raw water to the consumers. If only soft water should be provided, the soft water supply to the consumers has to be closed.

Wait until the current filter regeneration has finished and then open the soft water supply to the consumers. The controller will always automatically complete regeneration of this filter.

Find and eliminate the fault and confirm the fault display via the “Horn” key.

If regeneration is really necessary again (triggered via consumption measurement), regeneration will occur at the end of the current regeneration.

If you have programmed a minimum regeneration interval, regeneration will be started after this period has expired. With triggering via a contact at the START input, you have to start regeneration manually via the “Run/Stop” key.

---

### Error message "Minimum regeneration interval not achieved"

Min. reg. Pause

Regeneration triggering via contact at the start input or if consumption is too high during the programmed time after a completed filter regeneration.

Confirm the fault display with the "Horn" key.

Regeneration requested via the water consumption is executed after the programmed period.

Regeneration triggering via the START contact is ignored. Check the plant and trigger a required regeneration manually. The error message is subsequently deleted.

---

### Error message "Maximum number of regenerations achieved"

Max. regenerat.

The entered maximum number of possible regenerations has been achieved. The current status of the regeneration meter is shown in the SERVICE menu under "Reg. meter".

In addition to the error message, the yellow warning light "**Chemical/brine low**" lights up.

Confirm the fault display with the "Horn" key. The message is displayed until the regeneration meter is deleted.

Delete the regeneration meter in the SERVICE menu under "Reg. meter".

---

### Error message "Incorrect hardness measurement"

Error hardness  
measurement

The connected water hardness measuring instrument (e.g. Testomat 2000) gives an incorrect current signal 4-20mA.

Confirm the fault display with the "Horn" key.

Check the settings of the current input. Programming has to correspond to the set signal level of the measuring instrument. Check the signal levels in the SERVICE menu under "Diagnosis".

---

### Error message "Error total water hardness measuring instrument"

Error T2000 1

The connected water hardness measuring instrument (e.g. Testomat 2000) for the total water hardness gives an alarm. The alarm signal occurs at contact input ALC1.

Confirm the fault display with the "Horn" key.

Check the connected unit. The error display is deleted after the alarm signal has ceased.

---

### Error message "Error soft water hardness measuring instrument"

Error T2000 2

The connected water hardness measuring instrument (e.g. Testomat 2000) for soft water monitoring gives an alarm. The alarm signal occurs at contact input ALC2.

Confirm the fault display with the "Horn" key.

Check the connected unit. The error message is deleted after the alarm signal has ceased.

Regeneration triggering via START contact is suppressed as, in the case of quality-controlled plants, the START signal is usually triggered by the instrument for soft water monitoring if the hardness is exceeded.

---

### Error message "Error operating position filter 1"

Error Filter 1

The central control valve or pilot distributor of filter 1 does not give a signal in the operating position or is not running synchronously. The signal does not occur at contact input SCV1.

Confirm the fault display with the "Horn" key.

Check the connected central control valve or pilot distributor of filter 1.

The error display is deleted after the fault has been eliminated.

---



### Error message "Error operating position Filter 2"

Error Filter 2

The central control valve or pilot distributor of filter 2 does not give a signal in the operating position or is not running synchronously.  
The signal does not occur at contact input SCV2.

Confirm the fault display with the "Horn" key.

Check the connected central control valve or pilot distributor of filter 2.

The error display is deleted after the fault has been eliminated.

---

### Error message "Chemicals low"

Chemicals low

The brine or chemical tank is empty.

The EMPTY signal occurs at contact input Prog1 and the input is programmed as "Chemicals low" contact.

In addition to the error message, the yellow warning light "**Chemical/brine low**" lights up.

Confirm the fault display with the "Horn" key.

Check the brine tank and desalination valve or the automatic refilling of the measuring vessel. The error display is deleted after the fault has been eliminated.

---

### Error message "Chemicals overflow"

Chem. overflow

The brine or chemical tank is overflowing.

The overflow signal occurs at contact input Prog2 and the input is programmed as "Chem. overflow" contact.

Confirm the fault display with the "Horn" key.

Check the brine tank and desalination valve or the automatic refilling of the measuring vessel. The error display is deleted after the fault has been eliminated.

---

### Error message "Error disinfection facility"

Error disinf.

During the regeneration phase "Salting" there is no or only an insufficient flow via the electrolysis cell in the chemical line. The conductivity of the chemical is insufficient due to the salt deficiency, or no chemical is sucked in, or the fuse on the disinfection card is defective, or the salting stage has been programmed incorrectly.

Confirm the fault display with the "Horn" key.

Check the brine tank and supply line as well as the electronic components of the disinfection facility.

---

### Error message "Regeneration stopped"

Reg. STOP

If the program has been stopped via an external switch (STOP input) prior to or during regeneration and if you have programmed the alarm message for the STOP input, the display "Reg. STOP" will appear as an error message.

Confirm the fault display with the "Horn" key.

The display ceases as soon as the switch reopens and the program cycle is continued.

---

## Terminal block identification

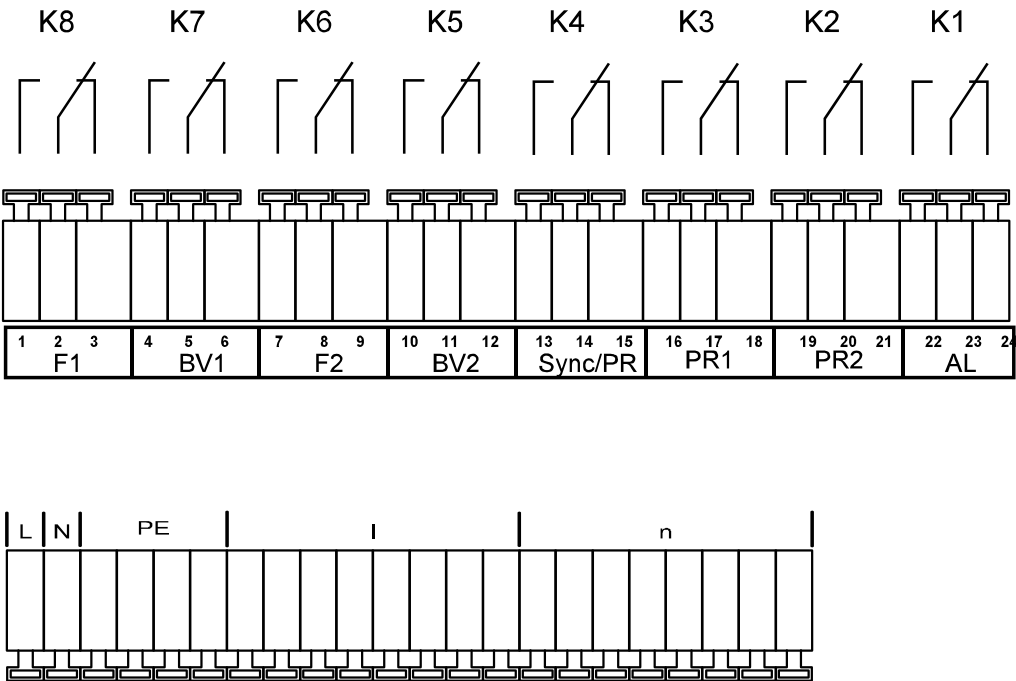
**Functions** (IN = input, OUT = output)

No.	Terminal	Type	Function	Note
	PE	IN	4x Mains-Protective earth	
	N L	IN	Mains, N = Neutral Mains, L = Live	Mains-input 230 - 240 V AC
	n l	OUT	8x Neutral switched 8x Live switched	Mains voltage, max. 4 A
1 2 3	Filter1	OUT	Filter1, 7 - normally open Filter1, c - common Filter1, 6 - normally closed	Volt-free relay output max. load 240 V AC, 4 A
4 5 6	BV1	OUT	Service valve filter 1, no - normally open Service valve filter 1, c - common Service valve filter 1, nc - normally closed	Volt-free relay output max. load 240 V AC, 4 A
7 8 9	Filter2	OUT	Filter2, 7' - normally open Filter2, c - common Filter2, 6' - normally closed	Volt-free relay output max. load 240 V AC, 4 A
10 11 12	BV2	OUT	Service valve filter 2, no - normally open Service valve filter 2, c - common Service valve filter 2, nc - normally closed	Volt-free relay output max. load 240 V AC, 4 A
13 14 15	Sync	OUT	Sync, 8 - normally open Sync, c - common Sync, PR - normally closed	Volt-free relay output max. load 240 V AC, 4 A
16 17 18	PR1	OUT	Supplementary program 1, no -normally open Supplementary program 1, c -common Supplementary program 1, nc -normally closed	Volt-free relay output max. load 240 V AC, 4 A
19 20 21	PR2	OUT	Supplementary program 2, no -normally open Supplementary program 2, c -common Supplementary program 2, nc -normally closed	Volt-free relay output max. load 240 V AC, 4 A
22 23 24	AL	OUT	Fault message output, no - normally open Fault message output, c - common Fault message output , nc - normally closed	Volt-free relay output max. load 240 V AC, 4 A
25 26	WM1 ⊥	IN	Water meter input 1 common load for inputs	See water meter description!
27 28	WM2 ⊥	IN	Water meter input 2 common load for inputs	See water meter description!
29 30	+12V ⊥	IN	12V-supply for turbine common load for inputs	See water meter description! ( Current max. 50mA )
31 32	SVC1 ⊥	IN	Synchronous message filter 1 (operating pos.) common load for inputs	Only for volt-free normally open/ normally closed contact!
33 34	SVC2 ⊥	IN	Synchronous message filter 2 (operating pos.) common load for inputs	Only for volt-free normally open/ normally closed contact!
35 36	ALC1 ⊥	IN	Error message Testomat 1 (total water) common load for inputs	Only for volt-free normally open/ normally closed contact!
37 38	ALC2 ⊥	IN	Error message Testomat 2 (soft water) common load for inputs	Only for volt-free normally open/ normally closed contact!
39 40	START ⊥	IN	external regeneration start common load for inputs	Only for volt-free normally open/ normally closed contact!
41 42	STOP ⊥	IN	external regeneration stop common load for inputs	Only for volt-free normally open/ normally closed contact!
43 44	PROG1 ⊥	IN	Brine level-switch EMPTY / brine deficiency common load for inputs	Only for volt-free normally open/ normally closed contact!
45 46	PROG2 ⊥	IN	Brine level-switch FULL / brine overflow common load for inputs	Only for volt-free normally open/ normally closed contact!
47 48 49 50	- - - -	OUT/ IN	Free for later add-ons (e.g. optional serial interface RS485 instead of RS232)	Not available yet !
51 52	Impuls ⊥	OUT	Dosing impulse (open collector) common load	Max. load 50mA, see dosing output description
53 54	Desinf. 12V AC	IN	Power supply for disinfection facility (optional)	12V AC, max. 1A
55 56	Desinf. Cell	OUT	Electrolysis cell of the disinfection facility	See disinfection facility description
57 58	⊥ IN 0/4-20mA	IN	common load Measuring value for total water hardness from Testomat	Testomat ECO or Testomat 2000 with SK910, 0/4-20mA output

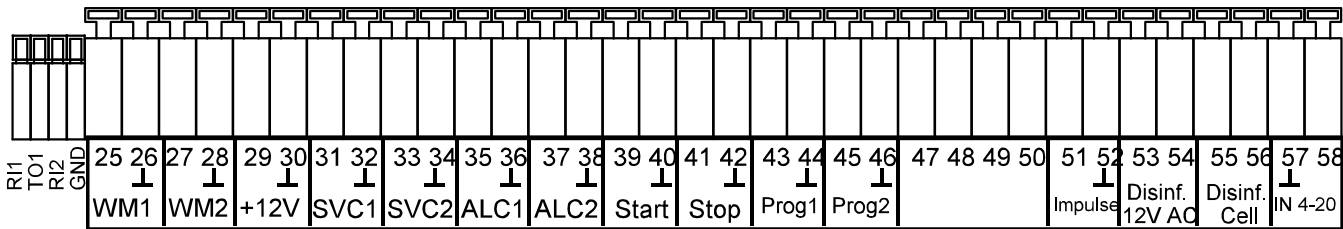
Continuation of terminal block identification

No.	Terminal	Type	Function	Note
	RI1 TO1 RI2 GND	IN/ OUT	Serial interface RS232, Rx/D Serial interface RS232, Tx/D Serial interface RS232, DTR/DSR Serial interface RS232, load	Parallel to D-SUB-plug RS-232 (J3)

Terminal blocks for mains supply and relay outputs



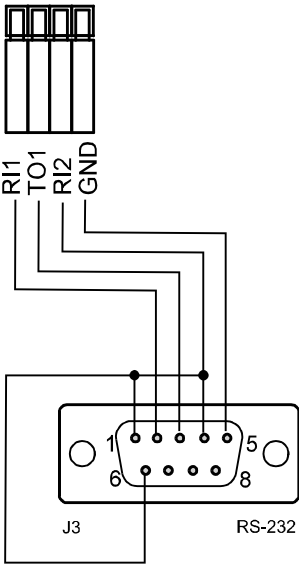
Terminal block for inputs and interface



Serial interface RS232

PIN 2 - Rx/D  
PIN 3 - Tx/D  
PIN 4 - DSR, DTR  
PIN 5 - GND, load

Please observe that the peripheral devices are connected via a neutral modem cable!



## Description of relay outputs

### Filter1 / Filter2, pilot distributor or central control valves 1 and 2

Connect the regeneration valves (central control valves) or pilot distributors which are controlled via an electric change-over or impulse switch to these relay outputs.

Change-over: In the case of change-over switches, the output changes after each regeneration stage.

Impulse: In the case of impulse switches, the output switches for 40 seconds (terminal 7 or 7').

Pilot valves: For pilot valves for controlling regeneration valves like, e.g., Siata V250/V360 etc.

The neutral position of the relay is the same during de-energized control and in the operating position of the filter: contact on terminal 6 or 6'.

Set the control type under menu option

"M" → BASIC PROGRAM → VALVE TYPE

If the regeneration valves or pilot distributors are equipped with a volt-free message contact for the operating position, it is possible to connect them to the inputs "SVC1" and "SVC2". Faults of the valve / pilot distributor are then monitored and evaluated by the controller in accordance with the programming (see SVC1/SVC2 service contact).

### BV1 / BV2 Service valves Filter 1 and 2

The service valves of the filter can be designed as normally closed or opened. Please connect valves which are normally closed to the terminals BV1-nc / BV2-nc. **For safety reasons, the service valves should be designed in a way that they opens under driving voltage.**

#### Note!

In the operating mode "double-filter serial connection", the outputs BV1 and BV2 are used for filter change-over. For this reason, they are not freely available. Please observe the plant example notes in the technical appendix.

### Sync Synchronous contact / Regeneration message

(formerly: 8th-contact at MMP70/81)

After a power failure (e.g. during regeneration) or if faults occur, it is often necessary to synchronize the valves or pilot distributors with the controller. It is even necessary to connect regeneration valves/pilot distributors with change-over control and an odd number of (electric) regeneration settings to the synchronous contact. Due to this, the regeneration valve / pilot distributor returns to the operating position after regeneration. The connection takes place at terminal Sync - 8.

The connection Sync - PR can be used for the external display of the program cycle (regeneration) or for the control of a contactor or magnetic valve during regeneration.

### PR1 / PR2 Supplementary program 1 / 2

The volt-free outputs PR1 (supplementary program 1) and PR2 (supplementary program 2) can be used for various functions:

#### Supplementary program 1

Supplementary program 1 is used, e.g., for the automatic filling of the brine tank or for the control of an additional valve - prior to, during or after regeneration with a programmable operating time. If output PR1 is switched, the LED "ZP1" lights up as a check.

Program the function under menu option (see basic programming "Supplementary program 1"):

"M" → BASIC PROGRAM → Aux. prog. 1.

#### Supplementary program 2

Supplementary program 2 can only be switched on and off twice during regeneration. If output PR2 is switched, the LED "ZP2" lights up as a check.

Program the function under menu option (see basic programming "Supplementary program 2"):

"M" → BASIC PROGRAM → Aux. prog. 2.

#### Note!

Supplementary programs 1 and 2 are used for filter change-over in the operating mode "double-filter serial connection". For this reason, they are not freely available. Outputs BV1 and BV2 also have a special function. Please observe the plant example notes in the technical appendix.

The two supplementary programs are also not freely available when using pilot distributors (e.g. Siata V250/V360).

(Programming: "M" → BASIC PROGRAM → Valve type → Pilot valves)

Please also observe the example in the technical appendix.

### AL Fault message output ("Alarm")

Output "AL" is a volt-free change-over relay contact. During trouble-free operation, the contact between the terminals 23 - 24 is closed and the one between terminals 22 - 23 is open. During power failure or if an error occurs, the contact between terminals 22 - 23 is closed and the one between 23 - 24 is open.

The controller monitors several plant statuses. Output "AL" remains activated (terminals 22 - 23 closed) until the fault ceases and is confirmed.

A fault is displayed with the red LED "Error message" and in the display.

The fault message signal at output "AL" is deleted by confirming the fault with the "Horn" key.

The fault display can only be deleted if the fault has been eliminated.

The following faults activate output "AL" and are displayed if the softening plant or valves/pilot distributors have been equipped with the appropriate contacts:

Statuses which **always** trigger a fault message:

Power failure

Plant override (regeneration start during filter regeneration)

Error hardness measurement (if current input has been programmed as 4-20mA and no current is measured)

Error messages which occur depending on the programming:

Minimum regeneration interval not achieved

Maximum number of regenerations achieved (when reaching the regeneration meter)

Regeneration stopped via Stop input

Error Testomat 1 (ALC1)

Error Testomat 2 (ALC2)

Error Ventil 1 (SVC1)

Error Ventil 2 (SVC2)

Depending on programmed PROG1 input:

Brine/Chemicals low

Depending on programmed PROG2 input:

Brine/Chemicals overflow

With active disinfection facility:

Error Disinfection

### Impulse / Dosing output

Use output "Impulse" to control a dosing pump if dosing should take place during operation. For this, a water meter has to be connected to the input "WM1" or "WM2". The impulse interval in litres can be set (litre/impulse).

Example:

An impulse lasting 1 second should be given per 50 litres : L/Imp. = 50.0, I.duration = 1.0sec

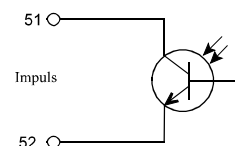
A dosing distance of less than 50 L/Imp should not be entered for this water meter! The minimum dosing impulse distance corresponds to the water meter constant.

"M" → Basic program → Dosing

"M" → Basic program → Water meter 1

"M" → Basic program → Water meter 2

The output is an open collector transistor with a **max. load capacity of 50mA/30V**.



## Description of signal inputs

### Note!

Connect the signal inputs "SVC1", "SVC2", "ALC1", "ALC2", "START", "STOP", "PROG1" and "PROG2" only to **volt-free** contacts!

### SVC1 and SVC2 check inputs operating position valve

When using pilot distributors or regeneration valves equipped with a volt-free signal contact for the operating position, it is possible to connect this contact to input "SVC1" for filter1 and "SVC2" for filter2. An operating fault is then monitored and, depending on the programming, evaluated by the controller.

Function	Test time	Type of contact	Type of contact connection	Action
<b>SVC1, SVC2</b> – signal contacts for operating position of the filters	1 - 99 sec.	Normally closed	Contact during operation	- Entry in error list programmable: - Continuous alarm
		Normally open	Contact during regeneration	

Please program the inputs according to the operating mode of the signal contacts under:

"M" → Basic program → Funct. SVC 1

"M" → Basic program → Funct. SVC 2

### ALC1 and ALC2 Alarm inputs for hardness measuring instruments (Testomat)

If the softening plant is equipped with hardness measuring instruments (e.g. Testomat 2000/ECO), we recommend monitoring these instruments for faults. Operating faults and hardness monitoring instrument errors are then monitored and, depending on the programming, evaluated by the controller.

Function	Type of contact	Test time	Action
<b>ALC1</b> – Alarm input "Hardness measuring instrument", on the input side or Testomat 2000 DUO	programmable normally closed/ normally open	programmable 1 - 99 seconds	– Calculate filter performance/soft water quantity with programmable water hardness (with measured total water hardness) – with DUO: regeneration only quantity-dependent, ignore START signal – Entry in error list programmable: – Continuous alarm
<b>ALC2</b> – Alarm input "Hardness measuring instrument", on the output side	programmable normally closed/ normally open	programmable 1 - 99 seconds	– Regeneration only quantity-dependent, ignore START signal – Entry in error list programmable: – Continuous alarm

### START external regeneration start

Connection for hardness monitoring instrument (e.g. Testomat)

Function	Type of contact	Test time	Action
<b>START</b> – Start of regeneration after filter exhaustion	programmable normally closed/ normally open	programmable 1 - 99 seconds	– Filter change (only serial and double-filter operation) – Regeneration start – Entry in history

Install a hardness monitoring instrument at the input/soft water side to avoid hard water (e.g. due to insufficient regeneration) being supplied by the plant.

If the limit value is exceeded (the limit value contact of the Testomat switches), the filter in the reserve/ready position goes into operation after a programmed test time and the exhausted filter is regenerated.

"M" → Basic program → Funct. Start

### Note!

If the plant is operated with a hardness monitoring instrument for triggering regeneration, we recommend monitoring the trouble-free functioning by connecting the alarm contact of the Testomat to input ALC2.

## STOP external regeneration interruption/prevention

Connection for volt-free contact

Function	Type of contact	Test time	Action
<b>STOP</b> – Regeneration stop	programmable normally closed/ normally open	programmable 1 - 99 seconds	– Regeneration interruption or prevention of a pending regeneration

During regeneration, it might be necessary to interrupt the regeneration externally via a switch (e.g. pressure switch at the input). A running regeneration can be stopped or a pending regeneration delayed via a contact at the STOP input. The message: "Reg. STOP" appears on the display.

"M" → Basic program → Funct. Stop

## PROG1 and PROG2 programmable function inputs

Inputs "PROG1" and "PROG2" can be used to connect level transmitters (monitoring or automatic filling of the brine tank) for an extended checking of the plant.

Function	Type of contact	Test time	Action
<b>PROG1</b> – Level transmitter input: "Chem. low" alarm or "EMPTY" level brine	programmable normally closed/ normally open	programmable 1 - 99 seconds	programmable: – Brine filling valve opens (relay output PR1 in connection with supplementary program 1) – Continuous alarm – Entry in error list
<b>PROG2</b> – Level transmitter input: "Chem. overflow" alarm or "FULL" level brine	programmable normally closed/ normally open	programmable 1 - 99 seconds	programmable: – Brine filling valve closes (relay output PR1 in connection with supplementary program 1) – Continuous alarm – Entry in error list

"M" → Basic program → Funct. PROG1

"M" → Basic program → Funct. PROG2

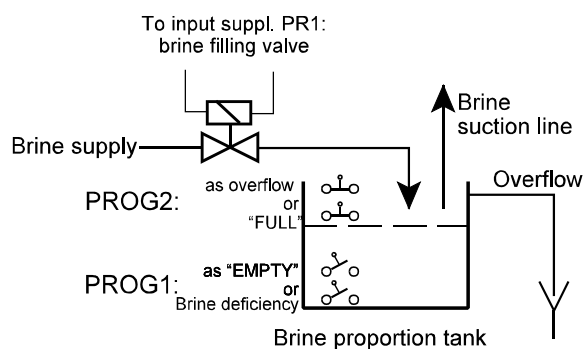
Example:

The supplementary program 1 with input PROG1 has to be started for automatic filling. Please program the supplementary program 1 accordingly:

"M" → Basic program → Aux. prog. 1

→ Start PROG1

The filling valve closes again if the level switch "FULL" opens at PROG2 input.



## Disinf. 12 AC and Disinf. Cell, connections for disinfection facility

In connection with the plug-in card **Disinfection DES2002 (Art. no. 37262)**, it is possible to disinfect the resin bed and/or monitor the salting during the salting process. An external power supply (12V AC) has to be connected for the disinfection mode. An electrolysis or measuring cell also has to be installed in the brine suction line(s). In the case of double-filter plants with separate suction lines, one cell is required for each suction line; the cells have to be connected in parallel.

### Disinfection

Program the regeneration stage "Salting" in which the disinfection is to be started:

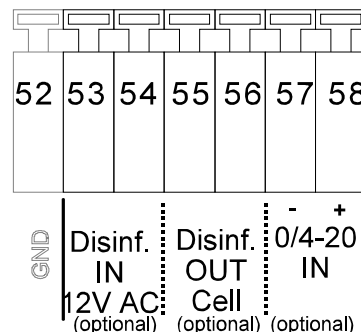
"M" → Basic program → Disinfection  
→ Start stage

The controller determines the disinfection intensity on the basis of the programmed exchanger capacity. In this case, a continuous current regulation takes place to guarantee a consistent generation of sodium hypochlorite.

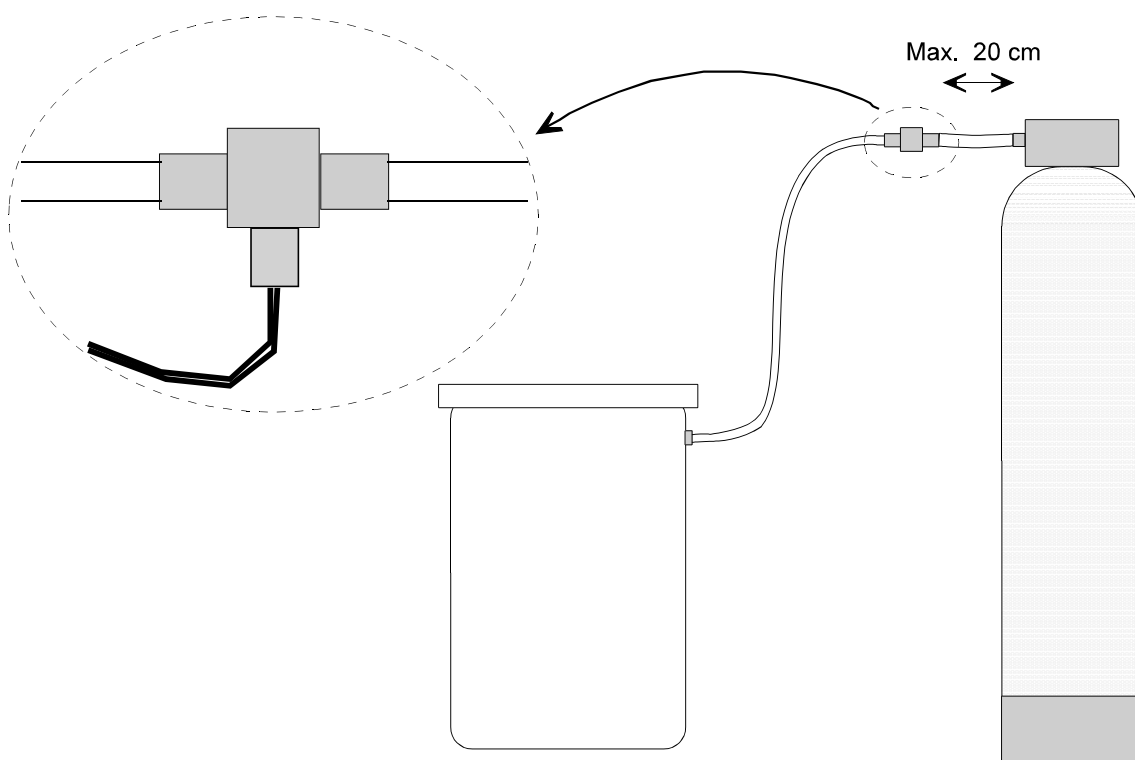
### Brine monitoring

An alarm is triggered if the brine conductivity changes during brine suction due to the sucking in of air or if the conductivity is too low due to insufficient brine concentration. It is also possible that the electrodes of the cell are contaminated/oxidized or used up. (see error message: "Error Disinf. " and also menu "Disinfection")

Terminal block identification:



### Installation of the disinfection cell in the brine suction line





#### IN 0/4-20mA total water hardness measuring signal (Testomat 2000/ECO)

Function	Connection	Test time	Action
Input for interface 0/4 - 20 mA	Terminals 57 / 58 load type 200 Ohm	-	- Total water hardness (measuring signal of the Testomat 2000/ECO)

The measuring input **IN 0/4-20mA** (only in connection with the **optional** plug-in card **disinfection DES2002, Art.no. 37262**) for connecting a hardness measuring instrument Testomat 2000/ECO with 0/4-20mA output is used for the automatic calculation of the filter capacity (available soft water quantity in m<sup>3</sup>) on the basis of total water hardness. Program the measuring range of the used reagent in the menu:

"M" → Basic program → Funct. IN 0-20mA → max. h.

If the filter performance is to be calculated automatically, activate the function in the menu:

"M" → Basic program → Exchange Cap. → Calc. f. cap.

#### Note!

In the case of automatic filter capacity calculating, we recommend monitoring the trouble-free functioning of the hardness measuring instrument. For this, please connect the alarm contact of the Testomat 2000/ECO with the alarm message input ALC1. This way, an incorrect calculation can be avoided when faults occur. The controller then calculates the filter capacity with the programmed total water hardness. If the input is programmed as 4-20mA input and there is no signal (< 4mA), the calculation of the filter capacity also takes place with the programmed total water hardness.

Request the total water hardness in the service menu (e.g.):

"M" → Service → Hardness raw water → Measured: 16.7°dH

#### RS232 Serial interface (terminal block left and 9-pole D-Sub)

Function	Connection	Test time	Action
serial interface RS 232	see terminal block identification on page 7	-	- Connection to printer (alternative connection to Testomat 2000 or further Softmaster instruments being planned)

Activate the function of the output in the menu accordingly:

"M" → Basic program → Interface

According to the connected peripheral device, set this in the menu ( printer).

# Programming

## Start menu

Call the menu with the "M" key.

## Menu selection

The current line position is displayed as a heading in CAPITAL LETTERS. Activate the selected/displayed menu option with the "ENTER" key, i.e. you "jump" into a submenu. Call the next menu point with the "DOWN" arrow key: thus you "scroll" the menu.

## Input

**Inputs are only possible in the BASIC PROGRAM menu and in some SERVICE menu options.**

Select a programming step with the "DOWN" and "UP" arrow keys and activate the input function with the "ENTER" key.

When entering digits, the digit/position to be changed flashes.

Change to the next or previous digit (now flashing) with the "Right" and "Left" arrow keys.

Change the value or selection with the "DOWN" and "UP" arrow keys.

Selected functions are marked with a ✓ if selection is possible.

Terminate the input function with "ENTER".

Change to the higher-order menu with the "M" key.

## End menu

Return to the higher-order menu with the "M" key. After returning from the highest menu level, the unit is once again in the display function.

## Information menu

"M" → Information

Request the current settings without entering a password in the information menu.

The information menu is also displayed if an incorrect password has been entered.

## Programming

"M" → Basic program

## Enter password

The programming menu is protected with a 3-digit password (number between 000 and 999) in order to prevent unauthorised intervention in the programming.

Enter the password under "M" → Basic program → input password and confirm the input with "ENTER".

You are now in the menu **BASIC PROGRAM**

## Change password

Enter or change your individual password at any time. For this, enter the old password (OLD: ) and then the new one (NEW: ).

When restoring the factory settings, the password is also deleted and reset to 000!

"M"



MENU
Service
Information
Basic program

BASIC PROGRAM
Input Password
Change Password
Password:

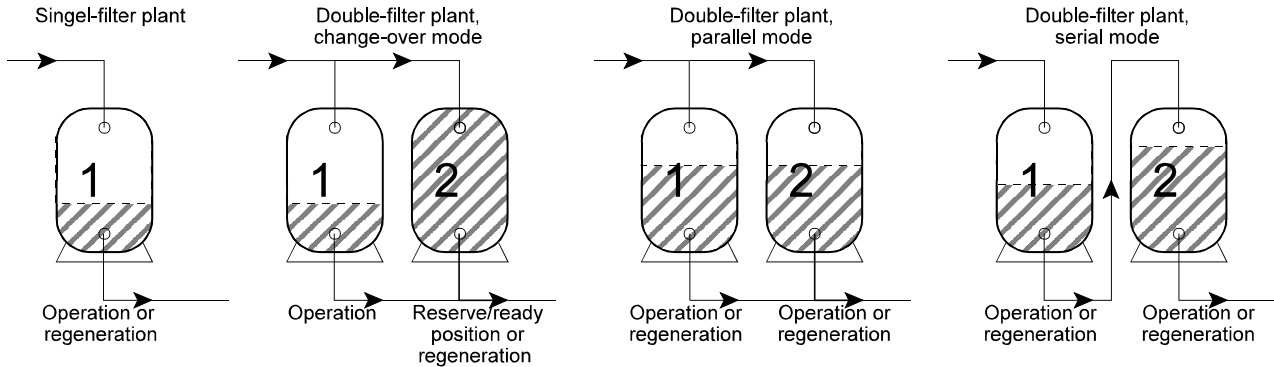
# Functioning and programming description

## Switching on and voltage loss

After switching the unit on and after each voltage loss, the plant automatically returns to the last active position.

## Operating modes (type of plant)

Control the following softening plants with the controller Softmaster MMP2:



### Single-filter plant

Only one filter (filter 1) in operation, no soft water is available during regeneration.

Programming: “**Single- filter** ✓”

### Double-filter change-over mode

Alternately, one filter in operation, one filter in reserve/ready position or in regeneration. Usually, soft water is always available.

Programming: “**2-F. alternate** ✓”

### Double-filter parallel mode

Both filters in operation. Usually, soft water is always available.

With the parallel mode, only quantity-dependent regeneration triggering should be selected. Only enter the capacity of **one** filter.

When commissioning the plant, both filters are regenerated, one after the other. After this, soft water is removed. After removing a filter's soft water, a regeneration is started. At this point of time, both filters are half exhausted. After regeneration, the regenerated filter has full soft water capacity while the other filter is available with its residual capacity.

Programming: “**2-f. parallel** ✓”

### Double-filter serial mode

Both filters in operation. Alternately, one filter is first filter, the other one is connected downstream as a “polishing filter”. After removing a filter's soft water, the first filter is regenerated and the second filter becomes first filter. The regenerated filter becomes “polishing filter”. Usually, soft water is always available.

Programming: “**2-f. serial** ✓”

OPERATING MODE	
Single-filter	-
2-F.alternate	✓
2-F.parallel	-
2-F.serial	-

### Note!

As the supplementary programs 1 and 2 are used for the filter change-over in this operating mode, they are not freely available. Outputs SV1 and SV2 also have a specific function. Please observe the notes on the plant example in the technical appendix.

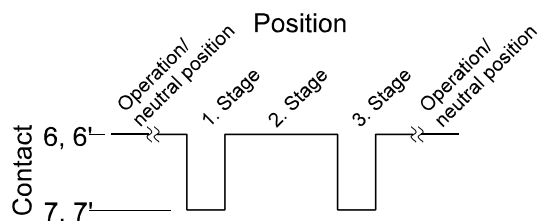
## Electric control of regeneration valves

It is possible to use central control valves or pilot distributors with up to 8 stage/positions with impulse or change-over control as well as pilot valves with 4 positions.

In the case of pilot valves, the number of stages is set to a maximum of 3 regeneration stages as these valves usually have 4 positions.

VALVE TYPE	
Change-over	✓
Impulse	–
Pilot valves	–

Examples for 4-stage valves/pilot distributors:  
as change-over

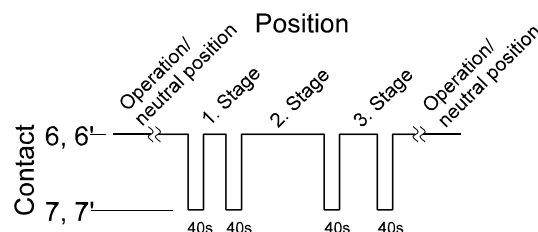


In the case of change-over switches, the output changes after each regeneration stage. If the number of mechanical positions is odd, the return movement to the operating position has to take place via the synchronous contact (operating switch).

In the case of plants with pilot valves, the relay outputs filter 1/2 and the supplementary program PR1/2 change after each regeneration stage.

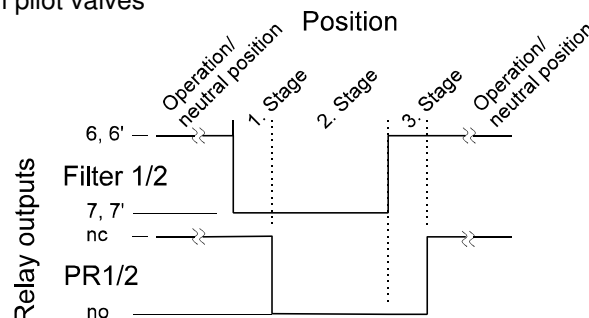
For a description of the connection, see example in the technical appendix.

as impulse



In the case of impulse switches, the output switches for 40 seconds at the beginning of each stage (terminal 7 or 7').

with pilot valves



## Hardness unit

Enter and display the total water hardness in different units:

**German hardness = °dH**

**French hardness = °f (1.79 °f  $\triangleq$  1 °dH)**

**ppm as CaCO<sub>3</sub> = ppmCaCO<sub>3</sub> (17.9 ppmCaCO<sub>3</sub>  $\triangleq$  1 °dH)**

Enter the **exchange capacity** according to the unit (in the next menu option).

HARDNESS UNIT	
°dH	✓
°f	–
ppmCaCO <sub>3</sub>	–

## Exchange capacity

The controller calculates the filter capacity of available soft water quantity in m<sup>3</sup>.

For this, enter the **exchange capacity** of a filter in m<sup>3</sup>x°dH, m<sup>3</sup>x°f or gCaCO<sub>3</sub> and the current total water hardness (in the "Service" menu).

EXCHANGE CAP.	
m <sup>3</sup> °dH	100
Calc. f. cap.	–

## Manual calculation of the filter capacity

If the function "calc. f. cap." is not activated, the filter capacity (often also described as filter performance), i.e. the available soft water quantity, is calculated on the basis of the entered total water hardness.

"M" → Service → Hardness raw water → Setting: 016°dH (example)

$$\text{Filter performance} = \frac{\text{Exchange capacity}}{\text{Total water hardness}} \quad (\text{in m}^3)$$

### Automatic calculation of the filter capacity

If the total water hardness varies strongly, it is also possible to automate the calculation of the filter capacity (available soft water quantity). The total water hardness is measured with an analysis instrument (Testomat 2000/ECO) and requested at the measuring input **IN 0/4-20mA** (only in connection with the **optional** plug-in card **Disinfection DES2002, Art. no. 37262**). The request interval for the calculation is one minute. If the alarm contact of the analysis instrument is connected to the alarm message input ALC1, the controller measures the filter capacity if the measuring instrument is not working correctly on the basis of the entered total water hardness.

If the filter capacity is to be calculated automatically, activate the function in the menu:

"M" → Basic program → Exchange cap. → Calc. f. cap.

Request the total filter capacity (available soft water quantity after regeneration) in the service menu:

"M" → Service → Exchange cap.

The remaining residual filter capacity or residual soft water quantity is shown in the operating display.

## Regeneration

### Regeneration start

Regeneration of an exhausted filter can be started via different triggering criteria:

- Manually by operating the "Run/Stop" key (press the key for 5 seconds)
- After removing the set soft water quantity (filter capacity)
- After the end of the set daily interval at the programmed time
- Via start impulse from the water hardness measuring instrument (Testomat)

### Manual regeneration

A filter change takes place when starting regeneration manually. The filter in operation is regenerated and the filter in the reserve/ready position is put into operation.

### Quantity-dependent regeneration

In most cases, we recommend recording the removed soft water quantity and to regenerate the filter when the calculated filter capacity has been reached. The controller calculates the filter capacity on the basis of the programmed exchanger capacity ( $\text{m}^3 \times \text{°dH}$ ) and total water hardness. Quantity recording takes place via a water meter in the filter/plant output.

Program **regeneration delay** in order to avoid a regeneration taking place at an inappropriate time for the operation. A necessary regeneration only starts at the set time, e.g. 20:00 (see "Regeneration delay").

During change-over mode, there is an immediate change to the filter in reserve and regeneration of the exhausted filter is caught up on at the set time.

The filter can be overrun due to delayed regeneration. Additionally select a **premature regeneration triggering** (reg. start at x% of residual filter capacity) to avoid this happening.

### Time-dependent regeneration

If there should only be a time-controlled regeneration of the plant, program the daily interval and the time of regeneration (**regeneration delay = ON**).

### Quality-controlled regeneration

Using the internal control functions in connection with a water hardness measuring instrument (e.g. Testomat 2000/ECO), it is possible to construct a convenient and reliable plant. The water hardness measuring instrument monitors the soft water hardness and sends a start signal to the controller in order to trigger regeneration if the set limit value has been reached.

Due to the combination of the different control possibilities, it is possible to assure the greatest possible operating safety.

### Stop or delay the regeneration

Manually cancel a running regeneration at any time with the "Run/Stop" key. A regeneration can be delayed or a running regeneration stopped via a contact at the "Stop" input.

### Regeneration stages

Up to 8 regeneration stages can be programmed. Exception: In the case of pilot valves, the number of stages is set to a maximum of 3 regeneration stages as these valves usually have 4 positions.

The minimum duration per stage is 1 minute (operating time of the valve/pilot distributor), the maximum duration is 99 minutes.

## Regeneration delay

Program regeneration delay ON and the corresponding time if a triggered regeneration (e.g. due to reaching the filter capacity, via time interval or measured hardness irruption) is to be carried out at a later time or only during a time window. Regeneration only starts at the set start time "**Reg. at:** ", e.g. 20:00. Enter the latest time for the regeneration start under "**Reg. to:** ", e.g. 06:00. This prevents regeneration taking place at an inappropriate time for the operation.

REG. DELAY	
On	—
Reg. at:	20:00
Reg. to:	06:00
BV on (1-F, P)	✓

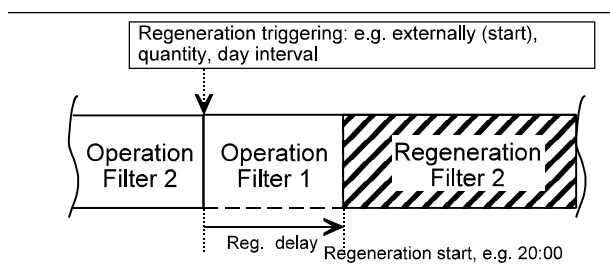
During change-over mode, there is an immediate change to the filter in reserve and regeneration of the exhausted filter is caught up on at the set time.

In the case of single-filter plants, it is possible to preset whether the service valve remains open until regeneration or whether it is closed immediately: "**BV on (1-F.)** ✓" = service valve will close at start of regeneration.

### Note!

The filter can be overrun due to delayed regeneration. Additionally select a **premature regeneration triggering** (reg. start at x% of residual filter capacity) to avoid this happening.

Example for double-filter:



## Premature regeneration triggering

Select this function for single-filter plants in order to guarantee a specific quantity of soft water for the following day. Please additionally program "Regeneration delay" with the desired time for the regeneration start if regeneration is not to start when the set residual filter capacity has been reached. This prevents regeneration taking place at an inappropriate time for the operation.

REG. PRE-TRIG.	
Resid. cap.	10%
Prop. salting	—

In the case of double-filter plants, there is an additional application possibility in connection with "Regeneration before commissioning".

Set values of between 0 and 50% of soft water reserves for a premature regeneration triggering. (Basic setting is 0% = **no** premature regeneration triggering)

## Economic (proportional) salting

Shorten the time of the salting stage in proportion to the consumption via the function "Economic salting" (proportional salting). If, for example, regeneration is triggered at 30% of residual filter capacity, the salting time is only 70% of the programmed time; but salting time is at least 10% of the programmed time.

### Note!

This possibility is only available with 5-stage central control valves or pilot distributors or with appropriately designed fittings which have separate positions for "Salting" and "Wash slowly". Enter the salting stage under menu option "Disinfection".

## Regeneration interval

Regeneration can be carried out at fixed daily intervals in order to avoid improper bacterial contamination of the resin bed during longer downtimes. The regeneration interval (0 - 99 days) complies with the operating conditions and national regulations on the supply of drinking water (e.g. DVGW, DIN, etc.).

If regeneration is to take place at a specific time, please additionally program "Regeneration delay" with the desired time for the regeneration start.

**Without** regeneration delay, the filter is regenerated at the same time as the last regeneration.

The interval restarts after each completed regeneration.

Request the time - in days - of the next interval regeneration in the menu under "M" → Service → Reg. info → Interv. days.

On the day of the interval triggering of a regeneration, the control lamp "REG" of the corresponding filter starts to flash at midnight (00:00).

REG. INTERVAL

Days 0

## Regeneration before service

Select this type of triggering for double-filter plants at which bacterial contamination problems, due to longer downtimes of the filter in reserve, can occur.

In order to still have soft water available during the regeneration time, trigger regeneration via the "premature regeneration triggering" early enough for soft water to still be removed for approx. 2 hours.

REG. BEFORE SERV

On -

### Note!

It is **not** possible to combine this operating mode with the supplementary program 1 before a regeneration with immediate filter change.

The manual service functions "Regeneration of the reserve filter" and "Filter change without regeneration" are also not possible in this operating mode.

## Minimum regeneration pause

If the softening plant is equipped with a desalination tank for brine storage, the interval between two regenerations has to be at least 4 hours in order to achieve a sufficient concentration of brine. Otherwise, the regeneration is insufficient and quickly leads to an "Overrun" of the plant.

MIN. REG. PAUSE

10min

If regeneration can also be triggered by an analysis instrument (e.g. Testomat) due to hardness irruption, use the minimum regeneration interval in order to avoid regenerating too frequently which is caused by premature triggering. Premature triggering can occur, e.g., due to hardness increase caused by the counter ion effect or due to insufficient washing out of the filter or if the measuring instrument is not functioning correctly.

If regeneration triggering (e.g. caused by reaching the max. quantity to be removed or externally by an analysis instrument) occurs within this time, an error message "Min. reg. interval" is displayed and the alarm relay switches. The regeneration has to be triggered manually.

## Regeneration stages

Enter the number of regeneration stages (without operating position!) and the time of the individual stages according to the used central control valves or pilot distributors. Up to 8 regeneration stages/positions can be programmed.

The number of stages is fixed to a maximum of 3 regeneration stages when using pilot valves as these valves usually have 4 positions.

The following times are programmable:

Stage 1: 1 - 250 minutes, Stages 2: 1 - 99 minutes, stages 3: 1 - 99 minutes, all other stages: 0 - 99 minutes.

Example:

Valve position

Time (duration)

Operation	-
Re-rinse	10 minutes
Salting and	
Slow washing	60 minutes
Washing out /	
Quick washing	20 minutes

REG. STAGES

Max. stages 3

Stage 1: 10m

Stage 2: 60m

Stage 3: 10m

Stage 4: 0m

Stage 5: 0m

Stage 6: 0m

Stage 7: 0m

Stage 8: 0m

## Supplementary program 1

With the supplementary program 1, a valve or pump can, e.g., **only** be switched on **once** for a programmed time either before, during or after regeneration. Activate this function with "**Start reg.** ✓".

Enter the triggering time of the supplementary program under "**Start stage:** ":

**0 =** Before the regeneration, after the exhaustion of the filter capacity. Filter change (change-over to service valves) or regeneration start with **regeneration before commissioning** only takes place after the end of the supplementary program.

Program "**BV off (only 0)** ✓" if the change-over to service valves = filter change FC (or closing of the SV at single-filter plants) is to occur immediately after the exhaustion of the filter capacity. Start of the regeneration cycle only takes place after the end of the supplementary program. **Not possible with regeneration before commissioning !**

**1 to 8:** With the start of the entered regeneration stage 1 to 8, maximum like the number reg. stages.

**2 to 9:** After the end of the last regeneration stage, maximum like the number reg. stages + 1.

Program how long the relay should be switched under "**Duration**" from 0 to 999 minutes.

0 means that a supplementary program is not required.

Alternatively, it is also possible to use supplementary program 1 for the automatic filling of the brine tank. Activate this function with "**Start prog 1** ✓".

The input is switched (fill brine tank/brine filling valve open) if the "Prog1" input (EMPTY level brine tank) is active. If the "Prog2" input (FULL level brine tank) is active, output "PR1" moves to the neutral position (brine filling valve closed).

If output PR1 is switched, the LED "ZP 1" light up as a check.

### Note!

In the operating mode "double-filter serial connection", the supplementary programs 1 and 2 are used for filter change-over. For this reason, they are not freely available.

When using pilot valves, the outputs also have a specific function. Please observe the plant examples in the technical appendix.

## Supplementary program 2

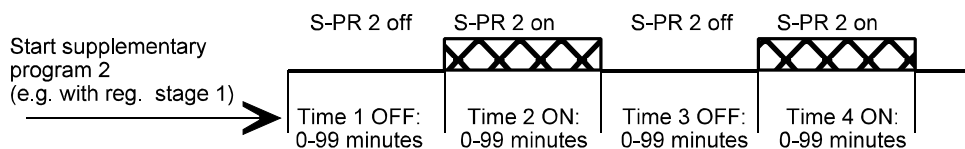
With the supplementary program 2, a valve or pump can **only** be switched on and off **once or twice during** regeneration.

Enter the triggering time of the supplementary program under "**Start stage:** ":

**1 to 8:** With the start of the entered regeneration stage 1 to 8

**9:** After the end of the last regeneration stage

Enter the time stages under "**Time 1 OFF** " to "**Time 4 ON** ":



If output "PR2" is switched, the LED "ZP 2" light up as a check.

If output "PR2" is not switched ("OFF" time), the LED "ZP 2" flashes as a check.

AUX PROG. 1	
Start prog 1	-
Start reg.	✓
Start stage:	1
Duration	0m
BV off (only 0)	-

AUX PROG. 2	
Start stage:	1
Time 1 OFF	0m
Time 2 ON	0m
Time 3 OFF	0m
Time 4 ON	0m



## Water meter

The controller has two independently operating water meter inputs. Water meter 1 is used to record the used soft water quantity. The memory of this water meter is deleted after each regeneration and, in case of parallel operation, also during the start of regeneration. Water meter 2 can be used for dosing purposes or for measuring the total consumption.

Set the impulse numbers for the contact water meter or turbines in the menu:

Consumption values for both filters are administered separately. The residual capacity remains stored during a filter change.

Request the recorded quantities in the "Service" menu, e.g.:

"M" → Service → Water meter 1 → L/Imp: 43 m<sup>3</sup>

"M" → Service → Water meter 2 → L/Imp: 72360 m<sup>3</sup>

WATERMETER 1
L/Imp. 100.000

WATERMETER 2
L/Imp. 100.000

## Dosing

Use the output "Impulse" for the control of a dosing pump if dosing is to take place during operation. Program the water meter to be used for dosing, the volume for which an impulse is given as well as the impulse period. **Please note that it is not possible to enter an impulse interval in litres which is smaller than the basic number of the water meter.**

Alternatively, it is also possible to use the impulse output to duplicate the contact of the water meter signal. We recommend this if you wish to control the hardness measuring instrument (e.g. Testomat 2000 DUO) quantity-dependently. For this, please observe the instructions of the connected hardness measurement instrument.

DOSING
Active WM 1 ✓
Active WM 2 –
L/Imp. 100.000
I.length 0.5sec

## Disinfection

If the softening plant is equipped with a disinfection facility (**optional** plug-in card **disinfection DES2002**), it is possible to disinfect the resin bed and/or monitor salting during the salting process.

Activate this function with:

"M" → Basic program → Disinfection → "ON" ✓

DISINFECTION
On –
Start stage 2
Min.suct.t. 30m

The intensity of the sodium hypochlorite generation via electrolysis is set and controlled automatically on the basis of the plant/filter size.

## Start stage

The disinfection facility is only switched on during the "Salting" stage. Please enter the start stage ("Salting" stage).

## Minimum suction time

Please enter the minimum brine suction time for monitoring the salting process. An alarm is triggered if the brine conductivity changes during brine suction or if conductivity is too low due to insufficient brine concentration. (see error message: "Error disinfect.")

Please enter the value 0 for the "Min. suction time" if no monitoring is to take place.

## Valve monitoring (SVC inputs)

The controller has the two inputs SVC1 and SVC2 for monitoring the filter position. Connect regeneration valves or pilot distributors with a contact (voltage-free!) for the operating position. The controller can thus display malfunctioning of the valves (e.g. motor failure) as error messages. Program the desired contact effect, test time (delay) and alarm function (no alarm = only display message).

The menu for programming input **SVC2** is structured as shown in the example for SVC1 (see opposite example).

FUNCT. SVC 1
Norm. closed –
Norm. open ✓
Delay 10s
Funct. Alarm ✓

## Monitoring of hardness measuring instruments (ALC inputs)

When equipping the softening plant with hardness measuring instruments (e.g. Testomat 2000/ECO), we recommend monitoring them for faults. The controller then monitors and evaluates operating faults and errors of the hardness monitoring instruments according to the programming.

### Total water measurement

If the alarm contact of the analysis instrument for total water hardness is connected to the alarm message input ALC1, the controller calculates the filter capacity on the basis of the entered total water hardness if the measuring instrument is not operating correctly.

"M" → Basic program → Funct. ALC 1 → "Funct. alarm ✓"

FUNCT. ALC 1	
Norm. closed	
Norm. open	✓
Delay	10s
Funct. Alarm	✓

When using a Testomat 2000 DUO for checking the soft water quality and for the simultaneous measuring of the total water hardness, connect the alarm output of the Testomat 2000 DUO to the ALC1 input. The controller regards existing error messages at the ALC1 input as total water measurement and soft water checking faults. Precondition for this is that the function "T2000 DUO" has been entered for the 0/4-20mA input under the menu option "Funct. IN 0-20mA".

### Soft water checking

If the alarm contact of the analysis instrument for checking the soft water quality is connected to the alarm message input ALC2, a possible existing START signal is ignored and regeneration is only triggered quantity-dependently when faults occur. Activate this function with:

"M" → Basic program → Funct. ALC 2 → "Funct. alarm ✓"

The menu for programming input **ALC 2** is structured as shown in the example for ALC 1 (see upper example).

### Note!

If the plant is operated with a hardness monitoring instrument for regeneration triggering, we recommend monitoring the trouble-free functioning by connecting the alarm contact of the Testomat to the input ALC2. Also avoid too frequent regenerating, caused by faults at the hardness monitoring instrument, by entering a minimum regeneration interval. If the hardness monitoring instrument triggers a new regeneration during this time, it is ignored and an error message "Min. reg. interval" is displayed.

## Function START input

If a regeneration is to be triggered quantity-dependently, a water hardness measuring instrument has to monitor the soft water hardness. When a set limit value has been reached, the measuring instrument sends a start signal for triggering regeneration to the controller.

In the case of double-filter plants, a filter change (only serial and change-over mode) takes place and regeneration is started according to the programming (e.g. regeneration delay).

"M" → Basic program → Funct. start

FUNCT. START	
Norm. closed	
Norm. open	✓
Delay	15s

## Function STOP input

During regeneration it might be necessary to interrupt this regeneration externally via a switch (e.g. pressure switch in the input). Due to a contact at the STOP input, a running regeneration can be interrupted or a pending regeneration delayed.

FUNCT. STOP	
Norm. closed	
Norm. open	✓
Delay	5s
Funct. Alarm	✓

## Function PROG1 input

The programmable input "Prog 1" is designed for special functions as level transmitter input for the "Brine deficiency" alarm or the "EMPTY" level during automatic brine filling. Program the desired contact effect, test time (delay) and alarm function. When monitoring the desalination tank for brine deficiency, the input is requested at start of regeneration. If the input is active = "Brine/Chemicals low" alarm, **no** regeneration is triggered. Regeneration has to be triggered manually and the error message confirmed. If the input is active during automatic filling of the brine tank (also see supplementary program SP 1) and after the test time "Delay prog 1", output ZP1 switches. During simultaneous "Chemicals low" monitoring, a "Chemicals low" alarm message (e.g. tank is still EMPTY despite an open filling valve) is displayed after the test time of the input.

FUNCT. PROG 1	
Norm. closed	
Norm. open	✓
Delay	3s
Chemicals low	✓

The programmable input "Prog 2" is designed for special functions as a level trans-mitter input for the "Chem. overflow" alarm or the "FULL" level during automatic brine filling. Program the desired contact effect, test time (delay) and alarm function. When monitoring the desalination tank for brine overflow (input "Prog 2" active), a "Chem. overflow" alarm message occurs after the test time "Delay prog 2".

FUNCT. PROG 2	
Norm. closed	
Norm. open	✓
Delay	3s
Chem. overfl.	✓

If the filter capacity calculation (available soft water quantity) takes place on the basis of the measured total water hardness (in connection with an analysis instrument, e.g. Testomat 2000/ECO/DUO), the setting of the signal input "IN 0/4-20mA" has to comply with the measuring instrument:

<b>Testomat 2000/ECO/DUO</b>	<b>Softmaster MMP 2</b>
<b>Interface (type)</b>	<b>Type</b>
0-20mA	0-20mA
4-20mA	4-20mA
<b>Reagent (measuring range)</b>	<b>max. h. (hardness)</b>
TH2100 (1-10°dH)	10
TH2250 (2.5-25°dH)	25

FUNCT.IN 0-20mA	
0 - 20 mA	✓
4 - 20 mA	-
T2000 DUO	-
max.H.	25.0°dH
min.H.	2.5°dH

If a Testomat 2000 DUO is connected in order to check the plant for hardness irruption/exhaustion and to measure total water hardness, activate the function **"T2000 DUO ✓"**.

The input of the maximum hardness is used for the parameterization of the current signal in order to calculate the total water hardness measured by the measuring instrument.

If the hardness falls below the value of the smallest possible total water hardness, calculation takes place on the basis of the entered total water hardness. (Input under "M" → Service → Hardness raw water → Input)

Program the type of the built-in serial interface according to the used plug-in card. Standard is RS232 for firmware updates via PC or for connecting a protocol printer.

INTERFACE
RS232
RS485

With the built-in serial interface, it is possible to program the controller or to request controller data via a PC/laptop (program “Softmaster Vision” is necessary):

Release mode:	none	=	Data transfer locked	
			passive	= Only reading of data is allowed
			active	= Reading/writing of data and programming allowed

RELEASE
none
read only ✓
active

With this function it is possible to display the serial number of this unit.

SERIAL NUMBER  
XXXXXX

## Language

Selection of the desired display language:

At present, these four "standard" languages are available. Other languages are available if desired by customers.

LANGUAGE	
German	✓
English	
French	
Italian	
Polish	

## "SERVICE" menu

Request and change current settings and statuses of the unit in the service menu.

### Regeneration of the filter in reserve

Press the "ENTER" key in this menu to regenerate the filter in the reserve/ready position. No filter change takes place.

**This function is only possible with change-over mode!**

REG.RES.FILTER	
Start	(Enter)

### Filter change without regeneration start

Press the "ENTER" key in this menu to change the filter in operation or, in the case of serial mode, to change the sequence of the filters.

**This function is only possible with change-over und serial mode!**

ONLY F. CHANGE	
Start	(Enter)

### Caution!

The display and memory value of the residual soft water quantity remain stored with each filter change.

### Hardness raw water

Enter the current raw water hardness and request the raw water hardness (Testomat) currently being measured

HARDN.RAW WATER	
Setting:	016.0°dH
Measured:	018.7°dH

### Filter capacity

The calculated total filter capacity is displayed.

FILTER CAPACITY	
Total	35,0m <sup>3</sup>

### Regeneration information

#### Interval days

Display of the number of days until the next interval triggering.

REG.-INFO	
Interval days	2
Chem.supply	05

#### Chemical supply

Display of the number of regenerations still possible until exhaustion of the chemical storage.

Enter the number of regenerations which is possible with the brine/chemical storage in the menu "Reg. counter". The LED "**Chemicals/Brine low**" lights up if the chemical storage is exhausted.

### Regeneration counter

The controller is equipped with a regeneration counter for monitoring the chemical storage, e.g. salt. Enter the number of regenerations which is possible with the brine/chemical storage.

REG.-COUNTER	
Max. Number	08
Reset?	(Enter)

The regeneration meter is off and no monitoring takes place if the value 00 is entered for the presetting of the counter.

The LED "**Chemicals/Brine low**" lights up if the set number of regenerations (= exhausted chemical storage) has been reached.

The menu "Reg. info - Chem.supply" displays the number of regenerations which can still be carried out with the available quantity of salt. The value is automatically diminished by 1 after each regeneration. If the value "0" has been reached, an error message "Max. reg." appears in the display and the fault display "Alarm" flashes. Confirm the alarm by pressing the "Alarm" key.

After the chemicals have been refilled to the prescribed filling height, the regeneration counter is reset to the initial value by pressing “Reset (ENTER)” in this menu.

If the chemical storage tank is, e.g., still half full with chemicals but should still be refilled to the prescribed filling height, the regeneration counter has to be reset to the initial value by pressing "Reset (ENTER)" in this menu.

Even though the message "Max. req." (Chemical low) is displayed, the regeneration cycle is not stopped.

Water meter 1 records the removed soft water quantity for the quantity-dependent regeneration triggering and the total quantity calculated since the last reset.

**Reset (ENTER):** Leads to a reset of the currently stored total soft water quantity.

Water meter 2 records the total quantity calculated since the last reset.

**Reset (ENTER):** Leads to a reset of the currently stored total soft water quantity.

**Quick motion can only be started during a running regeneration!**

**Wait for 1 minute before switching on quick motion if regeneration has been started manually! The function is locked during this time, the waiting period is displayed "Please wait ...s !"**

Press the "ENTER" key to start the quick motion of the regeneration. The programmed time of the regeneration stage is traversed in seconds. At the end of the regeneration started with quick motion, the controller returns to normal operation. Re-press the "ENTER" key to traverse the next stage in quick motion.

QUICK MOTION
Start (ENTER)

The unit records the working hours of the plant/controller and thus the load of the filters.

Request the current operating time in the service menu:

"M" → Service → Oper.time

```
OPER.TIME 00:00
Reset? (Enter)
```

After exchanging the resin bed or filters, it is possible to reset the current operating time to 0 hours::

"M" → Service → Oper.time → Reset

Please observe that the built-in clock only runs if the unit is switched on. Reset, if necessary, the time and date after a longer period of voltage loss or if the plant has been switched off.

**Display:** "M" → Service → Time

The display shows the time and date of the controller.

TIME	DATE
00:00	01.01.01
automat.	-

**Set:** Press the "ENTER" key under menu "M" → Service → Time Date.

Set the time and date by selecting the desired position with the "Right" and "Left" arrow keys and then change the time and date with the "UP" and "DOWN" arrow keys. Press the "ENTER" key again to save the setting and to return to the display function.

Open the error history with “display”. The error history lists the errors which have occurred during current operation.

The occurred error is recorded with error number, time and date.

```
ERROR HISTORY
display
delete
```

e.g.:                Chemicals low     6  
                                06:56      16.06.03

A maximum of 20 errors are stored in a circular buffer, i.e. the oldest error is overwritten with the next error if the buffer is full.

The buffer of the error history is deleted with “delete” and recording restarted.

The list is not deleted after a voltage loss.

## Status history

Open the status history with “display”. The status history lists the statuses which have occurred during current operation.

The status is recorded with time and date,

e. g.: **A. RegF1: 23.7m<sup>3</sup>**  
**21:28 30.09.03**

A maximum of 20 statuses are logged in a circular buffer.

The buffer is deleted with “delete” and recording restarted. The list is not deleted after a voltage loss.

Description of abbreviations:

A. RegF1: xxx m<sup>3</sup> = automatic regeneration triggering at xxx m<sup>3</sup> consumption,  
e.g. due to reaching the capacity or due to interval.

M. RegF1: xxx m<sup>3</sup> = manual regeneration triggering at xxx m<sup>3</sup> consumption, manual start

E. RegF1: xxx m<sup>3</sup> = external regeneration triggering at xxx m<sup>3</sup> consumption via START contact.

F1 -> F2: xxx m<sup>3</sup> = Filter change from filter 1 to filter 2 at xxx m<sup>3</sup> consumption.

F2 -> F1: xxx m<sup>3</sup> = Filter change from filter 2 to filter 1 at xxx m<sup>3</sup> consumption.

STATUS HISTORY

display

delete

## Diagnosis (Test in/out)

The diagnosis menu displays the current statuses of the in- and outputs. For checking purposes (e.g. during commissioning), the output statuses can be manually manipulated with the “DOWN” and “UP” keys. Please make sure that downstream plant parts cannot be damaged.

Active statuses (switched relay, switched input) are represented with “on”, inactive statuses with “off”, e.g.:

**Output SV 1**                      or    **Input SV 1**  
**off**    **on**

The analogue input displays the existing value, e.g.:

**Input MA**  
**6.8mA**

## Software status

Request the current software status here:

SOFTWARE STATUS

62Mxxx TT.MM.JJ

TEST IN/OUT

Output Fil

Output BV2

Output Fi2

Output BV2

Output Sync

Output PR1

Output PR2

Output AL

Output Imp

Input SVC1

Input SVC2

Input ALC1

Input ALC2

Input Start

Input Stop

Input Prog1

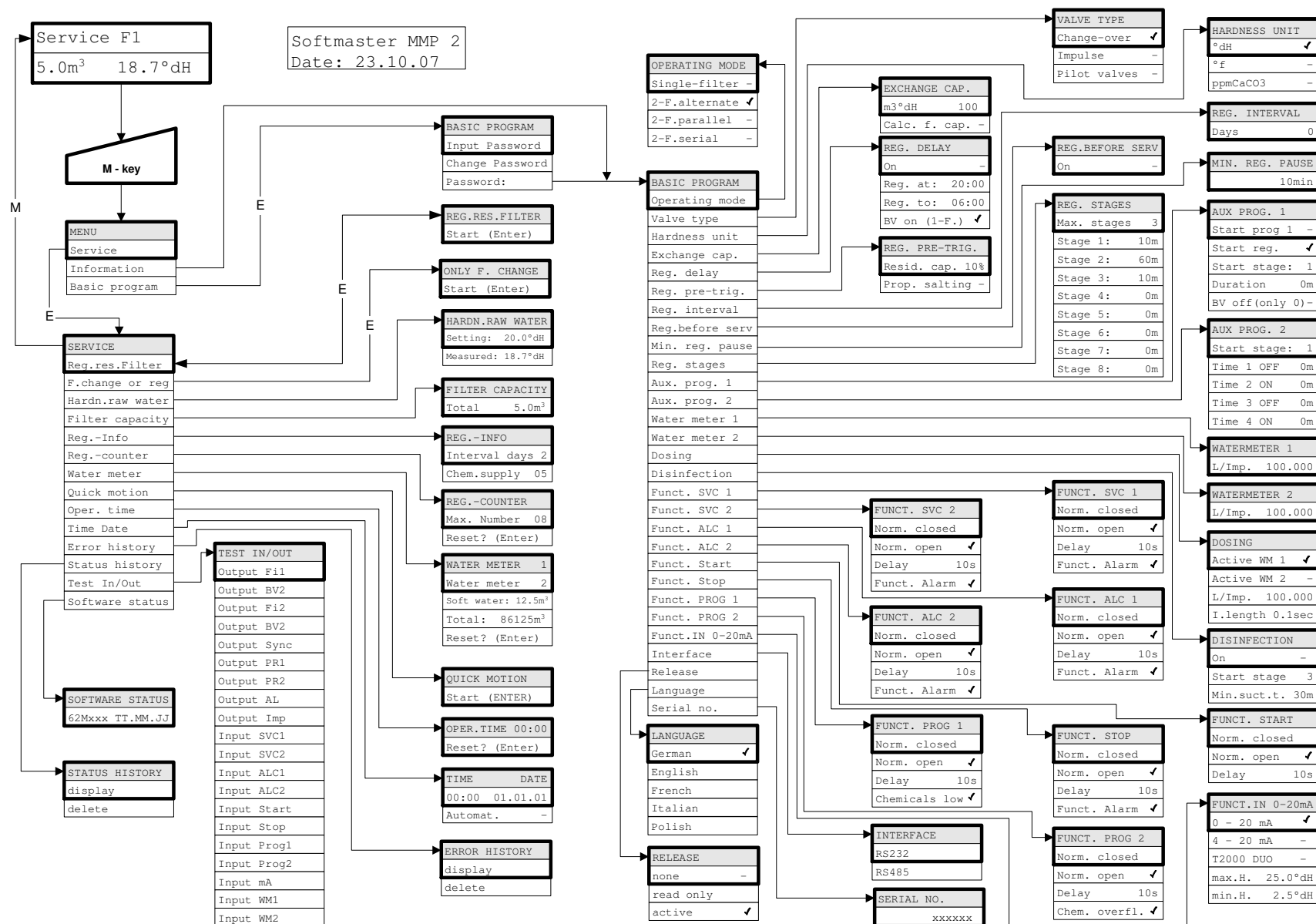
Input Prog2

Input mA

Input WM1

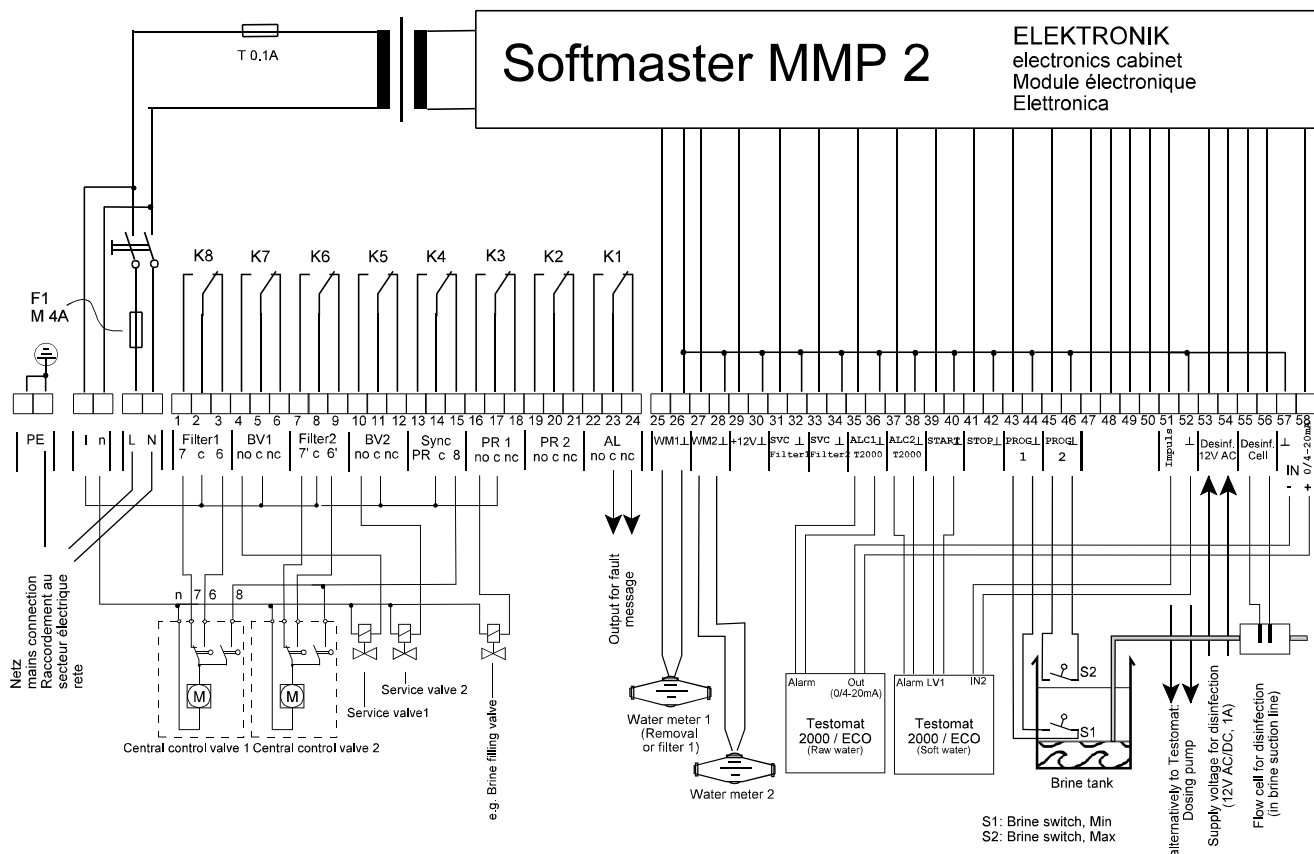
Input WM2

## Menu structure



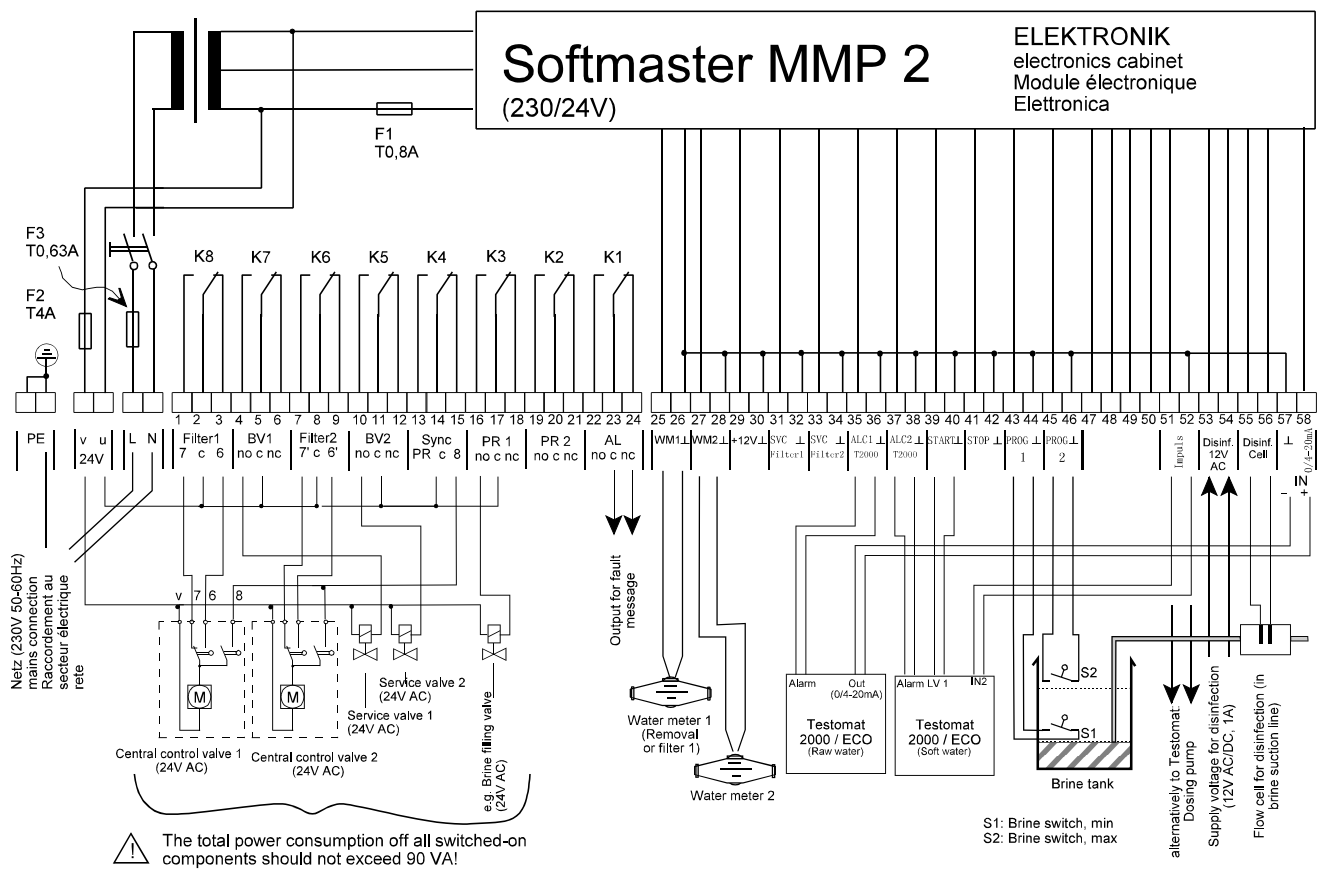
To call up the factory-set basic default setting, briefly hold down the “DOWN” key while switching the unit “ON”. The last set of programming will be erased !

## Connection example

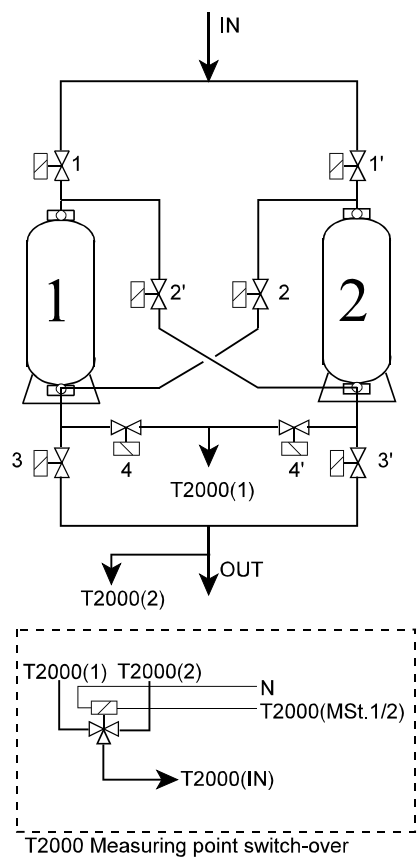




## Connection example 230/24 Volt



Example for double-filter softening plant with serial connection (polishing filter)



Filter		Valves								Softmaster MMP 2			
Operat.	Reg.	1	2	3	4	1'	2'	3'	4'	SV 1	SV 2	S-Pr. 1	S-Pr. 2
1 + 2	-	X	X	-	X	-	-	X	-	X	X	-	X
2	1	X	-	-	X	-	X	X	X	X	-	-	-
2 + 1	-	-	-	X	-	X	X	-	X	-	-	X	-
1	2	X	-	X	X	X	-	-	-	X	-	X	X
1 + 2	-	X	X	-	X	-	-	X	-	X	X	-	X

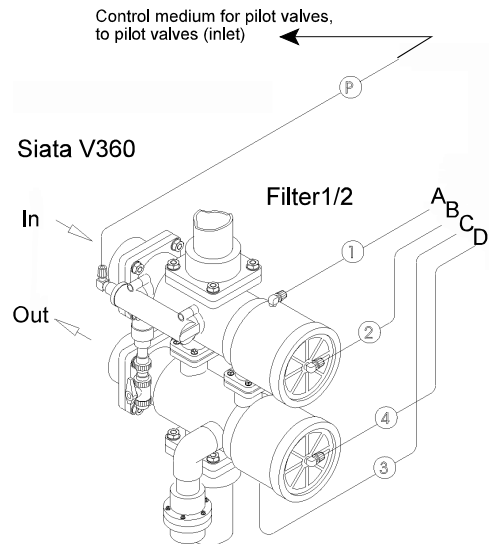
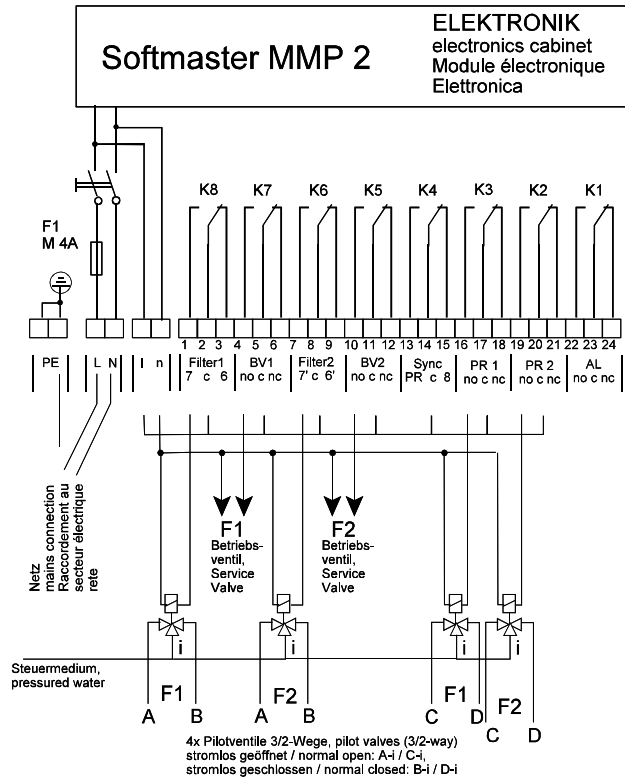
X = Valve open/ Relay switched

1.filter    2.filter

Valve-relay allocation:  
V1 = SV1-no (terminal 4)  
V1' = SV2-nc (terminal 12)  
V2 = SV1-nc (terminal 6)  
V2' = SV2-no (terminal 10)  
V3 = S-Pr1-no (terminal 16)  
V3' = S-Pr1-nc (terminal 18)  
V4 = S-Pr2-no (terminal 19)  
V4' = S-Pr2-nc (terminal 21)

Filters are displayed without regeneration valves  
(control via central control valve or pilot distributor with single valves)

## Example for double-filter softening plant with pilot valves (e.g. for valve Siata V360)



## Technical data

<b>Power supply:</b>	230 - 240 V or 24 V or 115V+/-10% / 50 -60 Hz, Safety fuse T6,3A
<b>Power consumption without external load:</b>	max. 9 VA
<b>Degree of protection:</b>	IP65
<b>Protection class:</b>	I
<b>Conformity:</b>	EN 50081-1, EN 50082-2, EN 61010-1
<b>Ambient temperature:</b>	0 - 45°C
<b>Accessory for disinfection facility:</b>	Plug-in card DES2002, electrode, power supply
<b>Housing dimensions surface/panel-mounted MMP 2:</b>	W x H x D = approx. 270 x 295 x 130 mm Housing made off ABS, Panel cut-out 262mm x 146mm, +1mm, Mounting depth approx. 90mm, Front frame dimensions 270mm x 155mm
<b>Weight:</b>	approx. 1.3 kg



**We reserve the right to make technical changes without notice in the interest of constantly improving our products!**

Art.-Nr.: xxxxx

Softmaster\_MMP2\_GB071031\_B.wpd