Ipari Elektronika Project

Designing and Executing

Co. Ltd.

Reverse Osmosis Controller

(JAZZ - UNITRONICS)

Operators Manual

CONTENTS

1. Introduction

Switch on the controller with the main switch on the front panel. The main switch is switching off all the 3 phases from the equipment.

With the „OPERATIONAL MODE” selector pushbutton is possible to select the operational mode of the equipment.

The process controlling pushbuttons („STAND BY”, „WATER PRODUCTION”, „MAINTENANCE”) are effective in „MANUAL” position only, if the key lock is not on.

In this case the signals from level sensors are inactive.

In „AUTOMATIC” position the apparatus operates the processes automatically by the controlling signals from the level sensors.

The momentary working condition of the equipment is displayed on the screen. The possible errors are shown on the screen too.

The controller governs the operations of the magnet valves, chemical dosers and pumps belonging to the equipment.

2. Operating buttons and their functions.

i button	Menu screen
ENTER	Error acceptance
0 button	Operational mode button / Key lock ON-OFF
Arrow Up	Page up the Screen
Arrow Down	Page down the Screen
Arrow Left	Stand by / Maintenance button / Negative (*Decreasing*) Calibration
Arrow Right	Water production button / Positive (*Increasing*) calibration

- **„MENU" button (*i button*)**

Pushing this button the „MENU" screen is displayed where the processes operated by the other pushbuttons are always visible. Following these instructions it is possible to check or modify all the available parameters of the equipment.

- **„OPERATIONAL MODE" button (*0 button*)**

If the key lock is not on with this pushbutton is possible to select the operational mode of the equipment.

If the „OPERATIONAL MODE" is displayed it is possible to change the operational mode from „AUTOMATIC" to „MANUAL" or vice versa by pushing this button.

RO: MAN. WORKING	
ALTERATIONS <0>	Change with the „0" button

EG. If the actual operational mode of the equipment is „MANUAL" pushing the „OPERATIONAL MODE" button the equipment switches over to „AUTOMATIC" mode.

- **„STAND BY" button (*Arrow Left*)**

If the Key Lock is not activated this pushbutton is usable in „MANUAL" operational mode only.

Pushing the „STAND BY" button it is possible to step from the „WATER PRODUCTION" or „FLUSHING" process to the „STAND BY".

With the same button it is possible to step to the „MAINTENANCE" process too but just after the switching over to the „STAND BY" mode and the input valve is closed already *(delay 5 sec*).

EG. The equipment is on the „WATER PRODUCTION" process. Pushing the „STAND BY" button once the equipment steps over to the „FLUSHING" process. Pushing the button again the equipment is switching over to „STAND BY". If the „STAND BY" button is not pushed during the „FLUSHING" period, after the flushing process the equipment steps to the „STAND BY" state automatically.

- **„WATER PRODUCTION" button (*Arrow Right*)**

If the Key Lock is not activated this button is usable in „MANUAL" operationa mode only.

Pushing the „WATER PRODUCTION" button it is possible to step from the „STAND BY" or „FLUSHING" process to the „WATER PRODUCTION" process.

With the same button it is possible to step to the „STAND BY" stage from the "MAINTENANCE" .

EG. The equipment is on the „STAND BY" process. Pushing the „WATER PRODUCTION" button once the equipment steps over to the „FLUSHING" process. Pushing the button again the equipment is switching over to the „WATER PRODUCTION" process. If the „WATER PRODUCTION" button is not pushed during the „FLUSHING" process, after the flushing period the equipment is switching over to the „WATER PRODUCTION" process.

- **„ENTER” button – acceptance of errors.**

Any error occurs the name of the error is flashing on the unacknowledged error screen. Furthermore the equipment has a global error signal output which is geting activated during any error. (*output is closed*) The „ENTER” button is to acknowledge this output and the unaccepted errors.

UNACCEPTED DEF.
DEF.: NO WATER

Accept with the „ENTER” button

EG. The equipment is sensing the lack of water. The error signal output is activated (*output is closed*). Pushing the „ENTER” button it is possible cease the active stage of the error output. (*output is open*)

ATTENTION!

If we are on the „PARAMETERS” screen the „ENTER” button is used to reset the individually programmable operational parameters of the equipment. *(eg. Unauthorized person set the values wrongly*).

Pushing the button for 2 sec. the „PARAMETERS GET UP!” script appears on the display and the parameters are reset ot the values programmed in the factory and making possible the proper operation.

- **„SCREEN PAGE” button (*Up-Down arrows*)**

If the process display is visible on the screen, pushing these buttons it is possible to change the screen (*checking various datas*).

Pushing the „UP” arrow button the actual stage of the inputs of the equipment are visible. Pushing the „DOWN” arrow button the operational mode, analogue datas, the running hours of water production and the momentary stage of outputs are visible. To display the name of the process is possible by pushing the opposite arrow.

If the presently active errors are displayed and more error signals are active simultaneously, pushing the „SCREEN PAGE” buttons is possible to display the active errors one by one.

Paging up or down on the parameters screen the programmable parameters are displayed one by one. Prior to paging it is necessary to accept the values with the „ENTER” button otherwise the paging is not working.

Paging up or down on the „CALIBRATION” screen the adjustable values are displayed one by one.

3. The displayed datas and their meanings.

- **MENU screen**

PROCESSES <1>	Display of Processes and Parameters
DEFECTS <2>	Display of active errors

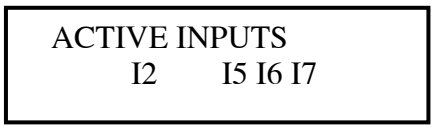
KEY LOCK <3>	Password needed: 1230
PARAMETERS <4>	Password needed: 4560

CALIBRATION <5>	Password needed: 7890

- **Process screen**

On this screen the actual stages of processes and other operational informations are displayed.

Pushing the „SCREEN PAGE” buttons (*Up/down arrows*) the available informations are displayable.



Push the Up-arrow button to reach it

The number of the active inputs.

The name of process

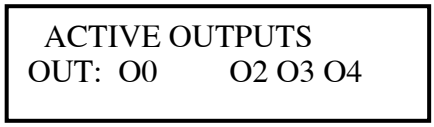
Perm. conductivity, Duration of process

Operational mode

Change with the „0” button

Conductivity and Temperature of Permeatum

Total time of water production



Active Outputs.

- **KEY LOCK Screen**

On this screen is possible to put on/off the KEY LOCK.

Pushing the <0> button is possible to change the actual state of the KEY LOCK. (*OPENED or CLOSED*)

KEY LOCK: OPENED	
ALTERATIONS	<0>

If the KEY LOCK is on (*CLOSED*) the process controlling pushbuttons and the operational mode selecting pushbuttons are inactive.

- **PARAMETERS Screen**

On this screen is possible to change the operational parameters of the equipment.

Pushing the „SCREEN PAGE" buttons (*up/down arrows*) the programmable parameters are displayed one by one. Prior to paging it is necessary to accept the displayed parameters with the „ENTER" button otherwise no paging possible.

RO FLUSHING	
PERIOD:	01:00m:s

Duration of FLUSHING
Set/accept the value in this format

RO S'BY FLUSHING	
PERIOD:	03:00m:s

Duration of the Stand by flushing
Set/accept the value in this format.

RO S'BY FLUSH	
TIMING:	08:00h:m

Periodicity of Stand by flushing
Set/accept the value in te given format
(*Eg. Stand by flushing for 3 min. 8 hourly*)

RO WORKING FLUSH TIMING: 01:00h:m	Periodicity of the Operational flushing Set/accept the time in the given format
RO NO WATER DELAY: 03sec	Sensing time of the lack of water Set/accept the time in this format
RO OVER PRESSURE DELAY: 03sec	Sensing time of the Overpressure Set/accept the time in this format
RO PRODUCT PUMP DELAY: 05sec	Delay of the start of the water prod. pump Set/accept the time in this format

The „ENTER” pushbutton is used to reset the individually programmable operational parameters of the equipment. (*eg. Unauthorized person set the values wrongly*).

Pushing the button for 2 sec the „PARAMETERS GET UP!” script apperas on the screen and the parameters are reset to the values set in the factory and making possible the proper operation.

- **CALIBRATION Sreen**

On this screen it is possible to calibrate the instruments of the equipment (*conductivity, temperature*).

Pushing the „SCREEN PAGE” buttons (*up/down arrows*) the programmable parameters are displayed one by one. Prior to paging it is necessary to accept the displayed parameters with the „ENTER” button otherwise no paging possible.

RO COND. MAX	200.0uS	Set/accept the time in this format
RO TEMP. MAX	100.0°C	Set/accept the time in this format

4. Operational Possibilities / Sequences

- Maintenance
- Stand by flushing
- Stand by
- Flushing
- Water production
- Working flushing

- **Maintenance**

The „MAINTENANCE” pushbutton is usable in „MANUAL” operation mode. The Key Lock should be inactive („*OPENED”*).

Pushing the button it is possible to switch from the „STAND BY” state to the „MAINTENANCE” process.

The input valve and flushing valve are opened. The **waterproducing motor starts up** after the preset time (*5 sec*), if the local switch of the motor is not off. The equipment does not monitor any error signal. From this stage it is possible to switch back to the „STAND BY” situation by pushing the „WATER PRODUCTION” button or set the operational mode to „AUTOMATIC” mode.

- **Stand by flushing**

The equipment is switching automatically in „AUTOMATIC" operational mode only and when the equipment is in the preset „STAND BY" period (*8 hrs*).

The input valve is opened, the flushing valve sets free with the preset delay and the chemical doser pump is working too. If the water to the equipment is supplied from storage tank the feedpump is running also. The equipment monitors the lack of water (*sensing time 3 sec*), the over pressure (*sensing time 3 sec*) and the low level signal.

This process is lasting for the preset time (*3 min*) and after the equipment returns to the „STAND BY" state.

If during the „STAND BY FLUSHING" process the level sensor gives low limit signal the equiment steps to the „FLUSHING" process and after the preset flushing time to the „WATER PRODUCTION" process.

- **Stand by**

In „MANUAL" operation the equipment proceeds from this stage by pushing the „MAINTENANCE" or „WATER PRODUCTION" buttons only (*If the Key Lock is not active, „OPENED"*).

In „AUTOMATIC" operational mode the equipment monitors the low limit signal from level sensor, and completes the „STAND BY FLUSHING" process by the preset time intervals (*8 hrs*).

If there is low-limit signal from the level sensor the equipment steps to the „FLUSHING" and the the „WATER PRODUCTION" processes.

- **Flushing (*Pre-Post flushing*)**

This process is always performed automatically in „AUTOMATIC" operational mode before the equipment steps from „STAND BY" to „WATER PRODUCTION" or opposite.

The input valve is opened, the flushing valve sets free with the preset delay and the chemical doser pump is working too. If the water to the equipment is supplied from storage tank the feedpump is running too. The equipment monitors the lack of water *(sensing time 3 sec)* the overpressure *(delay 3 sec)* and the signals from the level sensors.

This process is lasting for the preset time (*1 min*), after that in „AUTOMATIC" operational mode the equipment steps to the „STAND BY" or „WATER PRODUCTION" process governed by the signals from the level sensors.

If the Key Lock is not on („*OPENED"*) in „MANUAL" operation it is possible to step to the next process by pushing the „STAND BY" or „WATER PRODUCTION" BUTTONS.

- **Water Production**

In „MANUAL" operation mode the equipment steps to the next process by pushing the „STAND BY" button only. The Key Lock should be inactive („*OPENED"*).

In this process the equipment is producing the water. The input valve is opened and the chemical doser pump is running. If the water is supplied from storage tank the feedpump is working also. The waterproducing motor starts up after the preset time (*5 sec*), if the local switch of the motor is not off. The equipment monitors the lack of water (*sensing time 3 sec*), the over pressure (*sensing time 3 sec*) and the high level signal from the sensor.

In „AUTOMATIC" operation the high level signal from the sensor governs the equipment to the „FLUSHING" and after the „STAND BY" process.

- **Working flushing**

In „AUTOMATIC” operation after the preset „WATER PRODUCTION” time (*1 hour*) the equipment steps to this process automatically. This process equals with the „FLUSHING” but not possible to start manually.

The input valve is opened and the chemical doser is running. If the water is supplied from storage tank the feedpump is working too. The equipment monitors the lack of water (*sensing time 3 sec*), the overpressure (*sensing time 3 sec*) and the low-level signal.

This process is lasting for the preset time (*1 min*), and after the equipment continues the „WATER PRODUCTION”.

In „AUTOMATIC” operation the high-level signal from the sensor after the preset time (*1 min*) governs the equipment back to the „STAND BY” state.

4. STOP control

The apparatus has an external governing input. If this input is activated the equipment interrupts every operations. Exemption is the „MAINTENANCE” process only when the apparatus does not monitor the external governing inputs/signals.

The „STOP” control is needed if another pre-softening plant supplies the pre-softened water to the equipment. If this external water softener regenerates the water then does not supply water to the equipment. To prevent this during regeneration a no-voltage closing contact is given to the „STOP” input from the external plant.

When the equipment receives the „STOP” signal closes the valves and stops the motors, the „STOP” signal is displayed. The equipment remains in this state until the „STOP” signal is lasting. (*When the external plant starts to supply the water again*)

During „STOP” state in „MANUAL” operation only it is possible to step the equipment from „STOP” to „STAND BY” by pushing the „STAND BY” button and after that during the „STOP” state from the „STAND BY” to the „MAINTENANCE” process, if maintenance is needed. (*Manual working only!*).

5. Defects

Any error happens it is displayed on the screen, just as the errorsignal-output gets activated too. It is possible to acknowledge the errorsignals and the unaccepted errors by pushing the „ENTER” button.

The unaccepted errors could be acknowledged with the „ENTER” button one by one. When all the errors accepted the errorsignal disappears from the screen.

After the acceptance the error is still existing just not displayed on the screen.

UNACCEPTED DEF.
DEF.: NO WATER

Acceptance with the „ENTER” button

Except the overpressure some errors are ending automatically and the equipment restarts.

To acknowledge the „OVERP RESSURE” error with the „ENTER” is possible on the „ACTIVE DEFECTS” screen only (*if the over pressure input has ended*), then the equipment restarts.

ACTIVE DEFECTS
DEF.: OVER PRESS.

Accept with the „ENTER”

„NO WATER” (Lack of Water)

Except the „STAND BY” and „MAINTENANCE” this signal occurs on any other process if there is no water.

This errorsignal stops the operation of the waterproducing pump!

The delay time of „NO WATER” is 3 sec, so the equipment does not react to the sudden drop of pressure.

„OVERPRESSURE”

Except the „STAND BY” and „MAINTENANCE” this error might occur at overpressure on any other process.

This error stops the operation of the motors!

The delay time of „OVERPRESSURE” is 3 sec, the equipment does not react to the sudden pressure rise.

„VALVE” error

This error occurs if the fuse of the controlling magnet valves has released (*Eg: the magnet valve is short circuity*).

This error stops the operation of the motors!

„LEVEL SENSOR” error

This error occurs in „AUT” operation only, if the level sensor has failed or connected wrongly.

LOW level sensor: signals to the equipment in opened state. The equipment steps from „STAND BY” to the „FLUSHING” then „WATER PRODUCTION” processes.

UPPER level sensor: signals to the equipment in closed state. The equipment steps from „WATER PRODUCTION” to the „FLUSHING” then „STAND BY” state.

„CHEMICAL DOSER”

This error occurs if the chemical doser has not failed, functional, but for some reason *(eg. Finished the chemical)* gives an error signal.

This error in case of „AUT” operation puts the equipment to „STAND BY” process!

„MOTOR PROTECTION”

There is such error signal when the motor has failed, the thermoswitch has cut off for some reason (*short circuit*) or the local switch of the motor is off.

This error stops the operation of chemical doser and in case of „AUT” operation puts the equipment to „STAND BY” process!

6. Programming the equipment

The instrument is pre-programmed in the factory for the maximum performance. Of course it is possible to modify the program at request. Furthermore it is possible to change the operational parameters on the „PARAMETERS” screen.

7. Technical datas

Box type:	SCHNEIDER 430 x 330 x 200, or SCHNEIDER 500 x 400 x 200 (2 mot.)
Voltage:	3 x 400V - 50Hz
Max. Power consumption:	4 KVA
Contact Protection:	Null method
PLC Type:	UNITRONICS JZ10-11-R16
Display Type:	UNITRONICS JZ10-11-R16

8. Operation and Maintenance

It is advised to service the instrument throughout yearly (*Eg. Check/tight the contacts, etc.*) by qualigied technician!

Operate the equipment by well trained person only!

The equipment used only by qualified personnel only!

9. Control of Quality and Test

The ready made equipment is put to continuous operational trial as follows:

All the operational processes are checked in „MANUAL" and „AUTOMATIC" modes when the equipment is controlled by the level sensors, indicators or other governing signals or the equipment is changing the processes according to the preset time and performs the governing operations belonging to the actual process (*control of magnet valves, motors).*

When the equipment performs a given process the proper state of the controlling outputs are checked according to the operational tables (magnet valves, motors) just as the working capability of the controlling inputs, belonging to the given processes (level indicators, instruments and other controlling signals). Furthermore the displayed messages, belonging to the given process, on the programming terminal are checked also.

These inspections are performed at all the possible operational processes..

If there are instruments built in to the equipment (*µS/cm, pH, Rx, Cg, etc*) then the proper operation of these instruments is inspected also, just as the adjustment of switching limits required by the equipment.

On the Worksheet in the section of the „Notes of Supplier" is entered the duration of the operational trial and the worksheet is signed by the technician preparing/checking the equipment.

In case of deviations, errors the quality supervisor should be advised. The errors, the reason of errors must be entered in the section of "Quality observations" of the worksheet.