

# OSIN1

## GENERAL DESCRIPTION

OSIN1 is an instrument designed to control and drive a reverse osmosis system.

The control section analyses signals received from the following sensors: minimum pressure switch, maximum pressure switch, maximum value pressure switch, output conductivity, input conductivity, water temperature, and two level probes located in the water outflow tank.

The command section includes: input solenoid-valve, high pressure pump, wash solenoid-valve, output solenoid-valve.

A non-resettable hour counter is situated on the front panel, to show the operating time of osmosis membrane.

## CONTROL SECTION

### MINIMUM PRESSURE SWITCH

Main water pressure of at least 2 bars is required for efficient system operation. A pressure switch, tripping in the range 0.7 to 1 bar, must be fitted at the water port to protect the pump, in addition to a pressure gauge. Lack of pressure stops the pump and activates the alarm output - if pressure is restored, the system restarts automatically. One of the causes of a drop in pressure could be a clogged cartridge in the filter.

### MAXIMUM PRESSURE SWITCH

Turning the hydraulic flow control adjustment can cause the maximum pump pressure to be exceeded. To avoid possible damage, the maximum pressure switch must operate when pressure exceeds pump maximum operating pressure by 2 bar. Excess pressure shuts down the system and activates the alarm output. To re-activate the system, switch the instrument off and then on again checking operating pressure.

### CONDUCTIVITY METER

OSIN1 displays output conductivity value only when water is produced - during the waiting and washing stages, the conductivity meter and display are both off. The input conductivity reading can be displayed by pressing the push-button located near the display.

A high light intensity, three-digit, red Led display is used.

Operating range:

Input conductivity : from 0 to 99.9 milliS

Output conductivity : from 0 to 999 microS

Alarm threshold adjustment: from 0 to 100 microS

The instrument has 3 adjustments, 2 for aligning the relative conductivity probes, the other for the alarm. To adjust the alarm set point, pressing the push-button the value is shown on the display. A small switch with plastic actuator is located on the printed circuit under the terminal board cover - the identification label is SW2 uS ALL. If the cursor is positioned to OFF, the conductivity alarm is disable, if the cursor is moved upward, the alarm is enable. When output conductivity exceeds set point value for over 50 sec, the following leds will turn on: "ALARM uS, ALARM and DISCHARGE".

The alarm is resettable. If, at the end of the washing time, the conductivity value is greater than set value, the following Leds will illuminate: "ALARM uS, ALARM, SHUT-DOWN" - in this case, the instrument shuts down. To start again the instrument, switch it off and then on again.

### THERMOMETER

The instrument has a temperature probe that shows input water temperature and compensation of conductivity too. Temperature readings are important in reverse osmosis systems in order to determine the exact flow of permeated matter and thus the system's performance. The measurement range is 0° to 30°C, reading resolution is 1°C, precision being +/- 1°C.

### TANK LEVELS

After power-up, the instrument automatically washes the system and, on completion of this, checks the level of the collection tank. If HIGH LEVEL is detected, OSIN1 goes on stand-by, if level below LOW LEVEL is ascertained, OSIN1 begins water production until HIGH LEVEL is reached. A further wash follows and when this has been executed, there is a further level check - the system is now ready for a new cycle.

The level sensors installed in the collection tank must provide the following signals:

closed contact on the HIGH LEVEL sensor when water is at maximum level, closed contact on the LOW LEVEL sensor when level is below minimum.

Obviously, when the level reaches the tank's midway point, both sensors will signal an open contact.

## **COMMAND SECTION**

### **INPUT SOLENOID-VALVE**

The input solenoid-valve, which is of the normally closed type, is opened electrically when water is produced, during the washing stage, and when disinfecting is necessary.

Piloting power (220 vac) is supplied by the instrument.

### **PUMP**

The pump is activated when water is produced, during the washing stage, and when disinfecting is necessary.

To avoid damage to the pump, clearance is given approximately 3 sec. after the input solenoid-valve is opened.

Piloting power (220 Vac, max.load 1 Kw, or motor with max. power of 1/2 HP ) is supplied by the instrument. If pumps with greater power consumption or having three-phase conductors are used, you are recommended to use a contactor with relevant overload cut-out located on a suitable panel, situated separately. In this case, replace the pump fuse with a delayed effect fuse of approximately 0.5 A.

### **WASH SOLENOID-VALVE**

The wash solenoid-valve, which is of the normally closed type, is opened electrically when water is produced, during the washing stage, and when disinfecting is necessary.

Piloting power (220 vac) is supplied by the instrument.

### **OUTPUT SOLENOID-VALVE**

If water with a high purity rating is required, two solenoid-valve must be fitted at the RO system's output - one oriented toward the tank, and the other - normally closed type - toward the outlet port. The instrument supplies piloting power (220 Vac) to operate both valves.

## **MEMBRANE WASH**

Automatic washing, effected both before and after the production stage, is essential to prevent any deposits on the membrane surface. Washing time is set on a dip-switch located under the cover of the instrument's terminal board. Available times for selection : 0.5', 3', 6', 12', 15'. Move one dip-switch only to the ON position. Washing cannot be disabled and all dip-switches cannot be set to the OFF position.

Washing time should be selected so that the conductivity value read after the end of the wash is below the value calculated and set for the alarm threshold.

To prevent deposits on the membrane, the instrument commands a wash whenever 12 hours elapse after the previous wash.

## **ALARM**

Whenever the ALARM Led lights, a relay is energised and its contact (without power) can be used for a remote alarm.

## **DISINFECTING**

If the system is being put out of service for a long time, the membrane must be washed with an appropriate solution.

A small switch with plastic actuator is located on the printed circuit under the terminal board cover - the identification wording is SW3 DISINF.

Normal operation is with cursor set to OFF. If the cursor is moved upward, disinfecting is activated.

The following outputs are active during disinfecting: INPUT SOLENOID-VALVE, WASH SOLENOID-VALVE, OUTPUT SOLENOID-VALVE, PUMP - all the alarms are off.

### **MANUAL MODE OPERATION**

If you wish to test the RO system with a full collection tank and the instrument on stand-by, it is sufficient to open the terminal board cover and move the small actuator of the switch to MANUAL. Carefully check tank level and on completion, set the cursor to AUTO.

### **ELECTRICAL CHARACTERISTICS**

Power supply voltage: 220 Vac +/- 10%.

OSIN consumption: approximately 10W.

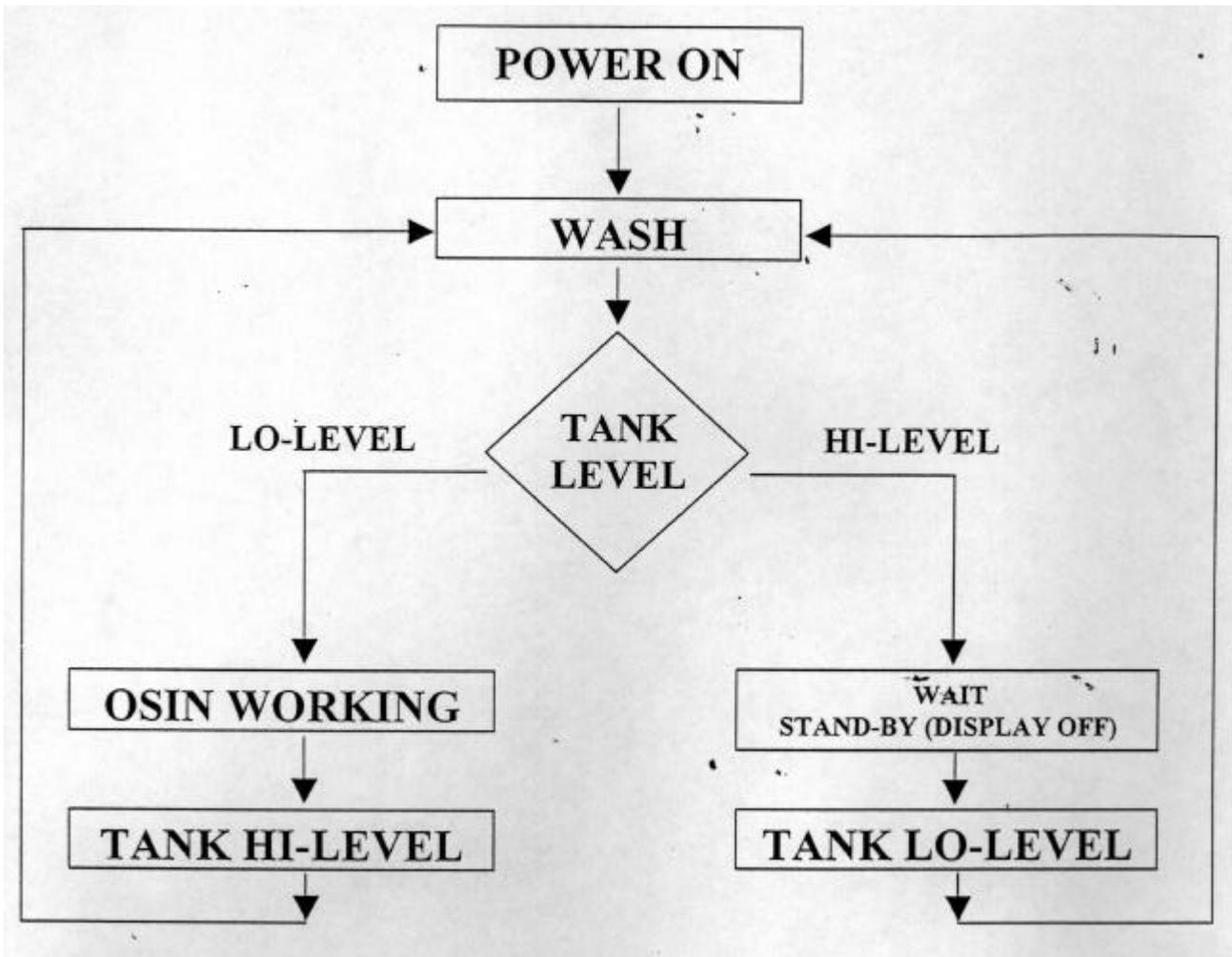
Pump fuse: check pump load absorption, maximum 6A rapid.

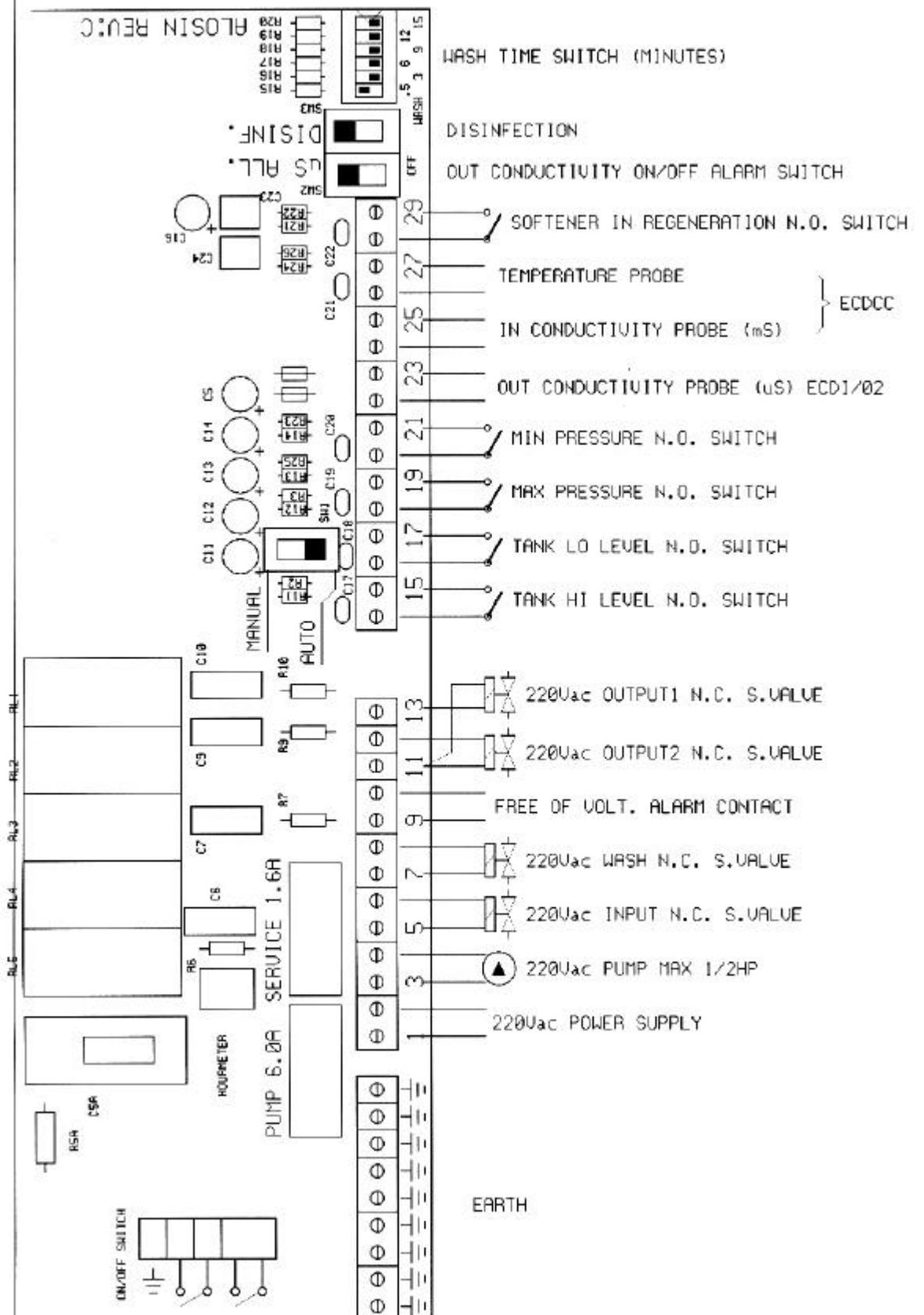
Utilities fuses: check solenoid valves absorption, maximum 1.6A delayed.

### **WARNING**

BEFORE REMOVING SCREWS FROM THE COVER, SWITCH OFF MAINS POWER, AND TAKE GREAT CARE WHEN ACCESSING THE INSIDE OF THE INSTRUMENT. ALL ACTUATORS MUST BE MOVED BY USING A SMALL INSULATED SCREWDRIVER. BEFORE POWERING UP THE INSTRUMENT, MAKE SURE THAT THE TERMINAL BOARD COVER IS PROPERLY CLOSED.

DRAWINGS AND TECHNICAL CHARACTERISTICS CAN BE MODIFIED WITHOUT PRIOR NOTICE IN ORDER TO IMPROVE PERFORMANCE.





R1 R2 R3 R4 R5

R29 R28 R19 R18 R17 R16 R15

WASH TIME SWITCH (MINUTES)  
DISINF.  
US ALL.

OUT CONDUCTIVITY ON/OFF ALARM SWITCH  
SOFTENER IN REGENERATION N.O. SWITCH  
TEMPERATURE PROBE  
IN CONDUCTIVITY PROBE (mS) ECDCC

OUT CONDUCTIVITY PROBE (uS) ECD1/02  
MIN PRESSURE N.O. SWITCH  
MAX PRESSURE N.O. SWITCH  
TANK LO LEVEL N.O. SWITCH  
TANK HI LEVEL N.O. SWITCH

220Vac OUTPUT1 N.C. S.VALUE  
220Vac OUTPUT2 N.C. S.VALUE  
FREE OF VOLT. ALARM CONTACT  
220Vac WASH N.C. S.VALUE  
220Vac INPUT N.C. S.VALUE  
220Vac PUMP MAX 1/2HP  
220Vac POWER SUPPLY

EARTH

ON/OFF SWITCH

15A

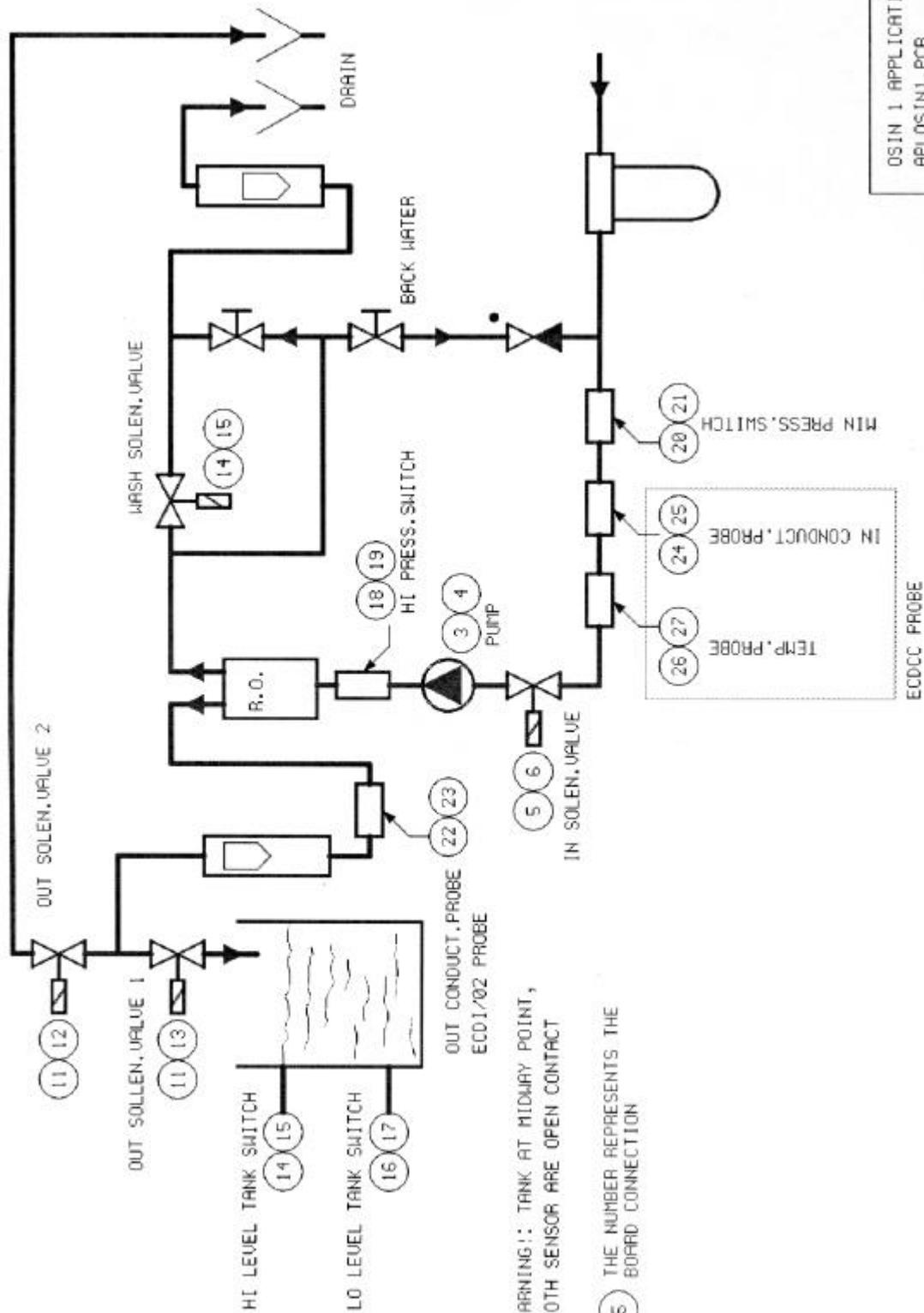
CSA

HOURMETER

PUMP 6.0A SERVICE 1.6A

MANUAL  
AUTO

ALOSIN REV.



OSIN 1 APPLICATION NOTES  
 APLOSIN1.PCB  
 18/09/01