

Installation and Operating Instructions

Balancing-tank control unit



NR-12-TRS-3



Part no. 303.000.0025 (including solenoid valve)

Part no. 303.000.0023 (excluding solenoid valve)



Function

The **osf** NR-12-TRS-3 balancing-tank control unit is a high-quality piece of engineering that can only work properly when it is installed and connected correctly and operated in accordance with these instructions. The **osf** NR-12-TRS-3 is ideal for use in overflow swimming pools and whirlpools with spillway. It employs integrated circuit technology and comprises:

- electronic control unit
- electrode probes with lead (option)
- solenoid valve (option)

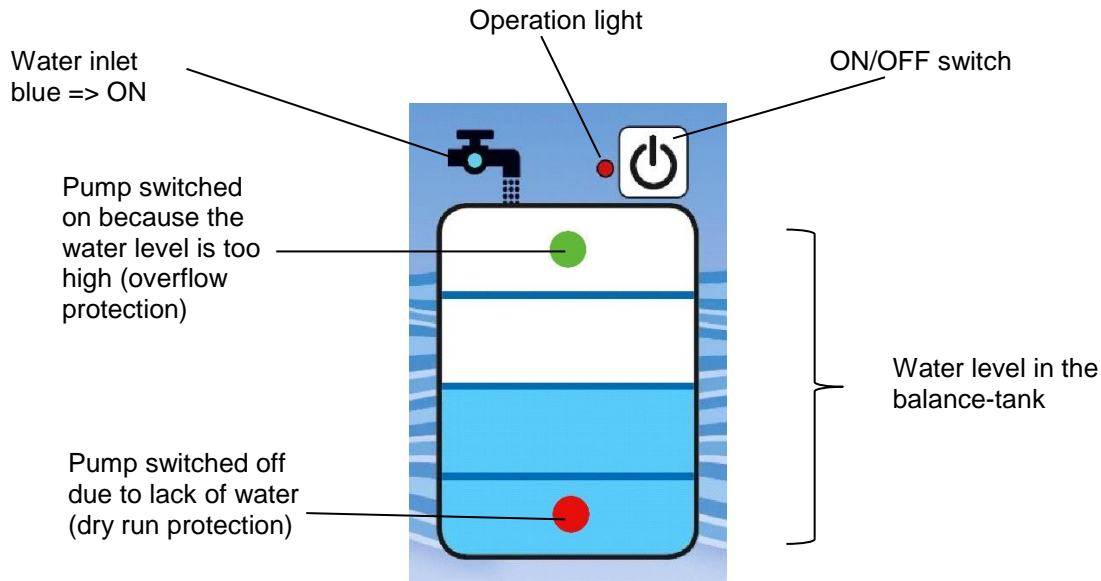
The AC-operated electrode probes do not produce electrolytes in the water. The electrode leads can be extended up to a length of 20m (min. cross-section 1.5mm²). Any extension leads must be laid in accordance with the Extra Low Voltage wiring regulations. The electronic control circuit is designed specifically for overflow balancing tanks. Thanks to the special circuit design, any wave movement does not trigger switching directly, avoiding over-rapid switching. For safety, the electrode probes are powered by a Safety Extra Low Voltage (SELV).

Technical data



Control unit:	
Dimensions:	220mm x 220mm x 100mm
Operating voltage:	230V/50Hz
Power consumption of control unit:	approx.7VA
Switching capacity:	see wiring diagram
Ambient temperature:	0-40°C
Air humidity:	0-95% non condensing
Degree of protection:	IP 40
Electrode probes:	
Dimensions:	ø24mm x 85mm
Lead length:	3m
Operating voltage:	12V
Solenoid valve:	
Nominal diameter	G1/2"
Operating voltage	230V 50Hz
Rated pressure	0.5 to 10bar
Electrical connection	DIN 43650 solenoid connector, male
Degree of protection	IP 65 (with solenoid connector fitted)

Display, indicator lights, controls



Mounting

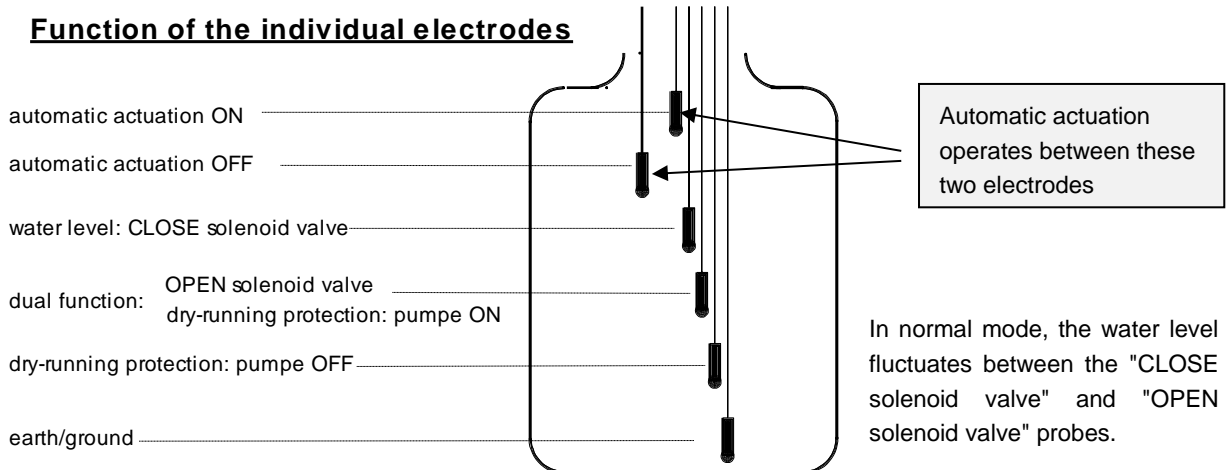
The control unit must be installed such that it is protected from moisture in accordance with its degree of protection. The ambient temperature must lie between 0° C and + 40° C during operation and should vary as little as possible. The relative humidity at the installation position must not exceed 95% and there must not be any condensation. Avoid exposing the unit to direct heat or sunlight. The swimming pool must be designed to prevent consequential damage resulting from a potential technical fault, power failure or faulty controller. **Before opening the housing, the device must be de-energized. The direction of flow indicated on the solenoid valve (direction of arrow) must be observed!**

Installing the electrode probes

The **ISI** electrode probes come as standard with special waterproof and ozone-proof cables. The tensile strength of the special cable is high enough for the probes to be suspended by this cable in the overflow balancing tank. It does not matter if the individual probes touch each other. Fix the probes above the tank by the cable gland, using strain-relief collars, cable clips, cable ties or similar devices depending on the local situation. The height differences depend on the individual circumstances, but must be no less than 5 cm to ensure sufficient switching intervals. Connect the special cables to a junction box (installed by the customer). Run a cable from this junction box to the control unit (e.g. cable NYM-0 7x1.5mm²). The electrode probes are not suitable for salt-water pools.

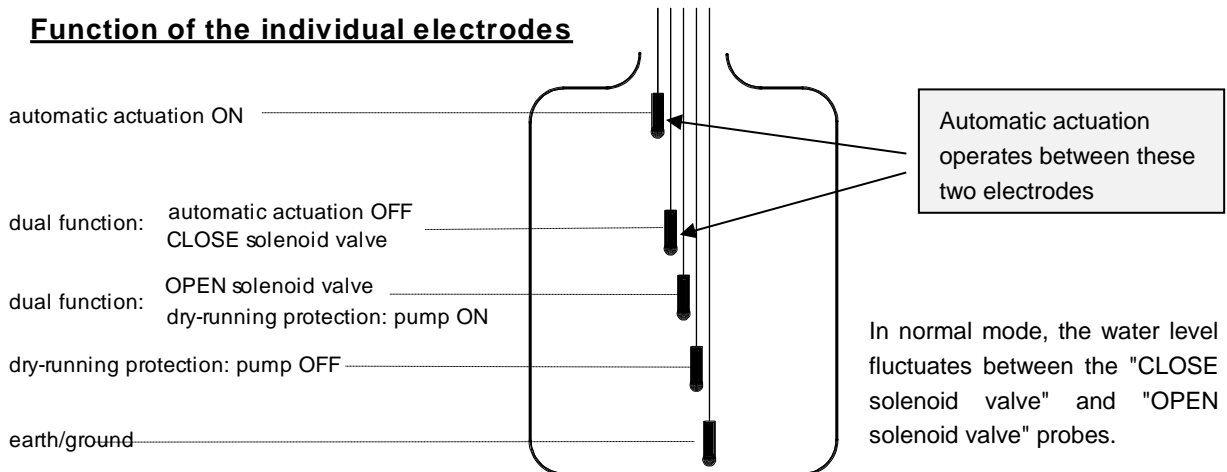
Operation with 6 electrodes

Function of the individual electrodes



Operation with 5 electrodes

Function of the individual electrodes



Electrical connection

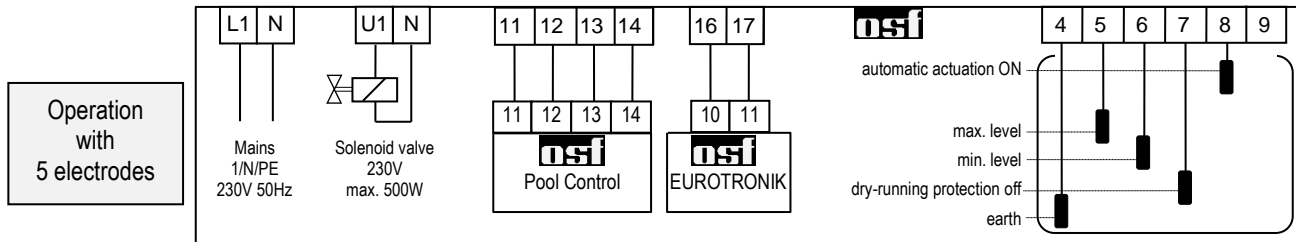
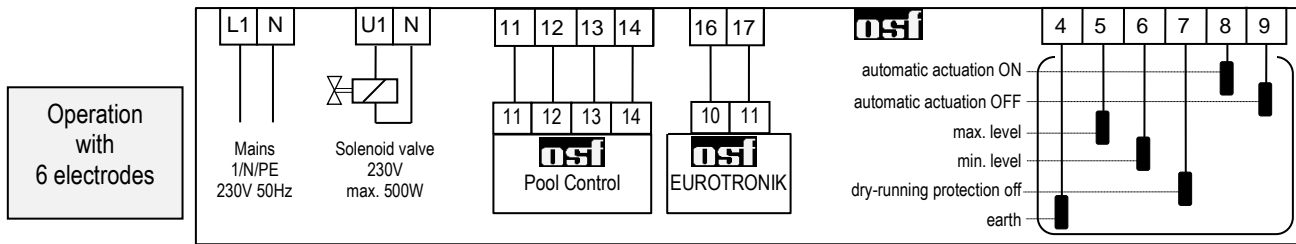
The control unit must be installed such that it is protected from moisture in accordance with its degree of protection. The power supply for the unit must be provided via an all-pole disconnection switch with a minimum contact gap of 3mm and via a residual-current circuit breaker with a fault current I_{FN} of $\leq 30\text{mA}$. **It is imperative to disconnect the unit from the mains power supply before opening the unit. The electrical wiring and installation and all calibration and servicing work must be performed solely by an approved electrician. The enclosed wiring diagrams and all applicable safety regulations must be observed.**

Extra Low Voltage lines

Extra Low Voltage lines must not be routed through the same cable conduit as 3-phase or AC power lines. Running Extra Low Voltage leads close to 3-phase or AC power cables should be avoided in general.

Example applications

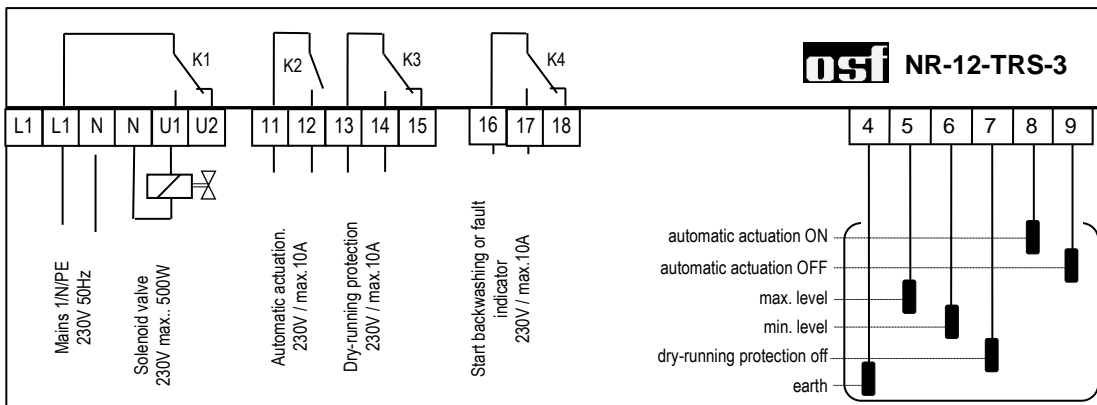
Connection to a filter control unit from the "POOL-CONTROL" range



Connection to any filter control unit

Relay K2 switches the filter pump on when the water level reaches the topmost electrode.

Relay K3 switches the filter pump off when the water level drops below the "dry-running protection" probe.



Connecting the electrode probes

Take special care when fitting the probes to ensure they are connected in the correct order, because the installation will not work if the probes are mixed up.

If the "Automatic actuation" function is not needed, the corresponding electrode probe (terminal 8) can be dispensed with. Connecting terminal 8 is then unused.

All the other probes are needed for the control function to work, so must not be omitted or bypassed.

Functions

The **tsi** NR-12-TRS-3 balancing-tank control unit includes the following functions:

a) Controlling the water level.

When water is lost from the swimming pool, e.g. through evaporation or backwashing, causing the water level to drop below the "OPEN solenoid valve" probe (terminal 6), the solenoid valve opens and the inflowing fresh water causes the water level to rise. As soon as the rising water level reaches the position of the "CLOSE solenoid valve" probe (terminal 5) and touches this probe, the solenoid valve closes the supply of fresh water.

b) Protecting the filter pump against dry-running.

When water is lost from the swimming pool, e.g. from backwashing, causing the water level to drop below the "dry-running protection pump OFF" probe (terminal 7), the balancing-tank control unit switches off the filter pump to prevent it being damaged by running without water. As soon as the water level has returned to the height of the "dry-running protection pump ON" probe (terminal 6) and touches this probe, the **tsi** balancing-tank control unit automatically switches the filter pump back on.

c) Automatic actuation, operation with 5 electrodes.

If water displacement in the swimming pool has increased the water level in the balancing tank so that it touches the "automatic actuation ON" probe (terminal 8), the **tsi** NR-12-TRS-3 balancing-tank control unit (in conjunction with an **tsi** filter control unit) automatically switches the filter pump back on. The water is then pumped back into the pool, avoiding unnecessary loss of precious water. The "automatic actuation ON" probe (terminal 8) must be placed a few centimetres lower than the overflow. The automatic actuation function is switched off as soon as the water level drops below the "automatic actuation OFF/CLOSE solenoid valve" probe (terminal 5).

d) Automatic actuation, operation with 6 electrodes.

If water displacement in the swimming pool has increased the water level in the balancing tank so that it touches the "automatic actuation ON" probe (terminal 8), the **tsi** NR-12-TRS-3 balancing-tank control unit (in conjunction with an **tsi** filter control unit) automatically switches the filter pump back on. The water is then pumped back into the pool, avoiding unnecessary loss of precious water. The "automatic actuation ON" probe (terminal 8) must be placed a few centimetres lower than the overflow. The automatic actuation function is switched off as soon as the water level drops below the "automatic actuation OFF" probe (terminal 9).

A normally closed solenoid valve must be used.

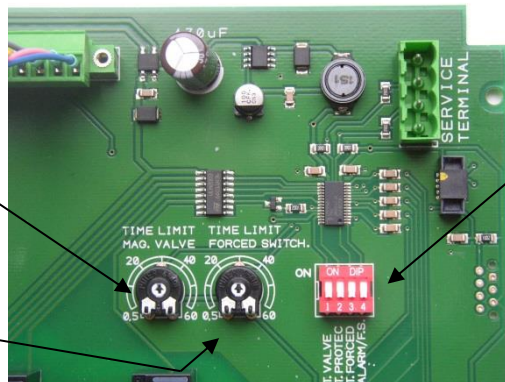
A full functional test must be carried out once installation is complete.

Settings available in the unit

Inside the control unit are 4 DIP switches and 2 trimmers, which can be used to configure additional control unit functions.

Trimmer 1:
Time limit for water intake

Trimmer 2:
Time limit for automatic actuation



DIP switches

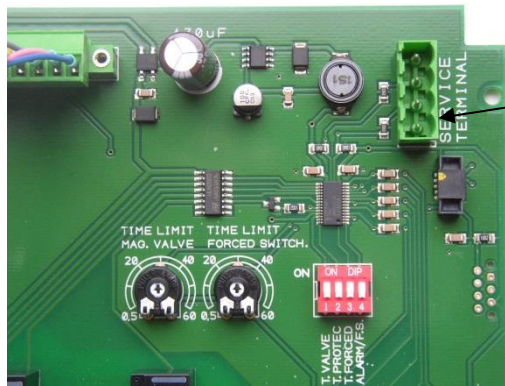
DIP switch functions:

<u>DIP 1:</u>	OFF	There is no time limit to how long the solenoid valve operates.
Time limit for solenoid valve	ON	The length of time for which the solenoid valve is ON is limited to the time set by Trimmer 1 (0.5 to 60 minutes). If the maximum operating level is not reached within this time, the solenoid valve (K1) is switched off and, if applicable, the collective fault indicator (K4) is actuated (see DIP 4).
<u>DIP 2:</u>	OFF	There is no time limit to how long the dry running protection is in force. If the water level drops below the "dry-running protection" probe, the pump (K3) is switched off. It is not switched back on until the water level reaches the minimum operating level.
Time limit for dry-running protection	ON	Dry running protection is time-limited. If the water level drops below the "dry-running protection" probe, the pump (K3) is switched off. It is switched back on once the "dry-running protection" probe has been back in the water for 60 seconds, or once the water level has reached the minimum operating level.
<u>DIP 3:</u>	OFF	Operation with 5 or 6 electrodes: There is no time limit to the automatic actuation function. When the water level reaches the "automatic actuation" probe, the pump (K2) is switched on. It is not switched off again until the water level has dropped below the maximum operating level.
<u>DIP 3:</u>	ON	Operation with 5 or 6 electrodes: The automatic actuation function is time-limited. When the water level reaches the "automatic actuation" probe, the pump (K2) is switched on. It is not switched off again until the water level has dropped below the maximum operating level. If this level is not reached within the time set by Trimmer 2 (0.5 to 60 minutes), the pump is switched off and the fault indicator (K4) is actuated.

<p>DIP 4: Collective indicator</p>	<p>fault</p>	<p>OFF</p> <p>Relay K4 is used as a collective fault indicator. It is actuated if:</p> <ul style="list-style-type: none"> the dry-running protection is triggered the time limit for the solenoid valve is reached (see DIP 2) the time limit for the automatic actuation function is reached (see DIP 3) the electrodes are giving inadmissible readings (e.g. "automatic actuation" probe indicates it is in the water but "dry-running protection" probe does not - probes swapped over).
		<p>ON</p> <p>Relay K4 is actuated when the automatic actuation function is on for longer than the time set by Trimmer 2 (0.5...60 minutes). This setting allows K4 to be used with the pressure switch input of the osi EUROTRONIK-10 to initiate a backwash cycle to remove excess water from the system.</p>

Service terminal

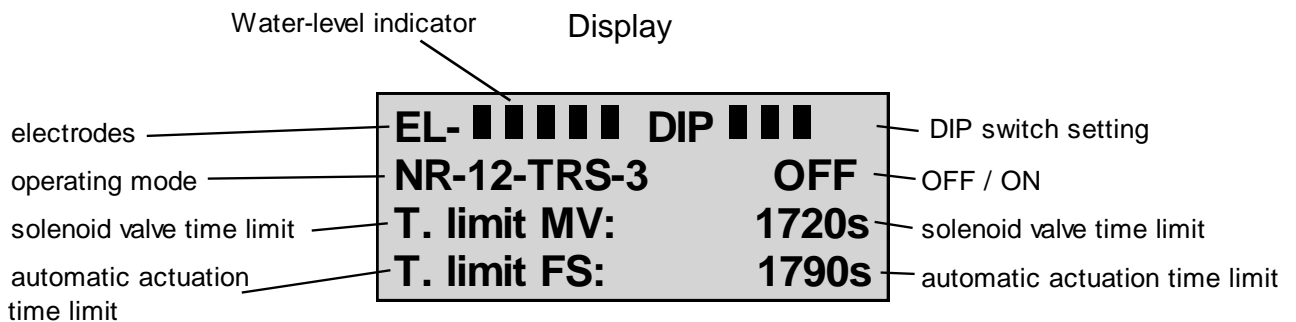
Inside the control unit is a socket that can be used to connect the **osi** Service terminal.



Socket for the Service terminal



The Service terminal clearly displays the current operating status of the level control system, helping to troubleshoot any potential problems. **Caution! Always disconnect the control unit from the power supply (switch off circuit-breaker) before plugging-in or removing the Service terminal.**



Installation instructions for the solenoid valve

- Clean the piping system before fitting the valve, because any dirt will cause the valve to malfunction
- **If necessary, fit a dirt trap before the valve input**
- Do not twist the valve housing, for instance by fitting between pipes that are not aligned or using unsuitable sealing parts
- Always use the correct tools
- Do not use the solenoid as a lever when fitting
- The direction of flow (direction of the arrow on the brass body) must be observed during installation. The valve will only close tightly in the specified flow direction. The solenoid valve may be damaged if fitted the opposite way round
- The preferred installation position is "solenoid vertically at the top". The valve is at least risk of wear or soiling in this position

Electrical wiring

The electrical wiring must be carried out solely by an authorized electrician in accordance with the applicable regulations. The protective earth connection must be fitted without fail.

The solenoid connector must only be plugged in or removed with the power off. AC solenoids are damaged when operated without an armature.

Servicing

Servicing work must be performed solely by a qualified service engineer and only when the piping system is de-pressurized and the solenoids de-energized.

Troubleshooting

If the valve will not open or close, clean the control holes and the armature. Servicing work must be performed solely by a qualified service engineer and only when the piping system is de-pressurized and the solenoids de-energized.

Relax and enjoy your swimming pool!

Further information can be found on the Internet at the following address:

<https://osf.de/download/documents/documents.php?device=NR-12-TRS-3>

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