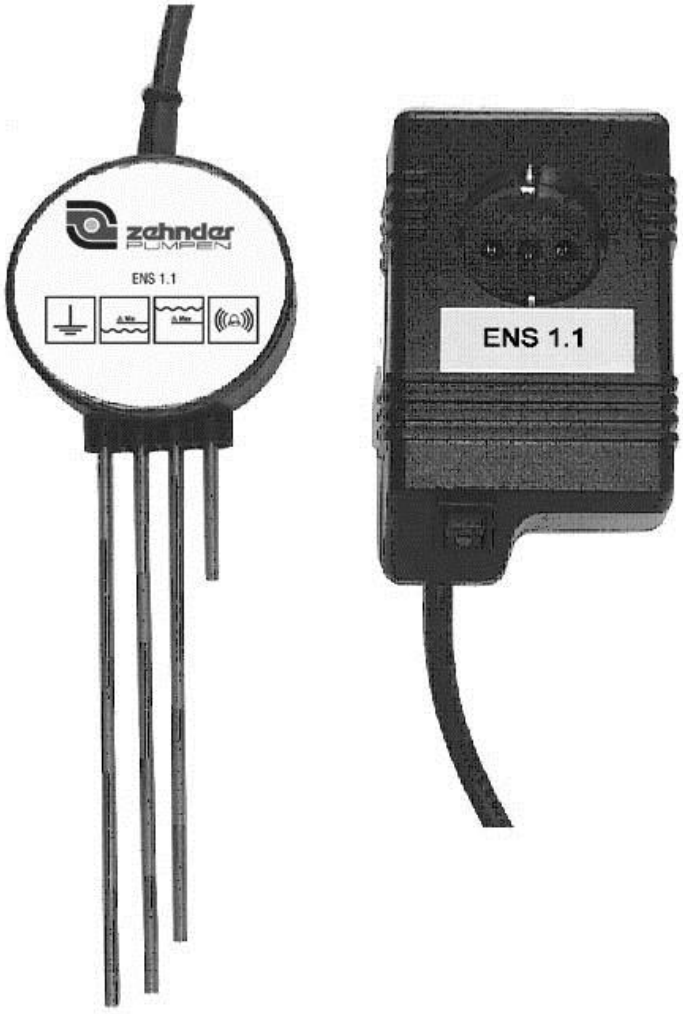
Elektronische Niveausteuerung

Electronic level control



ENS 1.1

Betriebsanleitung
Operating manual

V 1.2

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Declaration of conformity

We, the **ZEHNDER Pumpen GmbH**
Zwönitzer Straße 19
08344 Grünhain-Beierfeld,

herewith declare

that the **electronic level control ENS 1.1**
conforms to the following relevant regulations in the respective valid version:

- Guideline 2014/35/EU “EC low voltage directive”,
- Guideline 2014/30/EU “EMC directive “,

applied harmonised standards, particularly

- EN 61010-1
- EN 61000-6-2
- EN 61000-6-3

Grünhain, 28/04/2017

Matthias Kotte
Product development

1. General:

1.1 Introduction

This operating manual is valid for the electronic level control.
If the instructions of the operation manual – especially the safety instructions - are not observed, or in case of unauthorized modifications of the device or the installation of non-original spare parts, the guarantee expires automatically. The manufacturer assumes no liability for damages resulting from such behaviour!

Such as any other electrical device, this product may fail due to absence of mains voltage or a technical failure. If damage could occur, an emergency power supply, a second plant and/or an off-grid alarm device should be provided according to the application. We as manufacturer are at your disposal for consultation also after the purchase. In case of failures or damages, please contact your retailer.

Manufacturer: ZEHNDER Pumpen GmbH
Zwönitzer Straße 19
08344 Grünhain-Beierfeld

State of the operation manual: July 2011

1.2 Enquiries and orders

In case of enquiries or orders, address yourself to your specialist retailer.

1.3 Technical data:

Electronic level control	
Voltage U	230 V, 1~
Frequency f	50 Hz
Nominal current of the motor I	max. 6.0 A
Output P	max. 1000 W
Number of pumps	1
High water alarm potential-free max. contact load	max. 6 A max. 230 V
Degree of protection connector	IP 20
Degree of protection electrode holder	IP 68

Materials:

Electrodes ..... Stainless steel
Electrode holder..... Plastics
Cable jacket ..... Rubber
Connector casing ..... Plastics

1.4 Range of application

The electronic level control is used when filling levels of conductive, non-burnable media in tanks or cavities must be exactly complied with or if these liquids shall be pumped off on a very flat level. The max. filling temperature is 55^0 C.

1.5 Accessories

The electronic level control is delivered with 4 stainless steel electrodes in electrode holder, mounting bracket with nut connector, 10 m cable and connector switching device. The evaluation electronics, a safety plug and a safety socket for the connection of the pump are located in the connector switching device.

2. Safety:

(from:“VDMA sheet 24 292“)

The operation manual at hand provides basic notes which must be taken into account during assembly, operation and maintenance works. Therefore, before assembly and commissioning, this operation manual must be read by the assembler as well as by the responsible personnel/operator at all costs. It always must be available on site of operation of the machine/plant.
The general safety notes listed under the main point safety are not the only notes to be taken into account. Please also observe the specific safety instructions, such as those for private use, listed under other main points.

2.1 Marking of the notes contained in the operation manual

The safety notes contained in this operation manual which can cause danger to persons are specifically marked by the following general danger symbol

Safety sign according to DIN 4844 - W 9,

The following symbol warns against dangers caused by voltage

Safety sign according to DIN 4844 - W 8.

In case of safety notes the non-observance of which can cause danger to the switching device and its functioning, the word ATTENTION! is inserted.

Notes that are directly attached to the machine, such as type plate
must be observed and kept in completely readable condition at all costs.

2.2 Personnel development and training

The personnel responsible for operation, maintenance, inspection and assembly must have the corresponding qualifications for those types of work. Area of responsibility, competence and the surveillance of the personnel must be regulated precisely by the operator. If the personnel do not possess the necessary knowledge, they are to be trained and instructed. By order of the operator, the instruction and training, if necessary, can be carried out by the manufacturer/supplier. Furthermore the operator has to make sure that the personnel have completely understood the content of the operation manual.

2.3 Dangers in case of non-observance of the safety notes

The non-observance of the safety notes can cause dangers to persons as well as to the environment and the machine. If the safety notes are not observed, this can result in the loss of all compensation claims.

In detail, non-observance can for instance result in the following damages **as an example**:

- Failure of important functions

- Failure of the prescribed methods for maintenance and repair

- Endangerment of persons through electrical, mechanical and chemical influences

- Endangerment of the environment through leakage of hazardous substances

2.4 Safety-conscious way of working

The safety notes listed in this operation manual, the existent national regulations on accident prevention as well as possible internal working, operating, and safety instructions of the operator must be observed.

2.5 Safety notes for the operator/user

- Hot or cold machine components which could cause danger must be secured against contact by the customer.

- Protection against contact with moving parts (e.g. coupling) must not be removed while the machine is activated.

- Leakages (e.g. of the shaft sealing) of hazardous materials to be conveyed (e.g. explosive, toxic, hot) must be discharged in such a way that no danger arises for persons or the environment. The legal requirements are to be observed.

- Endangerments through electric power are to be eliminated (details concerning this, see e.g. the regulations of the VDE (German Association for Electrical, Electronic and Information Technology) and the local energy suppliers).

2.6 Safety notes concerning maintenance, inspection, and assembly works

The operator has to make sure that all maintenance, inspection, and assembly works are carried out by authorised, skilled, and qualified personnel which are adequately informed by having thoroughly studied the operation manual.

Generally, works on the switching device are only to be carried out when the device is turned off.

Level controls used for media dangerous to health must be decontaminated. Immediately after finalising the works, all safety and protection installations must be reinstalled and/or activated.

Before (re)start, the points listed in the chapter commissioning must be taken into consideration.

2.7 Unauthorised modification and fabrication of spare parts

Retrofitting and modifications of the switching device are permitted only after having consulted the manufacturer. Original spare parts and accessories authorised by the manufacturer ensure the safety. The use of other parts can lead to the removal of liability for the resulting damages.

2.8 Unauthorised modes of operation

The operational reliability is only guaranteed, if the level control is used as intended according to chapter 1 – General. The limit values stated in the data sheet must not be exceeded.

3. Transport and temporary storage

The level control should only be transported and shipped in the original packing.
For a temporary storage, we recommend storage at a cool, dry, frost-free and dark place.

4. Operating mode

The electrode voltage between the electrodes is approx. 12 V direct voltage, the operating voltage for the pump connection is 230 V~. The four electrode rods extend with different lengths into the conductive fluid. The longest electrode is used as ground electrode, the next (decreasing in length) is the deactivation electrode, then the activation electrode and the shortest is the alarm electrode.
If the liquid level increases up to the activation electrode, the control activates the connected pump. If the liquid level falls below the deactivation electrode, the control deactivates the pump. Is the alarm electrode is reached by the liquid, the potential-free contact in the switching device closes and the integrated buzzer sounds. The potential-free contact is provided for special applications and may be used for an external alarm. See appendix for the position of the contacts (spring terminals) on the conductor plate.

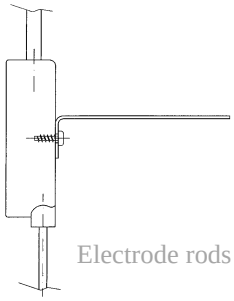
Changing the cable from connection 3 (discharge) to connection 1 (charge) the function may be inverted. As a solution, the connected device switches-on if the deactivation electrode is reached and switches-off if the activation electrode is reached. (filling function). The alarm is triggered in case that the tank to be filled is overfilled. The device is delivered in filling function condition.

5. Installation

- Disconnect the power supply before carrying out any kind of work on the plant.
- The electric connections of the connector switching device must not be exposed to humidity.

5.1 Electrode holder

The included bracket is fixed as shown using the 2 screws on the electrode holder. **Attention** the long side must point upwards!



5.2 Pump

The hose nozzle with connecting nut is removed from the pressure outlet of the pump FSP 330. The electrode holder is directly plugged onto the pressure outlet of the pump is such a way that the electrodes point downwards. Subsequently, it is fixed using the included connecting nut. Then, the hose nozzle is re-plugged and fixed using the connecting nut previously unscrewed. Please ensure the correct position of the non-return valve in the pressure outlet of the pump. The lengths of the electrodes are adapted to the pump FSP 330. In case of using a control for other pumps, the electrode holder must be properly fixed to the pump or the tank. It may be possible, that the length of the electrodes must be adapted. The difference in length of the activation and deactivation electrode complies with the switching differential.

ATTENTION ➢ **The control electrodes must not contact the pump or the walls of the pump sump. The ground electrode must be the longest electrode and may bear on the bottom. Please ensure that the deactivation point pretended by the length of the electrode will be reached by the pump. It may be necessary to shorten the deactivation electrode. If the electrodes shall be shortened in order to modify the switching points, the protection hose on the lower end of the electrodes must be cut by approx. 5 mm after the shortening. Before commissioning, the electrode rods must be slightly tightened using pliers, in order to prevent a loosening during the operation of the pump.**

It is possible to deliver the level control with other electrode lengths or to connect the hanging electrodes to the electrode holder.
During adaption of the electrodes, please respect the necessary minimum water level for switching-on as well as the minimum exhaustion height of the pump. Please see the operation manual of the pump for these data.

6. Commissioning

After fixation of the electrode holder, connect the switching device to mains; plug the connector of the pump in the switching device and effect test runs. See point 4 for the shifting from the discharging function (condition as supplied to customer) to the filling function.

The key has the following function:
Not actuated = automatic operation,
Actuated = Test run (The pump operates as long as the key is actuated. In case that the water level has not reached the deactivation point after loosen the key, the pump runs until the deactivation point is reached.

If damages should occur during this process, please check if there is a proper power supply and/or if the connected devices are in proper function and the liquid has enough conductivity. For further indications, see chapter 8.

7. Maintenance

 Disconnect the power supply before carrying out any kind of work on the plant.

The level control is maintenance-free as far as possible. At certain intervals, the electrode tips should be cleaned from possible accumulations, because it could generate a functional disorder.

8. Malfunctions; causes and elimination

 - Disconnect the power supply before carrying out any kind of work on the plant.

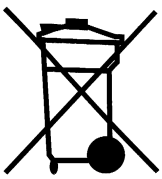
Failure	Cause	Removal
1. Pump does not switch on	- No and/or faulty mains voltage	- Check the power supply
	- Faulty connection	- Correct the connection
	-Defective cable	- Replacement (after-sales-service)
	- Active motor protection (over-heating, blockage, voltage error or another defect of the pump)	- Check, inform after-sales-service
	Blown fuse in the switching device	- Replace the fuse - Micro-fuse 8 A slow
	- Control failure/defective electronic system	- Check, inform after-sales-service
	- Electrodes soiled	- Clean the electrodes
	- Pump defective	- Replacement (after-sales-service)
2. Pump does not switch off	- Key continually actuated	- Do not actuate the key
	- Control failure	- After-sales-service
	- Deactivation electrode too long	- Shorten the deactivation electrode (respect the minimum possible deactivation point of the pump)
3. Faulty switching logic	Change cable on terminal X1	Change cable from terminal 1 to terminal 2. (and/or inversely)

9. Warranty

As manufacturer, for this product we provide a warranty of 24 months from date of purchase. Your sales receipt passes for verification. During that warranty period, we gratuitously remedy all deficiencies which are attributed to material or fabrication defects by either repairing or replacing the device (to our choice).
Defects which are attributed to misuse, wear or overload are excluded from warranty. We will assume no responsibility for consequential damages that are caused by a breakdown of the device.

10. Technical modifications

We reserve the possibility of technical modifications for the purpose of further development.



Only for EU countries

Do not put the electronic tools into the household waste!

According to the European Directive 2002/96/EC on Waste Electrical and Electronic Equipment and transposition into national law, wasted electronic tools must be collected separately and must be recycled in an environmentally compatible manner.

Plants

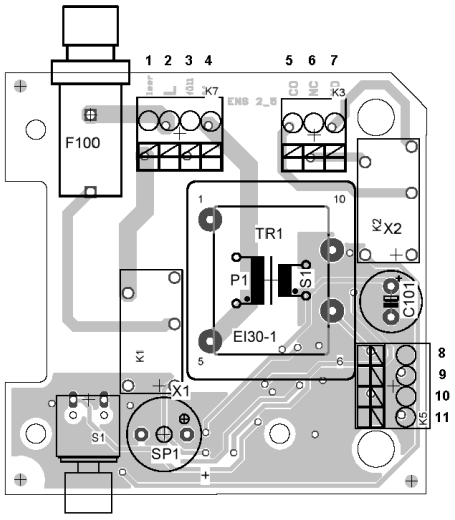
- **Adaption of the electrodes to the operating conditions in case of type “Universal”**

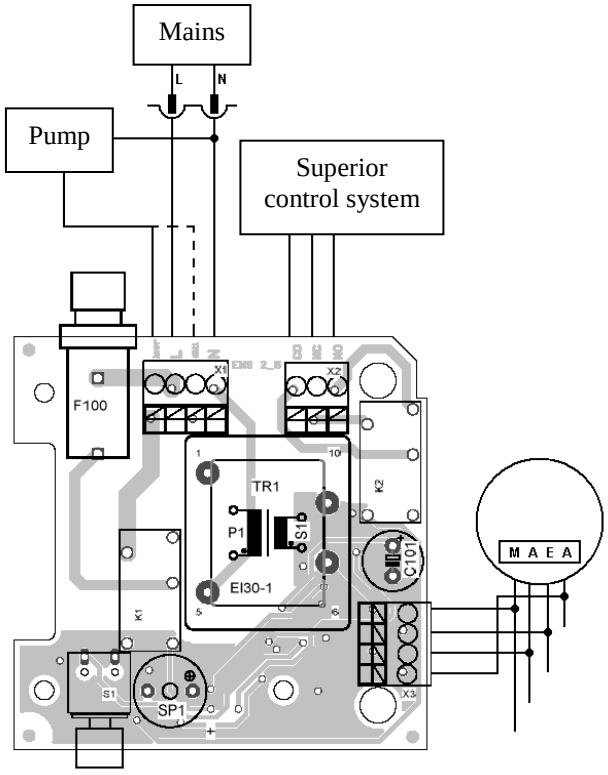
The electrodes of the electronic level control ***Universal*** must be shortened according to the desired activation and deactivation points. A use of the level control with electrodes not shortened is not possible!

The adaption shall be effected as follows:

- Disconnect the power supply before adaption
- Fix the electrode holder to the pump and/or the tank wall.
- The electrodes must be shortened as follows on the side without **thread**:
  - Shorten the earth electrode in such a way that the electrode is minimum 5 mm longer than the deactivation electrode.
  - Shorten the deactivation electrode in such a manner that the electrode rises out of the water at the desired deactivation point
  - Shorten the activation electrode in such a manner that the electrode dives into the water at the desired activation point
  - Shorten the alarm electrode in such a manner that the electrode dives into the water at the desired alarm point
  - Cut the protection hose at the lower end of the electrodes by approx. 5 mm after shortening.
  - The electrodes are screwed into the electrode holder (please respect the sequence according to indication on the electrode holder)

- **Terminal assignment conductor plate ENS 1.1 variant 2-5**





Terminal	Connection
1	Supply voltage pump (charge)
2	Mains voltage (phase)
3	Supply voltage pump (discharge)
4	Mains voltage (neutral conductor)
5	Alarm contact (COM)
6	Alarm contact (NC)
7	Alarm contact (NO)
8	Sensor contact (long electrode – earth – green-yellow)
9	Sensor contact (short electrode – OFF – grey)
10	Sensor contact (middle-sized electrode – ON – blue)
11	Sensor contact (alarm electrode – black)