

User Manual

AquaControl +

Rainwater System Controller

Item no.: 351027



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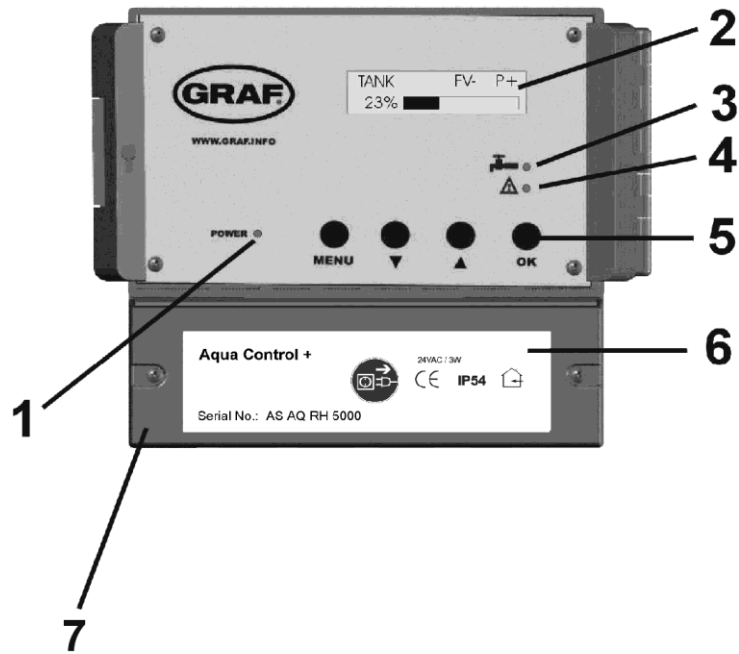


Figure 1: Indicators and Controls

- 1: LED for power supply
- 2: Information Display
- 3: LED for drinking water operation
- 4: LED for faults and malfunction
- 5: Operating buttons
- 6: Lower cover of the System Control
- 7: The main fuse for the rainwater system controller is under this cover.

Important Safety Notes:

Please read and follow safety instructions carefully before assembly or using the device!

Equipment using a 120 VAC supply may only be installed and commissioned by a qualified tradesman. The assembly place must allow all possible safety precautions when laying the attached cables.

The Rainwater System Controller must be mounted in a clean, dry location free from rain, harsh elements and direct sunlight. If exterior mounting is desired, an optional enclosure is available for a minimal cost by contacting RainHarvest Systems or an authorized dealer. Damage resulting from water, excessive heat or sunlight is not covered by the warranty.

Power supply cables and data cables must not be damaged or pinched in any way. Plan the assembly place so that you can reach the transformer easily and unplug it from the electrical outlet in dangerous situations.

Choose the assembly place so that children cannot play or be near the device and its connections without supervision.

Before opening the device, disconnect it from the main supply (unplug) otherwise there is a serious danger of an electrical shock.

Fuses may only be replaced with standard-compliant parts with the same nominal value.

All liability is excluded for damages which result from non-compliance of these instructions or from improper handling of the device. At chosen intervals in this handbook we will give directions for safety precautions. These safety precautions have been specially marked:



STOP Before opening the equipment
unplug the transformer from the outlet!

1.Description

The **AquaControl+** is an electronic water management control system.

It has been developed especially for rainwater usage systems. It can be used with a wide variety of tank systems.

Tanks made from metal or steel reinforced cement may only be used when the following conditions have been correctly followed.

Metal tanks lead to faulty readings. It is optimal to install the device so that the sensor is as far as possible from the metal sides so, for example, in the center of a cylindrical tank. The system controls offer an easy to use guide for the switch programming. Using an LCD display the fill measurement is shown in 1 % stages (in relation to the height of the tank). The sensor operates with 12 volts DC, supplied from the main control unit.

All programmed values such as the tank height are retained after disconnection of the power supply or after loss of power.

Performance features:

- Fill level measurement display in 1% steps with a bar type indicator
- Freely variable switching points in 1% steps for drinking water refill
- Automatic flushing of the system intervals in days, and duration in minutes are programmable
- Dialogue oriented user guidance (choice of language)
- Equipment indication using 3 additional LED
- Supervision of the sensor control box and the sensor
- Error indications in simple text
- Analog output for connection to external systems: 0-10V DC

Technical data:

Control electronics

Operating current :24VAC
Fused :T500mA
Power consumption :3VA

Measurement sensors

Measurement voltage :12V DC
Measuring frequency :(0.2-20)kHz
Data cable length :165 feet,
maximum
Tank height :9.8 feet (optional 20feet)
Measurements :6.1"x6.5"x3.5" Measurements :3.6"x3.2"x2"

Terminal 1

Operating voltage : 24V AC
Maximum Current : 5Amps

Terminal 2-4

Operating voltage : 24V AC
Maximum Current : 1Amps

Terminal 5

Operating voltage : 120V AC/DC
Maximum Current : 3Amps

Analogue outlet:

Minimal apparent ohmic resistance : 20K Ohm
Short circuit protection : Yes
Short circuit current : Approx. 15mA
Cable length : 650 feet, maximum; shielded

Note:

Only the control electronics in the device are protected by the fuse. Valves and pump connections are **not** protected. These are protected only by the mains supply via the circuit breaker.

The yellow LED indicating “Drinking water operation” [3] is lit as soon as the valve switches over to the mains supply. The user is made aware that the system now uses water from the mains supply. The red LED for “Faults and malfunctions” [4] is lit as soon as the system identifies a fault. The display will then show a warning that describes the cause of the fault in plain text.

2.Assembly

2.1Control system

The mains plug of the transformer serves as an on / off switch.



- Loosen the fastening screws of the lower cover [6] and remove the cover
- Mark out drilling points and drill according to sketch
- Fasten the device with the enclosed installation hardware (screw anchor and screws)

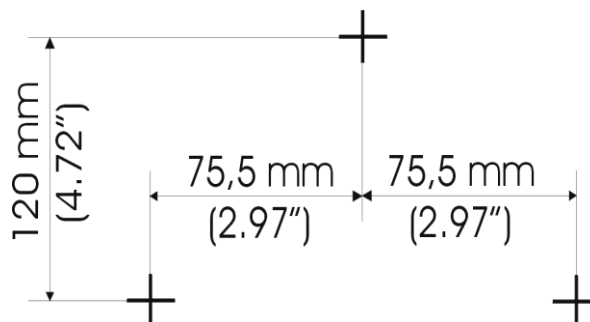


Figure 3: Drilling outline for housing outline (*Not to scale*)

2.2 Connection Sensors and Cable

Sensor electronics consist of a stainless steel probe [22], red and white connecting wires [27] and sensor control box [28].

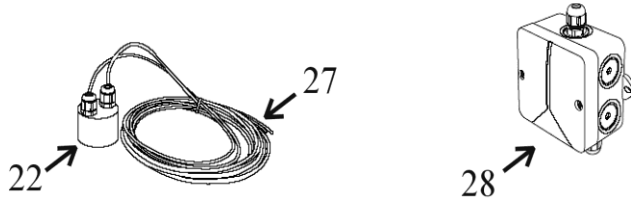


Figure 4: Sensor technology

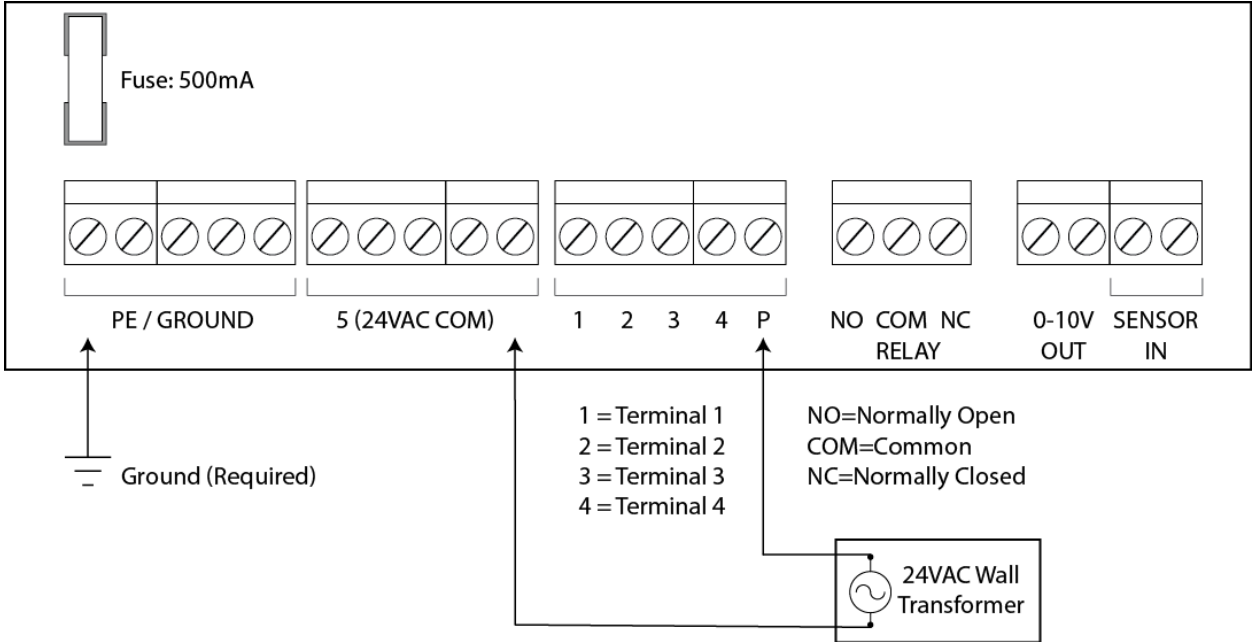
1. Now the sensor control box [28] (cover removed) should be installed on the tank wall (preferably in the manhole shaft of the Graf synthetic tank). The location of the mounted sensor control box should be between 4" and 6" above the overflow [25]. The enclosed screws should be used to secure the device. After fully tightening the screws, the points that are showing themselves on the outside of the tank must be blunted to avoid injury [24].
2. Measure the height from the bottom of the tank [23] to the end of the terminals [15] and [16] on the [28].
3. Shorten the connection cable to suit the measured height.
4. After shortening the cable, the distance between the cable fastening spacers [21] should be set equally along the entire length. The cable fastening spacers prevent the red and white wires of the sensor from crossing over and thereby causing a slight distortion of the measurement readings. If for any reason the cable fastening spacers cannot be mounted, an additional distortion of the measurement reading of approximately 1% may result.
5. Connect the sensor cable to the sensor as described in the following instructions: Remove approximately 1/4" of insulation from both of the wires. Next, pass the red wire through the wire seal 1 [19] and tighten this lightly, then connect the red wire to the terminal [16]. The free white wire is now passed through the wire seal 2 [18] and tightened lightly, then connect the white wire to the terminal [15].
6. Now pass the end of the data cable [12] through the wire seal 3 [13]. Lightly tighten the wire seal and connect the cable wire cores of the data cable [12] to the double terminal [14]. The connection of the data cable is reverse polarity protected. **Attention! The screws should be tightened with care to ensure that they are not damaged.**
7. Now recheck that all the connections and the sensor components have been fitted correctly. Replace the cover of the sensor control box and secure this with the appropriate fastening screws.
8. At the main system control unit, remove the jacket from the ends of the shielded sensor data cable, strip about 1/4" of insulation from the wires, and insert each wire into the appropriate terminal labeled "SENSOR" on the main circuit board. Tighten the terminal screws securely.

Note:

The red and the white wires going down to the probe should be straight and smooth to be drawn taught by the weight of the stainless steel probe. The stainless steel probe must hang just above the tank floor. When setting the spacers please be sure to distribute them equally over the complete length as shown in Figure 2.

2.3. Electrical Wiring Connections

The AquaControl+ offers the rain water system a dry run protection for the pump or the house water system when equipped with an external pump relay. In order for the dry run protection will function properly the rain water system must be wired according to the following diagram.



For the supply of 24V AC to operate valves and other accessories, external power must be supplied to the 24V AC input terminals using a transformer sufficient for the needs of the attached devices.

Figure 5: Electrical wiring diagram

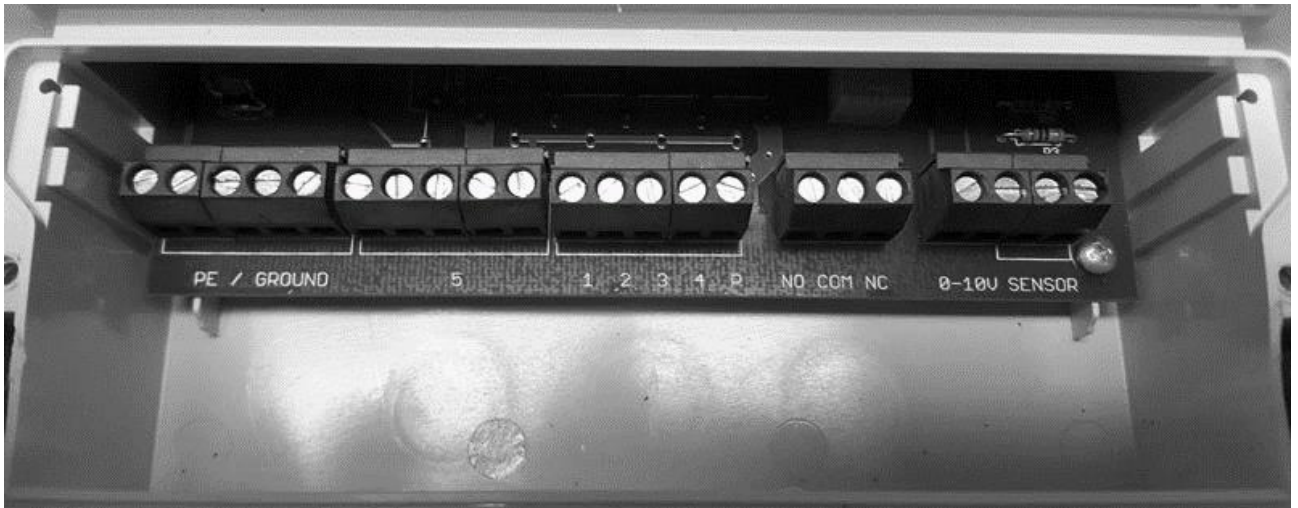


Figure 6: Photo of electrical connections

3.Activation and calibration process

Before the energizing the equipment, be sure that all electrical connections are correctly insulated and all covers are properly closed.

Now open the transparent cover of the system controls. Plug the transformer into the outlet (this outlet must be exclusively for the equipment and be on its own breaker). The system runs a self-test automatically.

For the duration of the system check (approx. 10 seconds) the following signal will be displayed in the window:

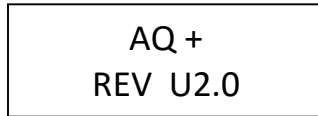


Figure 7: Display during the equipment check

The equipment type is shown on the first line and the software check in progress is shown in the second line.

If after the initial installation check all is correct, the LCD indicator will display the fill level (in %).

Figure 8 shows the LCD-display in the operation mode. The display shows the filling level and the operating modes as abbreviations: "FV" and "P". These abbreviations correspond as follows:

- FV+ : filter cleaning valve opened
- FV- : filter cleaning valve closed
- P+ : (pump on) house waterworks in operation
- P- : (pump off) no water currently being withdrawn

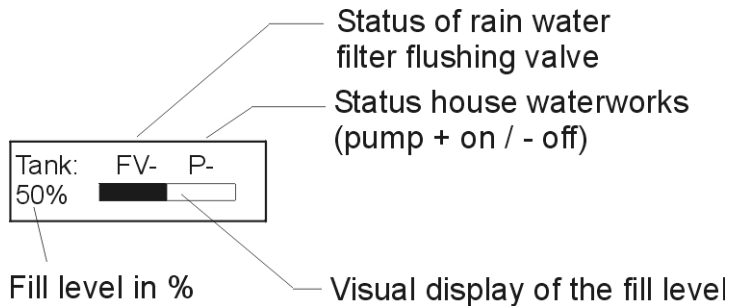


Figure 8: Display in the operation mode

4. Set Up of the System Control

After putting into operation, the system control must be adjusted and programmed according to the conditions and requirements of the individual user's system. The required settings are easily programmed. There are four buttons for this purpose. All necessary programming data entries follow a menu displayed by the LCD. For the setup, follow all the points listed in table 1 in the sequence shown. Should any error in the sequence occur then it is necessary to begin the set up again from the beginning starting with the tank height. Begin the programming of the settings by pressing the button marked "MENU".

With the buttons "+" or "-" the menu may be scrolled backwards and forwards. With the respective menu point shown the values may be altered. For this the button "ENTER" must be used. The value begins to flash. With the "+" or "-" the desired value may now be entered according to individual requirements.

When the desired value has been entered this must be confirmed by pressing the “ENTER” button. The value is only then taken over and stored in the programming of the unit. Through pressing the “MENU” button again the display changes back to the operation mode.

It is possible to reset the unit to the factory setting standard values at any time.

The resetting can only be carried out in the operation mode (Display see Figure 7): To do this press the “ENTER” button and hold it pressed. Now simultaneously in addition press the “MENU” button. After a short wait the following display will be shown:

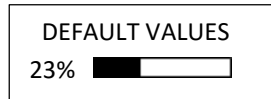


Figure 9: Message reset to standard factory settings

As soon as this message is displayed the buttons may be released

The menu structure integrated in the system control is outlined in Figure 8. To bring up the menu, press and hold the “MENU” button for longer than 5 seconds. All outputs are inactive when the menu level has been activated and operation of the device is suspended. The system automatically returns to operating mode when no entries have been received for approximately 30 seconds.

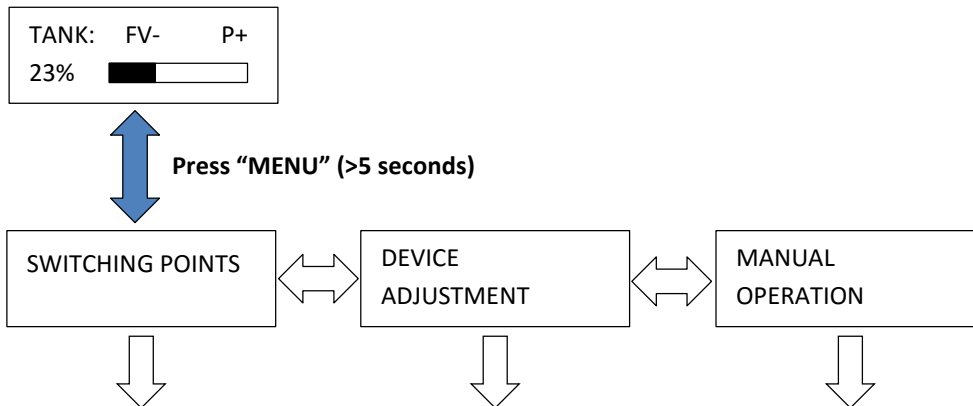
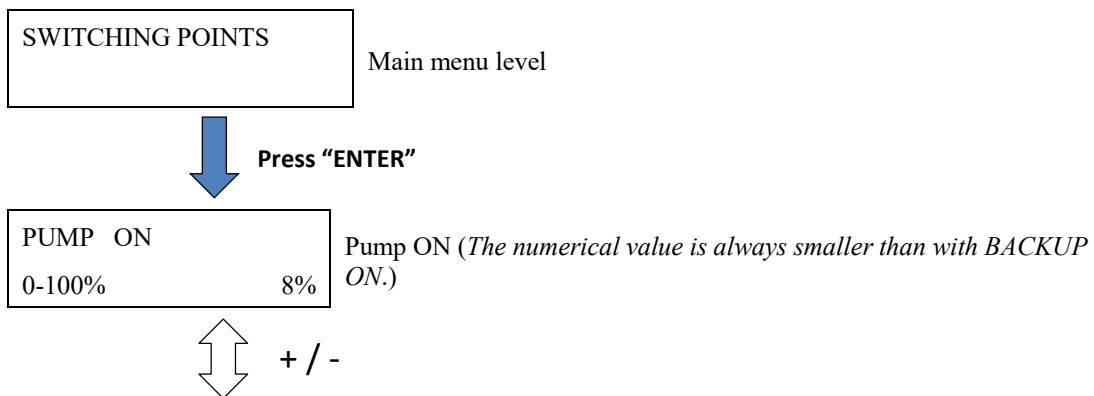
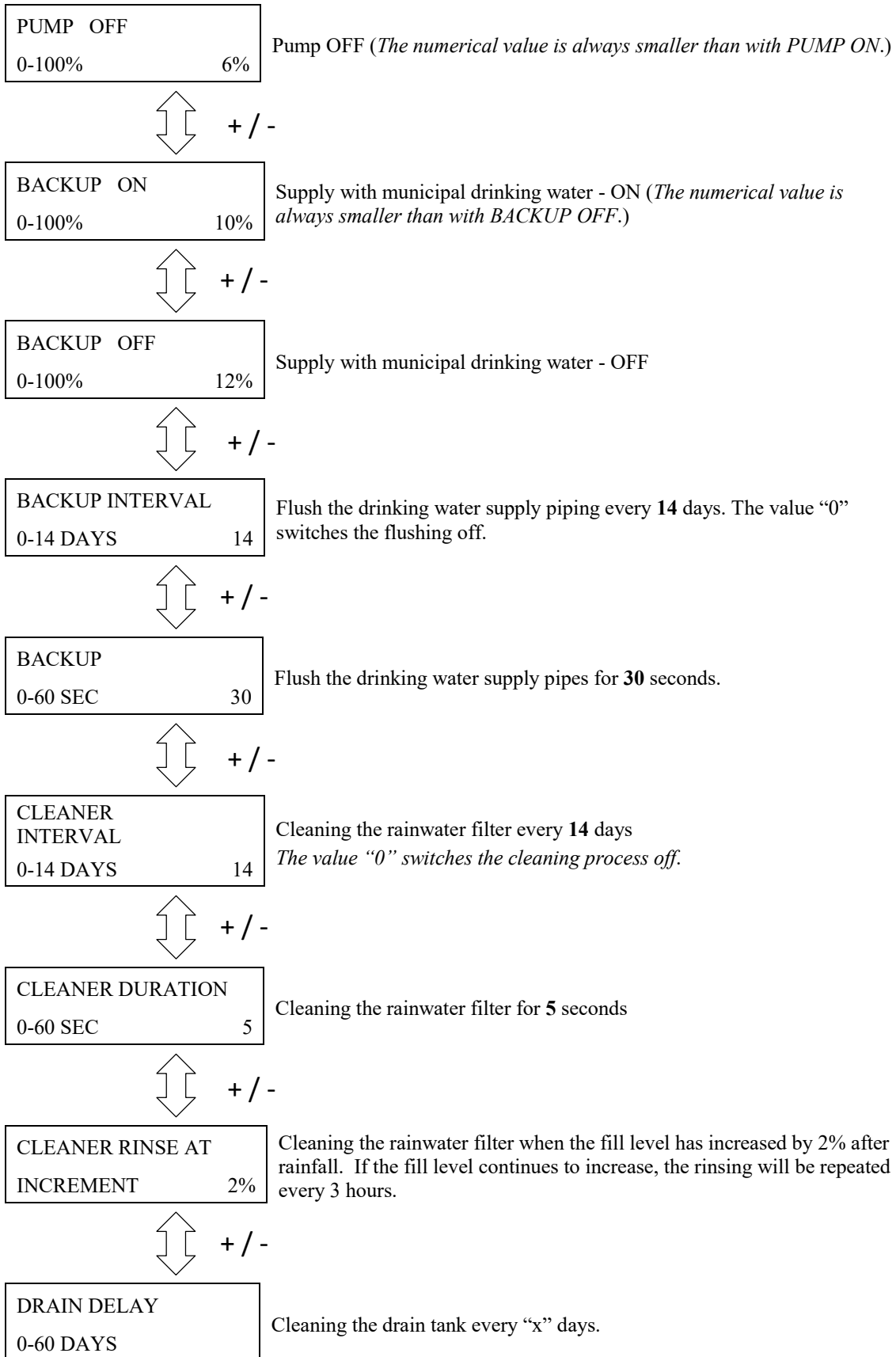
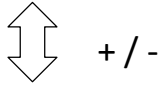


Figure 10: Main menu level

Press the “ENTER” button to arrive at each of the listed sub-menu functions. Through pressing the “MENU” button again the display changes back to the operation mode

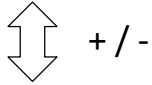






DRAIN TIME
0-60 MIN

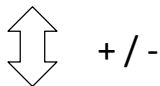
Cleaning the drain tank for “x” minutes.



TRANSFER FROM
0-100%

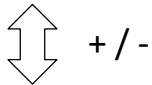
This enables water to be pumped out of the main tank. The chosen numeric value “Transfer from” should always be greater than the numeric value “BACKUP OFF”!

The water will be pumped off when it rises above the set value. To prevent constant switching on and off of this function, it is pumped off to 2% under the opposed value.



REFILL ON
0-100%

Numeric value is always greater than the value “BACKUP ON” **and** less than the value for “REFILL OFF”.



REFILL OFF
0-100% 6%

Numeric value is always greater than the value for “REFILL ON”.

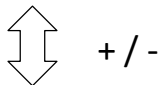
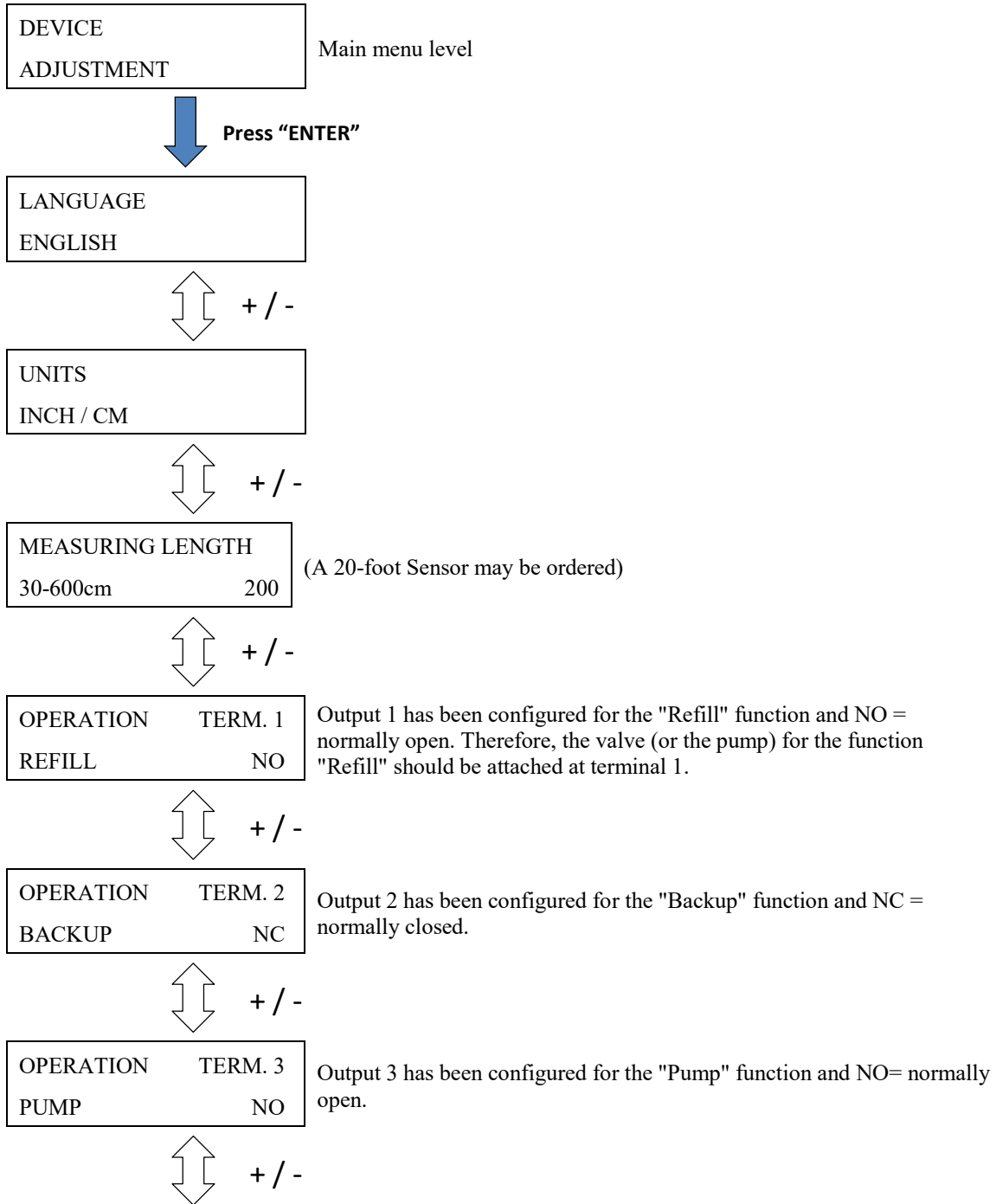


Figure 11: Sub-menu "Switching points"

Press the "ENTER" button to alter the respective switching points. The value to be altered will begin to blink. The value may then be adjusted by using the "+" and the "-" buttons. Press the "ENTER" button again when the displayed value should be accepted.

The following is an introduction to the general device settings:



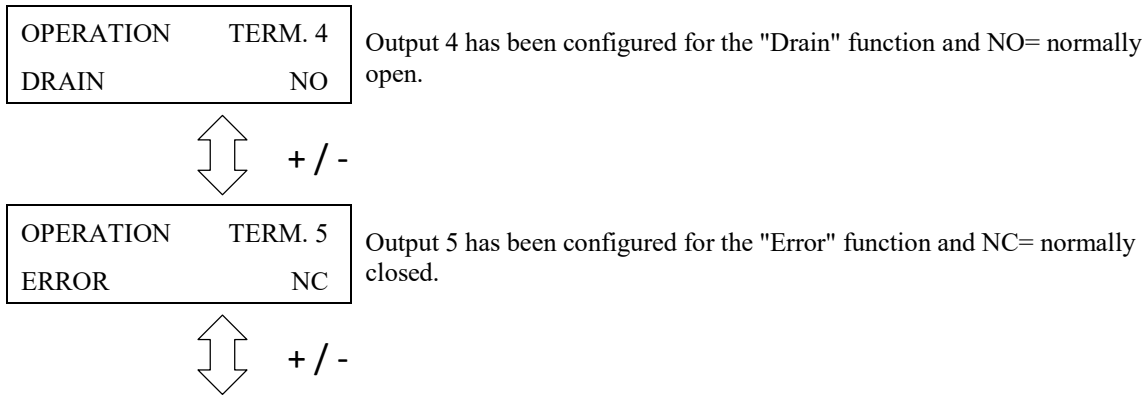


Figure 12: Sub-menu “General device description”

For each terminal the selection between the following functions exists:

- BOOSTER PUMP NO
- BOOSTER PUMP NC
- CLEANER NO
- CLEANER NC
- BACKUP NO
- BACKUP NC
- TRANSFER NO
- TRANSFER NC
- REFILL NO
- REFILL NC
- PUMP NO
- PUMP NC
- DRAIN NO
- DRAIN NC

Note:

Please configure each output according the requirements of your rainwater system requirements.

The function of the output can be specified for each terminal separately (normally open or normally closed). Please consider the maximum current values for each individual terminal:

- Terminal 1: 5 Amps
- Terminal 2: 1 Amp
- Terminal 3: 1 Amp
- Terminal 4: 1 Amp
- Terminal 5: 3 Amps

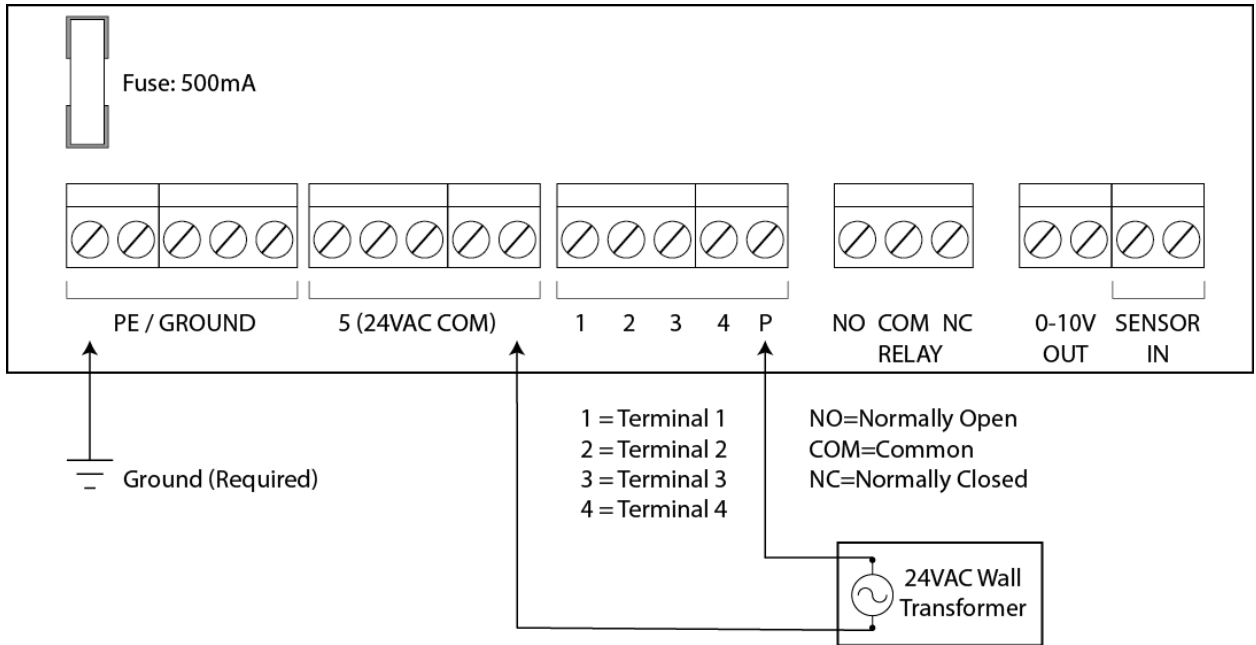


Figure 13: Allocation of Terminals 1-4 and Relay outputs

This section covers the manual functions:

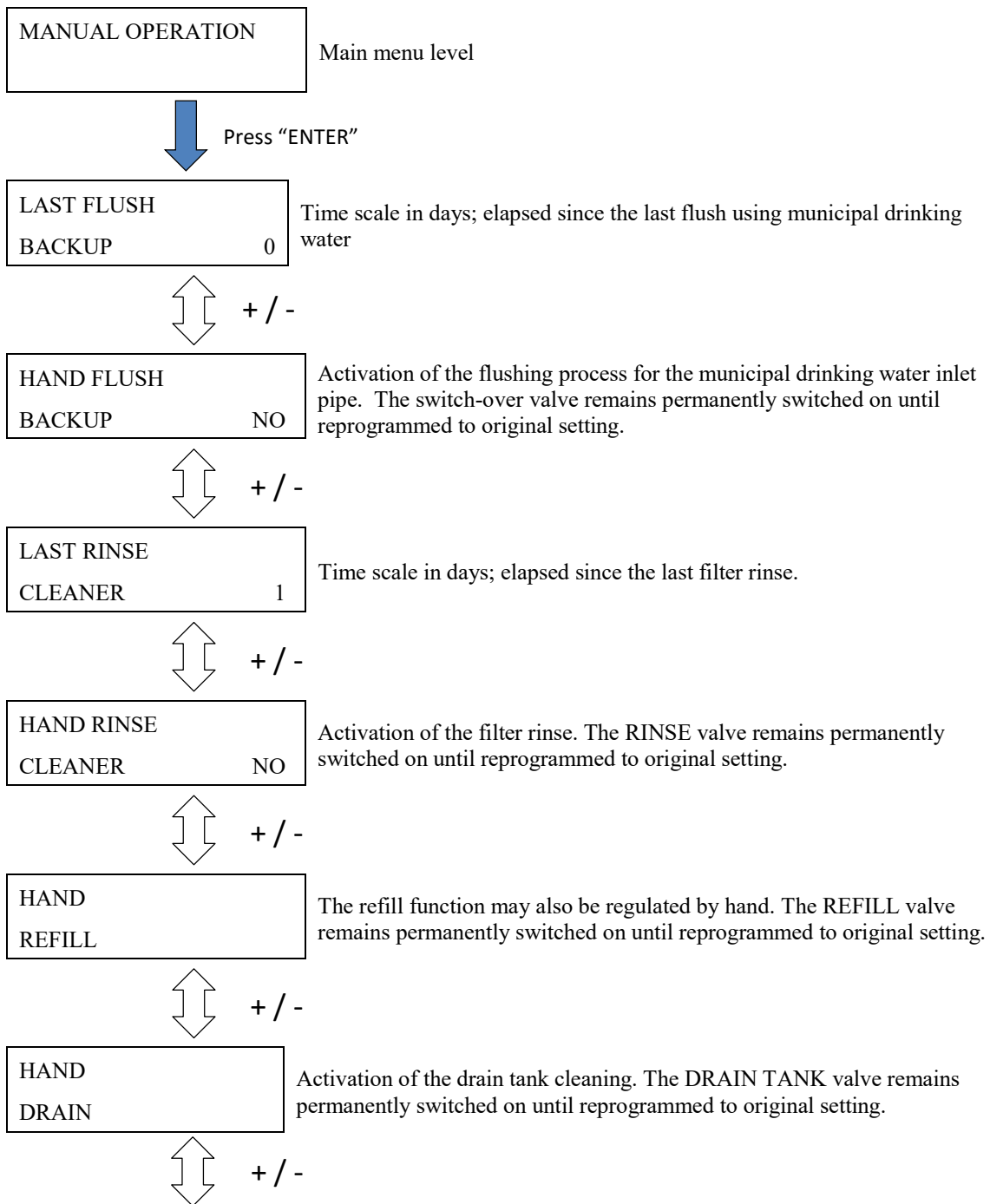


Figure 14: Sub-menu “Manual functions”

5. Error messages and fault correction:

The operation of the system control should be checked at regular intervals (at least every 4 weeks).

The error messages provide an indication of general symptoms. Additional troubleshooting will be required to determine the underlying cause and necessary actions.

Please also take note that the system control device cannot sense any malfunction of the municipal water supply or house water system. (No malfunction signal is supplied by external water supplies or devices to the system control device).

If faults are recognized by the tank level sensor, the system control cannot continue to work properly.

The following faults are shown in the plain text on the display:

ERROR SENSOR	The reason for this error is that the white sensor wire has been damaged.
ERROR DL SHORT CIRCUIT 0	Error possibilities: <ul style="list-style-type: none">• The data cable of the sensor control box is not connected to the data cable terminal [14] but has been connected to the sensor terminal• Wires of the data cable have been damaged
ERROR SENSOR CONTROL	The sensor control box delivers no signal and must be replaced.
ERROR SENSOR SYSTEM	For further diagnosis, remove the stainless steel weight [22] out of the water. If the error indication has now stopped, then the sensor itself was the cause of the fault. If the error indication continues, this implies that the sensor control box is defective.
ERROR NO SIGNAL NO	The communication between the system control to the sensor control box is interrupted.
ERROR MEMORY	First try resetting the system control to the factory default settings. If the error message continues to be displayed, then it is necessary to contact your service partner. Note: <i>After resetting to the factory default settings all the newly programmed setting values will have been overwritten and must be re-programmed!</i>

Figure 15: Error messages

If the device shows no function at all then check whether the main electrical supply provides current and also check the house breakers.



If the electrical outlet is working properly, then unplug the transformer from the system control. Once the system has been de-energized open the lower cover of the system control (see Figure 1) and check the rainwater system controller main fuse.

6. Analog Output

Your device has been fitted with an analog output terminal. This terminal shows the percent values from the system control (0% -100%) by a voltage range from 0V to 10V DC. The following connection values apply:

Minimal apparent ohmic resistance	: 20K Ohm
Short circuit protection	: Yes
Short circuit current	: Approx. 15mA
Cable length	: 650 feet, maximum; shielded

Note:

The system control is only capable of displaying whole percent values (no fractions). These are shown on the analog signal display.

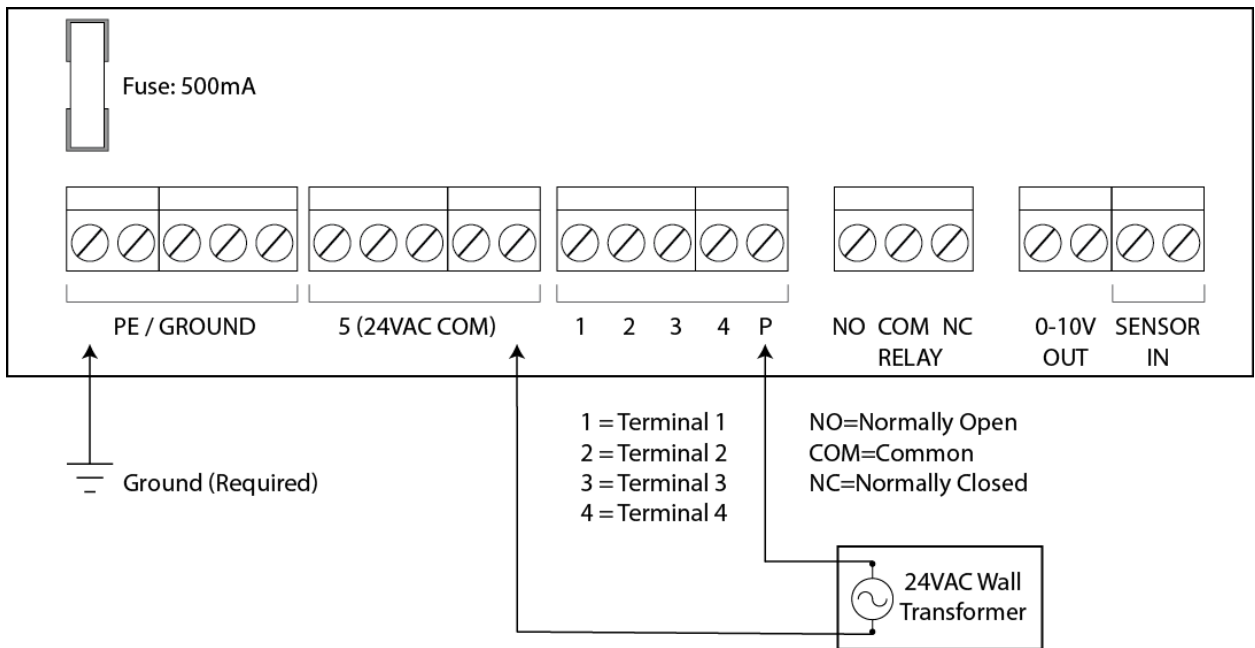


Figure 16: Analog output (0% -100%) via 0-10VDC is on the '0-10V OUT' connection block

Attachment A – Symbols used:



Attention! Pull out the mains plug from the socket before opening the device.



Attention! An error has occurred.



Mains drinking water operation



Page down



Page up



Only for use in dry areas

Space for your notes:

Purchase date: _____

Device serial number / Type: AS AQ RH

Tank height _____

Software level AQ+ REV: U2.0

Design and specifications are subject to change without notice

Manual revision (RHS): June, 2016; Version: AQ+ U2.0A