Fore bay water level meter

A simple level meter has been used in some projects to monitor the level of the water in the fore-bay. This is especially useful when the fore bay is far away, the fore bay overflow is limited or non-existent, and if the site has a high head.

It is made of wires that conduct when submerged in water. It consist of a vertical plow with wires, a small 6 volt (4-10 Amp-Hr) lead/acid battery, a circuit board (Figure 1) with LEDs (Light Emitter Diodes) and a box as shown in Figure 2.

Figure 3 shows the vertical pole with 4 mm^2 wires. There is one positive line that is un-insulated, and connected to LP+ on the cards. The negative lines, connected to LP1 - LP7 on the card are insulated except at the end, where they point outwards. The pole has a cover on the top to protect the connectors from rain. The pole is mounted in the fore-bay and connected to the circuit board in the power house with an internet wire that consists of 8 wires.

In the power house the circuit board in Figure 1 is in a box with a 12V transformer and a small 6V motorcycle lead acid battery. The LEDs and the switch are on one side of the card and the other components on the other side. The box allows the LEDs to be seen which shows the water level in the fore bay. The LEDs can be colored red for the upper water level to warn the operator. A green LED is used to show that the system is on and has power. The battery allows the meter to work when there is no electricity. On one of the two projects the life of the battery was 6 years.

The circuit board consist of a simple charger, a switch to turn it off and 8 transistors that conduct electricity when a small current of about 0.1 mA goes through the sensor.

This system has been installed on two projects and is working well. It gives the operator an idea of how much water is in the fore-bay. However, the wires that are under water get an oxide coating after some time which does not conduct, therefore, the wires must be cleaned about every 6 months.

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For one larger plant, RHL mounted two boxes with LEDôs connected to one sensor pole. This way the operator could monitor the fore bay water depth in the control room and in the turbine room.

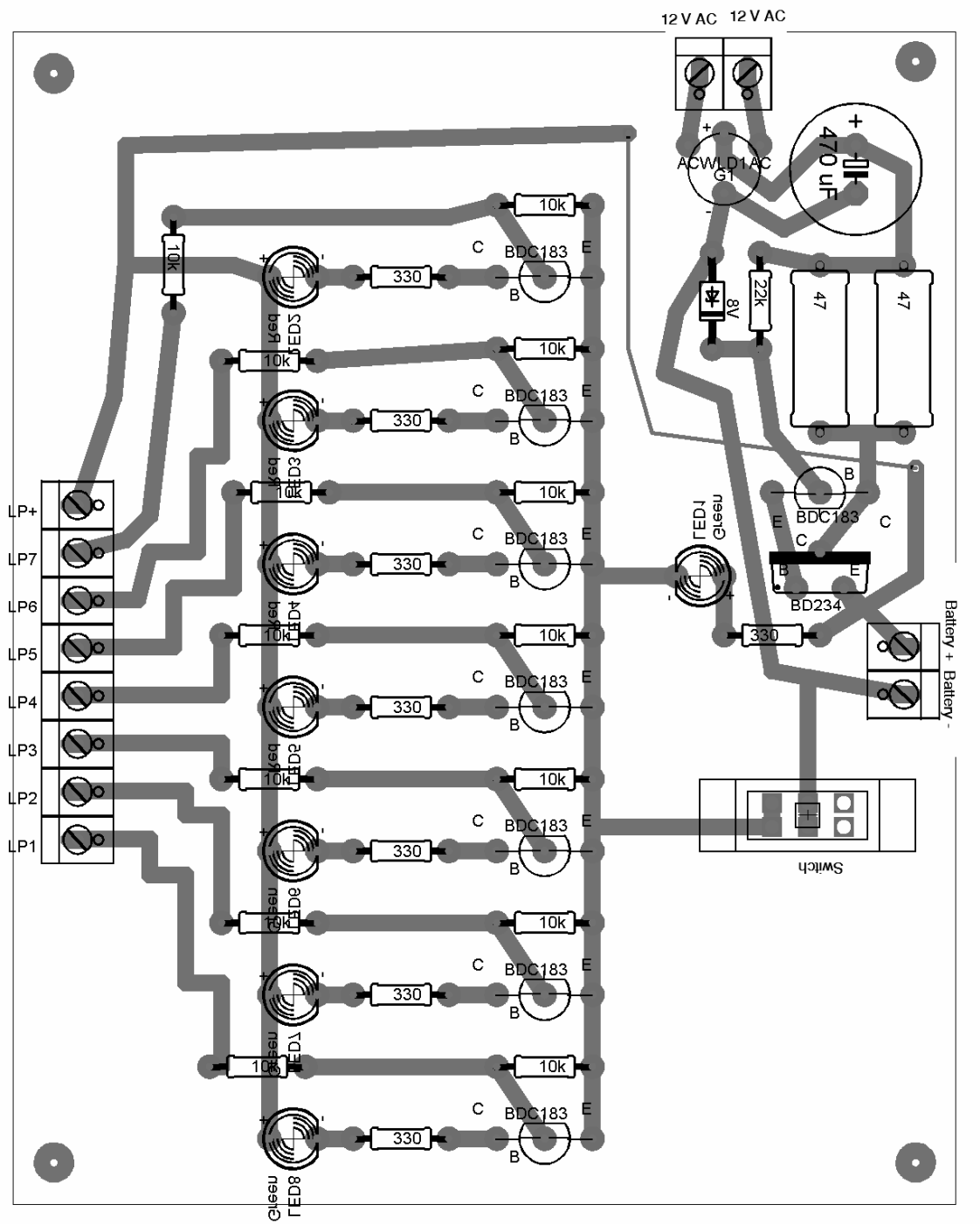

Figure 1 Card for level meter. Connectors LP1-LP7 and LP+ are connected to the level pole.

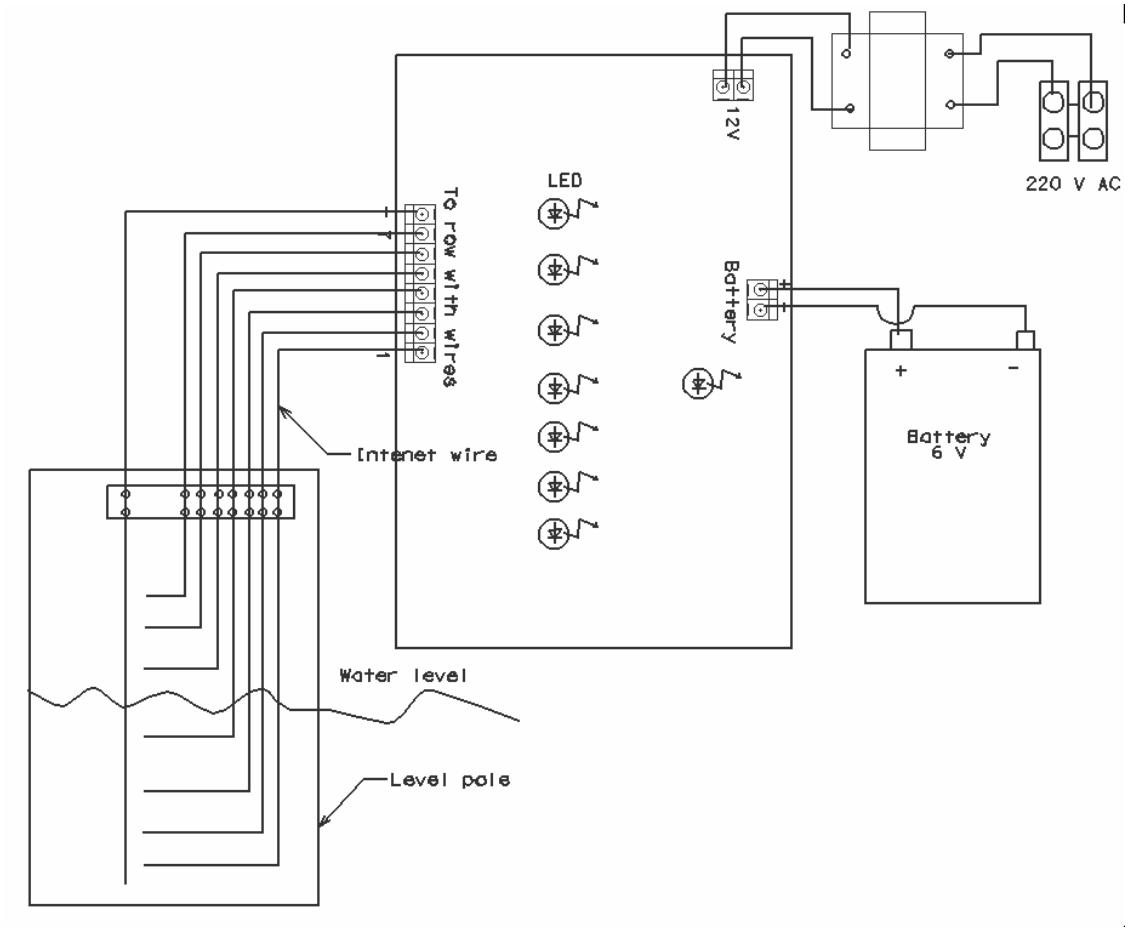

Figure 2 Card connected

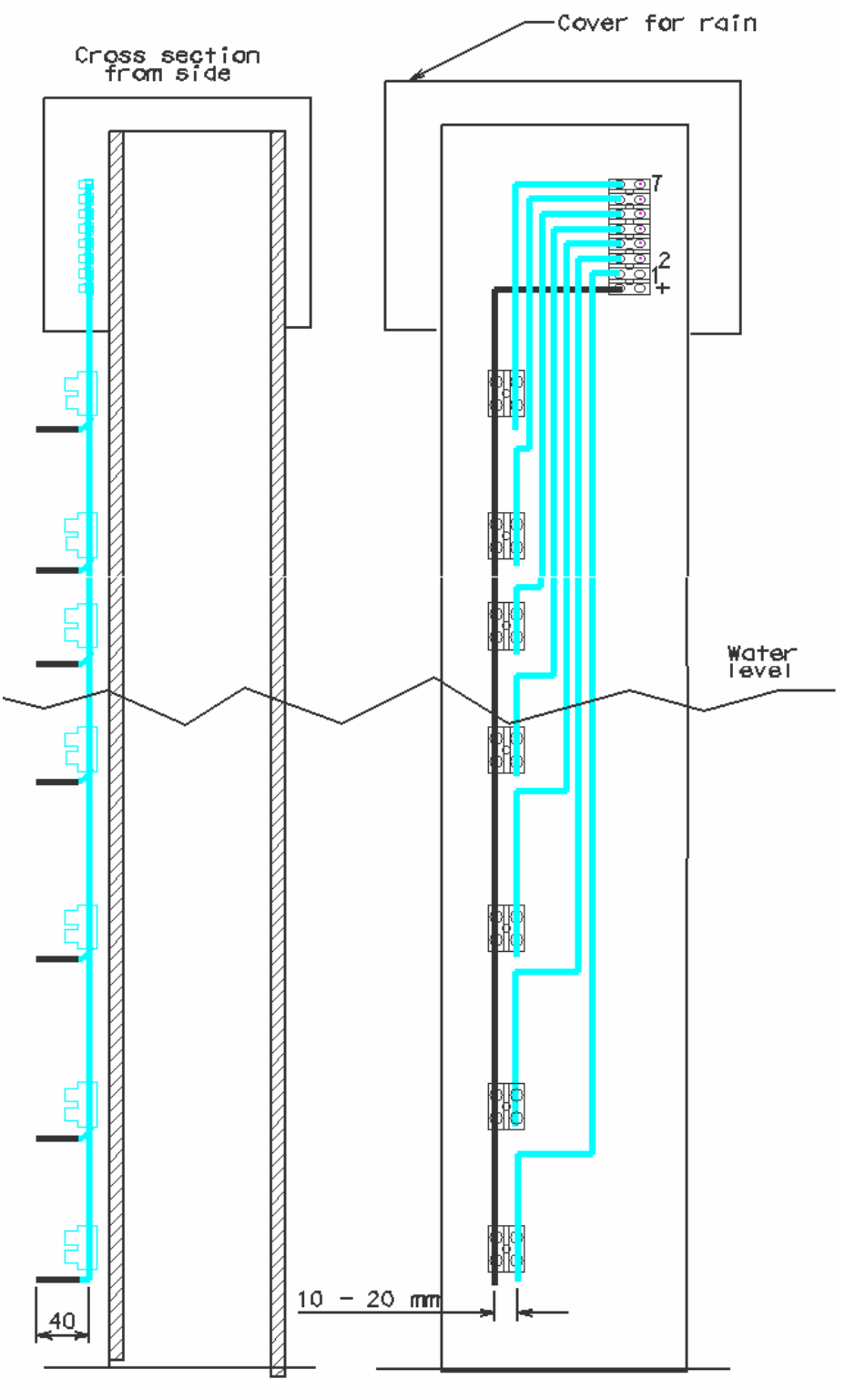

Figure 3 Level pole. PVC pipe is used as vertical pole in fore bay. Insulated wires are light blue and un-insulated wires are black