This ULU

The *ULU.53 Object sensor* uses (active) infrared radiation to detect the presence of objects. It contains a clear infrared transmitter and black receiver. The reflected infrared radiation is used to detect the presence of objects.

Used parts

The following standard parts are used:
1x casing 50 x 25 x 25mm;
2x 2mm signal connector;
2x black O-ring 9 x 5 x 2mm;
1x power connector;
1x 3mm round LED ;
1x resistor to dim the LED;
1x LED holder;
1x micro (G6K-2F-Y-5VDC) relay;
1x fly back diode (1N4148);
1x M3 5mm male/female standoff;
1x M3 countersunk bolt;
1x M3 nut.

The following extra parts are used:
1x 1K resistor;
1x s8850 transistor;
1x active infrared sensor;
1x 10K potentiometer;
1x 15mm knob.

Construction

The standard ULU specifications are applicable as specified in the datasheet *ULU.00 – Common specifications*.

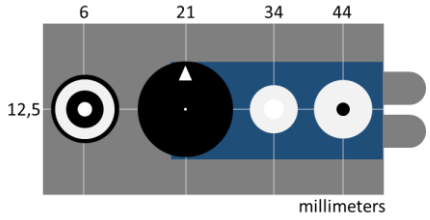

Figure 1 – Drill guide

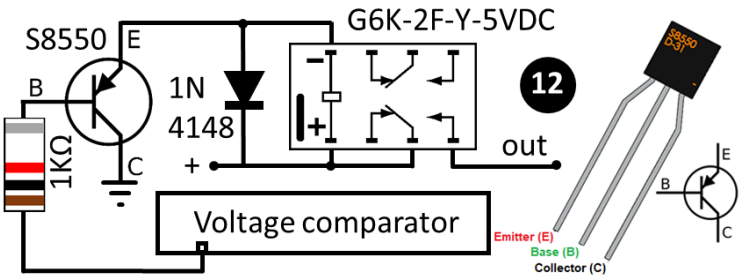

Figure 2 – Schematic

Figure 3 – The used sensor

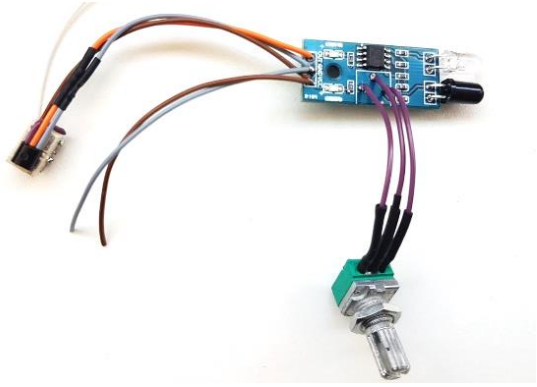

Figure 4 – PCBs connected

First, the pin header and potentiometer need to be desoldered from the used sensor (Figure 3). The easiest way is to cut both components to pieces and desolder the pins one by one. Then a chirurgical clamp is clamped on one of the pins to draw it downwards and this part can be desoldered with a common soldering iron. After that, a desoldering cleaning rod or a small PCB drill will open the hole.

Wires are used to connect the three holes in the PCB to the corresponding pins of the panel mounted potentiometer. The solder connections of this potentiometer are insulated with shrink fit tube. In the same way the transistor with corresponding resistor and relay with corresponding diode are insulated with shrink fit tube (Figure 6). A piece of duct tape is used to insulate the back site of the sensor PCB.

In the bottom of the enclosure a 3mm hole is drilled and countersunk to fit a M3 countersink bolt. Be sure to drill this hole not too close to the end, otherwise the sensor will not fit. Also ensure that the hole is drilled at the correct end of the enclosure, otherwise the top part of the enclosure will not fit. The bolt is used to attach a 5mm female/male standoff to the casing. A nut is used to attach the PCB to the standoff. Two holes are drilled in one of the front cover plates to facilitate the transmitter and receiver.

Figure 6 – ULU inside

Figure 5 – Soldered relay

Figure 7 – Finished ULU

Usage

This ULU can be used to detect the presence of an object. The rotary knob is used to adjust the threshold of the sensor and determine the required detection distance. The reflection capabilities of the object will influence the detection: a bright surface has better reflection and will be detected earlier.

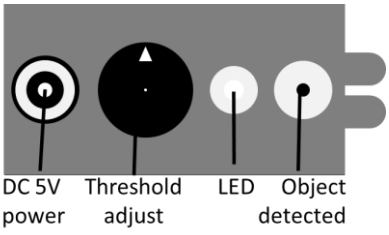

Figure 8 – Controls and connectors