Hairdryer overview

This is the only kinetic item by Nervous Squirrel ltd. that is at ground level and directly accessible to the public. It functions as a wireless RF interface to control the windmills on the balcony.

The hairdryer is made of machined fire retardant MDF, coated with a 200g twill weave fibreglass cloth and Scott Bader crystic 1355PA class 1 fire retardant polyester resin. A central column allows the outer structure to rotate on a pair of 2" bearings, bolted to an internal steel frame. The central column is bolted to the floor via a 10mm thick base plate with welded gusset plates.

Rotation is limited to approximately 180 degrees using a pair of rubber stops, and the speed of rotation is limited using an 8.7Nm rotary damper to prevent injury to the public.

Positional feedback is obtained from a 12 bit absolute encoder attached to the top of the central column, driven by a flexible shaft coupler. This is calibrated once, during installation, by entering calibration mode on the rotary switch and following the instructions on the built in OLED screen (see notes below). This only has to be done once - the values are saved to EEPROM memory.

Once the hairdryer has been calibrated, the public may move it back and forth to trigger individual windmills. When the windmill is pointed at a particular windmill, the encoder detects the position and activates the transmitter. The transmitter communicates with the receiver on the windmill balcony, which receives the signal and activates the corresponding windmill/s.

The transmitter within the hairdryer consists of a hacked 8 channel Trap RF handset with CMOS 4066 quad bilateral switching chips as an interface between the Teensy and the soldered membrane pads. There are currently 2 channels spare.

When the hairdryer is moved there is also a 230V 200mm diameter fan that activates, switching off when no further movement is detected for 10 seconds. A relay and 25A contactor turn the fan on and off.

To facilitate air flow the machined aluminium side grilles on the hairdryer have a steel mesh, covered by fire retardant speaker fabric to hide the inside from view.

There is an aluminium finger trap guard screwed to the underside of the hairdryer - do not remove this component.

Maintenance

Touch up paint or respray every now and again when necessary.

Replace fan occasionally when it wears out.

Oil bearings every 10 years.

Rotary switch modes

0: Run normal routine (the only setting with RF transmit)
1: Calibrate windmill 1 centre position
2: Calibrate windmill 2 centre position
3: Calibrate windmill 3 centre position
4: Calibrate windmill 4 centre position
5: Calibrate windmill 5 centre position
6: Calibrate windmill 6 centre position
7: Display all 6 calibrated positions on the OLED
8: Extra zone info - displays the current encoder position, calculated active windmill, zone boundaries and encoder wraparound information.
9: A congratulatory message for all your hard work
10-15: Unused

Things to watch out for

It is recommended that a spare fan is purchased, as the current model is a snug / custom fit in the hairdryer nozzle.

Troubleshooting

Check serial output for diagnostic clues.

Notable components

RF Solutions 8 channel 868MHz Trap RF system, RS Components part number 192-6550
12 bit absolute encoder, 6mm shaft, Ali Express, model BRT38-S0M
Rotary damper, RS Components part number 793-3073
18mm FR MDF, creffields.co.uk
FR resin, 1590-1590, ecfibreglasssupplies.co.uk
Fire rated speaker cloth, KBT14149-U241-BL-FA, fabricuk.com
GDSTIME 200 X 60mm 230V axial cooling fan, 370 CFM, Amazon

Colours

2K satin RAL Light Pink 3015
2K satin RAL Heather Violet 4003
Base plate: 1K cellulose generic satin black