Windmills overview

The 5 windmills and ferris wheel all use a 4Nm NEMA24 stepper motor, with a 10:1 planetary gearbox fitted.

Each windmill is identical in terms of electromechanical setup, although speed and direction have been set differently to match physical characteristics (bigger windmills rotate slower).

The motors all have extension cables added to the original power and data leads. The lengths are 5m, 7m, 7m, 7m, 10m & 10m. The power leads were custom made. Data cables are available from kenable.co.uk, details below.

The windmills are controlled by a RF unit that receives trigger signals from the hairdryer.

Note that although the new motor system with aluminium drive gear was supplied, the ferris wheel was built by others.

No calibration / limit switches required for these items.

Maintenance

Check motors, gearboxes and bearings for wear occasionally, or if erratic behaviour is noticed.

The bearings of the ferris wheel have been welded in place rather than bolted, and may eventually need to be cut off and replaced. The ferris wheel has already had a long working life and will no doubt require maintenance sooner than the windmills.

Rotary switch modes

0: Run normal routine with RF triggering
1: Test mode, sequencing windmills from 1 to 6
2-15: Unused

Things to watch out for

The ferris wheel is in need of restoration, and may not be perfectly balanced. Look out for excess wear of the gearbox if rotary motion deteriorates over time.

If for any reason the Trap RF system needs the transmitter to be re-connected to the receiver then the process is as follows:

(1) Open the receiver box.
(2) There are 2 PCBs in the box. Press and hold the push button next to the buzzer on the LH PCB, for 10 seconds. You should see some green / red alternating LED flash action. That has cleared existing pairing memory.

(3) Press and hold the button again for about 2 or 2.5 seconds. You should hear a beep.
(4) Press button 1 on the handset transmitter.
(5) You should now hear 2 beeps. Press button 1 a second time. You've now set relay 1.
(6) Press and hold the button in the receiver box for 2 seconds. After the beep, press again. You should hear 2 beeps.
(7) Press button 2 on the handset. You should hear 2 beeps. Press button 2 a second time. You've now set relay 2.
(8) Press and hold the button in the receiver box for 2 seconds. After the beep, press again. You should hear 2 beeps. Press again - you should hear 3 beeps.
(9) Press button 3 on the handset. You should hear 2 beeps. Press button 3 a second time. You've now set relay 3.
(10) Press and hold the button in the receiver box for 2 seconds. After the beep, press again. You should hear 2 beeps. Press again - you should hear 3 beeps. Press again - you should hear 4 beeps.
(11) Press button 4 on the handset. You should hear 2 beeps. Press button 4 a second time. You've now set relay 4.
(12) Pause for a second to curse the designer of this interface.
(13) Repeat the process for the second PCB, for buttons 5-8 and relays 5-8.

Note the 4066 chips in the hairdryer may have to be removed from their sockets for this process to work (untested).

Troubleshooting

If a windmill isn't turning, swap power and data cables with a functioning windmill. If the windmill springs to life you'll know that the issue is on the control box side. If not, it may be a wiring or mechanical issue out on the balcony.

A thin technician will be required to climb through the small window that leads to the balcony.

Notable components

RF Solutions 8 channel 868MHz Trap RF system, RS Components part number 192-6550
NEMA24 stepper motor kit, Stepper Online part number 4-CLTS40-V41
NEMA24 10:1 planetary gearbox Stepper Online part number EG24-G10
Data cables, various lengths, sold as "SVGA Monitor Extension Cable HD15 15 pin Lead Male to Female", from kenable.co.uk

Colours

Windmill stand basic colour: RAL Signal Red 3001
Aging details were done by others - paint colours unknown.