QR6 Vertical Axis Wind Turbine

- Elegant aesthetically pleasing swept blade design
- Compact and easy to integrate
- Revolutionary blade tip designed to shed noise
- Unique aero-elastic blade design captures turbulent wind and absorbs vibration
- Power regulation
- In built safety mechanisms – auto emergency shutdown
- Operating wind speeds: start up 1.5 m/s – safety cutout > 20 m/s
- Design life 30 years +
Wind conditions & site exposure

The Power Curve below is perhaps the easiest way to understand power production. It is important to note that the power curve is not linear and there are sharp gradients due to the Qr6 turbine being optimized to run in the 10m/s (22mph) to 16m/s (35mph) band, so a small increase in wind makes a significant difference to power production. The Qr6 Turbine has a cut in speed of 1.5 m/s (3.35 mph) and will function making a positive contribution down to 1.1 m/s (2.5 mph) and cuts out to protect itself at 20 m/s (45mph). Most calm days in the UK can be considered to still have 6mph to 10mph wind speeds on the ground which increases rapidly on a mast at 15m.
Optimising Wind Energy in the Urban Environment

As the air passes over the building there will be a region of accelerated airflow. Correctly placing the turbine into this region will boost the amount of electricity generated.

At a distance of 10h downwind from the obstruction, wind shadowing effects will be minimised.

In urban areas, it is highly likely that the wind will be disturbed by buildings or trees upstream so any height advantage is beneficial.

Installation Options

- Ground mount standard mast options: 15m or 9m
- Roof mounted standard mast options: 6m or 3.5m

Note: masts come galvanised, other finishes are available on application.

Turbine Spacing

Multiple turbines should be placed at least 3 rotor diameters (9.3m) apart to minimise interference.
Mast and turbine in operating position

Mast and Turbine in maintenance position

Hydraulic ram used for maintenance

Highlighted area denotes working area for installation and maintenance – 6m mast however see table for required dimensions for other mast sizes

<table>
<thead>
<tr>
<th>Mast Height</th>
<th>Dimension 'H'</th>
<th>Total Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>6m</td>
<td>5015mm</td>
<td>14385mm</td>
</tr>
<tr>
<td>15m</td>
<td>13885mm</td>
<td>23055mm</td>
</tr>
<tr>
<td>18m</td>
<td>16910mm</td>
<td>26080mm</td>
</tr>
</tbody>
</table>

ELEVATION @ 1:100 (A4)
Maintenance Requirements

1565mm

DIMENSION 'H' (see table)

5100mm

Note: Dimension 'H' varies with mast height, all other working areas are constant.

3130mm

5130mm

These areas can be modified according to local site conditions with prior agreement from quietrevolution.

TOTAL LENGTH (see table)

MAINTENANCE: It is essential that due consideration is given to maintenance access. In most instances a minimum request is stair access due to heavy trolley mounted equipment used during maintenance.
The qr6 Vertical Axis Wind Turbine was designed as the next generation of helical VAWT offering improved power generation, increased swept area whilst retaining the intrinsic beauty of the original design.

The blades, spokes and torque tube are made of advanced composite materials including carbon fibre for weight, reduction, stiffness and longevity.
Test Site Data

Derived Noise Emission and Noise Immission for a wind speed of 8 m/s at rotor centre height

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>SYMBOL</th>
<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apparent Emission Sound Power Level (dB(A) re 10^{-12} W)</td>
<td>$L_{Wd,8m/s}$</td>
<td>86.5</td>
</tr>
<tr>
<td>Combined Uncertainty (68% confidence level) (dB)</td>
<td>$\sigma$</td>
<td>1.9</td>
</tr>
<tr>
<td>95% Confidence Limit (dB)</td>
<td>$1.645\sigma$</td>
<td>3.1</td>
</tr>
<tr>
<td>Noise Slope at 8 m/s (dB/m/s)</td>
<td>$S_{dB}$</td>
<td>2.38</td>
</tr>
<tr>
<td>Declared Apparent Emission Sound Power Level, (dB(A) re 10^{-12} W)</td>
<td>$L_{Wd,8m/s}$</td>
<td>90</td>
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<tr>
<td>Immission Sound Pressure Level at 60 m at 8 m/s (dB(A) re 20 \mu Pa)</td>
<td>$L_{p,60m}$</td>
<td>47</td>
</tr>
<tr>
<td>Immission Sound Pressure Level at 25 m at 8 m/s (dB(A) re 20 \mu Pa)</td>
<td>$L_{p,25m}$</td>
<td>54</td>
</tr>
</tbody>
</table>
Unlike traditional horizontal axis wind turbines, the qr helical VAWT will maintain its power curve in turbulent winds.
The qr turbine is a recognised, iconic design with strong aerodynamic performance.
UK Designed & Manufactured