

CLAIMS

1. An electric power generator comprising a rotor and a plurality of stators, wherein:

the rotor and the plurality of stators are arranged coaxially and concentrically about a central axis;

5 the rotor is provided radially inwardly of the plurality of stators;

a first stator of the plurality of stators is provided concentrically around and adjacent to the rotor, the rotor and the first stator being separated by a rotor-stator airgap;

10 a second stator of the plurality of stators is provided concentrically around and adjacent to the first stator, the first and second stators being separated by a stator-stator airgap;

the rotor includes a plurality of magnetic pole structures configured to provide or generate a plurality of magnetic poles;

15 a radially outer surface of each of the magnetic pole structures is curved with an average radius of curvature which is less than an average distance between the outer surface and the central axis, the rotor-stator airgap thus varying circumferentially in distance, with a shortest distance being at a circumferential centre of each of the magnetic pole structures and longest distance being at circumferential ends of each of the magnetic pole structures;

20 and

the stator-stator airgap is of uniform thickness.

2. The electric power generator as claimed in claim 1, in which a ratio of the longest distance to the shortest distance is in the range of 30:1 to 2:1.

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3. The electric power generator as claimed in claim 1, in which the shortest distance at a circumferential centre of each of the magnetic pole structures is 5 – 50 mm.

4. The electric power generator as claimed in claim 1, in which the longest distance at circumferential ends of each of the magnetic pole structures is 30 – 150 mm.
5. The electric power generator as claimed in claim 1, in which the longest distance
5 is 135 mm and the shortest distance is at least 5 mm.
6. The electric power generator as claimed in claim 1, in which the stator-stator airgap is shorter than the shortest distance of the rotor-stator airgap.
- 10 7. The electric power generator as claimed in claim 1, which include a back-iron configured to provide a return path and assist in closing a magnetic circuit from the magnetic poles of the rotor, wherein the back-iron is provided around the plurality of stators, in other words, around an outermost stator.
- 15 8. The electric power generator as claimed in claim 7, in which the plural stators work together to form a better output waveform having lower harmonics from windings in the plural stators compared that from an individual one of the plural stators.
- 20 9. The electric power generator as claimed in claim 1, which produces, as a result of presence and configuration of the plural stators, a sinusoidal output waveform having a Total Harmonic Distortion of less than 0.8% without use of waveform-correcting circuitry.
- 25 10. The electric power generator as claimed in claim 1, in which the stator-stator airgap is at least 0.25 mm.
11. The electric power generator as claimed in claim 7, in which the back-iron is at least 2 mm thick.

12. The electric power generator as claimed in claim 1, which comprises at least three stators, namely the first stator, the second stator, which is an intermediate stator, and a third stator, which is an outermost stator, provided concentrically around and adjacent to the second stator, the second and third stators being separated by a second stator-stator airgap.

13. The electric power generator according to claim 1, wherein teeth of the second stator are joined to a back of the first stator for support.

14. The electric power generator according to claim 1, which includes tie-rods comprising steel provided between adjacent stators for support thereof.

15. The electric power generator according to claim 1, which includes a non-magnetic and non-electrically conductive material is used as support structure between adjacent stators.

16. The electric power generator according to claim 1, which further includes a dummy stator, in addition to the plurality of stators, and arranged concentrically with the plurality of stators, the dummy stator being characterised in that it has no operative windings.

17. A method of operating the electric power generator as claimed in claim 1, in which:

all of the plurality of stators are operated on-load; or

all but one of the plurality of stators are operated on-load and one of the plurality of stators is operated off-load.

18. A method of operating the electric power generator as claimed in claim 16, in which the dummy stator is operated off-load.