I have changed all my design because when I have calculated axial length of the motor, it came 300 mm , then inner diameter of lamination is 55 mm so that maximum L became 110 mm so that I decrease pole number, power and increase number of turns.

I have chosen lamination-9. Number of slot on the stator is 36.

Also in order to arrange max speed high motor is designed with 4 poles. Synchronous speed of motor became 1500 rpm. Number of slot per pole is 9, per phase 12, per pole per phase 3.

Motor is designed double layer and integral fractional slot concentrated winding in order to eliminate 5th and 7th harmonics as soon as possible.

Slot angle is 180/9 = 20, chosen coil span degree is 140,

Kw1  = 0.9

Kw3 = -0.33

Kw5 =-0.0226

Kw7 = -0.058

Kw11 = -0.037

Stator slot area is 41 mm2 then AWG12 type wire is used for wiring so number of turns is decided N=5. Awire = 3.3 mm2, because of double layer each slot has 10 wires. So that total copper area of slots is 33, then filling factor is 33/41\*100 = %80.

Input voltage connection is decided WYE in order to eliminate 3rd harmonics. So that by using standard city electricity

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| A1 | A2 | A3 | -C1 | -C2 | -C3 | B1 | B2 | B3 | -A4 | -A5 | -A6 | C4 | C5 | C6 | -B4 | -B5 | -B6 |
| A12 | -C10 | -C11 | -C12 | B10 | B11 | B12 | -A1 | -A2 | -A3 | C1 | C2 | C3 | -B1 | -B2 | -B3 | A4 | A5 |

Ia = 1, Ib = -0.5, Ic = -0.5

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| I |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| I | I | I |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| I | I | I | I |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| I | I | I | I |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

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| 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 |
| A7 | A8 | A9 | -C7 | -C8 | -C9 | B7 | B8 | B9 | -A10 | -A11 | -A12 | C10 | C11 | C12 | -B10 | -B11 | -B12 |
| A6 | -C4 | -C5 | -C6 | B4 | B5 | B6 | -A7 | -A8 | -A9 | C7 | C8 | C9 | -B7 | -B8 | -B9 | A10 | A11 |