

TECHNICAL SPECIFICATIONS AND OTHER ALLIED REQUIREMENTS

| SI No. | Description of items | Quantity |
|--------------------------|--|----------|
| PUR/267/R&A/AM/E/2020-21 | | |
| 01. | Supply of Frameless BLDC Motor (End Use, Detailed Specifications, Scope of Supply etc are provided in below Annexure-I) | 02 Nos. |

1. QUALIFICATION CRITERION

1.1 As per below ANNEXURE-I

2. WARRANTY

2.1. Comprehensive on-site warranty for a period of one year must be provided to be effective from the date of acceptance of the items/equipment at the User's laboratory/Institute.

Annexure – I

Supply of Frameless BLDC Motor

End Use:-

The frameless BLDC motor will be housed inside a suitable mechanical body (Aluminium Casing) for operation in open water submerged environment. The motor will act as power producing element, as defined in detailed specifications.

Detailed Specification:-

| Sr. No. | Parameters | Value |
|---------|------------------------------|---|
| 1. | Outer Diameter of Motor | 50 – 60 mm |
| 2. | Inner Diameter of Motor | 12 – 15 mm |
| 3. | Overall Length of Motor | 55 – 65 mm |
| 4. | Continuous (Rated) Torque | ≥ 1.3 Nm |
| 5. | Rated Speed | 7200 RPM |
| 6. | Rated Output Power | ≥ 980 W |
| 7. | Maximum No Load Speed | 9000 RPM |
| 8. | Cooling Method | Forced Water Cooling |
| 9. | Overall Weight of Motor | ≤ 1.0 Kg |
| 10. | Operating Voltage | ≤ 175 Vdc |
| 11. | Continuous Current | ≤ 10 A |
| 12. | Peak Current | ≤ 30 A |
| 13. | Efficiency | $\geq 95\%$ |
| 14. | Stator & Rotor Configuration | <ul style="list-style-type: none">• External Stator with Proper Provision for Fixing inside a Mechanical Housing.• Inner Rotor. |
| 15. | Hall Sensor | Integrated Hall Sensors for 120° Electrical Phase Angle |
| 16. | Winding Temperature Sensor | Integrated with Positive Thermal Coefficient of Resistance |
| 17. | Electrical Cables | <ul style="list-style-type: none">• Teflon (PTFE) Insulation with Nickle Plated Copper Conductor.• Phase Connection Size :- 14 – 20 AWG• Sensor Connection Size :- 24 – 26 AWG• Individual Cable Length ≥ 200mm• Different colours must be used for proper marking of cables. |
| 18. | Warranty | Minimum 12 Months |

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Scope of Supply & Incidental Services:-

1. 2 units of Frameless BLDC Motor with Instruction Manuals and Installation Guidelines. Hall sensor based commutation table and electrical connection diagram must be included.
2. A Technical Report giving overview of major design, prototyping and testing activities carried out during the motor development.
3. Test Reports against supplier company certification. At least the following tests must be carried out and reported.
 - (i) Motor Phase-Phase Resistance Test
 - (ii) Motor Phase-Phase Inductance Test
 - (iii) Insulation Resistance Test
 - (iv) High Voltage Test
 - (v) Surge Test
 - (vi) Back EMF Constant Test
 - (vii) Maximum Speed Test
 - (viii) Torque Constant Test
 - (ix) Peak Torque Test
 - (x) Weight of Stator and Rotor
 - (xi) Torque Speed Characteristics Graph
 - (xii) Drive details used for testing
4. Final Specification of the supplied motor. At least the following specification must be mentioned.
 - (i) Peak Torque
 - (ii) Continuous Torque
 - (iii) Torque Constant
 - (iv) Maximum No Load Speed
 - (v) Peak Current
 - (vi) Continuous Current
 - (vii) Voltage
 - (viii) Back EMF Constant
 - (ix) Pole Numbers
 - (x) Stator Winding Connection
 - (xi) Phase-Phase Resistance
 - (xii) Phase-Phase Inductance
 - (xiii) Maximum Power Dissipation at maximum allowed winding temperature
 - (xiv) Overall Weight of Motor
 - (xv) Electrical Time Constant
 - (xvi) Motor Constant
 - (xvii) Rotor Inertia excluding shaft
5. Mechanical drawing of the supplied motor showing all relevant views and cross-sections for proper representation of the supplied motor.

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Inspection and Tests Required:-

On request factory inspection and testing for rated capacity must be offered by the supplier.

Acceptance Test:-

1. All the supporting documents mentioned under "*Scope of Supply and Incidental Services*" must be provided.
2. Visual inspection for physical damage, checking of motor dimensions, static electric testing like phase resistance & inductance measurement etc. will be carried out.

Qualification Criteria:-

1. Supplier must have experience in design, development & supply of Frameless BLDC/PMSM motors of 500W or higher power for a Government / Public Sector Undertaking Organisation, during last three years. Relevant purchase order copies from end users are to be attached with the technical bid as documentary evidence.
2. The Director(s) of the Supplier should be Indian national(s).

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