

## SPECIFICATIONS OF BALANCING MACHINE

Deptt: EM group (LEM)  
Item NO.  
Spec no  
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Issuing Deptt / Section- EM TTDM

1. **Introduction:** The balancing machine is required for the balancing of the rotors in two planes in horizontal configuration.
2. **Applications:** The jobs are motor rotors (armatures). The rotor is assembly of shaft core and winding and has provision in two planes for doing the balancing. Due to high speeds required in the motors, (working speeds upto 3600 RPM) Therefore, the balancing machine must be give suitable balancing accuracy on these jobs.
3. **Job size:** The max rotor diameter shall be 2000 mm and length will be around 6 meters and weight will be around 30 tons. Core length should be around 2500 mm.

#### 4. Tech specs of the machine/equipment:

- |   |   |
|---|---|
| (a) Max Centre Height                   | - To suit the application   |
| (b) Max RPM                             | - Vendor to specify   |
| (c) Max job wt                          | - 30 tons (see the job data in table I)<br>Nominal Pedestal Capacity – 45 Tons  |
| (d) Max diameter of rotor               | - 2000 mm   |
| (e) Journal diameter range              | - 125 to 300 mm   |
| (f) Max job length                      | - 6 meters  |
| (g) Min dist betn pedestals             | - Vendor to specify   |
| (h) Drive power                         | - suitable for application (vendor to specify with justifications)  |
| (i) Balancing speed options             | - 160, 280, 470, 750, 1170, 1600 (Vendor to specify in details)   |
| (j) Type of balancing                   | - two plane balancing   |
| (k) Max $w_n^2$                         | - $4000 \times 10^6$ Kg/min <sup>2</sup> (vendor to specify)  |
| (l) Min resolution in balancing         | - (vendor to specify)   |
| (m) Number of pedestals required        | - 2   |
| (n) Motor power & RPM                   | - suitable for the application (with suitable acceleration power)   |
| (o) Gear box                            | - All gears must be ground and motorized lubrication must be present  |
| (p) Controller/monitor/ Instrumentation | - Modern Instrumentation, software to simplify complex balancing tasks, Powerful Microprocessor based system with color monitor with graphics capability for vector meter simulation for quick assessment of unbalance. Features should be :- |

- Easy entry of data.
- Display on high resolution 12" colour monitor.

- Capable to measure small residual unbalance within short cycle time.
  - Two RS232 ports for printer and host computer connection.
  - Unbalance measuring range should be low
  - Speed range - 120- 4000 rpm.
5. **Accuracy** - 2 times Least count of the machine
6. **Safety** - safety hoods/enclosures are to be provided to prevent any accident in case of any fly off
7. **Electrical Supply:** 415 VAC +/- 10 %, 3 phase at 50 Hz +/- 1.5 % frequency
8. **Scope of Supply:**
- (i) Balancing machine along with drives, pedestals, control panel, roller assemblies etc –  
One number
  - (ii) Spare Roller assemblies - 8 sets of 2 nos each for different diameters
9. **Predispatch inspection & duration:** The machine will be tested at the works of the supplier. Supplier to arrange suitable / similar job to demonstrate the accuracy and usability of the machine. The duration of inspection can be 3 to 6 days.
10. **Transport:** The machine needs to be transported by the supplier on door delivery basis at BHEL, Bhopal works
11. **Incoming inspection at BHEL Bhopal:** The machine shall be inspected after arrival at BHEL Bhopal works for any damages or shortages. If the machine is dispatched in dismantled condition, the same shall be seen for damages/ shortages. Supplier to send their representative for the same.
12. **Erection/ installation:** supplier to send their engineers/ technicians for erection of the machine at BHEL Bhopal works and perform commissioning of machine and 2 nos of actual BHEL jobs are to be proved on this machine.
13. **Civil foundation:** Supplier to give civil design drawing with relevant RCC details, reinforcement details etc for the foundation . BHEL will make the foundation as per the civil design details as given by the supplier. Supplier's representative should see and approve the foundation before pouring of cement.

14. **Experience / qualifying criteria:** Supplier should have supplied at least one machine of the same capacity or above and the machine should be working satisfactorily for atleast one year period after handing over. Relevant evidence of the above to be given by the supplier in the offer.
15. **Hyd/ Pneumatics/ compressed air:** Suitable arrangement for hydraulics and Pneumatics to be done in the machine. Make of the components should be good. For hydraulics Rexroth, Bosch, Yuken, Vickers make is acceptable.
16. **Guarantee:** Supplier to give guarantee of 18 months after the commissioning of the machine.

**TABLE I**

	<b>Job wt</b>	<b>Max job dia</b>	<b>Length</b>	<b>Approx. dist between journals</b>	<b>Max rated speed Of BHEL Motor</b>	<b>Over speed Desirable for the rotor</b>
<b>Heavy job 4 pole</b>	<b>20 T</b>	<b>1250</b>	<b>6000</b>	<b>5000</b>	<b>1800</b>	<b>2160</b>
<b>Heavy job 16-20 pole</b>	<b>30 T</b>	<b>2000</b>	<b>6000</b>	<b>5000</b>	<b>600</b>	<b>720</b>
<b>small job 2 pole</b>	<b>6 T</b>	<b>800</b>	<b>4500</b>	<b>4000</b>	<b>3600</b>	<b>4320</b>