Indian Institute of Technology, Kanpur
Department of Aerospace Engineering

Inquiry no: AE/ACM/2017/Controller
Date of Opening: July 10, 2017
Date and time of Closing: 3pm, August 3, 2017 * Date extended

Sealed quotations are invited for the supply of a VFD based speed controller for feedback control of a 30kW AC motor, which will drive the axial fan of a low-speed wind tunnel. The necessary specifications for its various components are mentioned below.

Specifications for VFD:

1. Installation: indoor
2. AC Output: Current wave form approx. sinusoidal to provide step less speed variation to squirrel cage motors rated for operation on 380 to 480 V AC, +/- 10%, 3 phase, 50Hz
3. Rating: 37kW Low overload/ 30kW High overload
4. Maximum output current: 120A
5. Rated output current: 75A
6. Overload: 2 × base load current IH (i.e. 200% overloads) for 3 sec plus 1.5 × base load current (i.e. 150% overload) for at least 50 sec. with a cycle time of 300 sec.
7. Cooling: Internal air cooling capability should be present
8. Duty cycle should be of 300 second during overload
9. Ambient temp: 40 deg. C
10. Efficiency: The efficiency of drive at rated voltage and load shall be >97%.
11. Voltage and frequency dips: The drive shall be designed to withstand momentary dips of about 30% in supply frequency and voltage.
12. Protection: Following protections shall be provided for the VFD:
    a) Surge protection
    b) Short circuit
    c) Instantaneous over current
    d) Fan failure of VFD panel
    e) Stall protection
    f) Fuse failure
    g) Thermal overload
    h) Solid state single phasing preventer
    i) AC under voltage protection
    j) Earth fault protection
    k) Control and regulated power supply failure protection
    l) Panel temperature high protection

13. VFD should be modular design. It should comprise of separate three units - i.e. Power Unit, Control Unit and Operator Panel.
14. Control Unit with inbuilt profinet port for fast communication with PLC system.
15. DI: 6 , DO:3, AI:2 , AO:2
16. Inbuilt DC chokes.
17. Output frequency when control type vector: 0 to 240Hz.
18. VFD to motor cable length 300 mtr. (unshielded)/200 Mtr. (Shielded).
19. Diagnostics using plain text display can be used locally on-site without documentation
20. Direct manual operation of the drive to toggle between automatic and manual modes
21. Status display with freely selectable units; display of real physical values
22. Graphic display with bar charts, e.g. for status values such as pressure or flow rate
23. Standard commissioning using the clone function (parameter set data is saved for fast replacement)
24. Upload and download of parameter sets (system memory or SD card)
25. Storing of up to 16 fixed or 200 freely namable parameter sets
26. Power loss should not be greater than 1.01 kW during operation.
27. Door mounting kit should be provided to monitor at panel door
28. Windows based VFD commissioning software (professional version) is required

- **Specifications for PLC system**

1. The PLC should have controlling functionality with 192 kB work memory, and it should have load memory inserted via Micro Memory Card.
2. The PLC should be capable to be used with up to 63 I/O modules in ONE RACK.
3. Connection to PROFINET via a PROFINET interface with integrated switch and THREE RJ45 ports.
4. As a PROFINET IO controller, the CPU should support:
   - The real-time communication via RT and IRT
   - The prioritized start-ups of PROFINET IO devices
   - The replacement of devices without exchangeable medium/PD
   - Isochronous mode on PROFINET
5. Online program modification can be achieved.
6. Requirement of IOs : AI – 06; AO - 02; DI – 12; DO- 12
7. PLC should support diagnostics buffer inbuilt
8. Input power supply should be 22…28VDC/5Amp for PLC

- **Specifications for HMI**

1. 7” colour display; TFT wide screen display, LED backlighting
2. Key/ touch operation.

3. Profinet interface
4. 1 No USB Interface up to 16GB.
5. Support diagnostics buffer inbuilt
6. Should support MMC compatibility for back up
7. USB interface should support back up uploading and downloading
8. Input Voltage 24VDC
9. Password protection facility in HMI
10. Should support modbus TCP/IP communication
11. IP65 at front
12. It should also support various other PLCs manufactured by different companies

- **Specifications of SCADA system:**

1. SCADA system should be a licensed version with authenticity certificate, and it should be provided along with an industrial grade PC (with minimum i3 processor, 4 GB RAM Minimum; 500GB Hard disk; windows 7 professional service pack 1; 64bit; DVD reader/writer; 6 USB port; 21.5" LED HD quality screen, Optical mouse and keyboard, Profinet interface, 6 No USB Interface)
2. SCADA Software runtime license for 128tag
3. Runtime monitoring & control license required for minimum 128 tags
4. 3D graphics can be displayed
5. Multi user log in facility
6. Alarm history for 30 days
7. Real time Trending
8. USB interface should support back up uploading and downloading
9. Input Voltage 110…220VAC
10. There should be password protection facility in SCADA
11. It should support modbus TCP/IP communication
12. It should support various other PLCs as well

- **Specifications for differential pressure transmitter for feedback control**

1) Smart type Differential pressure transmitter to measure differential pressure
2) Differential pressure measurement: 0 to 2000 Pascal
3) Resolution should be as good as possible
4) Measuring cell with silicon oil filling
5) Output: 4-20mA (from 3.55mA to 23mA)
6) HART communication required
7) Protection: IP65 protection
8) Material of mounting bracket: Stainless steel
9) Power supply: 10.5 to 45V DC
10) Accuracy: Less than or equal to 0.065% of the full scale

Along with the above components, a **sensor** for actual reading of the motor rpm (range 0-1500 rpm, resolution should be as good as possible)**,** a **panel** (apprx. size, L ×W ×H, 1200 mm × 600 mm × 2000 mm) for housing/mounting, HMI, VFD, PLC, etc, a **manometer** (range: 0-2000 Pa, resolution should be as good as possible) for monitoring the actual pressure/velocity in the test section**,** and a **multi-function meter** should be provided.

Kindly also note the followings:

1. VFD, PLC, HMI, and SCADA system of same brand are preferable.
2. All quotations must reach the undersigned by 3 pm, **August 3, 2017**.
3. A copy of authorization letter is to be submitted from OEM.
4. Quotation must be valid for 60 days.
5. Warranty period should be mentioned clearly.
6. Technical details for various components should be attached along with the quote.
7. Please include any other required accessories, power supply, cables, tubes, etc.
8. Include maximum educational/academic discounts, if any.
9. The price should be FOR IIT Kanpur and it should also be inclusive of packing and forwarding charges, commissioning and installation charges at IIT Kanpur.
10. Payment terms and conditions as per the institute rule.

Address for the quotation:

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