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GOVERNMENT OF INDIA
BHABHA ATOMIC RESEARCH CENTRE
DIVISION OF REMOTE HANDLING & ROBOTICS (DRHR)

Ref: DRHR /APD /INQ/2017/204

Date: 28.12.2017

Sub: Minor Fabrication - Invitation of Quotation for Fabrication, Supply and Guarantee of Microcontroller based Experimental Setup for Controlled Respiration.

1. Quotations are invited for the minor fabrication job: Fabrication, Supply and Guarantee of Microcontroller based Experimental Setup for Controlled Respiration as per specification attached and Annexure-I.
2. The quotation includes procurement of standard components, fabrication of parts, interfacing, assembly and delivery of the system to DRHR, BARC, Trombay, Mumbai.
3. **No Free issue material will be supplied by BARC.**
4. Taxes other charges, if any, shall be quoted separately.
5. The quotation must reach Head, DRHR, BARC by **Jan 15th, 2018** and must be sent in a sealed envelope superscribed with the reference number & the due date given above.
6. Quotation should be sent by **speed post only**. Hand delivery or deliver by private courier will not be accepted.
7. The address on the envelope should read:
**Head, DRHR,
BARC, Trombay, Mumbai - 400 085.
(Attn.: Amaren P Das, SO (F), DRHR)**
8. The fabrication and assembly work shall be subjected to inspection by our engineer. The finished unit shall not be dispatched prior to approval by our engineer at bidder's premises. The unit shall be delivered by the bidder at **DRHR, BARC, Trombay, Mumbai.- 400085.**
9. Head, DRHR, BARC reserves the right to accept / reject any or all quotations without assigning any reason.
10. Incomplete offer / offer received after the due date shall not be considered.
11. The bidder shall provide break-up cost **for material and fabrication** in the quotation.
12. Quotations should be preferably neatly printed and corrections are not acceptable.
13. Quotation must indicate the **delivery period** and the **validity of offer**.
14. Quotation received in computer-generated form shall not be acceptable.
15. Quotation must be submitted in printed letterhead, mentioning clearly GST registration no., PAN No. Submission of Challan and Invoice shall also comply the same, in case, work order is placed.
16. Drawings must be returned along with the offer.

Encl.: Annexure - I
Annexure - II

Annexure-I

(A) Scope of work:

Fabrication, assembly, interfacing and supply of **Microcontroller based Experimental Setup for Controlled Respiration** as per attached specification.

Material required for manufacturing and procedure qualification shall be arranged by supplier.

Minor fabrication. Job description	Quantity	Reference document
Fabrication and assembly of Microcontroller based Experimental Setup for Controlled Respiration as per specification attached	1Unit	Annexure-II (specifications)

(B) Delivery and Guarantee

1. **Consignee:** DRHR, BARC, Trombay, Mumbai. .
2. **Guarantee:** The items under the work order shall be guaranteed for a satisfactory performance against manufacturing defects and faulty workmanship, for a period of 12 months from the date of final acceptance.
3. All work shall be done with good workmanship. Our supervisor will supervise the quality of work.

I General Specifications

1. **Quality surveillance, inspection**

- 1.1. All work covered shall be subject to quality surveillance / inspection by the purchaser or his authorized representative.
- 1.2. No Insurance policy is required for the material as the job is to be done by supplier's material.

2. **Delivery**

- 2.1. The bidder shall finish the work after approval by our engineer within 3 months from the date of firm Work order is issued to the bidder.
- 2.2. Any delay which is attributable to the supplier is liable for penalty @ 0.5% per week (max.5%) to be imposed on supplier.
- 2.3. In case any extension in delivery is to be granted to the supplier. The supplier should request for the extension before expiry of the work order. The same may be justified by the Division, whether extension granted is with or without levy of liquidated damages.

3. **Sub-Contract**

3.1. The fabricator shall not sub-contract any or all the work without written consent from the purchaser. The fabricator shall be responsible to the purchaser for all work carried out the sub-contractor, of the fabricator, if allowed by the purchaser.

4. **Payment**

4.1. Payment will be made only after satisfactory completion of work and against submission of original bill and advance stamped receipt.

5. **Tax**

5.1. Income Tax of 2% on the bill amount and surcharge on IT as applicable and education Cess @ 3% (on IT& SC) shall be deducted in payment.

6. **Confidentiality**

6.1. No party shall disclose any information to any third party concerning the matters under this contract generally. In particular, any information identified as "**Proprietary**" in nature by disclosing party shall be kept strictly confidential by the receiving party and shall not be disclosed to any third party without the prior written consent of the original disclosing party.

6.2. This clause shall apply to sub-contractors, consultants, advisors or the employees engaged by a party with equal force.

7. **"Restricted information" categories under section 18 of the Atomic Energy Act,1962 and "Official Secrets" under section 5 of the Official Secrets Act, 1923:-**

7.1. Any contravention of the above mentioned provisions by any contractor, sub-contractor, consultant, advisor or the employees of the contractor will invite penal consequences under the aforesaid legislation.

8. **Publication against use of BARC's name without permission for publicity purpose:-**

8.1. The contractor or sub-contractor, consultant, advisor or the employees engaged by the contractor shall not use BARC's name for any publicity purpose through any public media like Press, Radio, T.V. or Internet without the prior written approval of BARC.

Annexure-II

(Specifications for Microcontroller based Experimental Setup for Controlled Respiration)

Air Deliver system Specification

- Tidal volume stting: 100 -2000ml
- Flow Rate: (l/min): 0.5-60
- PEEP (cm H2O): 0-50
- Pressure Control Above PEEP (cm H2O):0-120
- CVM Frequency (Breadth per min) : 4 -100
- Synchronized Intermittent Mandatory Ventilation Frequency (Breadth Per Min) : 1-60
- I:E ratio: 1:10- 4:1
- T Inspiration (s): 0.1-5
- Flow trigger sensitivity (fraction of bias flow) : 0-100%
- Pressure trigger sensitivity (cmH2O) -20-0

Power Supply

Main :

- AC 230V – 50Hz
- DC 12- 15V

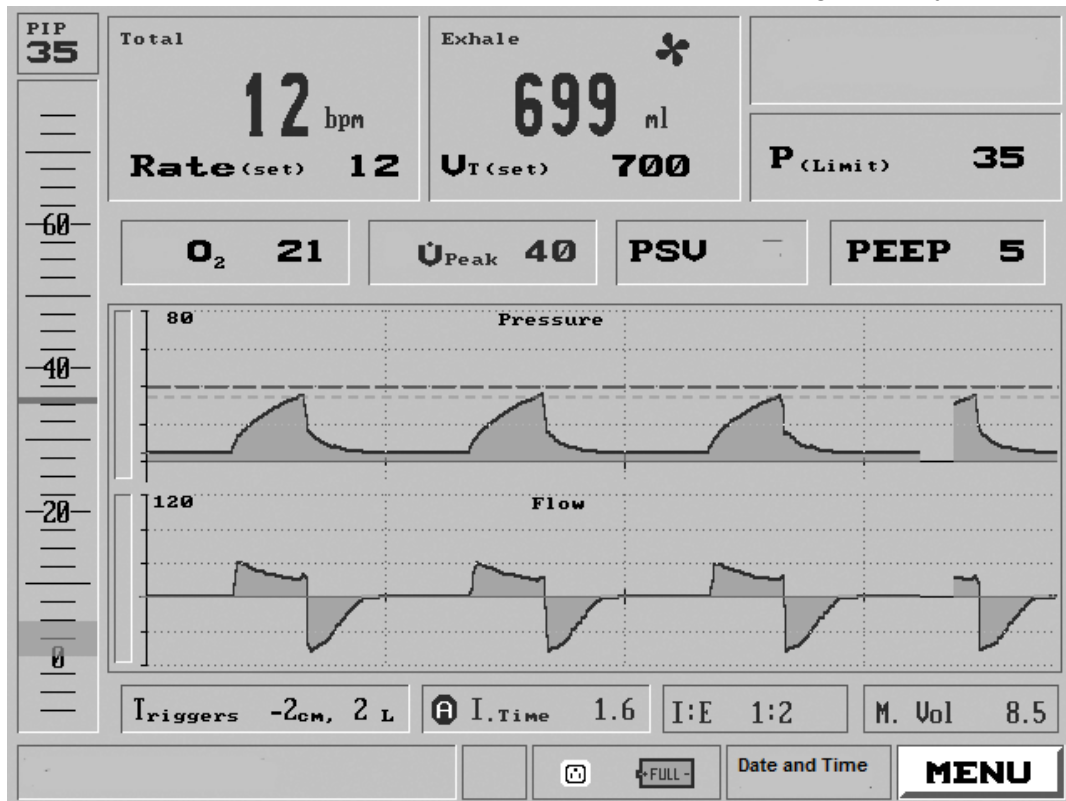
Internal Battery : 12VDC , 10Ah

Control Loop

Control Principle: Closed Loop Flow & Pressure Controller

User Interface

Touch screen 7" based Graphical interface to control the setting of the system.



Following display should be provided during operation

Monitoring and Displayed Parameters

Airway Pressure (analog bar graph & numerical)

Total Breath Rate

I:E Ratio

Exhaled Tidal Volume

Exhaled Minute Volume

Peak Flow

Inspiratory Time

Electrical Power Source (external / internal)

Battery Level

Pressure, Flow and Volume Waveforms Software Package:*

Real Time Pressure and Flow Waveforms

Waveform History Browse

Trending of Monitored Data

Respiratory Diagnostics Software Package:*

Pressure, Flow and Volume Loops

Lung Mechanics (C, R, MAP)

Dedicated Keys on Front Panel

“**Silence**” Key to immediately mute the audible alarm and minimize the corresponding pop-up message. It should then activates a two-minute timer which will appears in the lower right corner of the display, alongside the Silenced alarm icon. One short press on the Silence key resets the time to 2 minutes.

“**100% O₂**”, when activated, provides three (3) minutes of 100% oxygen and two minutes of alarm silence.

“**manual breath**” delivers a single breath at the set tidal volume or pressure.

“**hold**” activates and/or cancels the Hold manoeuvre. Pressing the button once should initiates an inspiratory hold maneuver, which shall allow the calculation of static compliance. Pressing it twice shall initiate an end expiratory hold maneuver, which will allow the calculation of intrinsic Positive End Expiratory Pressure.

“**clear**” has several functions. Pressing it will:

a) clear the screen of its current selection and return the operator to the previous screen or menu selection – just like the Escape key on a computer keyboard

b) minimize any alarm-warning pop-up box and mute the alarm sound for 30 seconds.

c) When **clear** is pressed and held, all corrected alarm messages (displayed in green) are cleared.

External Interface

Remote Monitor (VGA), USB Keyboard Connector, RS-232 Serial Port, 9 Pin RJ11, Remote Alarm Connector

Oxygen (enrichment) Supply

High Pressure Supply : 40 to 60 psi (2.8 to 4.2 bar)

Low Pressure: Max 80 L/min or 0.5 psi

User Adjustable Alarms

Respiratory Rate (high / low), Apnea (suspension of Breathing) (0 to 120 seconds), Minute Volume (high / low) ,FIO2 (high / low), Pressure (high / low),Leak (0 to 100%)

Additional Alarms

Inverse I:E Ratio, Low O2, AC Disconnect, Low Battery, Over Temperature, Subject Disconnect Check Sensor ,High PEEP.

LED Indicators

Three LED ("light-emitting diode") indicators provide a quick indication of power and alarm status:

- The red alarm LED blinks rapidly when the system detects an alarm condition.
- The amber charge LED lights to indicate that the System is connected to external power.
- The green on LED shows that power is switched on.

Breathing Circuit Resistance

0.6Kpa(6cmH2O) at 16L/min