

World class Bioreactors Made in India

**BIO
TRON
BIOTRON**



Tabletop bioreactors 2 to 15L, Skid mounter 20-100L

- ◆ Custom made impellers.
- ◆ Online gas & substrate analysis.
- ◆ Easy maintenance & cleaning.
- ◆ pH , DO & temperature control.
- ◆ Very simple setup procedure.
- ◆ Multi component gas spraging system.
- ◆ HOT COLD & TAP water circulation system.
- ◆ Temperature control through SS jacketed vessel.
- ◆ User-friendly GUI bioreactor control software.
- ◆ Supports both standalone & PC interface mode.
- ◆ Unique Reactive logic™ control better than FUZZY or PID.
- ◆ Four peristaltic pumps, variable speed with 8 roller head.
- ◆ Unique IR Tran reflectance foam probe quantifies bubble size.

A project funded by TIFAC (DST) under HGT program

We offer Borosilicate glass vessels with SS-316L jacket in 2 - 15L . Our double walled all glass reactors in 2 - 7.5L are for Stir tank Photo bioreactors. We also offer all SS-316L bioreactors in 20 - 100L. The vessel top plate is in SS-316L with 8 - 16 ports, for reagent addition & probes for instrumentation. There are standard 1/4" and 1/2" ports. The jacket are for dual purpose, water circulation for temperature control and for in-situ sterilization. The heater jacket vessels also serve both purpose.



**Multiple Vessel Options,
multiple capacities**

Four variable speed high performance stepper motor driven, **eight roller ultra low pulsation**, peristaltic pumps are provided as part of standard equipment. The pump head is a unique cassette design made out of NYLON, with adjustable pressure applicator. The first & second pumps are for the pH control i.e ACID & BASE respectively. The third pump is the anti-foam additive pump, while the fourth pump can be used for delivering inoculums & Nutrients. The stepper motor design ensure constant r.p.m un-affected by power fluctuations & long hours continuous duty.



**Variable speed ultra
precision stepper mo-
tor drives.**

The heart of the system is the state of art embedded RISC microcontroller (AVR ATMEGA128) from ATMEL delivering 16MIPS throughput that facilitates both standalone or PC interface mode of operation. The signal conditioning electronics for pH, DO & temperature employs the best OPAMPS from Burr-Brown (Now TI) to produce repeatable & highly accurate readings. The system employs a **proprietary control algorithm Reactive logic™** which out performs PID or FUZZY control algorithms.

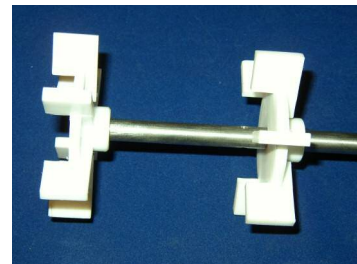


**ATMEL AVR ATMEGA128
RISC microcontroller
based single board
computer**



Our All new four variable speed peristaltic pump tower with built-in Linux SBC and a multi-touch capacitive LCD TFT screen.

Our new software for Linux keeps the system virus free, network capable, remote administrable. The credit card size Linux SBC is very Energy friendly, continuous long hours operation tested and very affordable solution.



**World's first our all Teflon
six segment RUSTON TUR-
BINE impeller.**



A sterilization in place (S.I.P), with steam generator & auto water feed system with built in temperature & pressure regulation. The system is fitted with two James Berry valves. This facilitates manual selection of circulation or sterilization. Jacket safety pressure switch prevents excess built up of steam pressure. The electronic unit controls the S.I.P system while monitoring the media temperature, the sterilization time & vessel pressure (Second level regulation).



S.I.P system for i-situ sterilization (optional accessory)

The HOT, COLD & TAP (All SS) water system is a standard accessory supplied with our fermenter featuring three independent chambers with dedicated circulation pumps. A dedicated embedded micro-controller controls the heater & chiller compressor. Two temperature sensors provide the hot & cold water temperature inputs to the embedded microcontroller.



20L Hot, Cold & Tap water circulation system

An oil free air compressor is another standard accessory supplied with our fermenter. Two models are available, ordering options are ...

- 1) SCI-FERM-COMP/HSV2
- 2) SCI-FERM-COMP/ HS-WP1T-20L

0.2 micron 13 & 47 mm disposable filters are supplied as standard accessories for the sparger & storage bottles.



Oil free air compressor with 20L storage tank (HS-WP1T-20L)

Our signal conditioning card (three stage galvanic & two stage optical isolation) supports any electrode, any brand (PHONIX, In-GOLD, HAMILTON, METTLER etc).



The user can himself replace the electrode, carry out our unique electronic calibration procedure without ever opening the unit.

Three stage galvanic & two stage optical isolation signal conditioner

Salient Features:

Vessel:

SS jacketed corning cylindrical glass vessel with curved base are employed. Permits visual observation of cultivation, process and products. SS Vessels have illuminated view ports

Construction:

Most convenient & optimized port design, Six Nos of 1/4 inch pipe fittings in SS-316 for accessories & instrumentation. Three other ports with special fixtures for pH, DO, Foam probes. Only four knurled nuts need to be removed for dismantling & cleaning the reactor vessel, one multiple input port for reagent addition.

Heat Transfer system:

SS jacket vessel with inlet & outlet ports to facilitate HOT/COLD water circulation. HOT/COLD water circulation system may be ordered separately.

Aeration:

Multi gas sparging system with choice of 2 to 4 manual or thermal mass flow meters for controlling the gas flow rates.

Agitation:

Double Wilson /Mechanical seal, top driven stirrer motor 100 to 250 watt DC motor, variable r.p.m from 30 to 1200. Specially designed impellers for vide fermentation applications.

Pumping system:

The system comprises of high precision stepper motor driven peristaltic pumps. The dosage quantity is dynamically controlled in case of ACID, BASE & FOAM pumps by varying the stepper motor speed by the electronic unit's control logic.

Sterilization:

The sterilization may be carried out in-situ or in an auto-clave.

Electronic unit:

Master command module that can operate in standalone or PC interface mode. Provides pH, DO & temperature control.

pH, DO & Temp control:

User selectable three modes, Single sided; double sided & REACTIV logic are available. Also manual control is provided for experimenting, where in all the controls are turned off & system may be employed for reaction trending.

Fermwrks PC software:

The software is GUI based, event driven, simplifies the reactor setup procedure. Provides full control of the bioreactor.

Photo Bioreactor Light Source & Control:

RGB, Warm White, Cool White or Neutral LED Sources with dedicated microcontroller based intensity control

Specifications:

| | |
|---|--|
| Vessels (1) Glass (2) Glass in Glass (3) All SS-316L | 2 to 15 liters BOROSILICATE Glass Double walled All Glass 3 & 7.5 L 20 - 100 L |
| Jacket | 316 SS Jacket (2-15L Glass vessels), facilitates In-situ sterilization also. |
| Working volume | 2/3 rd vessel volume |
| Pressure Max Seals | 2.0 Kg/Cm ² VITON LIP seals & 'O' Rings |
| Display | 1) 20 X 4 Alphanumeric, Membrane keypad 2) Linux SBC, with 7" Capacitive Touch |
| Ports | 6 ports fitted with 1/4 inch SS tube fittings & 3 ports for sensors, multiple input port for Reagent addition. |
| Stirrer | DC 24V up to 250 Watt, 1200 r.p.m motor with PWM control or AC induction motor with V/F drive |
| Impellers | World's first 6 segment all TEFLON RUSTON TURBINE Impeller, Corrosion & Erosion free. Other impellers include MARINE, VORTEX, PADDLE etc. |
| Peristaltic Pumps For... ACID BASE Anti-Foam Nutrient | Four high precision 8 roller cassette pumps, VARIABLE SPEED, stepper motor driven, continuous duty with dedicated intelligent embedded controller for each pump. |
| Foam Probe | Active IR Trans reflectance sensor, detects foam bubble size for dynamic foam control. |
| Cabinet | Powder coated All Aluminum integrated tower, housing Electronic unit & the four peristaltic pumps. |
| Hot, Cold & Tap water circulation system with dedicated 2 Chanel P.I.D controller | Compressor based Cold water (min 8° C) up to 2KW heater for hot water (max 65° C), Independent Tap water tank, each with dedicated Pump system and valve management unit such that water is returned to the respective storage tank. The electronic unit controls the dwell time of the circulation media within the jacket. |
| Steam Generator for C.I.P & S.I.P | For In-situ sterilization of vessels with a capacity of up to 15L, controlled by the Fermenter's Electronic Unit. Sterilization temperatures 115 to 125° C & 10-15 psig. |
| Compressor | Oil free air compressor with & without storage tank (up to 50 Liters). |
| Filters | 0.2 micron 47mm filter for inlet air & 0.2 micron 13 mm filter set. 13mm filter holders permit replacing the filter. |



Spectrochem Instruments Pvt. Ltd.

B-23 Huda Complex, Saroornagar, Hyderabad, Telangana State, 500 035 INDIA
Ph: +91 402 420 1570-72, Email: spectro_hyd@vsnl.net, URL: www.spectrochemindia.com