We Know

Bio Processing

Fermenter for Research and Development
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Fermenter for Research and Development

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CNS Co., Ltd specialize in producing fermenter, bioreactor, SMB etc. All products are of unique design, high tech and excellent quality. We manufacture our products by high standard and strict quality control and we fully follow our ISO quality management system standard. CNS strives for excellence and continuous improvement in quality, retain expertise and performance, and ensure strong customer support and customer satisfaction.
CNS Co., Ltd’s goal is to become a world’s leading manufacturer of fermenter and bioreactor in the bio-industry. We are committed to provide innovative and reliable solutions to our customers.

CNS will do our best to meet your expectations.
History

2004

Establishment of CNS Co., Ltd

· Start business with maintaining fermenter
· Developed CNS’s new lab-scale fermenter model
· Entered business partnership with Broadley James
· Entered into a technical partnership with LTH

2006

Developed CNS’s new Pilot-scale Fermenter

· Agreement on developing Hydrogen Gas reactor (Korea Institute of Energy Research)
· Developed TN/TP Analyzer - MOU (HUMAS)

2008

Acquired Korea patent (No.0821376) - Microbial Fermenter using Indirect sterilization method

· Energy resources Technological development Institute (Inha University)

2010

Established CNS’ Technical Institute

· Partnership with Sensortechnik (Germany)
· Innovation Research program for Korean Small Business (Kyunghee University)
· Relocate Head office
2012
Certificate of venture company (Technology Guaranteed Fund)
- Selected project for Korean 7th Business consolidation of competitive power
- Certification of ISO 9001:2006(KorQ-121099)
  /14001:2004(KoE-124397)

2014
Certificate of INNO-BIZ (KIBO)
- Certificate of Promising Small and Medium Enterprise (Daejeon city hall)

2015
Relocation of Head office
- CE Certificate
MARADO series is a compact and easy-to-use fermenter with a full range of application possibilities. It is designed for small volumes ranges from 1L-10L.

It is characterized by a precise temperature, pH and DO control, an exactly controllable agitation with automatic monitoring system as well as real-time analysis.

It is ideal solution to satisfy the research and small scale production necessities due to their flexibility and simplicity in use.
Features

- Maintenance through remote control
- Compact, mobile design saves laboratory space
- Precise software control: HMI-PLC interoperability
- Optimized vessel structure for maximum culture yield
- Flexible customization for individual users' need

Product Code

- MARADO 05 S P B
- Name of product
- Vessel volume
- S: Single, D: Double
- B: Benchtop
- S: Standing
- P: PC, X: X-panel

MARADO-05D-PB
MARADO-05D-PS
MARADO-05D-XB
MARADO-05D-XS
Vessel

The vessel is designed to prevent contamination during fermentation process which maximize productivity.

The bowl-type temperature controller circulates the heated water inside the bowl to adjust temperature. It gives stable heat transfer due to its relatively large contact area as compare to volume of cell cultivation.

Control System

- 8 Unit control in one screen
- User-friendly control
- Automatic gas mixer system (4Gas, 3Gas, N2, O2)
- RPM, Pressure, Airflow Automatic cascade control according to DO value
- Real time customer service through remote control
- Available fermentation process analysis graph
- Available excel file output
- Dual transmitter (pH, DO)
- Continuous culture sudden brown out
- User log-in for security purpose
- Available more functions (options) by user needs
Technical Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>MARADO- Single</th>
<th>MARADO-Double</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vessel Type</td>
<td>Standard : Bowl Type 1ea</td>
<td>Standard : Bowl Type 2ea</td>
</tr>
<tr>
<td>Software</td>
<td>HMI (PC &amp; X panel-Touch Screen)</td>
<td>HMI (PC &amp; X panel-Touch Screen)</td>
</tr>
<tr>
<td>Foot print</td>
<td>W500 x D650 x H1450/800</td>
<td>W1000 x D650 x H1800/1150</td>
</tr>
</tbody>
</table>

**General**

<table>
<thead>
<tr>
<th>Specification</th>
<th>MARADO- Single</th>
<th>MARADO-Double</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vessel Working Volume</td>
<td>1L : 0.3-0.7L, 2.5L : 0.75-1.75, 5L : 1.25-3.75L, 7.5L : 2.0-5.5L, 10L : 2.5-7.5L</td>
<td></td>
</tr>
<tr>
<td>Vessel Volume</td>
<td>1L, 2.5L, 5L, 7.5L, 10L</td>
<td></td>
</tr>
<tr>
<td>Agitation Speed</td>
<td>50-1, 200 RPM</td>
<td></td>
</tr>
<tr>
<td>Impeller Type</td>
<td>Standard : Rushton (changeable)</td>
<td></td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>4-80°C</td>
<td></td>
</tr>
<tr>
<td>Vessel material</td>
<td>Borosilicate glass, Stainless-steel 316L</td>
<td></td>
</tr>
<tr>
<td>Adjustable port</td>
<td>pH, DO, Thermo well, Baffle, Foam, Inoculation, Sampling, Feeding</td>
<td></td>
</tr>
<tr>
<td>Exhaust Condenser</td>
<td>Stainless-steel exhaust condenser, mounted on the head plate</td>
<td></td>
</tr>
<tr>
<td>pH Sensor</td>
<td>One gel pH electrode with digital display in 0.01 increments</td>
<td></td>
</tr>
<tr>
<td>pH Range &amp; Control</td>
<td>0-14 pH, via PID control. Cascade to pumps, gases and external loops</td>
<td></td>
</tr>
<tr>
<td>DO Sensor</td>
<td>One polarographic DO sensor with digital in 0.1% increments</td>
<td></td>
</tr>
<tr>
<td>DO Range &amp; Control</td>
<td>0-100%, via PID control. Cascade to agitation, gases, pumps and external loops</td>
<td></td>
</tr>
<tr>
<td>Foam Sensor</td>
<td>One foam sensor with digital display in 1 increments</td>
<td></td>
</tr>
<tr>
<td>Pumps</td>
<td>3 built-in, assignable, peristaltic pumps are standard, 25 RPM speed duty cycle</td>
<td></td>
</tr>
<tr>
<td>PV/SV Setting</td>
<td>pH, DO, Temperature, RPM, Air, Feeding</td>
<td></td>
</tr>
<tr>
<td>Control &amp; Setting</td>
<td>PID control &amp; on-off setting</td>
<td></td>
</tr>
<tr>
<td>Aeration</td>
<td>Ring sparger is provided with 0.2㎛ disposable filter</td>
<td></td>
</tr>
</tbody>
</table>

**Available options**

- Vessel : Double jacket type vessel
- Impeller : 3 Blade pitched paddle, 4 blade pitched paddle, propeller, etc.
- Touch Screen : PC type
- Sparger : Mesh sparger
- Continuous stirred tank reactor
- Air-lift loop bioreactor
- Load cell control

※ The functions mentioned above, are subject to change without prior notice for the user’s convenience.
Pilot Fermenter

CNS’ Know-how, Microbial fermenter of indirectness sterilization

CNS fermenter/bioreactor provides you the total package solution depending on your application and experimental needs.

It is perfect for scale up/scale down and has proven to be an invaluable fermenter for clients research, education, manufacturing, and other settings.

Moreover, CNS got patented of indirect sterilization process which ensures process optimization and characterization. It provides enhanced functionality making it the ideal model for your large scale process.
2D/3D Design & Manufacture

- CNS is always trying to provide the highest quality products and services to our customers.
- We provide customized design product for individual user’s need.

Indirect Sterilization Process

- The indirect sterilization process is the method that circulates the heated water in the jacket to raise temperature using heat exchanger.
- Precise temperature control no more than ± 0.1°C
- Minimize the deformation of culture medium during sterilization process.
CNS has designed, manufactured, installed, and commissioned in accordance with GMP/ASME BPE standard.

Features

- Quick set-up and easy operation
- Real time customer service through remote control (software)
- Use central control unit
- Stable and reliable control system for fermentation process
- Real time analysis of culture profile
- Trend analysis for preventing contamination
- 19" Touch screen
- Real time database available
- Secure user log-in
- Flexible customization for individual users' need
- Option: ISO/Android control available
## Technical Specifications

### Capacity

<table>
<thead>
<tr>
<th>Vessel Volume</th>
<th>Pilot</th>
</tr>
</thead>
<tbody>
<tr>
<td>30L</td>
<td>50L</td>
</tr>
<tr>
<td>20L</td>
<td>35L</td>
</tr>
<tr>
<td>50-400</td>
<td>50-400</td>
</tr>
<tr>
<td>0.75(1)</td>
<td>1.5(2)</td>
</tr>
</tbody>
</table>

### General

#### Construction
- Aspect Ratio 2.2:1
- Material of Construction: STS316L
- Finish: 0.6 Ra (Internal/external), Optional: electro polished interior

#### Agitation
- Drive: Top/Bottom drive, Units-mechanical seal
- Impeller: (3) Rushton
- Baffle: (4 removable, STS316L)

#### Air Line
- Line comes equipped with rotameter, SIP inlet filter, and sparger
- Options include: mass flow controller system

#### Exhaust Line
- Exhaust condenser
- Automatic backpressure control

#### Temperature control line
- All systems come with automatic sterilization as the standard
- Indirect sterilization by hot water circulation

#### Sensor
- pH/DO kit
- Retractable probe housing

#### Controller
- Large color touch PC operator interface that is used to access multiple screens and functions

### Available options

- 21 CFR Part 11 compliant digital chart recorder
- NovaSeptum sampling systems / Septum needle for dosing liquids / Variable speed pumps
- Vessel volume via differential pressure / CIP interface / spray balls / Load cells
- Marine and pitched – blade impellers / Validation packages / Scales for addition vessel

*The functions mentioned above, are subject to change without prior notice for the user’s convenience.*
Plant Fermenter

“precise control, more productive results”

Plant fermenter is designed with the flow of users’ movement
Pharmaceutical production line

“Fermenter for production of pharmaceutical raw material”

Eco-friendly microorganism production line

“Eco-friendly microorganism production in local government”
Food production line

Fermentation system for R&D in Korea Research Institute of Bioscience and Biotechnology (KRIBB)

plant-scale fermenter for Food production

Probiotics production (GMP)
## Technical Specifications

### Capacity

<table>
<thead>
<tr>
<th>Vessel Volume</th>
<th>1,000L</th>
<th>2,000L</th>
<th>3,000L</th>
<th>5,000L</th>
<th>10,000 - 100,000L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working Volume</td>
<td>700L</td>
<td>1,400L</td>
<td>2,100L</td>
<td>3,500L</td>
<td>7,000 - 70,000L</td>
</tr>
<tr>
<td>Speed (RPM)</td>
<td>50-250</td>
<td>50-250</td>
<td>50-200</td>
<td>50-200</td>
<td>30-150</td>
</tr>
<tr>
<td>Motor Kw (Hp)</td>
<td>7.5(10)</td>
<td>15(20)</td>
<td>15(20)</td>
<td>22(30)</td>
<td>37(50)</td>
</tr>
</tbody>
</table>

### General

- **Construction**
  - Aspect Ratio 2.2:1
  - Material of Construction: STS316L
  - Finish: 0.6 Ra (Internal/external), Optional: electro polished interior

- **Agitation**
  - Drive: Top/Bottom drive, Units-mechanical seal
  - Impeller: (3) Rushton
  - Baffle: (4 removable, STS316L)

- **Air Line**
  - Line comes equipped with rotameter, SIP inlet filter, and sparger
  - Options include: mass flow controller system

- **Exhaust Line**
  - Exhaust condenser
  - Automatic backpressure control

- **Temperature control line**
  - All systems come with automatic sterilization as the standard
  - Indirect sterilization by hot water circulation

- **Sensor**
  - pH/DO kit
  - Retractable probe housing

- **Controller**
  - Each system comes standard with an industrial PLC
  - Large color touch PC operator interface that is used to access multiple screens and functions

### Available options

- 21 CFR Part 11 compliant digital chart recorder
- NovaSeptum sampling systems / Septum needle for dosing liquids / Variable speed pumps
- Vessel volume via differential pressure / CIP interface / spray balls / Load cells
- Marine and pitched – blade impellers / Validation packages / Scales for addition vessel

※ The functions mentioned above, are subject to change without prior notice for the user’s convenience.
SMB Chromatography system is used to separate one chemical compound from one or more other chemical compounds to provide significant quantities of the purified or enriched material at a lower cost than could be obtained using simple batch chromatography. The continuous delivery of feed and desorbent enables the permanent extraction of two fractions at high concentrations. The system works thermostatically and can be used up to 8 columns. In addition, the solenoid valve block drastically reduce the dead volume.

**SMB Related Key Components**
- Control module
- Dual-piston pump
- UV/Vis Detector (Deuterium, halogen lamp / 190-740nm)
- Solenoid valve block / Rotary valve assemblies

**HMI Process Control**
- Intuitive interface
- Convenient data storage and analysis
- Real time monitoring system
- Customized program
Why SMB?

The Simulated Moving Bed (SMB) chromatography principle for continuous extraction of pure substances on a preparative scale is successfully used in several areas of chemistry and biochemistry.

- Petrochemical Industry
- Sugar Industry
- Chiral Separation
- Production of Pharmaceutical
- Other Industries

Technical Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>SMB Bio System, SMB Chem System</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pump</td>
<td>Type: Dual piston pump 4 sets or 5sets</td>
</tr>
<tr>
<td></td>
<td>Flow rate: 0.1<del>100 ml/min or 1</del>200 ml/min</td>
</tr>
<tr>
<td></td>
<td>± 0.3%</td>
</tr>
<tr>
<td></td>
<td>Max pressure: 1MPa or 5MPa or 100MPa</td>
</tr>
<tr>
<td></td>
<td>Safety Function: Column integrity protected by convenient upper-limit pressure switch</td>
</tr>
<tr>
<td>Valve</td>
<td>Material: Manifold System block (Feed valve, Eluent Valve, Product valve, Transfer valve)</td>
</tr>
<tr>
<td></td>
<td>Material: Glass column or STS column</td>
</tr>
<tr>
<td>Column</td>
<td>Size: 6mm x 150mm or 25mm x 300mm or 50mm x 500mm</td>
</tr>
<tr>
<td></td>
<td>Packing material: Size exclusion resin, Ion exchange Resin, ODS</td>
</tr>
<tr>
<td></td>
<td>Max pressure: Glass column: 100-900 psi, STS column: 1000-7000 psi</td>
</tr>
<tr>
<td>Detector</td>
<td>Wavelength: Variable UV Detector: 190~1000nm</td>
</tr>
<tr>
<td></td>
<td>Light source: Deuterium and tungsten halogen lamps</td>
</tr>
<tr>
<td></td>
<td>Noise and Drift: &lt;±1 x 10-5 AU (over 30 sec period peak to peak, 1.0 sec rise time); &lt;±1 x 10-4 AU (over 30 min period peak to peak, 1.0 sec rise time) with STD sample cell at constant temperature</td>
</tr>
<tr>
<td></td>
<td>Sample cell: Standard HPLC flow cell with 10mm path length, total dead volume of 19 µL</td>
</tr>
<tr>
<td>Additional Options</td>
<td>RID, Brix meter, Conductivity, pH meter</td>
</tr>
<tr>
<td>Control</td>
<td>Operation Program: Human machine Interface</td>
</tr>
<tr>
<td></td>
<td>Operation Method: Step control, Sequence control</td>
</tr>
<tr>
<td></td>
<td>Monitoring: Real time (UV absorbance, Conductivity, pH)</td>
</tr>
</tbody>
</table>

※ The functions mentioned above are subject to change without prior notice for the user’s convenience.
**Solid Fermenter**

**Features**
- Patented seed germ inoculation device
- Temperature and humidity controlled culture
- More than two different types of microbial culture simultaneously
- Uniform culture that is independent of season
- Compact system design to minimize a dead volume
- Automation system for the entire process

**Fluid Dynamics Analysis**
Designed optimum process using SolidWorks FloXpress

**Transfer Conveyor**
An equipment that penetrate water into the base material and prepare for steaming process using heated water in the jacket.

**Continue Mixer**
An equipment that mix and preheat the base material by sprinkling water.

**Continue Cooker**
An equipment that continues steaming and discharging.

**Gathering screw conveyor**
An equipment that transfer discharged base material from continue cooker.

**Transfer Screw Conveyor**
An equipment that continuously transfer to continue cooler.

**Rotary Feeder**
An equipment that supplies refrigerated homogenized base material to KOJI ROOM.
CNS CO., Ltd has successfully completed many of the most ambitious projects in Korea.
Accessories

3CH Transmitter

**Model: MXD70 Series**
- Measuring maximum of three sensors available (ex. pH, DO, MLSS, SS, Turbidity etc.)
- Data output using SD card.
- Ambient Operating Temperature: -20°C to +50°C (-4°F to +122°F) for full specification.
- Display: 3¾” QVGA back lit LCD module.
- Current Output Adjustment: ±0.01mA, 3 point 0-4-20 mA for remote monitor calibration.

pH Electrode

**Model: F615 Series**

The F-615 style offers a T-pull handle which makes installation and cable routing easy in large tanks. Typically used in steel vessels 20 liters and up, this design is very robust and withstands multiple SIP and CIP cycles. Steam sterilizable.

<table>
<thead>
<tr>
<th>Electrode Model</th>
<th>Class</th>
<th>Use with these Housing Models</th>
<th>Electrode Length</th>
<th>Cable Length</th>
<th>Connector</th>
<th>Electrode Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>F-615</td>
<td>A</td>
<td>320, 330, 326,336, 350, 357, 370</td>
<td>130 mm</td>
<td></td>
<td></td>
<td>F-615-B130-DH</td>
</tr>
<tr>
<td>F-615</td>
<td>B</td>
<td>320, 330</td>
<td>160 mm</td>
<td></td>
<td></td>
<td>F-615-B160-DH</td>
</tr>
<tr>
<td>F-615</td>
<td>C</td>
<td>320, 330</td>
<td>210 mm</td>
<td></td>
<td></td>
<td>F-615-B210-DH</td>
</tr>
</tbody>
</table>

**Model: F635 Series (DH Type)**

The F-635 style can be used in either lab-scale or industrial-scale fermenter and is available in a variety of lengths. Steam sterilizable and autoclavable.

<table>
<thead>
<tr>
<th>Electrode Model</th>
<th>Class</th>
<th>Use with these Housing Models</th>
<th>Electrode Length</th>
<th>Cable Length</th>
<th>Connector</th>
<th>Electrode Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>F-635</td>
<td>D</td>
<td>325, 335</td>
<td>120 mm</td>
<td></td>
<td></td>
<td>F-635-B120-DH</td>
</tr>
<tr>
<td>F-635</td>
<td>F</td>
<td>325, 335</td>
<td>200 mm</td>
<td></td>
<td></td>
<td>F-635-B200-DH</td>
</tr>
<tr>
<td>F-635</td>
<td>X</td>
<td><strong>Extended lengths for use with:</strong> compression fittings or thread directly into vessel’s headplates</td>
<td>225 mm</td>
<td></td>
<td></td>
<td>F-635-B225-DH</td>
</tr>
<tr>
<td>F-635</td>
<td>X</td>
<td>Many other lengths available, call factory for information.</td>
<td>320 mm</td>
<td></td>
<td></td>
<td>F-635-B325-DH</td>
</tr>
<tr>
<td>F-635</td>
<td>X</td>
<td></td>
<td>420 mm</td>
<td></td>
<td></td>
<td>F-635-B420-DH</td>
</tr>
<tr>
<td>F-635</td>
<td>X</td>
<td></td>
<td>480 mm</td>
<td></td>
<td></td>
<td>F-635-B480-DH</td>
</tr>
</tbody>
</table>
**pH Cable** Type M-5 mm, low noise, shielded coaxial cable. Thicker and more rugged, the 5 mm cable is often specified for pilot and process installations. A wide selection of connectors is available upon request.

Model : AX-1000-HP-FF/SL Series

Standard length : 1M, 2M, 3M

![AX-1000-HP-FF](image1.png)  ![AX-1000-HP-SL](image2.png)

**Model : F695(DK Type)**

The F-695 is similar to the F-635 and varies only in the connector type. Suitable for either lab-scale or industrial-scale fermenter. Steam sterilizable and autoclavable.

<table>
<thead>
<tr>
<th>Electrode Model</th>
<th>Class</th>
<th>Use with these Housing Models</th>
<th>Electrode Length</th>
<th>Cable Length</th>
<th>Connector</th>
<th>Electrode Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>F-695</td>
<td>D</td>
<td>325, 335</td>
<td>120 mm</td>
<td></td>
<td></td>
<td>F-695-B120-DK</td>
</tr>
<tr>
<td>F-695</td>
<td>F</td>
<td>325, 335</td>
<td>200 mm</td>
<td></td>
<td></td>
<td>F-695-B200-DK</td>
</tr>
<tr>
<td>F-695</td>
<td>X</td>
<td>Extended lengths for use with: compression fittings or thread directly into vessel's headplates</td>
<td>225 mm</td>
<td></td>
<td></td>
<td>F-695-B225-DK</td>
</tr>
<tr>
<td>F-695</td>
<td>X</td>
<td>Many other lengths available, call factory for information.</td>
<td>320 mm</td>
<td></td>
<td></td>
<td>F-695-B325-DK</td>
</tr>
<tr>
<td>F-695</td>
<td>X</td>
<td></td>
<td>420 mm</td>
<td></td>
<td></td>
<td>F-695-B420-DK</td>
</tr>
<tr>
<td>F-695</td>
<td>X</td>
<td></td>
<td>480 mm</td>
<td></td>
<td></td>
<td>F-695-B480-DK</td>
</tr>
</tbody>
</table>

**pH Cable** Type M-5 mm, low noise, shielded coaxial cable. Thicker and more rugged, the 5 mm cable is often specified for pilot and process installations. A wide selection of connectors is available upon request.

Model : AX-1000-KP-FF/SL Series

Standard length : 1M, 2M, 3M

![AX-1000-KP-FF](image3.png)  ![AX-1000-KP-SL](image4.png)

**DO Sensor**

**Model : D400 Series**

- 316L Stainless Steel
- Serialized for traceability
- RA32 finish with electropolish on wetted parts
- Internal and external silicone o-rings
- Secured retainer ring

<table>
<thead>
<tr>
<th>Sensor Model</th>
<th>Sensor Length</th>
<th>Typical Insertion Length</th>
<th>Sensor Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>D400</td>
<td>70 mm</td>
<td>35 mm (1.4”)</td>
<td>D400-B070-PT-D9</td>
</tr>
<tr>
<td>D400</td>
<td>150 mm</td>
<td>115 mm (4.5”)</td>
<td>D400-B150-PT-D9</td>
</tr>
<tr>
<td>D400</td>
<td>220 mm</td>
<td>182 mm (7.2”)</td>
<td>D400-B220-PT-D9</td>
</tr>
<tr>
<td>D400</td>
<td>320 mm</td>
<td>278 mm (10.9”)</td>
<td>D400-B320-PT-D9</td>
</tr>
<tr>
<td>D400</td>
<td>420 mm</td>
<td>374 mm (14.7”)</td>
<td>D400-B420-PT-D9</td>
</tr>
</tbody>
</table>
Model : D140 Series

- 316L Stainless Steel
- Serialized for traceability
- RA32 finish with electropolish on wetted parts
- Internal EPDM o-rings

Model : D540 Series (D140 Renewal Product)

- 316L Stainless Steel
- Serialized for traceability
- RA32 finish with electropolish on wetted parts
- Internal EPDM o-rings

DO Cable

Model : AX-5000-D4-FFSeries
Standard length : 1M, 2M, 3M

- Stock cable assemblies feature the most commonly requested cable lengths and connector schemes.
- Cables are shielded to decrease signal noise and other interferences.
- Cables are tagged with part numbers for easy replacement.
- Cables have a D4 twist-lock coaxial cable plug to connect to the sensor.
- Cable assemblies are 100% tested for continuity and the absence of short circuits.
- D-type cables are 6 mm diameter, low noise, multiconductor cables.

12 mm OxyProbe with Straight Connector

<table>
<thead>
<tr>
<th>Sensor Model</th>
<th>Sensor Length</th>
<th>Sensor Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>D140</td>
<td>120 mm</td>
<td>D140-B120-PT-D9</td>
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<tr>
<td>D140</td>
<td>150 mm</td>
<td>D140-B150-PT-D9</td>
</tr>
<tr>
<td>D140</td>
<td>220 mm</td>
<td>D140-B220-PT-D9</td>
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<tr>
<td>D140</td>
<td>320 mm</td>
<td>D140-B320-PT-D9</td>
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<tr>
<td>D140</td>
<td>420 mm</td>
<td>D140-B420-PT-D9</td>
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</tbody>
</table>

Membrane Cartridge Kit

Model : K25 Series

This kit includes:
- One 25 ml bottle of electrolyte
- Four membrane cartridges
- Four sets of internal o-rings

<table>
<thead>
<tr>
<th>Description</th>
<th>Part Number</th>
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<tbody>
<tr>
<td>Single Cartridge Kit</td>
<td>KA2501, KA1201</td>
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<tr>
<td>Four Cartridge Kit</td>
<td>KA2504, KA1204</td>
</tr>
<tr>
<td>25 Piece Cartridge Kit</td>
<td>KA2525, KA1225</td>
</tr>
</tbody>
</table>

Model : K12 Series
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Bio Processing