Dual Drive System
Dual Independent Channel Syringe Pump

Two independently controlled pumping channels in one instrument

High accuracy ±0.25%

Graphical user interface with 7” LCD color touchscreen display

Accommodates syringe sizes 0.5 µl to 60 ml

Smooth flow down to 1.02 pl/min

USB, RS-232 and TTL connectivity

Harvard Apparatus
da division of Harvard Bioscience, Inc.
The Harvard Apparatus Pump 33 DDS (Dual Drive System) is a leap forward in syringe pump capability. The Pump 33 DDS has two independent pumping channels controlled by an intuitive touch screen interface.

This multi-purpose syringe pump employs advanced syringe mechanisms that include a tight gripping, extremely secure syringe clamp that accommodates syringe sizes 0.5 ul to 60 ml. The Pump 33 DDS offers enhanced flow performance with high accuracy and smooth flow from 1.02 pl/min to 106 ml/min.

Graphical User Interface

The intuitive Pump 33 DDS graphical user interface controlled with a large 7” LCD color touchscreen display allows quick and easy setup. The display run screen presents the user with all key dispensing parameters in real time. Syringe tables containing all major syringe manufacturers allow simple selection of any compatible syringe size. Audible Alarms, Adjustable Force and Screen Lock are all features that are available with a touch of the screen.

Advanced Connectivity

The Pump 33 DDS comes standard with USB and RS-232 for PC communication and RS-485 for pump-to-pump communication. An entire suite of ASCII commands is available to control the pump remotely with a PC. The pump contains a footswitch input and digital input/output for each independent pumping channel.

Harvard Apparatus syringe pumps are for research purposes only. Not for use on humans.
Operating Conditions
Three operating conditions are available to accommodate a wide range of setups and experimental protocols.

### Independent Condition
Independent Condition allows the Pump 33 DDS to operate as two separate syringe pumps named P1 & P2. Each syringe will operate independently with different syringe types, size, force, target (volume or time, mode dependent).

<table>
<thead>
<tr>
<th>Mode</th>
<th>Syringe</th>
<th>Rate</th>
<th>Target Volume/Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>Infuse, Withdraw, Infuse/Withdraw, Withdraw/Infuse</td>
<td>Any size/type 0.5 µl - 60 ml</td>
<td>Any within syringe capability</td>
</tr>
<tr>
<td>P2</td>
<td>Infuse, Withdraw, Infuse/Withdraw, Withdraw/Infuse</td>
<td>Any size/type 0.5 µl - 60 ml</td>
<td>Any within syringe capability</td>
</tr>
</tbody>
</table>

### Reciprocating Condition
In reciprocating condition, both syringe channels move in opposite directions at the same rate using the same syringe size and type. When combined with a valve box, the reciprocating condition can provide the continuous fluidic delivery of a peristaltic pump with the accurate, pulseless, low flow rates provided by a syringe pump.

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</thead>
<tbody>
<tr>
<td>P1</td>
<td>Infuse/Withdraw, Withdraw/Infuse</td>
<td>Any size/type 0.5 µl - 60 ml</td>
<td>Any within syringe capability</td>
</tr>
<tr>
<td>P2</td>
<td>Opposite of P1</td>
<td>Same as P1</td>
<td>Same as P1</td>
</tr>
</tbody>
</table>

### Twin Condition
Twin Condition allows both syringes to operate in the same mode using the exact same syringe type, syringe size, force, target (volume or time) and flow rate settings. The pump also allows the user to combine both flows for higher speed and volume infusion applications.

<table>
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<td>P1</td>
<td>Infuse, Withdraw, Infuse/Withdraw, Withdraw/Infuse</td>
<td>Any size/type 0.5 µl - 60 ml</td>
<td>Any within syringe capability</td>
</tr>
<tr>
<td>P2</td>
<td>Same as P1</td>
<td>Same as P1</td>
<td>Same as P1</td>
</tr>
</tbody>
</table>

### Specifications
<table>
<thead>
<tr>
<th>Type</th>
<th>Microprocessor dual independent infuse/withdraw continuous syringe pump</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accuracy</td>
<td>±0.25%</td>
</tr>
<tr>
<td>Reproducability</td>
<td>±0.05%</td>
</tr>
</tbody>
</table>

**Syringe:**
- **Type:** Glass, plastic and stainless steel
- **Size Minimum:** 0.5 µl (0.103 mm minimum inner diameter)
- **Size Maximum:** 60 ml (32.573 mm maximum inner diameter)*

**Flow Rate:**
- Minimum: 1.02 pl/min (0.5 µl syringe, 0.103 mm inner diameter)
- Maximum: 106 ml/min (60 ml syringe, 32.573 mm diameter )

**Display:** 7” color display with touch screen

**Connectors:**
- USB: Type B
- RS-232: 9-pin D-sub connector
- RS-485: IEEE-1394, 6 pos for pump-pump communication
- TTL Input/Output: Two 15-pin D-sub connectors, one for each pump mechanism
- Footswitch: Two phonojack inputs, one for each pump mechanism

**Average Linear Force:**
- 70 lbs (31.75 kg) at 100% force setting up to a flow rate of 90 ml/min using up to a 60 ml syringe with a 32.573 mm inner diameter
- 50 lbs (22.6 kg) at 100% force setting for flow rates 90 ml/min to 106 ml/min using the same size syringe

**Power Supply:**
- Input 100-240 VAC, 50-60 Hz, Output 30 V 1.66 A 50 W

**Weight:** 21 lbs (9.09 kg)

**Dimensions (L x D x H):** 11 x 15 x 8” (28 x 39 x 21 cm)

**Classification:** Class I

**Pollution Degree:** 1

**Installation Category:** II

**Regulatory Certifications:** CE, ETL (UL & CSA), CB Scheme, EU RoHS, WEEE

*NOTE: Some larger syringes may be compatible with the Pump 33 DDS. Please contact Technical Support for more information.

**Order #**
- 70-3333: Pump 33 DDS Dual Independent Syringe Pump
- 70-2215: Footswitch (with phone plug)