

# BalanceTutor™

## Technical Specification

Mar 2016



*BalanceTutor a dynamic and static postural control trainer*

This technical specification covers all critical components and physical elements for the following MediTouch product:

### **BalanceTutor BT100**

The BalanceTutor dynamic and static postural control trainer has been tested to IEC medical standards for electrical safety. It is a Class I, Type BF device.

Type BF Medical Equipment



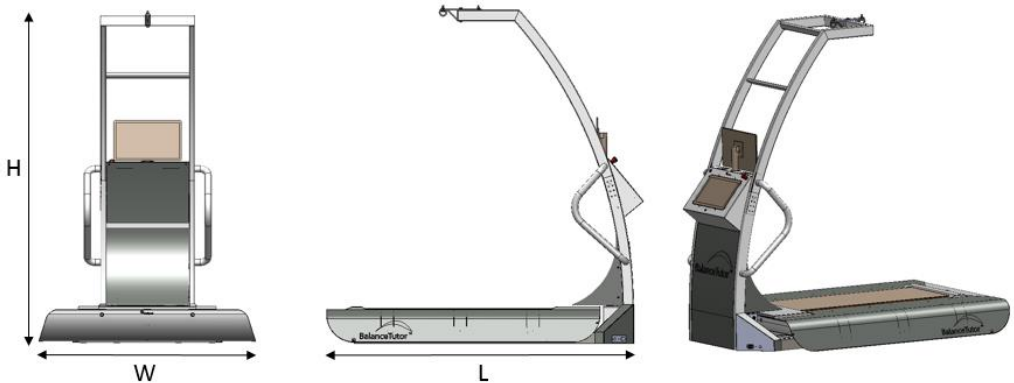
IEC 60601-1-1 compliant

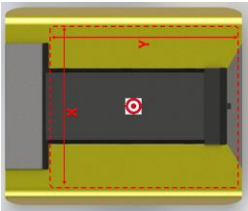
IEC 60601-1-2 compliant

IPX-0

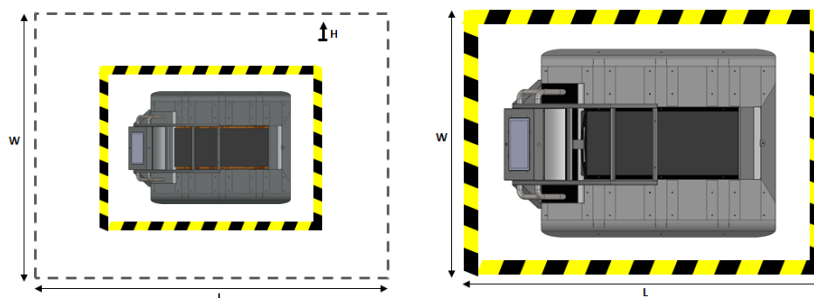
Date	Change description	Written by	Ver.
01 Jan 2014	Initial version	Ziv K.	140101
13 Mar 2016	US ratings clarifications	Ziv K.	160313

E&EO

<b><u>PARAMETER</u></b>	<b><u>DESCRIPTION</u></b>
<b>Product name</b>	BalanceTutor
<b>Product model</b>	BT100
<b>Order P/N</b>	HMBT100A
<b>Applications</b>	Rehabilitation, fall prevention, sports medicine and cardiology. User touch screen display terminal for data input, setting parameters, data recordings and analysis.
<b>Overall dimensions</b>	L: 233 cm (91.73") W: 161 cm (63.38") H: 245 cm (96.45")
	
<b>Running surface</b>	<ul style="list-style-type: none"> <li>▪ L: 232 cm (92") W: 161 cm (64") access height H: 245 cm (97")</li> <li>▪ Shock load reduction for the joints</li> <li>▪ Belt surface with anti-slip material</li> <li>▪ Max. Permissible load: 150 kg (330 lbs.)</li> </ul>
<b>Device weight</b>	500 kg (1100 lbs.) ±5%
<b>Crate weight</b>	236 kg (520 lbs.) ±8%
<b>Treadmill Speed</b>	0...±7.0 km/h (0... ±2 m/s)
<b>Treadmill perturbation kinematics</b>	<p>Treadmill Speed: 3...239 cm/s</p> <p>Acceleration: 15...475 cm/s<sup>2</sup></p> <p>Deceleration: 5...389 cm/s<sup>2</sup></p> <p>Forward Distance: 3...87 cm</p> <p>Backward Distance: 1...146 cm</p>
<b>Lateral perturbation kinematics</b>	<p>Speed: 5...60 cm/s</p> <p>Acceleration: 25...200 cm/s<sup>2</sup></p> <p>Deceleration: 25...200 cm/s<sup>2</sup></p> <p>Distance: ±18 cm</p>
<b>Perturbation intensity</b>	30 levels combining Acceleration, Deceleration, Distance, and target speed.
<b>Walking direction</b>	<ul style="list-style-type: none"> <li>▪ Forward and backward</li> <li>▪ In case of walking direction change, remove buckles from upper bridge hooks, place the person on the opposite side and fasten again the buckles to the same bridge hooks.</li> </ul>

<u>PARAMETER</u>	<u>DESCRIPTION</u>												
<b>Ratings</b>	230 Volt AC L/N/PE 50-60Hz 10A, dedicated 1phase line required with separated circuit breaker. 208 Volt AC L1/L2/PE 50-60Hz 16A, dedicated 2phase line required with separated circuit breaker.												
<b>Electrical outlet</b>	Worldwide According local standards USA 6-20R NEMA												
<b>Motor system</b>	Treadmill: Servo motor, 1.7kW, 3kRPM, 5.9Nm Perturbation: Servo motor, 0.6kW, 3kRPM, 2.1Nm												
<b>Power transmission</b>	Treadmill: Gear ratio 5:1, timing belt to poly Perturbation: Gear ratio 5:1, timing belt to poly												
<b>Motor controller</b>	Treadmill: Servo digital drive, CPR 1610W, CC 6.5A, PC 13.0A Perturbation: Servo digital drive, CPR 1140W, CC 4.0A, PC 8.0A												
<b>Electrical safety</b>	External isolated transformer: 230v/230v 2kVA or 120v/120v 2kVA. Under IEC-601-60601-1, B-3 UL Recognized, CE.												
<b>Leakage current</b>	< 0.2mA												
<b>Safety power off switch</b>	Emergency-off-switch (mains off), switch for immediate disconnection of motor and motor controllers power supply.												
<b>Safety stop switch</b>	Stops lateral perturbation if ranges exceeds from norm. Norm = $\pm 20$ cm												
<b>Force sensor</b>	Type: Aluminum-Alloy IP65 single point load cell. X4 units Sensitivity: $2.0 \pm 0.2$ mV/V Force range: 0...250 kg Location range: X: -65...+65 cm, Y: -80...+80 cm X: -25"...+25", Y: -31"...+31"												
													
<b>Motion feedback sensors</b>	<table border="1"> <thead> <tr> <th><u>Device name</u></th> <th><u>Model</u></th> <th><u>Body part</u></th> <th><u>Connection</u></th> <th><u>Technology</u></th> <th><u>Remark</u></th> </tr> </thead> <tbody> <tr> <td>IMU</td> <td>3DT100</td> <td>Leg</td> <td>Bluetooth</td> <td>6DOF IMU</td> <td>Supplied L + R</td> </tr> </tbody> </table>	<u>Device name</u>	<u>Model</u>	<u>Body part</u>	<u>Connection</u>	<u>Technology</u>	<u>Remark</u>	IMU	3DT100	Leg	Bluetooth	6DOF IMU	Supplied L + R
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IMU	3DT100	Leg	Bluetooth	6DOF IMU	Supplied L + R								
<b>Interface</b>	<ul style="list-style-type: none"> <li>PC power On/Off switch with blue indication LED</li> <li>RJ45 for Ethernet access 10/100/1000</li> <li>Bluetooth Class 2</li> <li>USB 2.0 port X2</li> <li>3 Pin internal power in connection</li> </ul>												
<b>Operator display</b>	Model: 1940L Projected Capacity Manufacturer: ELO Characteristics: Active matrix TFT LCD, 18.5", 16:9, 1366x768, 5ms, 1000:1												
<b>User display</b>	<ul style="list-style-type: none"> <li>22" 16x9 LED display</li> <li>Stereo built-in speakers</li> <li>Screen elevation adjustment up to 20cm</li> <li>Functional for visual output only</li> </ul>												

<u>PARAMETER</u>	<u>DESCRIPTION</u>		
<b>Internal computer</b>	<p>Model: BoxPC ARK-1550</p> <p>Manufacturer: Advantech</p> <p>Characteristics: Fanless box PC, Intel Core i5 1.9 GHz, 2.5" SSD Drive, 2G DDR3-1066, Gigabit Ethernet, Intel GT2-4400 Graphics, Window 7 x64, DC 12V power input.</p>		
<b>Software</b>	<ul style="list-style-type: none"> <li>▪ Input parameters</li> <li>▪ Full control of treadmill speed acceleration</li> <li>▪ Full control of perturbation speed, acceleration and distance</li> <li>▪ Setting and loading training program</li> <li>▪ COP (Center OF Pressure) measurement</li> </ul>		
<b>Safety harness belt</b>	<ul style="list-style-type: none"> <li>▪ Sized full body harnesses provide the ultimate in comfort and safety</li> <li>▪ Tough nylon webbing and forged hardware means long-term wear</li> </ul>		
<b>Ambient condition</b>	<p>Usage temperature: +10...+40°C</p> <p>Storage temperature: -30...+70°C</p> <p>Relative humidity: 30...70 %</p> <p>Atmospheric pressure: 700...1060 hPa</p>		
<b>User dimensions</b>	<p>Maximal weight: 135kg (297 lbs.)</p> <p>Height range: 120cm (47") ... 190cm (75")</p>		
<b>Facilitation</b>	<table border="0"> <tr> <td style="vertical-align: top;"> <p><u>Minimal room dimensions</u> L: 400cm (160") W: 300cm (120") H: 265cm (104") Device centered at middle of the room.</p> </td> <td style="vertical-align: top;"> <p><u>Keep out zone</u> L: 270cm (106") W: 230cm (90") To avoid collision at perturbation mode.</p> </td> </tr> </table>	<p><u>Minimal room dimensions</u> L: 400cm (160") W: 300cm (120") H: 265cm (104") Device centered at middle of the room.</p>	<p><u>Keep out zone</u> L: 270cm (106") W: 230cm (90") To avoid collision at perturbation mode.</p>
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Floor

Any floor type, avoid carpet.

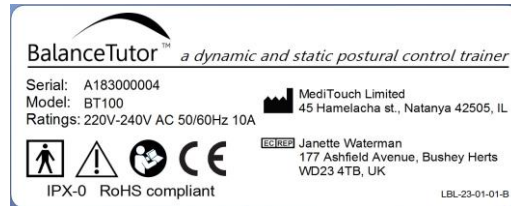
**Warnings**

- No children under age of 12 allowed being on or near to the device as well as operate it
- It is mandatory to fasten the user with harness belt to prevent fall
- The exercise permanently has to be supervised by a physiotherapist or a medical doctor in the field of orthopedics and/or neurology
- Cables and cuffs must not be used for the patient's hands
- Disregard of warnings and/or the use of the BalanceTutor without a fall protection system is strictly prohibited and may lead to accidents and injuries with fatal consequences

**PARAMETER**

**DESCRIPTION**

**Device Recognition**



**Safety**

Directive 93/42/EEC; EN 60601-1; EN 60601-1-1; EN 60601-1-2 (EMC approved); ISO 9001; EN ISO 13485; Emergency-off-switch (mains off), transformer for potential-isolation from the mains under IEC-601-60601-1, B-3 UL Recognized.

**Safety class / category**

I / B

**Classification**

Class I Medical device (MDD)

**Manufacturer**

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