Optima Force Platforms: Available Models

Model number	Dimensions	Capacities available	High Frequency Design
OPT464508	464mm x 508mm	1000, 2000	
OPT464508HF	464mm x 508mm	1000, 2000	✓
OPT400600	400mm x 600mm	1000, 2000	
OPT400600HF	400mm x 600mm	1000, 2000	✓

Optima Signal Conditioner: Feature Highlights

State-of-the-art signal conditioning

1 kHz anti-aliasing filters, oversampling, and digital signal processing

Fully calibrated and NIST-traceable

Tested to medical-grade standards for safety, essential performance, and electro-magnetic compatibility

Intuitive and easy to use

Fully software configurable

Automatic balancing of strain gage bridges initiated by front-panel button or by software

Multiple Optima Signal Conditioners automatically synchronize data sampling

Analog inputs	Six four-arm strain gage bridge inputs	
Bridge excitation	Channel independent, software configurable — 2.5, 5 or 10 VDC	
Amplifier gains	Channel independent, software configurable — 500, 1000, 2000, 4000	
Auto zero (with offset capability)	Push button or software initiated	
Anti-aliasing filter	1000 Hz low pass, 2-pole Butterworth	
Analog output range	+/- 5 volts	
Analog output reconstruction filter	1000 Hz low pass, 3-pole Butterworth	
Analog output DAC	16 bit	
Sample rate	Max: 1200 Hz/channel Min: 10 Hz/channel	
Synchronization	Genlock, external trigger, internal clock	
Digital Signal Processor	16 bit	
Digital data	IEEE 754 floating point, 32 bit	
Digital resolution	14 ENOB	
Power supply	External medical grade (included)	
Connectors	- Digital output: USB 2.0 - Sync/genlock: RCA phono - Power: 5.5 mm x 2.1 mm plug	- Analog output: DB25S - Transducer Input: 26-pin circular type connector

ISO 13485 certified

The Optima Human Performance System is a medical-grade system manufactured under the ISO 13485:2003 and ISO 9001:2008 quality systems.

CE

This product meets the standards set by CE Directive 2006/95/EC and has successfully been tested to comply with medical electrical equipment standards regarding basic safety, essential performance and electro-magnetic compatibility: AAMI – ES 60601-1, CSA – EN 60601-1, UL–IEC – EN 60601-1, IEC – 60601-1-2.

OPTIMA

Human Performance System

The best science starts with the best measurements.

AMTI

FORCE AND MOTION

Optima Human Performance System is a revolutionary development in force measurement technology, offering a 10-fold improvement over any force platform system on the market.

Using AMTI's new optimized strain gage technology, the Optima HPS provides levels of accuracy never before seen in force platform systems:

- Average COP accuracy of just a fraction of a millimeter (typically less than 0.2)
- Crosstalk values typically ±0.05% of applied load
- Measurement accuracy typically ±0.1% of applied load*

How do we know the performance of the Optima HPS is that good? AMTI verifies the accuracy of each Optima system through a proprietary Precision Calibration that takes up to 4000 measurements throughout the platform's entire rated capacity. This process uses a high-density calibration grid that covers the entire platform surface and uses fully documented NIST-traceable standards.

Each Optima Human Performance System is composed of an Optima Force Plate, Optima Signal Conditioner, Optima Calibration Certificate, and cabling. Signal conditioner features and available platform sizes can be found on the back of this brochure.

Precision Calibration Overview

The calibration of an Optima system is an exacting process involving up to 4000 measurements taken along a 1-inch-grid pattern.

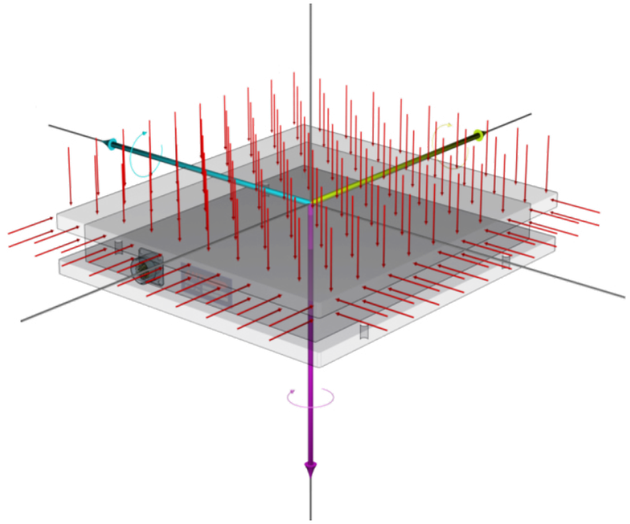
Multiple loads are applied at up to 400 locations using a precision machine capable of maintaining absolute positioning accuracy of 0.005 mm (certified by The Association For Manufacturing Technology).

First, live loads from 50 pounds to Full Scale Capacity (FSC) are applied across the top and sides of the force plate.

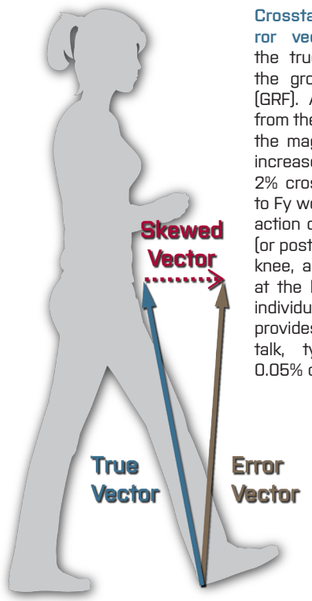
Next, dead weights of 50, 100, and 200 pounds (accurate to 0.01%) are used to verify the system's performance in the physiological testing range.

Finally, secondary characteristics, such as linearity and hysteresis are measured at eight locations using a ten-point-up, ten-point-down calibration protocol.

This exhaustive calibration and verification process ensures that each Optima system offers the best possible quality, accuracy, and performance available.



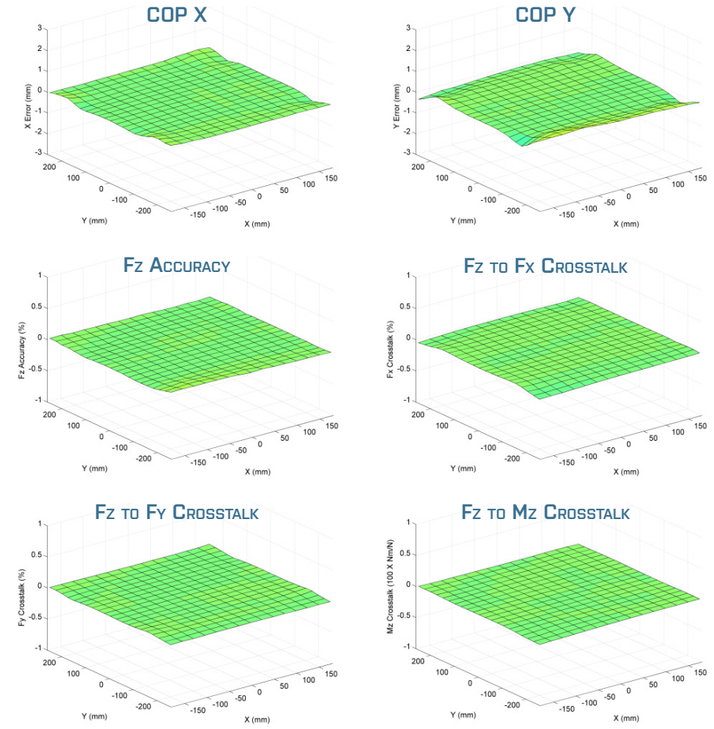
The Optima Precision Calibration verifies the performance of each Optima force plate at up to 400 locations in a 1-inch-grid (2.54 cm) pattern. The above graphic illustrates the procedure with sparser loading than is actually used.



Crosstalk results in an error vector which skews the true line of action of the ground reaction force (GRF). At greater distance from the center of pressure, the magnitude of the error increases. For example, a 2% crosstalk error from Fz to Fy would move the line of action of the GRF anteriorly (or posteriorly) 12 mm at the knee, and possibly 20 mm at the hip in a long-legged individual. The Optima HPS provides near zero crosstalk, typically less than 0.05% on every channel.

* Minimum applied load of 50 lbs

OPTIMA PERFORMANCE RESULTS



Summary

The above plots show the unmatched performance of the Optima Human Performance System. Each intersection of the grids represents a physical location at which performance verification data was taken; any platform error is shown on the Z axis.

Procedures

COP error is determined by loading the platform at precise locations. The plots shown above represent the performance with a 200.00 lb. (890 N) applied Fz load. A precision machine capable of maintaining absolute positioning accuracy of 0.0002 inches (0.005 mm) is used to locate the weights on a grid spacing of 1 inch (25.4 mm) yielding 300 measurement points. The COP plots represent the COP error on the Z axis with the platform X and Y coordinates on the X and Y axes.

Fz accuracy is measured by loading the platform as described for COP error above. The accuracy is determined by scaling the Fz output and then subtracting that value from the known NIST-traceable dead weight value. The difference is the error, which when divided by the known applied load is the accuracy of the Fz measurement. Fz accuracy is reported as a percentage of applied load.

Fz to Fx and Fy crosstalk is measured by loading the platform as described for COP error above. The crosstalk is determined as the ratio of the Fx or Fy output (scaled to represent Newtons of force) and the applied Fz load (the weight). As dead weights do not apply any side load this is a very accurate way to determine the crosstalk at that particular load. Fx and Fy crosstalk are reported in units of percent applied load.

Mz crosstalk is measured by loading the platform as described for COP error above.