

# **Fitness** *Technology*

Performance Measurement, Training and Rehabilitation Equipment

## **FORCE PLATE**

### **400S+ Performance Force Plate Manual**

**THIS MANUAL SHOULD BE READ AND UNDERSTOOD BEFORE OPERATING THIS  
FORCE PLATE**

**Fitness Technology**

**21 Bishop St.**

**Skye SA 5072**

**Australia**

**Postal Address: PO Box 139 Fullarton 5063**

**+61 418815400**

**Mob: 0418 815 400**

**[www.fittech.com.au](http://www.fittech.com.au) E [info@fittech.com.au](mailto:info@fittech.com.au)**

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Do not hesitate to contact us if you have any questions about this product

# FORCE PLATE 1000 Kg Capacity

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## FORCE PLATE 1000 Kg Capacity

### Specifications.

**Capacity:** 1000Kg Rated Force

**Safety Factor:** Side-load rejection ratio 500:1  
Safe side-load 100 % of R.C. Maximum safe central overload 150 % of R.C.  
Ultimate central overload 300 % of R.C.

**Physical Size:** 795mm x 795mm x 60mm

**Materials:** Carbon Fibre Platform with non-slip Top.  
Load Cells complete with adjustable height feet assemblies that can adjust the height of the Plate to approx 120mm

**Sample Rate:** Maximum Sampling Rate of 1000Hz on all channels via BMS version 2 (BMSv2) software program.

**Integration:** 400S+ Performance Force Plate + BMS Linear Position Transducer (LPT) is calibrated by users on site via the BMSv2 software via Tools\Configure\Calibration (tab window)

**Unique:** Only Performance Force Plate on the market with a footprint size large enough for every users' Centre of Mass (COM) to remain over this force plate for all testing functions for accurate data collection all the time. It is also capable of running the BMS LPT & auto saving all data files + outputting to Excel via the BMS software. It also measures uni-lateral & bilateral R & L leg anterior / posterior & medio / lateral force - all done on this single 400S+ force plate!

Only Performance Force Plate on the market capable of running on our new InnerBalance software tracking used to measure & record all anterior-posterior & mediolateral sway movements.

**Weight:** 400S+, 14.5 Kg (32 lbs)

**Operation:** Integral PCB Module operates 4 Load Cells + Output powered via 5 V DC Computer USB Port only. Sensor type Steel Shear Beams rating 250Kg @ 3mV/V that are genuinely rated to sample @ 1000Hz. Simply install the software onto your Hard Drive and then connect the USB Cable plug into your Computer. The 400S requires no other power supply or charging of batteries is required.

**PCB monitors:** Sensors # 1 – 4 each have a Load cell cable connector 5 terminal plug (Molex) (four in total as shown on pages 3&4) sensors # 1&2, 3&4 may share a Load cell cable connector 10 terminal plug (Molex) (two in total as shown on page 14). These connect to 4 Load cells. (see page 6).

**Outputs:** Communicates via 1 x USB 2.0 Cable that does not rely on Bluetooth or other wireless connection to the laptop, so has NO internal batteries - annoying flat battery and recharging issues are irrelevant!

**Power:** Computer USB supplies 100% of power supply to operate the 400S from any PC or laptop USB Port. 1

**Cables:** 1 x USB 2.0 Extension Cable 3 M Long provided with all 400S units. This mean zero external RF interference.

**Connections:** 1 x RJ 45 Connection (located under the Force Plate) with connection lead supplied going to 1K Ohm Potentiometer on the BMS LPT Model **PT5A-150-V62-UP-1K-M6-632676A** this LPT is an optional plug-in connection – only used if barbell tracking data is also required to be tracked simultaneously with the ground reaction force data (See pages 4 & 5).

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**PCB:** Self-contained in the 400S Platform Assembly.

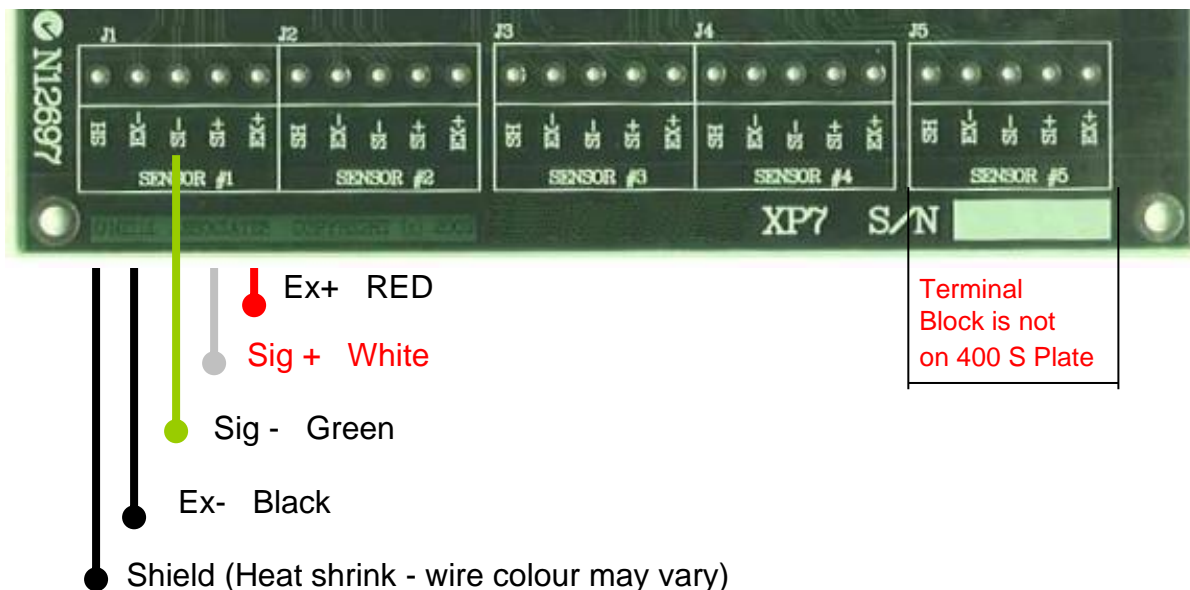


## Load Cell Wiring

The four Load Cells connect into the XPV7 Electronics Module are colour coded on the load cell cables at the terminal blocks for ease of wiring, they are as follows

Load Cell	1.	Blue	Heat - Shrink shroud as per next page
Load Cell	2.	Green	Heat - Shrink shroud as per next page
Load Cell	3.	Red	Heat - Shrink shroud as per next page
Load Cell	4.	Yellow	Heat - Shrink shroud as per next page

The wiring connection for each individual load cell is as follows.

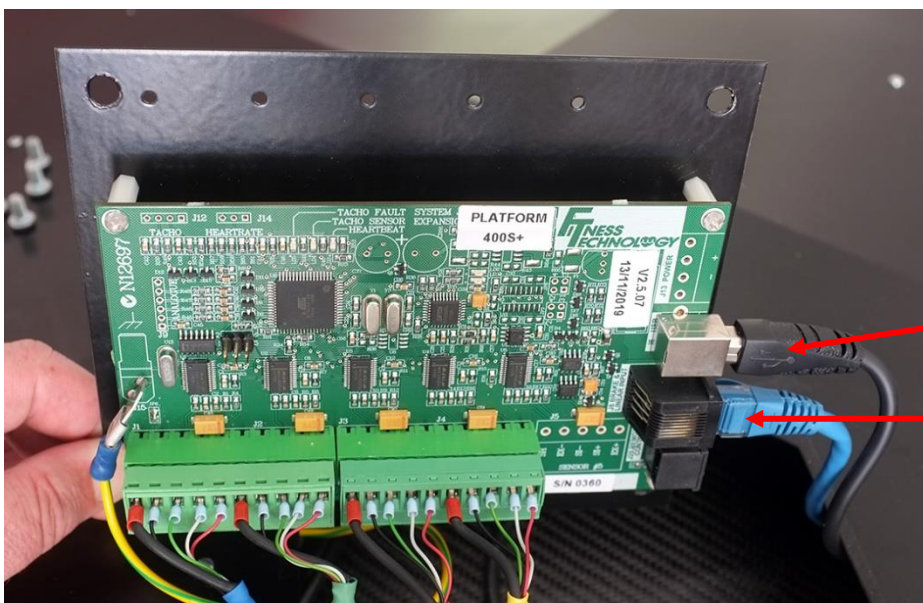


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### Installation:

1. Carefully unpack the platform by lifting it out the end of the transport carton. Make sure all items are present. (Report any discrepancies immediately.)
2. Place the platform onto a flat stable surface.
3. Install each foot into the load cell holes on the four corners of the platform by rotating the feet to the right. (right hand thread) Adjust height as show below.
4. Connect the USB communication cable as shown below by removing the plug allowing access to the communications port. (See photos below)
5. The Platform is now ready for use.
6. Install the communications software and the processing software following the instruction for each module
7. The XPV7 PCB Electronics Module will automatically identify any cable faults. Should this happen make sure the communication cables are properly installed. If communication failure continues, then replace the USB cable.
8. For any other problems contact our office for further instructions.

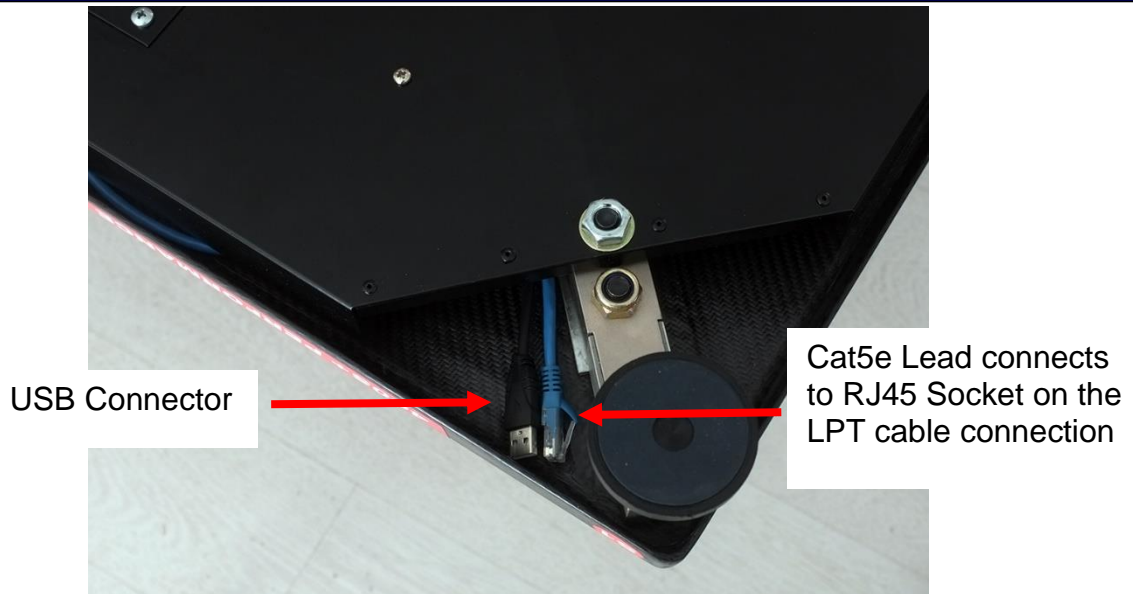
### USB and PT5A position Transducer Cable Connections



USB Connector

US8/8 Plug Cat5e cable  
Pin 2 = PT5A IK Pot V Signal  
Pin 4 = USB +5V  
Pin 6 = USB Gnd.  
Pin 7 = MBU V Signal.

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In the image above you can see the USB connector for the Force plate and the cat5e connector for the LPT. Both are tucked back in under the rear cover for shipping.

See below for an example of the PT5A position transducer connected to the 400S+ Performance force plate.

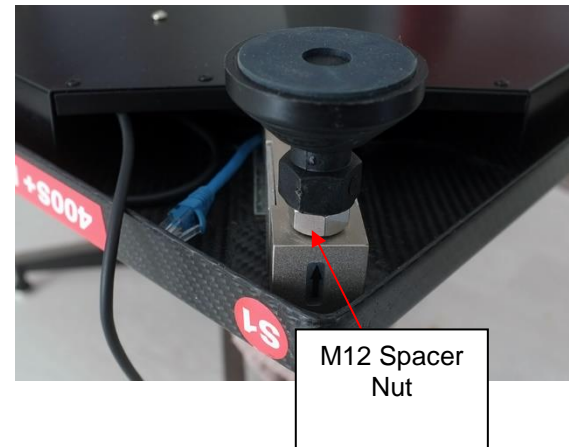


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### Installation of 4 x Platform Feet

The Platform cannot be used until the 4 x feet with M12 1.75 pitch threads are installed in each of the four corners. They screw into the Platform with standard a right-hand thread.

Stainless Steel M12 spacer Nuts are used for levelling and adjusting the height of the Platform. If required the M12 spacer nuts can be removed but if this is done never thread the 4 x feet threads thru all the way - back off 5mm. See page 11 for more detail.

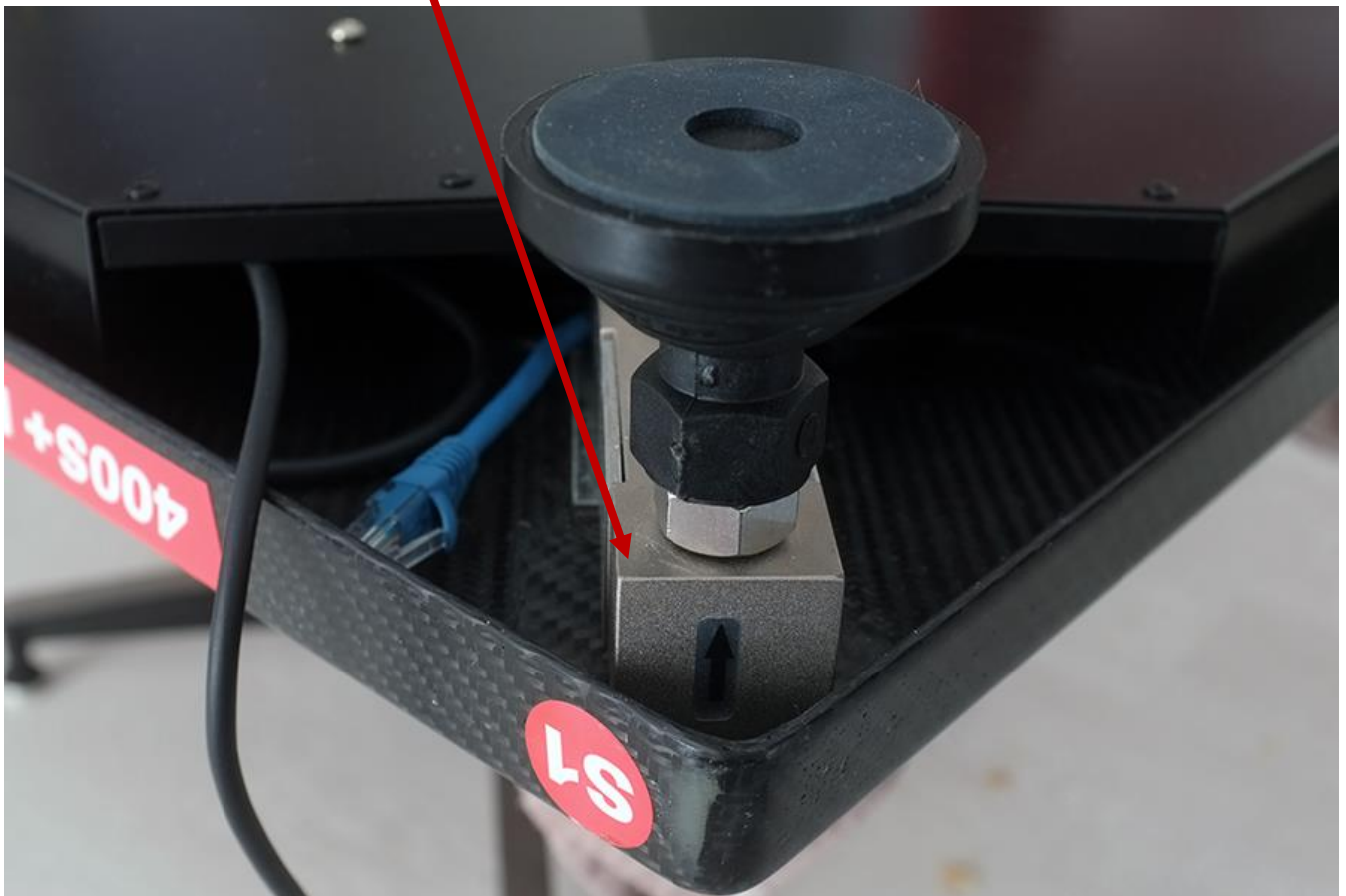


### Levelling the 400S+ Performance Force Plate

The Platform should also always be level when in use.

[How to level the 400S+ performance force plate using the XPV7 diagnostic software.](#)

**1 of the 4 x low profile shear beams bolted in position.**



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### Care and Maintenance of Force Plate

To clean the Force Plate, we recommend the use of standard household detergent to wipe down the external surface area.

**Note:**

Do not place or allow any water to ingress into the Platform via the load cell holes or the penetration used for the USB communication port underneath the Platform.

### PRECAUTIONS

Before the Force Platform is used for any purpose, checks must be carried out to ensure the safety of the individuals using the Platform. Appropriate footwear must always be worn when using the Platform.

All operators must ensure themselves that the Platform is suitable and safe for the application or testing purpose, by carrying out a series of tests prior to using the system.

The Testing Officer or Force Plate Operator acknowledges the decision to use the Force Plate and it's suitability for the purpose rests solely with their deliberate decision to use the device.

### Warranty.

The Company warrants that the products are thoroughly examined before shipment and agrees to make good any part that is proved to be defective due to faulty workmanship. Defects or failures in equipment which, under proper use, appear therein and arise solely from faulty materials or workmanship will be remedied by us free of charge provided the equipment is returned to our Workshop within a period of twelve (12) months from date of delivery, freight paid both ways. In the case of warranty service to equipment "on site" or at the purchaser's premises, all traveling and accommodation costs shall be to the purchaser's account. Damage to product including broken or damaged cabling caused by maliciousness, negligence or through changes to electrical configuration of equipment or voltage in excess of rating is specifically excluded from this warranty (the Proof to the contrary being the onus of the purchaser). Where this occurs then such warranty real or implied offered by The Company, shall immediately come to an end, The Company extends such warranties as are offered by the original manufacturer of material. Liability under this warranty applies only to repair or replacement (at the discretion of the Company) of the original goods supplied. The Company will not be liable for any damages or delay (general or consequential) whether directly or indirectly caused by the said defect, and shall not be responsible for any work done, or alterations, or addition, made to the products by any other party.

**NO VERBAL ARRANGEMENTS:** If the purchaser accepts this quotation it is acknowledged that any variations to the terms and conditions herein defined must be



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given in writing by Fitness Technology and that no reliance will be placed upon oral representation.

**APPLICABLE LAW:** Shall be the Law of the State of South Australia, and no variations to these conditions can be agreed to unless such agreement is in writing and signed by The Company.

### Frequently Asked Questions

#### Q. How do you calculate your variables?

**A.** We use standard biomechanical analysis to derive the additional data sets and summary parameters.

1. Vertical ground reaction force measured directly using the force plate
2. Force data is then integrated over time to derive the velocity time data set.
3. Velocity data is then integrated over time to derive the displacement time data set.
4. Power is calculated as instantaneous velocity multiplied by instantaneous force that each time point.
5. Maximum and minimum as well as average summary variables are being calculated for each data set.
6. Additional summary variables such as impulse over defined time periods, time to various peaks, rate of force development and time periods of various phases are calculated using standard biomechanical methods.

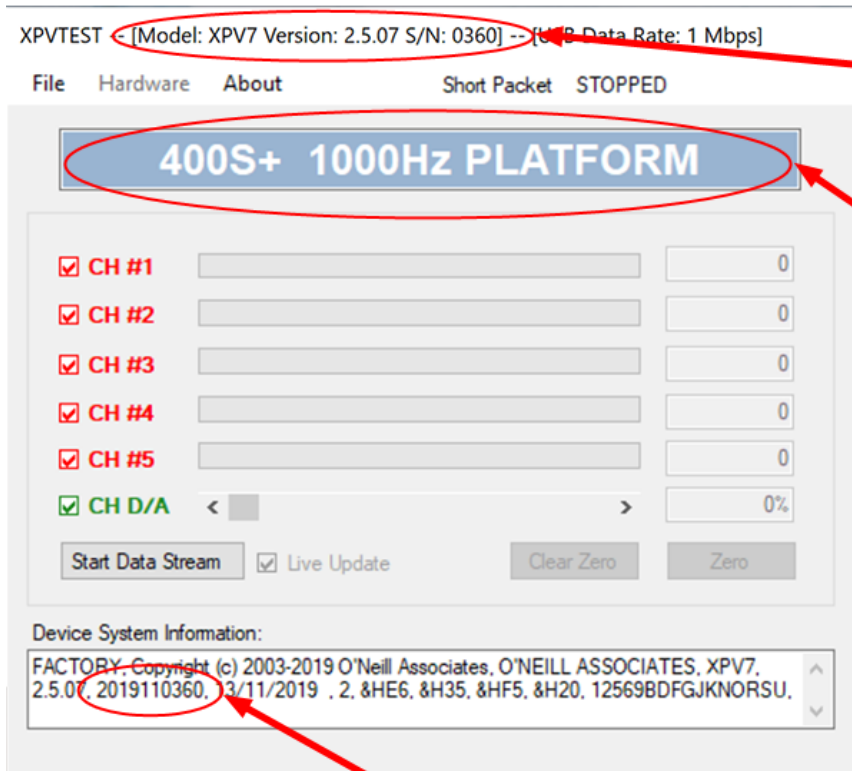
#### Q. What is the sampling period for mRFD in the BMS software?

**A.** mRFD is calculated as the greatest increase in force over a 30ms time epoch for the selected section of the data – that is the period of data displayed in the graph.

#### Q. What is the sampling frequency of the BMS software?

**A.** The 400S+ performance force plate has a sampling frequency of 1000Hz. Your XPV7 interface sample frequency can be determined by running the XPV7 diagnostic software and looking at the equipment type highlighted in the image below. The XPV7 diagnostic software can be downloaded [here](#).

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**Version Number  
and last 4 digits  
of serial number**

**Equipment Type  
and Frequency**

**Full Serial Number**

For any additional support information send email request to [info@fittech.com.au](mailto:info@fittech.com.au)