

	Troubleshooting Guide: Treadmill Deck Friction Testing		
Prepared by: Craig Burfield, Brian Nelson, Kevin Chang, Alex Lane	Time Required: 15-20 minutes	Models Affected: All Commercial Treadmills (AC Motor with waxed running surface)	Date Prepared: 4.24.2017
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Overview

The friction test measures the AC current needed to move the running belt at different settings. This will help you determine if there is excessive wear on the deck and running belt. **This process replaces the Amp Draw Testing procedures taught in the past.** There are 2 ways to set up for the test depending on the country you are located in. This instruction will outline the setup for both methods.

When should you conduct a friction test?

- Inspect the front and back rollers for lumps. Roll the belt with your hand or foot. Do you see lumps on the roller? These lumps are dust mixed with wax. Once it mixes, it will not redistribute to the running surface.
- Lift the belt enough to get your hand underneath. Feel the surface of the deck in the running/walking area. Is it sticky, do you feel grooves?
- When the mileage is around 15,000 miles (24,000 kilometers)
- When electrical breakers are tripping at the treadmill or the electrical box

IMPORTANT: Never add any lubrication to the running belt or deck. This will ruin the components.

Things to Know

Before performing a friction test, these are some key points you need to know.

- 3.2 mph or 5 kph must be used for consistency.
- Always perform the test when the running belt and deck are warm. Best to perform right after use or you can walk on the belt for 5-10 minutes before starting your test.
- Always cycle power on your meter after each recording.
- When asked to walk on the belt for your 2nd and 3rd recording, make sure you are walking before you press the record button.
- Always enter the frame serial number and mileage into the calculator for each treadmill tested. Do not use 1 serial number for tests performed on multiple units. This data is saved into our system and used by our quality teams.

Table of Contents	
Method 1 – Required Tools	Method 2 – Required Tools
Method 1 – Setup	Method 2 – Setup
Friction Test Procedure	
Steps For Medium/High Friction Results	
Deck Friction Testing Form	
Information About the Required Meter	
Information About AC Line Splitters	

Method 1 - Required Tools

Recommended for 120V treadmills

- US and Canada - Online Remedy / All other countries - <https://support.johnsonfit.com/deckfrictioncalculator>
- AMPROBE AMP-220 or 210 clamp-meter (features: measures AC, True RMS and record feature)
 - See section: [Information about the required meter](#)
- Female/Female Connection Wire
 - 12-gauge AWG wire cut to 12 feet in length.
 - 2 female 12-10 AWG Disconnect F connectors. Strip the ends of the wire and attach the connectors.
- Male/Male Connection Wire
 - 12-gauge AWG wire cut to 6 inches – 12 inches long.
 - 2 male 12-10 AWG Disconnect M connectors. Strip the ends of the wire and attach the connectors.

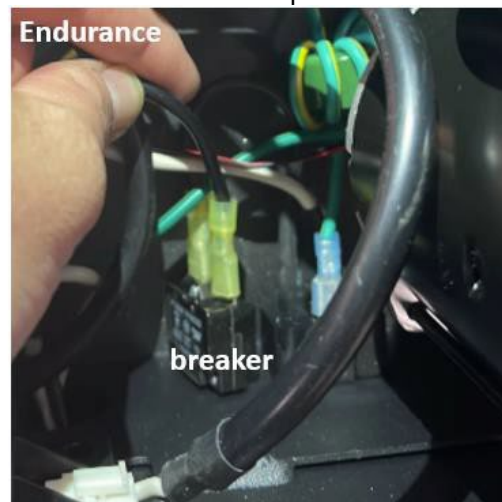
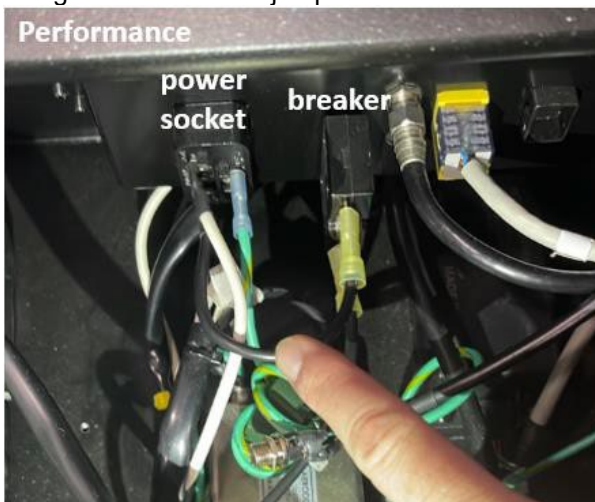


Method 1 – Setup

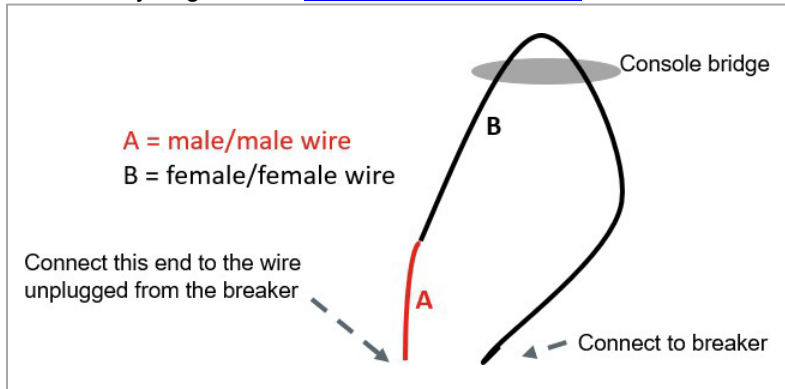
1. Turn off the treadmill at the power switch. Remove the power cord from the wall/floor outlet. Allow the treadmill to sit for a few minutes to ensure power has dissipated.
2. Prepare the treadmill for the test; the steps depend on the model:

Models: Performance, Endurance, Lifestyle, and Vision Commercial

- a. Remove the motor cover.
- b. Unplug the black wire closest to you from the breaker. The other end of this wire connects to the power switch. Connect one end of the male/male jumper wire to the female connector wire end you just unplugged. Plug the wire into the jumper wire and the other end of the 12' wire into the open breaker connector.

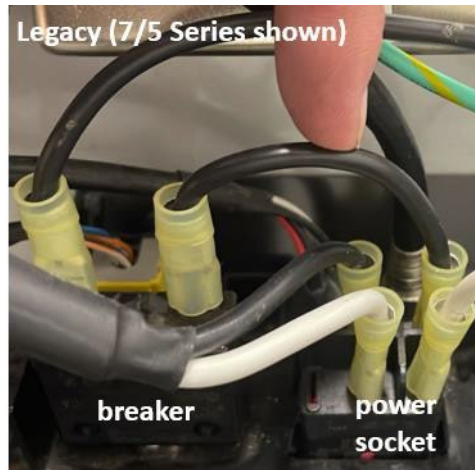
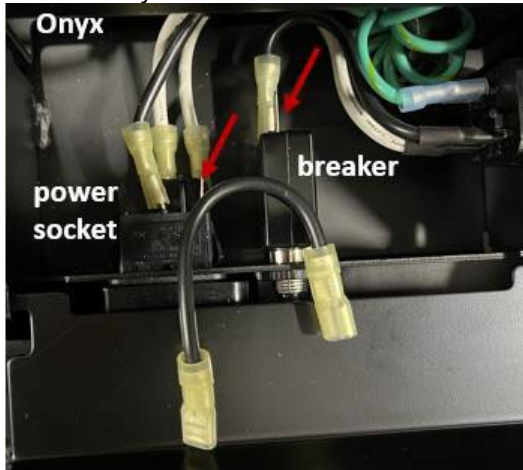


- c. Run the wire up to the console bridge and clamp your meter to the wire to hold it there. Do not turn on the meter until you get to the [Friction Test Procedure](#)

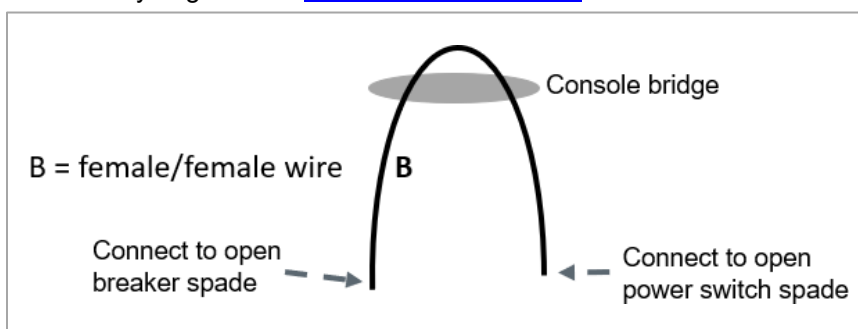


Models: Onyx, 7, 5 and 3 Series

- Remove the front shroud.
- Remove the short black wire that connects the power switch and the breaker. Plug in the female/female test wire where you removed the short black wire.



- c. Run the wire up to the console bridge and clamp your meter to the wire to hold it there. Do not turn on the meter until you get to the [Friction Test Procedure](#)



Method 2 - Required Tools

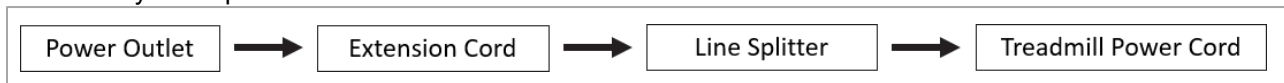
Recommended for 220V treadmills

- US and Canada - Online Remedy / All other countries - <https://support.johnsonfit.com/deckfrictioncalculator>
- AMPROBE AMP-220 or 210 clamp-meter (features: measures AC, True RMS and record feature)
 - See section: [Information about the required meter](#)
- AC line splitter
- Extension cord with local plug ends

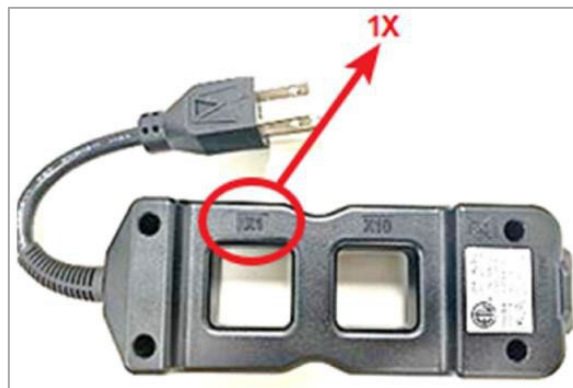


Method 2 – Setup

1. Turn off the treadmill at the power switch. Remove the power cord from the wall/floor outlet.
 - a. Prepare the treadmill for the test by connecting the line splitter and extension cord. Plug adapters on either end of the line may be required.



2. Run the cable up to the console bridge and clamp your meter to the 1X slot on the line splitter. Do not turn on the meter until you get to the [Friction Test Procedure](#)

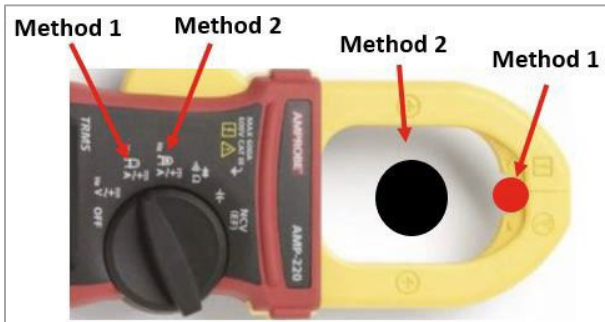


Friction Test Procedure

Use the [Deck Friction Testing Form](#) to record your findings.

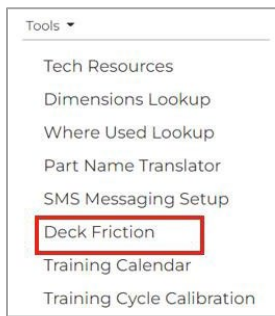
The steps below may require you to change the belt stop (tread sense) setting. If you do change any settings, please be sure to set them back to what they were.

Before you start the measurements, warm up the deck and belt by walking or running on the treadmill for 3-5 minutes.



1. **Measurement 1:** No user, no incline
 - a. Set the treadmill to 3.2 mph/5.0 kph at 0% incline. Do not walk on the treadmill.
 - b. Once the desired speed is achieved, turn on your meter to the correct setting depending on the method you are using. Begin recording the current over a 15-second period by pressing 'REC' on the meter.
 - c. Stop the current recording by pressing 'HOLD'.
 - d. To find the **average (Avg)** current value, press 'REC' three times. It will show you the values in this order: Max, Min, Avg. Enter the recorded **average** current value into the Friction Calculator (enter the number to the nearest tenth – ex. 3.7).
 - e. Turn off your meter to clear your recording. Leave it off until you are ready for your next measurement.
2. **Measurement 2:** With user walking, no incline
 - a. Set the treadmill to 3.2 mph/5.0 kph at 0% incline.
 - b. Once the desired speed is achieved, turn on your meter to the correct setting depending on the method you are using. Begin walking normally on the center of the running belt, $\frac{3}{4}$ of the way towards the front. Record the current over a 30-second period by pressing 'REC' on the meter.
 - c. Stop the current recording by pressing 'HOLD', then step on the side rails or press Stop on the console (do not stop walking until you press 'HOLD', otherwise the reading will be inaccurate).
 - d. To find the **average (Avg)** current value, press 'REC' three times. It will show you the values in this order: Max, Min, Avg. Enter the recorded **average** current value into the Friction Calculator (enter the number to the nearest tenth – ex. 3.7).
 - e. Turn off your meter to clear your recording. Leave it off until you are ready for your next measurement.
3. **Measurement 3:** With user walking, full incline
 - a. Set the treadmill to 3.2 mph/5.0 kph at 15% incline.
 - b. Once the desired speed and incline are achieved, begin walking normally on the center of the running belt, $\frac{3}{4}$ of the way towards the front. Do not hold on to the handlebars. Record the current over a 30-second period by pressing 'REC' on the meter.
 - c. Stop the current recording by pressing 'HOLD', then step on the side rails or press Stop on the console (do not stop walking until you press Hold, otherwise the reading will be inaccurate).
 - d. To find the **average (Avg)** current value, press 'REC' three times. It will show you the values in this order: Max, Min, Avg. Enter the recorded **average** current value into the Friction Calculator (enter the number to the nearest tenth – ex. 3.7).
 - e. Turn off your meter to clear the recording.

4. On an Internet-connected device, navigate to the Deck Friction Calculator.
 - For US and Canada, log into Online Remedy > Tools > Deck Friction.



- For all other countries, use this link: <https://support.johnsonfit.com/deckfrictioncalculator>

5. Enter the FRAME Serial Number, Mileage, and three measurements into the fields in the Deck Friction Calculator, and then click Submit.

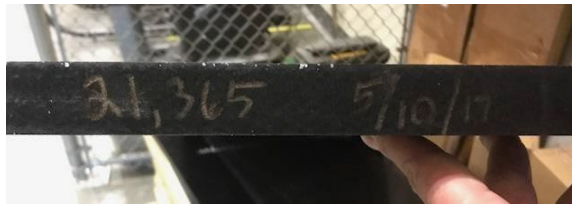
6. Document the FRICTION COEFFICIENT and REFERENCE NUMBER (see form [on page 9](#)). **If the reading warrants a new deck or belt, this information must be given to the Customer Service Representative at the time you place the parts order.**

Friction Coefficient	0.186
Reference Number:	DFC09269

Friction Value	Result
.000 to .250	Low friction - no action necessary
.251 to .400	Med/high friction - see Deck Friction Testing service bulletin on the product page
.400 and above	High Friction - flip/replace deck and replace belt

Steps For Medium/High & High Friction Results

1. Check the tension of the running belt. If it is too loose or too tight, tension it properly and take new readings (readings from a loose *or* tight belt will be higher than a properly tensioned belt).
2. **Med/High – If the reading is .251 - .399**, rotate the deck.
 - a. Loosen the running belt. Remove the deck bolts and slide the deck out.
 - b. Rotate the deck front to back as shown below (DO NOT FLIP).
 - c. Wipe the deck clean with a dry cloth.
 - d. Use a plastic scraper to remove as much dirt/wax buildup from the rollers as you can before reinstalling the deck. Be sure to vacuum or sweep away any debris you scrape from the rollers.
 - e. Before you reinstall the deck, use a Sharpie and write “Rotated” and the mileage and date on the end of the deck that will face the rear roller.



3. **High – If the reading is .400 or above**, reach under the deck to feel if there is a fresh side of wax (has the deck already been flipped?).
 - a. Can scratch off wax = not flipped → order a new belt. Once you have the belt and are ready to install it, flip the deck so the new side of wax is facing up and install the belt.
 - b. Cannot scratch off wax = already flipped → Order a new deck and belt.
4. If you need to order parts, remove the deck, and then rotate it 180 degrees (as shown above) to lower the friction until you can come back with the parts needed.

Note: When you flip the running deck to a new side, you must also replace the running belt. When replacing a deck, replace the elastomers (deck shocks) at the same time.

Information About the Required Meter

What is RMS?

Root-Mean-Square

In a direct current (DC) circuit, voltage or current is simple to define, but in an alternating current (AC) circuit, the definition is more complicated, and can be done in several ways. *Root-Mean-Square (RMS)* refers to the most common mathematical method of defining the effective voltage or current of an AC wave.

<https://whatis.techtarget.com/definition/root-mean-square-RMS>

Why True RMS?

True RMS is measured by using a mathematical equation measuring an average of current over a given amount of time. Only a meter stating it measures “True RMS” is guaranteed to give an accurate AC voltage or current measurement. If a meter does not state it is “True RMS”, it will output derived values of AC voltage or current assuming a perfect sine wave and therefore may be inaccurate in real-world applications.

Why is the AMPROBE AMP-220 or 210 required?

Johnson Health Tech engineers researched and tested numerous brands of meters with TRMS and a Record feature. We found that it was difficult to find these 2 features together on 1 meter. The AMPROBE meter is the most cost-effective meter on the market with these features.

Model 210 is the AC version of the meter and is usually \$10-\$20 US less; however, Model 220 reads both AC and DC, so it can replace the current meter you are using. On Matrix equipment, everything above the LCB/MCB is DC voltage and everything before the LCB/MCB is AC voltage.

Click the links below to purchase the AMPROBE AMP-220 Electrical Clamp Meter:

[Amazon - Buy Here](#)

[Grainger - Buy Here](#)

Information About AC Line Splitters

An AC line splitter will allow a safe current measurement using the approved AMPROBE clamp meter. Manufacturers and availability will vary by location. Multiple measurements may be possible depending on the manufacturer, but the proper measurement will be line (hot) at one times (1x) the current. See examples of line splitters below:

220-240V example: <https://www.ht-instruments.co.uk/en-gb/products/voltage-detectors-andothers/line-splitter/linesplitter/>

120V example: <https://www.extech.com/products/480172>

Finally, it may be required to obtain adapters to connect the line splitter to the treadmill power cord and extension cord. Contact your local electrical supplies dealer for assistance if needed.

Deck Friction Testing Form

Date: _____

Use the fields below to collect machine data for your records.

	Frame Serial Number	Mileage	Measurement 1: No user current (Amps)	Measurement 2: Average current with user, 0% incline (Amps)	Measurement 3: Average current with user, 15% incline (Amps)
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					

Enter the data you recorded for each unit into the Deck Friction Calculator to determine the Friction Coefficient and receive a Reference Number. These results must be given to Customer Technical Support when ordering parts.

	Friction Coefficient	Reference Number
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		

Please email a copy of your results to Matrix or Vision Customer Technical Support.