FITGUARD INC.

Schedule C

Power Requirements

The purpose of this document is to specify the power requirements for most commercial grade treadmills.

ATTENTION:

Consult the assistance of a certified electrician before installing, modifying or servicing any part of the electrical service for your equipment.

Facility Power Requirements When designing a facility or installing new commercial treadmills into a facility, it is important to have the correct electrical power provisions, in order for the equipment to operate safely and properly.

Each treadmill must be furnished with an *Individual Branch Circuit* (also known as a "dedicated" circuit). Circuits for 110 Volt models must include a 20 amp circuit breaker and individual 20 amp outlet (NEMA 5-20R) for each treadmill, per NFPA70 National Electrical Code clause 210.21(B)(1). Circuits for 220 Volt models must include a 15 amp circuit breaker and individual 15 amp outlet (NEMA 6-15R) for each treadmill. The NEC requires that each outlet have dedicated conductors of at least 12 AWG for line, neutral and ground for 20 amp service. Larger conductors (10 AWG) may be required for long branch circuits or high temperatures to prevent voltage drop.

Dedicated outlets must not share line, neutral or ground conductors with other outlets. This means that a single breaker, one hot wire, one neutral wire, and one ground wire are connected from the panel to a single electrical load (in this case, 1 treadmill). All circuits for treadmills SHOULD NOT SHARE A NEUTRAL OR A GROUND. Each neutral wire and each ground wire should be tied back to the panel directly.

This should help to avoid 3 problems commonly experienced:

Over-loading the circuit breaker. With only one treadmill connected to a single circuit breaker in the electrical panel, the smaller circuit breaker in the treadmill will trip first if there is an over-current situation due to abnormal treadmill operation. If more than one treadmill is wired to the same panel breaker, the additional current requirements may frequently overload and trip the panel breaker, even though the treadmills are operating normally.

Over-loading the Neutral wire. If there are multiple treadmills connected to the same neutral wire, even if each hot conductor is wired to separate breakers, there is a risk of over-loading the neutral wire, possibly resulting in a dangerous situation (could overheat and cause a fire) and/or, more commonly, low voltage at the outlet.

Low Voltage at the outlet. This can be caused by a few things. The most common is too many treadmills on one circuit (or neutral wire), which overloads the wire, heats it up, and causes the voltage at the outlet to drop. This can also happen if the wires are not a large enough size, or if the distance from the panel to the outlet is too far. Low voltage at the outlet can only be measured when the load is at it's peak. The voltage may be fine when all the treads are off, but lower significantly when they are all on and drawing 15 amps. Low voltage causes problems for the motor and MCB, and can result in unexpected behavior.

For Reference:

NEC (National Electrical Code)

The **National Electrical Code** (**NEC**), or **NFPA 70**, is a U.S. standard for the safe installation of electrical wiring and equipment. It is part of the National Fire Codes series published by the National Fire Protection Association (NFPA). "National Electrical Code" and "NEC" are registered trademarks of the NFPA. While the NEC is not itself a U.S. law, NEC use is commonly mandated by state or local law, as well as in many jurisdictions outside of the United States. [1] The NEC codifies the requirements for safe electrical installations into a single, standardized source.

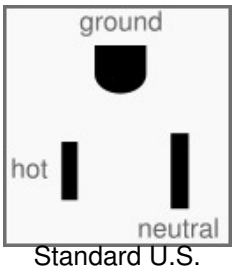
Details of selected NEC requirements

Articles 210 addresses "branch circuits" (as opposed to service or feeder circuits) and receptacles and fixtures on branch circuits. There are requirements for the minimum number of branches, and placement of receptacles, according to the location and purpose of the receptacle outlet.

As of 1962 the NEC required that new 110-volt household receptacle outlets (Fig. 1), for general purpose use, be both *grounded* and *polarized*. NEMA has implemented this in its U.S. standard socket configurations so that:

- There must be a slot for a center-line, rounded pin connected to a common grounding conductor.
- The two blade-shaped slots must be of differing sizes, to prevent ungrounded (2-wire) devices which use "neutral" as their only grounding from being misconnected.

Fig. 1



Standard U.S.
110V 15A
NEMA 5-15R

Actual vs. Maximum Current Rating

A 15-amp fuse or circuit breaker is not actually intended to routinely carry 15 amps of power. In actual fact, a given circuit may only carry up to 80% of its maximum-rated capacity, with the remaining 20% intended as a safety margin.

Maximum Rated Circuit Capacity	Actual Rated Circuit Capacity
10 amps	8 amps
15 amps	12 amps
20 amps	16 amps

Isolated Circuits

The term “Isolated” has been mis-used in the past to describe an individual branch circuit. An Isolated circuit actually describes an electrical power circuit that is isolated from the rest of the electrical power in the building through a separate transformer. Star Trac equipment **does not require** isolated circuits. This is usually used only for equipment that is very sensitive to electrical noise in the power lines.