

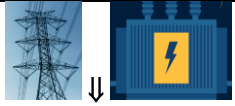
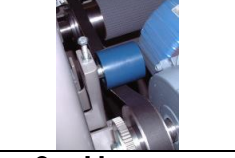
The „performance-chain“ of a running machine (treadmill ergometer)



Based on **the law of physics** there are many *links in the chain* which can result in performance limitations during high profile applications (high speed running, heavy subjects, 360s, high inclines, jump-on and off, etc.) on all treadmills, not just on h/p/cosmos treadmills.

A powerful treadmill motor does not automatically guarantee high performance, accuracy and speed stability at the running belt! The single-phase 220 V or 230 V AC power supply is sufficient for normal fitness and basic diagnostics but may not support all high-performance applications. The best choice for high profile applications is always a 3-phase voltage power supply with 380...420 volts with 16A or even 32A or 63 Ampere. Single phase 110 Volts AC power supply is not at all recommended for any treadmill. 110 V only work for basic home fitness.

Caution: A “step-up-transformer” (e.g. from 110 V to 220 V) does not work for treadmills with high performance applications if the basic power supply of the building or room is weak. A step-up-transformer does not create or “boost” energy!

Electric power plant. No performance limitations expected.	
High voltage power line with 3 phases. Transformer station to lower voltage, but still very stabile 3-phase power supply. No performance limitations expected.	
Customer's building. Almost all buildings worldwide have 3-phase main power supply and 3-phase available on each floor in the fuse-box, but then supply just single phase wires and outlets to the individual rooms. But a 3-phase power line to the room is possible in most cases with little investment only. >> From this point on, performance limitations may occur for single phase power supplies	
Limited performance with low voltage 220 ... 240 Volts 16 Ampere power line with 1 phase (single phase AC). Use dedicated power line with great voltage stability for each treadmill (running machine)! A 3-phase power supply and 3-phase running machine is recommended for high performance! picture top: CEE power outlet (socket), 5-pin, 16 A [cos11092] In optimum situation we need a 5-wire-cable for 3-phases: L1, L2, L3 with Neutral N and PE Protective Earth Protective Earth PE is always required! Ask also your local electrician for support and local details. In some cases the N can be created with the help of an external transformer [cos100803-02] picture below: CEE power plug (connector), 5-pin, 32 A [cos11090] <u>Europe / EU:</u> Voltage values for 3-phase power supply: L1 to L2: 400 V --- L1 to L3: 400 V --- L2 to L3: 400 V L1 to N: 230 V --- L2 to N: 230 V --- L3 to N: 230 V <u>some US area:</u> Voltage values 3-phase power supply: L1 to L2: 208 V --- L1 to L3: 208 V --- L2 to L3: 208 V L1 to N: 120 V --- L2 to N: 120 V --- L3 to N: 120 V In other areas different voltage supply values and different wiring schemes may apply. Formula to calculate voltage from 3-phase to single phase: 3-phase (e.g. 400 V) / the third root $\sqrt[3]{1.732}$: $400 / 1.732 = 230$ and vice versa $230 * 1.732 = 400$ Before installing the device, please compare the specifications on the name plate concerning the mains voltage and the mains frequency with your local characteristics. Connect only if identical. See also manuals / instructions for use IFU at h/p/cosmos website: https://www.hpcosmos.com/en/manuals	
Frequency inverter, which is in charge of motor speed and motor performance. If this crucial electronic part has low performance, then the main drive motor of the treadmill also has low performance and torque even if the nominal power rating (e.g. 3 kW or 4 HP) of the motor was fairly high based on the specs. In case voltage power supply from the room is single phase, the inverter will change single phase into 3-phase, but cannot create higher performance than originally supplied.	
Drive motor performance is very important. But if power supply and frequency inverter are not 3-phase high performance, then even a high capacity motor can only work with limited performance. The main drive motor is one important link in the performance chain, but for sure not the most important one!	
Drive system with high profile drive belt, spanners and drive rollers. Correct tension of drive belt and running belt for no „transmission-slip“ and also correct deck-lubrication is crucial.	
Finally the subject's weight and the running style and the applications have great impact on the performance of the running machine.	  sprint
	

Images: <https://de.freepik.com/> and h/p/cosmos