TECNICAL NOTE

THERMAL PROTECTION PTC:

When required, Simotop's standard provides for the installation of three PTC thermal sensors, one per phase, inserted in the head of the stator windings (hottest point) on the DE side.
They monitor the temperature limit and are therefore safety devices.

These devices do not measure the actual temperature of the windings but instead detect a temperature threshold for intervention.
the PTC thermistors provide a signal that can be used by an external control device (such as an inverter, PLC, or a device capable of converting the signal into an open or closed contact) to cut off the motor's power supply.
This external control device is not included in the electric motor's supply.

The PTCs installed as standard are of class F (150°C).

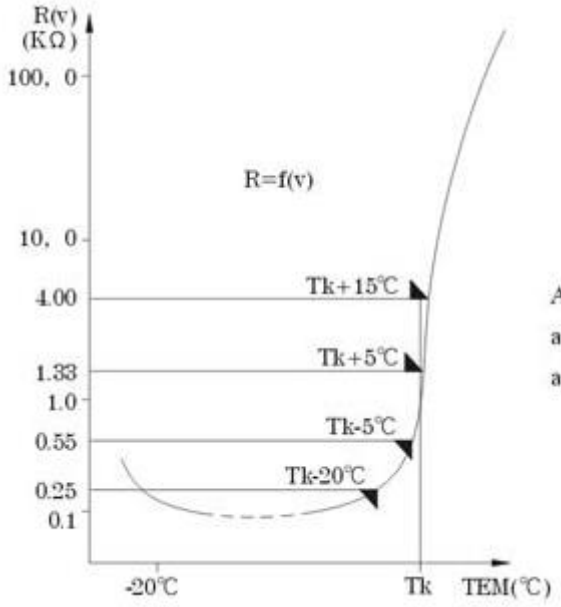
The electrical connection of the PTCs inside the motor's terminal box varies depending on the motor size:
in aluminum motors up to size 132, the PTC terminals are wired in two flying terminals of the "mammut" type;
in cast iron motors from size 160 onwards, they are wired into two fixed terminals located in the main terminal board.

SIMOTOP GROUP Spa
Via Cà Bianca, 320 – I-40024 – Castel San Pietro Terme (BO) – Italy
Tel. +390516951975 – Fax +39051941634
Web: www.simotopgroup.com – Email: info@simotopgroup.com
VAT N. 03003740234

Tecnical parameter PTC:

Technical parameter		Single PTC	Triple PTC	Units
Max.working voltage	Umax	30	30	V
Normal Using Voltage/Current	V	≤2.5/<2	≤2.5/<2	V/mA
Rated action temperature	Tk	60~180	60~180	℃
Tk tolerance		±5	±5	℃
Tk repeatability	△T	±0.5	±0.5	℃
Resistance in normal tempertaure T=25℃±1℃(V≤2.5V)	R25	≤100	≤300	Ω
PTC resistance at certain temperature	Tk-5℃	≤550	≤1650	Ω
PTC resistance at certain temperature	Tk+5℃	≥1330	≥3990	Ω
PTC resistance at certain temperature	Tk+15℃	≥4	≥12	KΩ
Resistance (-20℃~Tk-20℃)		≤250	≤750	Ω
Tk Actuation Time	Td	<5	<5	S
Insulation strength	V	2.5	2.5	KV
Maximum storage temperature	Tlmax	125	125	℃
Maximum storage temperature	Tlmax	-25	-25	℃
Lead wire color	See the colorful coding below			
Weight	Wt	2	3.5	g

Operating curve of a single PTC thermistor



At -20℃ to Tk-20℃, R≤250 Ω;
at Tk-5℃, R≤550 Ω; at Tk+5 ℃, R≥1330 Ω;
at Tk+5℃, R≥4000 Ω;

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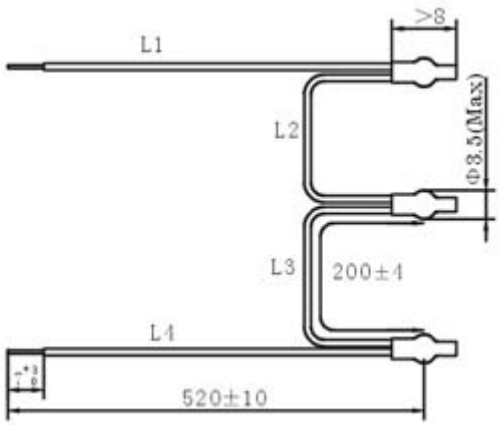
Diagram of a set of PTC thermistors



Instructions for the correct selection of the thermistor

The selection of the PTC thermistor must be made based on the motor's insulation class in which it is installed, see table.

classe di isolamento motore elettrico	massima temperatura di funzionamento	PTC (TK)
Y	90	80~85℃
A	105	95~100℃
E	120	110~115℃
B	130	120~125℃
F	155	145~150℃
H	180	170~175℃
C	above 180	above 180

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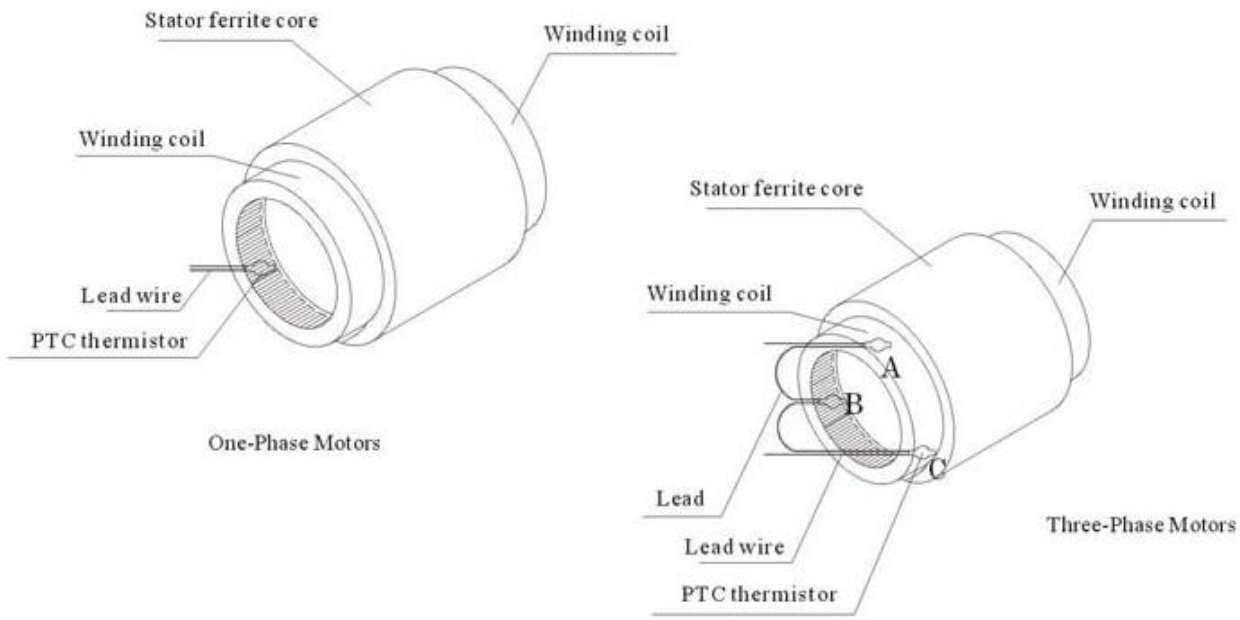
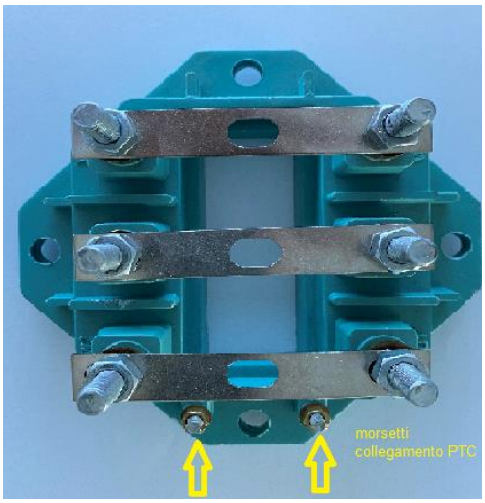
PTC installation diagram in the electric motor



To connect the PTCs (2 wires) from size 160 onwards, there are 2 terminals (yellow arrow) in the terminal block.



In motors up to size 132, a 2-pin mammut terminal is present in the terminal block.

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