KANTHAL SUPER MOLIBDENUM AND OTHER COLD RESISTANCE

Kanthal Super It's an electric heating element material for use in industrial and laboratory furnaces. It can be used in air to heat furnaces to a temperature as high as 1850 °C.

These resistance has a particular feature

- The resistivity of Kanthal super element increases sharply with temperature and when is cold can have a current that is up to 17 times, the nominal current if is not limited. It has a strong positive coefficient of resistance 17:1 from ambient to working temperature
- Thus a current limit thyristor unit with phase angle must be used like:

REVO CL: for one phase loads

CD 3000E or MULTIDRIVE 3PH: for three phase loads

Resistivity of some typical cold resistance

ELECTRONIC PANEL

With MoSi2 elements due to the very low cold resistance the inrush current is very quick so we suggest:

- Soft start (setted 2 sec)
- Current limit
- Phase Angle Firing

CD Automation Thyristor unit can accept an external current limit profiling signal. This is an important feature because is possible to have a density of circulating current up to 1200°C and after a linear decreasing up 1400°C.

For example it's possible to use:

20W/cm2 from O : 1200°C

10W/cm from 1200 : 1400°C

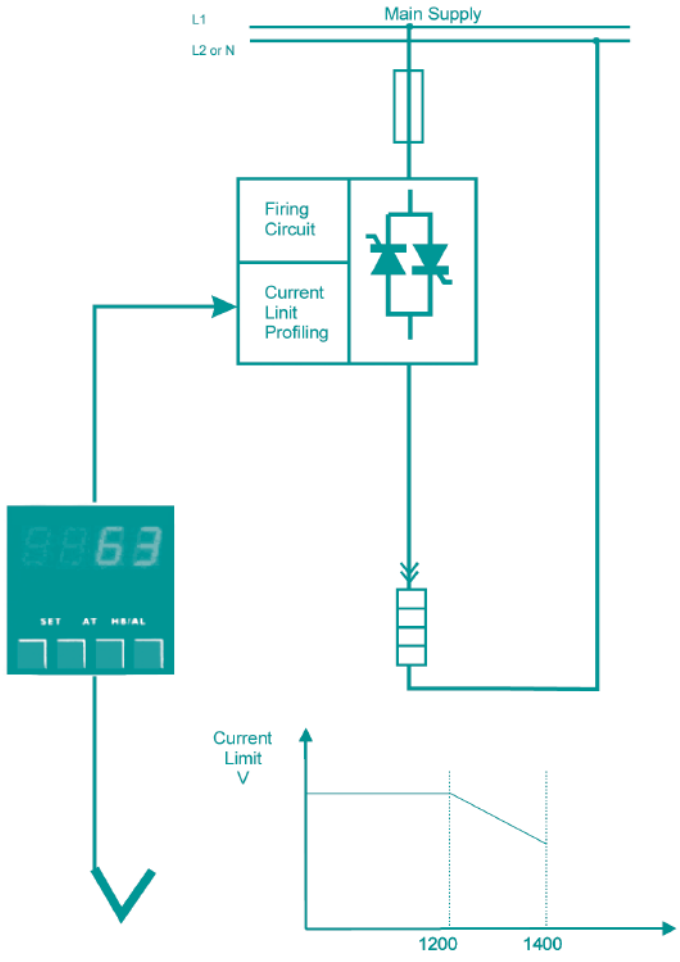
This external signal can be given by a temperature controller with retransmission of Process Variable.

The controller can be configured by front to have

From 0 : 1200°C → 10V Retransmission

From 1200 : 1400°C → Linear Decreasing retransmission from 10 to 5V

This output from controller can be connected on the external current profiling of CD Automation Thyristor Unit.



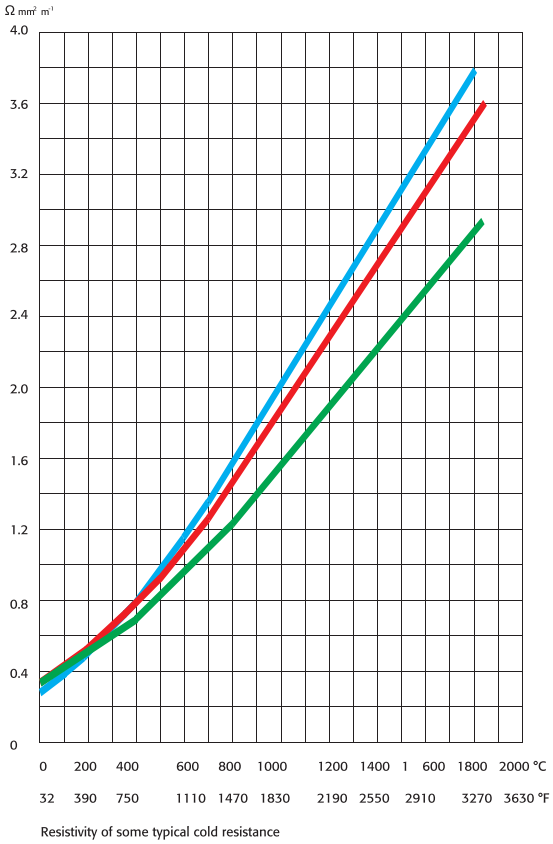
Kanthal Super Touch Panel

Kanthal Super increase resistivity sharply with temperature.
The graph on below show that at ambient temperature the resistance value is very low and increase its value up to 10 times.
To don't oversize in current the Thyristor unit it's necessary to limit the current to the load reducing the voltage with phase angle firing and current limit.
When the resistance value reach a setted value are possible two types of working method that can be selected from **HMI:**

Phase Angle plus current limit all the time long

Or

Phase Angle plus current limit when the resistance is cold and transfering to Delayed Triggering if load is coupled with transformer.



Resistivity of some typical cold resistance

If the Kanthal Super are coupled directly to the main voltage supply the unit start in Phase Angle plus current limit when the resistance is hot transfer automatically to Burst Firing.
This application is typical for cold resistances and CD Automation has developed its own software to drive these types of loads.
The size of the **HMI** available are 5", 8", 10" and 12".

FEATURES

- Automatic configuration and tuning of the thyristor unit
- Automatic tuning of current Control mode I or I^2 selectable
- Automatic tuning of Current Limit
- Automatic transfer from Phase Angle to Delay Triggering if the load is coupled with a transformer
- Automatic transfer from Phase Angle to Burst Firing with element coupled directly to line supply voltage
- Automatic tuning procedure of Heather break alarm to diagnostic partial or total load failure
- Diagnostic of fuse failure and Thyristor in short circuit
- Recent and historical curve of following process variable
  - Power density W/Cm2
  - Load Voltage
  - Load Current
  - Power to the load
  - Resistance value curve

All in line with SANDVIK specifications for a long element life.
Real time clock for furnace maintenance.

BENEFITS

- Phase Angle used just to reach the working temperature of elements with reduction of harmonics
- High Power factor with furnace working in Burst Firing or delayed triggering
- The Thyristor units are standard and easy to be found every where
- An external port on HMI is available to connect your normally used PLC
- One Ethernet port is also available on touch panel = > 8"
- The Human interface is friendly and just inserting few data of thermic project is possible to achive the features listed above.

The Thyristor Unit suitable to drive these type of load are:

- **REVO-CL** to drive 1 phase unit or 3 Phase open delta or star with neutral
- **CD3000E-3PH** to drive 3 phase loads in delta or star connection

(1) Kanthal is a registered trademark