

# R&D Electronics Newsletter (2015 Issue 7)

Welcome to our 7th issue of newsletters in 2015!

**R&D Electronics** is the **exclusive Sales-Channel of TECHSEM**, which is a well-known Chinese developer and manufacturer of **diode / thyristor modules and capsules** with more than 48 years experience.

In this issue we will present TECHSEM power semiconductors used in the soft starter applications. It is obvious that our customers enjoy the maximum benefits offered through the optimized structure and the compact design of TECHSEM power semiconductors, especially through the application-specific services of TECHSEM.

All of our newsletters have been achieved in our online shop. For more information please visit: [www.rd-ebusiness.com](http://www.rd-ebusiness.com)

Yours faithfully

R&D Electronics Team

## Why Soft Starter

Direct switching of electric motors can cause two main adverse effects: on the one hand, an up to 7-times increased inrush current against the rated current and secondly, up to 3-times increased torque. Through the increased torque there will be a sudden mechanical load in the machine, which leads to reduction of lifetime. The high inrush current may burden the main supply and may lead to voltage drops. As a result, sensitive consumers are impaired in their function. To eliminate the above-mentioned unpleasant effects, the solution concept of the soft starter has been developed.

## Composition of A Soft Starter

A soft starter consists essentially of a three phase anti-parallel connected thyristors which are connected between the power supply and the motor stator (Fig.1).

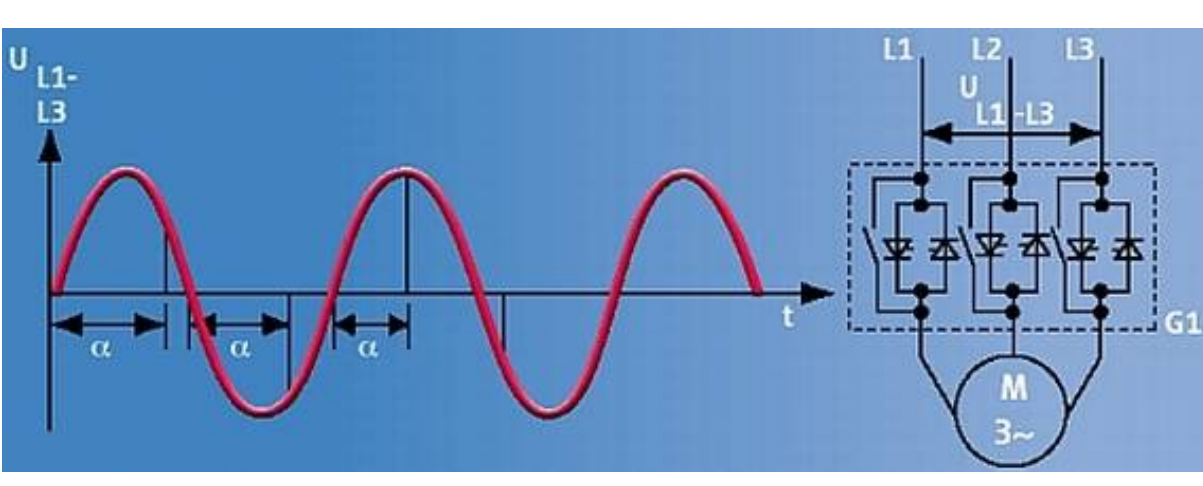
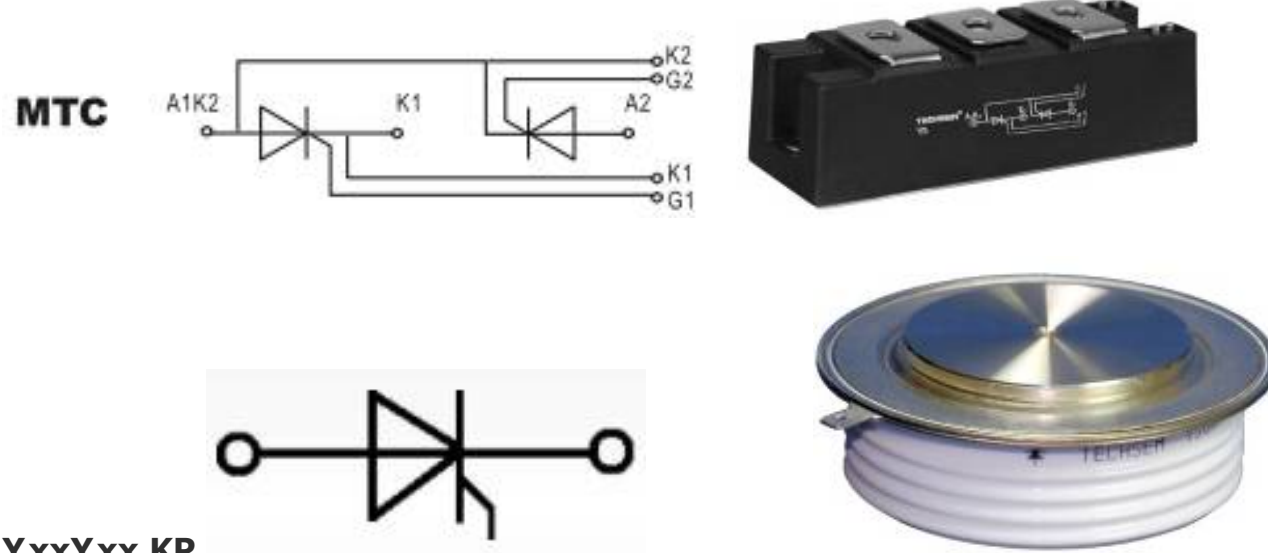


Fig. 1: Phase angle control and schematic structure of a soft starter

A soft starter controls the power supply (voltage control) of the three-phase motor continuously in the startup phase. Thus, the motor can be adapted to the load behavior of the driven machines. Mechanical equipment can be accelerated gently. The durability, performance and work processes will be then positively influenced.

## Selection of Anti-parallel Thyristors

The antiparallel topology can be easily realized with TECHSEM thyristor modules MTC series by short circuit of the cathode and the anode K1 / A2 of the module (Fig. 2). For higher power or high rated current of the electric motors, two phase controlled press pack thyristors (TECHSEM YxxKP series, Fig. 2) have often been connected in antiparallel.



YxxYxx KP

Fig. 2: TECHSEM thyristor module and phase controlled press pack thyristor

Based on the power and the line voltage of AC motor, the peak inverse voltage (VDRM / VRRM), the mean forward current (ITAV) as well as the package of the power semiconductors can be interpreted. In the following table you can find the deployable TECHSEM thyristors for the different power of electric motors. It was assumed that it is the interpretation of a soft starter for a 380V electric motor with bypass contactor.

Power of the Electric Motor (kW)	Rated Current of the Electric Motor (A)	Peak Inverse Voltage VRRM of the Thyristors (V)	TECHSEM Thyristor	Package Type
5.5	11	1200	MTC40	Power Module
7.5	15		MTC40	
11	22		MTC55	
15	30		MTC55	
17	34		MTC70	
22	44		MTC90	
30	60		MTC110	
37	74		MTC135	
45	90		MTC160	
55	110		MTC182	
75	150		MTC200	
90	180		MTC250	
110	220		MTC330	
135	270		MTC400	
150	300		MTC500	
200	400		Y30KPE	Press Pack
250	500		Y38KPE	
280	560		Y38KPE	
320	640		Y40KPE	
400	800	Y45KPE		
450	900	Y50KPE		
500	1000	Y50KPE		

## Antiparallel Thyristors in Series

To control the high voltage AC motors (e.g. 10kV), the output voltages of the soft starter must be correspondingly high enough. The high output voltage can be reached through the thyristors in series connection (Fig. 3). In order to ensure the homogeneous voltages on the power semiconductors and the similar electrical characterizations (blocking homogeneities, turn-on ratios and recovery properties) of the components in series connection are important. Regarding series connection of power semiconductors, you can find also more information in the last issue of our newsletter (2015 edition 6).



Fig. 3: Schematic structure of a high-voltage soft starter

## Advantages of TECHSEM Products for Soft Starter Application

- Increased lifetime of power modules due to pressure-contact technology;
- Two antiparallel thyristors in one single module with current up to 1200A;
- Single press pack thyristor up to 8000A;
- Pairwise selected antiparallel thyristors;
- Selection of the thyristors in series connection for high-voltage soft starters;

## Free Samples

You want to test our products? No problem. We provide now for certain types of products with limited quantities as free samples at your disposal. For the available products, you only need to pay for the shipping costs from Hong Kong to your delivery address. Do not hesitate to register as customer in our shop and contact us for free samples of your choice: [www.rd-ebusiness.com](http://www.rd-ebusiness.com).

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