



# ***SEM-N***

***Soft Starter for Naval Applications***

***8 - 17A, 220 - 440V***



***Designed, Built & Tested for Naval Applications***

*Ver 7.0 / 02*

# Introduction

## Starting AC Motors

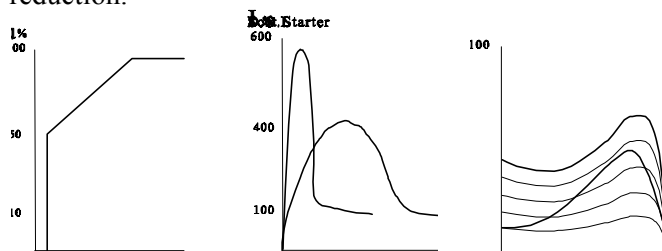
AC motors draw high starting current and produce high starting torque when started Direct On Line. For a typical motor the starting current will be 500 - 800% of motors Full Load Ampere and the starting torque will be 150 - 250% of Full Load Torque with even greater peaks during acceleration.

This high starting current may cause problems in the electrical power supply and the high starting torque may create strain and mechanical shocks on the drive system and the load.

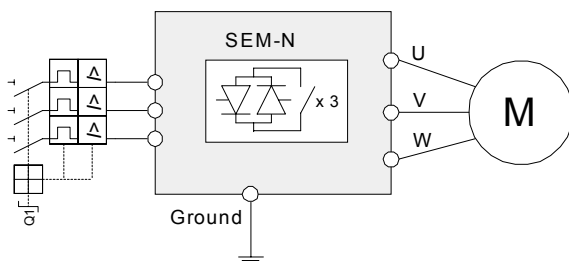
## Why Soft Starters ?

The SEM-N is a reliable thyristor based starter, designed to control voltage ramp-up. Ensuring smooth, stepless acceleration it provides the best method for reducing motor current and torque during starting.

During soft-starting current is reduced proportionally to the voltage reduction and torque is reduced in square proportion to the voltage reduction.



The SEM-N is connected in series with the motor contactor. When the contactor closes the SEM-N will supply a slowly, smoothly increasing voltage to the motor, thus providing soft start and smooth stepless acceleration.



## Advantages at a Glance

- \* High reliability - all solid state
- \* Reduced starting current inrush
- \* Eliminates shocks to motor and load
- \* Soft, smooth, stepless acceleration
- \* Maintenance free operation
- \* Easily applied and operated
- \* Virtually, unlimited starts per hour
- \* Compact and lightweight

## Starter Types

Starter Type	Motor - Full Load Amp.
SEM-N 8	8
SEM-N 17	17

Higher ratings are available by special order. The starter should be selected in accordance with the following criteria:

## System Voltage

Three voltage levels are offered:  
110 - 120V, 220 - 240V, 380 - 440V

Each starter is factory set for one of the above levels and for 50 or 60 Hz.  
(400Hz by special order)

## Operating Current

The starters are rated to carry 100% current continuously at 55°C. For higher temperatures consult factory.

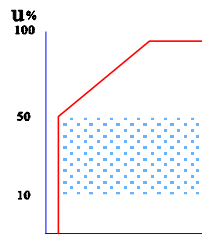
## Starting Conditions

The starter is designed for 30 starts per hour at 400% In, for max. of 10 sec. at 55°C.

# Starting Characteristics

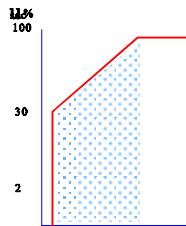
## Starting Torque

Determines the initial voltage to the motor (The torque is directly proportional to the square of the voltage).  
Range is 10-50%  $U_n$



## Acceleration Time

Sets the voltage ramp-up time from initial setting to nominal voltage.  
Adjustable 2-30 sec.



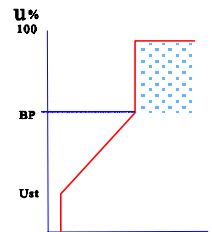
## Adjustments

Adjustment potentiometers are located on the printed circuit board, under the front cover.

## Break Point (BP)

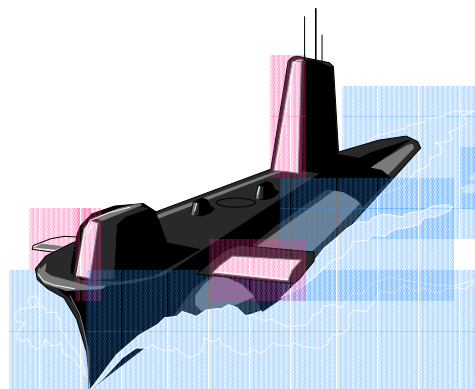
When the mechanical load has low inertia and relatively low power in comparison with motor's power (for example starting of an unloaded motor), the motor may vibrate and emit loud noise towards end of acceleration process.

An internal potentiometer enables, in this case, the stabilization of the acceleration process by immediately increasing the voltage to nominal, when the motor begins vibrating.



## Typical Application

- \* Pumps, fans, compressors
- \* Radars (Antenna positioners)
- \* Belts, gear and chain connected loads
- \* Replacing mechanical devices intended for soft starting
- \* For frequent starting
- \* Starting from a limited power source



# ***Meeting Naval Requirements***

**Voltages:** 110-440Vac  $\pm 6\%$  50, 60 or 400Hz

**Spikes:** 2500V/50uSec. @ 250Amp

**Vibration:** Sine wave, any axis, 2-500Hz @  $\pm 0.7G$

**Mechanical Shock :**  $\frac{1}{2}$  Sine Wave, 11 mSec & 15 G, any axis

**Thermal shocks:** -2.5°C to + 55°C for a period of 10 cycles at the rate of 4°C/Min

**Humidity:** 95% Relative conditions including vapor condensation.

**Environmental:** Salt fog, spray

**Acceptance Tests:** \* Naval Acceptance Test Procedure

\* 24 Hour testing - Every unit at 75% of Nominal current @ 47°C  $\pm 3^\circ\text{C}$

\* Warranty, Q.A., C.O.C. + Specification with every unit.

\* ***E.S.S. Test*** - The SEM-N was subjected to std. military equipment Environment Stress Screening, followed these tests the equipment was tested to its maximum specifications and was found fully operative.

## ***Ordering Information***

It is important to use correct product code as shown below:

SEM-N - 17- 440 / 6 - C

Type	_____	_____	_____	_____
Current (A)	_____	_____	_____	_____
Voltage (V)	_____	_____	_____	_____
Frequency (Hz)	_____	_____	_____	_____
Part (Complete)	_____	_____	_____	_____

**Dimension (mm)**

Weight 2.6 Kg