

# 4900C

Brochure 4900C  
September 1993 • New

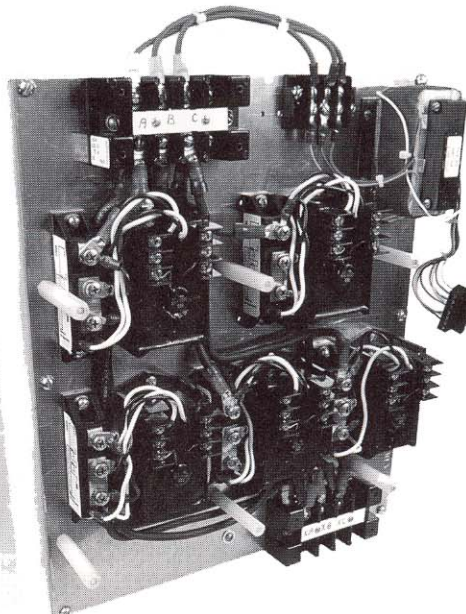
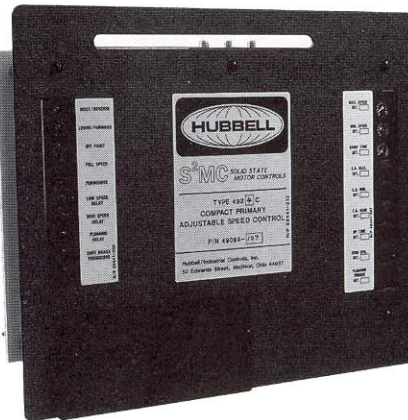
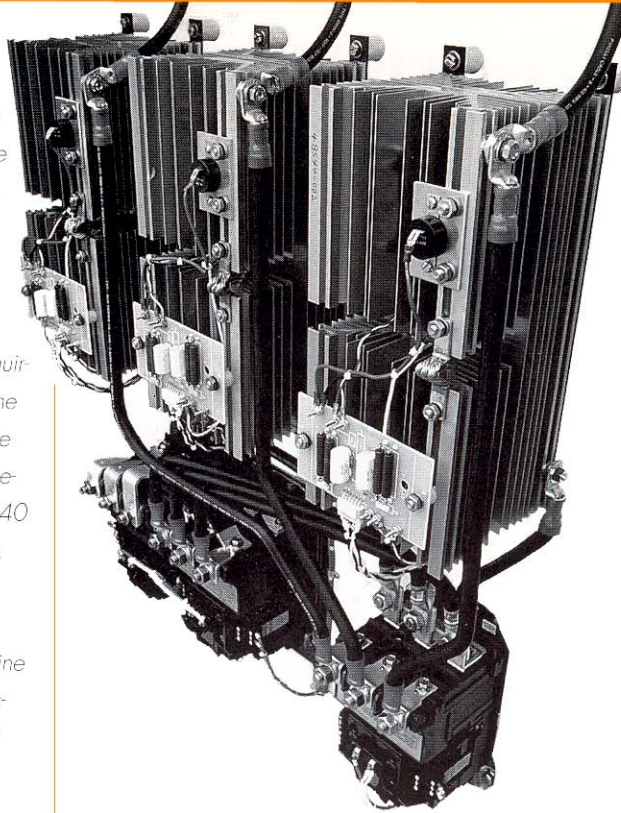
Hubbell's S<sup>2</sup>MC Solid State Stepless Motor Controls are ideal for controlling overhauling loads such as lift bridges, bridge cranes, bucket/grapple cranes, portal/whirly cranes, turbine cranes, tramways, and coke oven drives.

Utilizing AC induction motors (squirrel cage and wound rotor) the line of S<sup>2</sup>MC controllers are available in both primary thyristor (4920 series) and secondary thyristor (4940 series) through 500 hp, or more, and capable of operating on 208/230/380/460/575, 3 phase VAC, 50/60 hz. The line of S<sup>2</sup>MC controls have been successfully applied on hundreds of applications for over 15 years.

## Modular Components

Hubbell's modular approach to static controls offers functional units that can be integrated into a complete control system, either new or existing:

- **Variable Speed Control Modules** — provide motor speed and/or torque regulation. Simple upfront adjustments and test points.
- **Power Thyristor Modules** — available in several hp ranges, each module provides full wave control of either motor primary or secondary voltage. Each module supplied with r/c snubber and mov protection.
- **Eddy Current Brake Module** — provides complete control of eddy current brakes in conjunction with the variable speed control module.
- **Tachometer Continuity Module** — provides protection against loss of tachometer continuity.
- **Tachometer/Overspeed Switch** — available in both indoor or outdoor enclosures the tachometer/overspeed switch assembly provides speed reference feedback with overspeed protection for primary thyristor control.
- **TPM Test Module** — consolidates all test functions into one simple to use module, eliminating the need for VOM or other test instruments.



# S<sup>2</sup>MC Static Motor Controls

- 4922C Static Reversing
- 4924C Reversing/Plugging
- 4925C Primary ECB
- 4929C Counter Torque
- 4944C Reversing/Plugging
- 4945C Secondary ECB

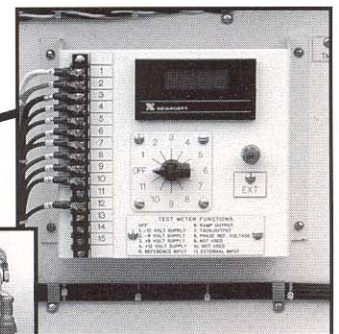
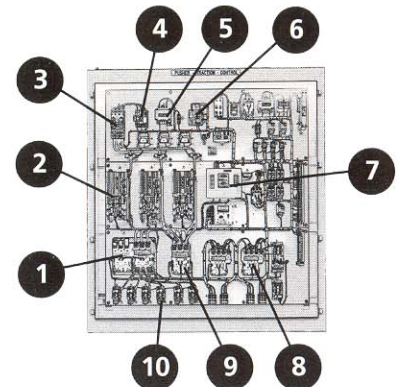
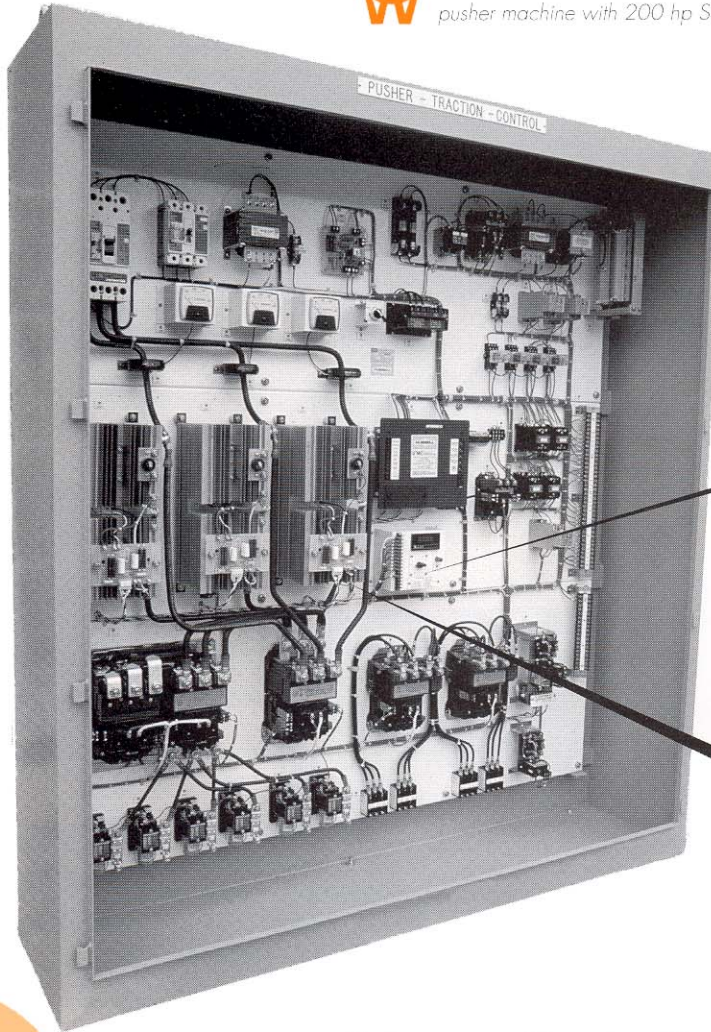




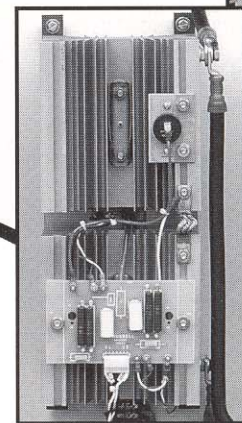
# Primary Thyristor Controllers



Type 4929C primary thyristor counter-torque controller for use on a coke oven duplex motor pusher machine with 200 hp SCR modules



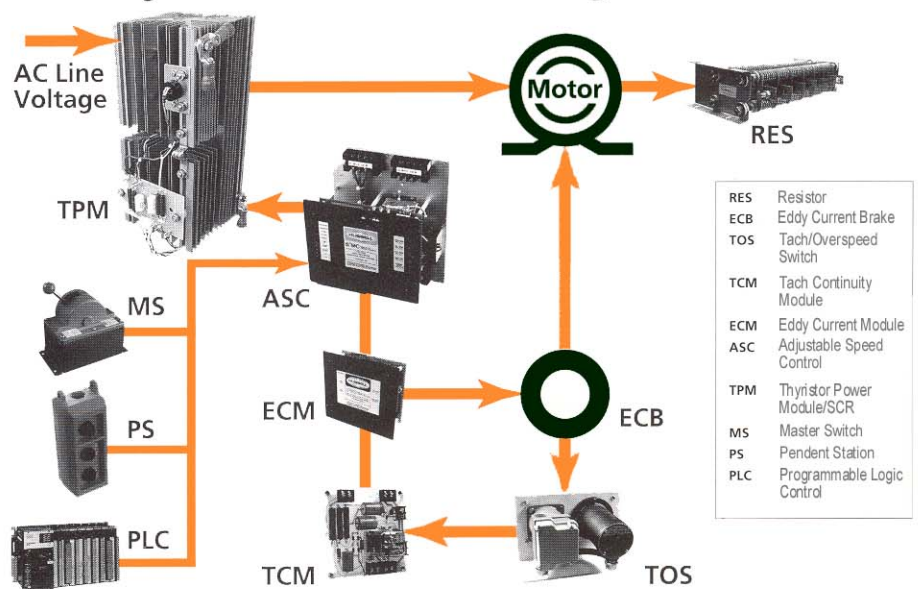
Test Module



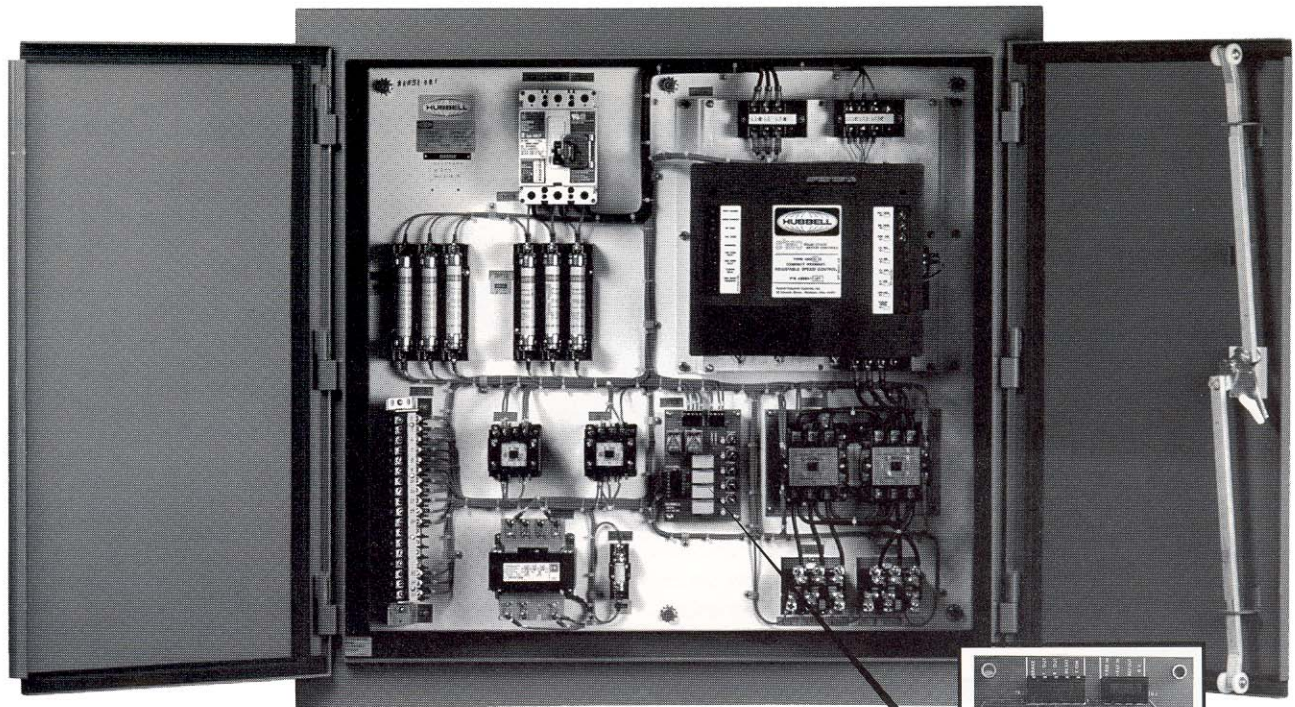
Thyristor Power Module


## Primary Controller Flow Diagram

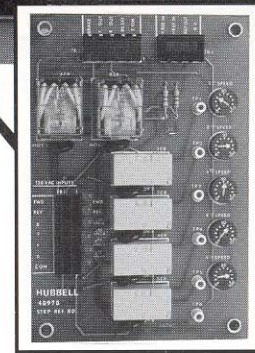
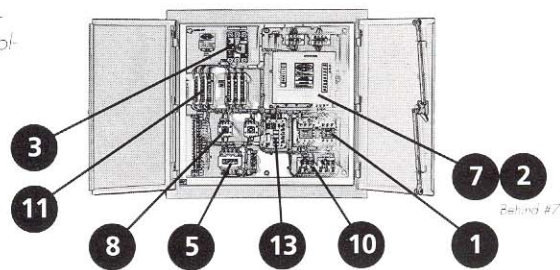
- 1 Reversing Contactor
- 2 Thyristor Module
- 3 Main Circuit Breaker
- 4 Control Circuit Breaker
- 5 Control Transformer
- 6 Tach. Continuity Module
- 7 Adjustable Speed Control Module
- 8 Secondary Contactors
- 9 Full Speed Contactor
- 10 Overload Relays
- 11 Fuses
- 12 Brake Relay
- 13 Step Reference Board
- 14 Main Knife Switch
- 15 Control Knife Switch
- 16 Line Contactor
- 17 Synchronizing Transformers














 Type 4924C primary thyristor reversing/plugging controller for use on bridge crane trolley application



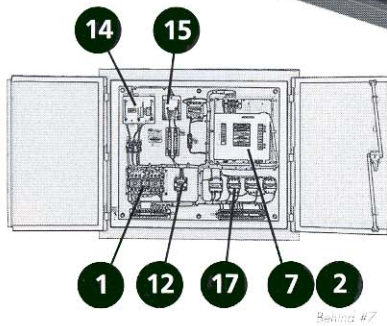
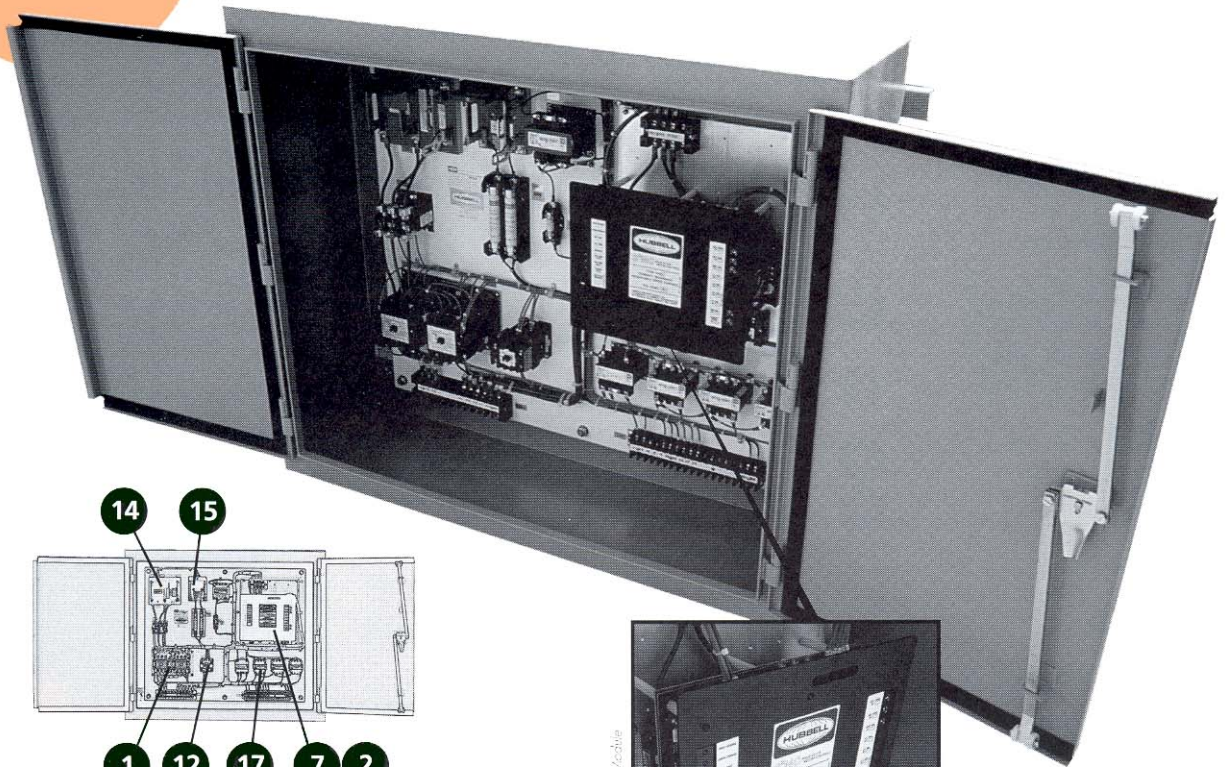
## Controller Selection Chart

This table summarizes the major features of the S<sup>2</sup>MC static controls available. For specific information, please request their specification sheets from Hubbell.

Model	Control Mode	Thyristor Type		Regulation	Tach Feedback	Typical Applications
		Primary	Secondary			
4922C	 Static Reversing	●		Speed	●	Lift bridges; hoists without load brakes; bucket cranes; 4 quadrant drives
4924C	 Reversing/Plugging	●		Torque or Speed	●	Multi motor travel drives; hoists with mechanical load brakes; soft starts
4925C	 Eddy Current Brake	●		Speed	●	Incinerator cranes; turbine cranes; paper machine cranes; die handling cranes
4929C	 Counter Torque	●		Speed	●	Hoists without load brakes, pusher machines; bulkhead controllers; 4 quadrant cranes
4944C	 Reversing/Plugging		●	Speed		Single motor speed regulated travel drives; variable speed pump controls; high voltage motors; hoists with mechanical load brakes
4945C	 Eddy Current Brake		●	Speed		Incinerator cranes; turbine cranes; paper machine cranes; die handling cranes



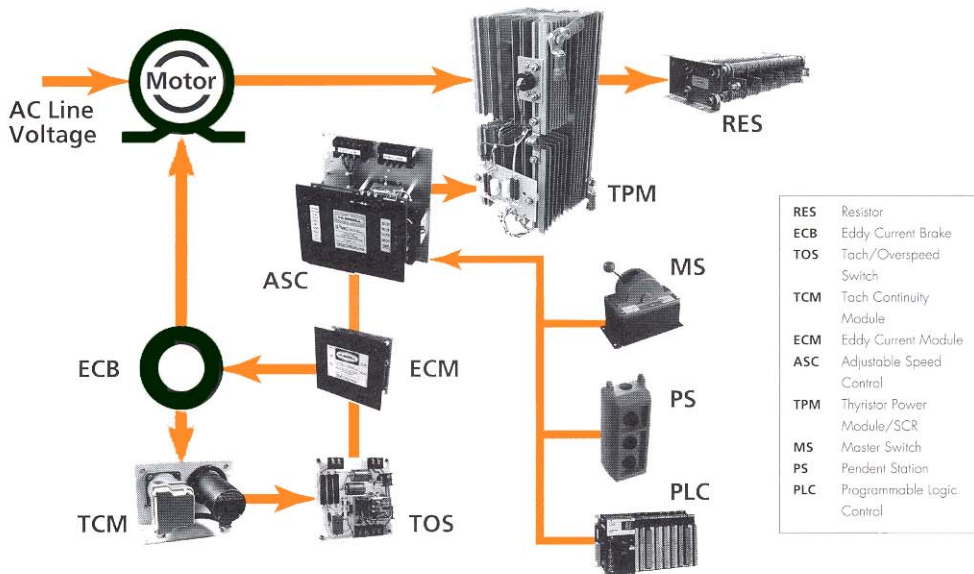
# Secondary Thyristor Controllers



Type 4944C secondary thyristor reversing-plugging controller for use on bridge crane mechanical load brake hoist application

Adjustable Speed Control Module

## Secondary Controller Flow Diagram

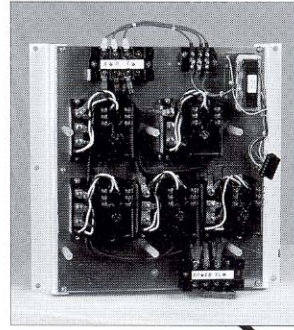
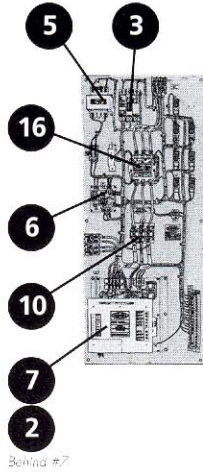




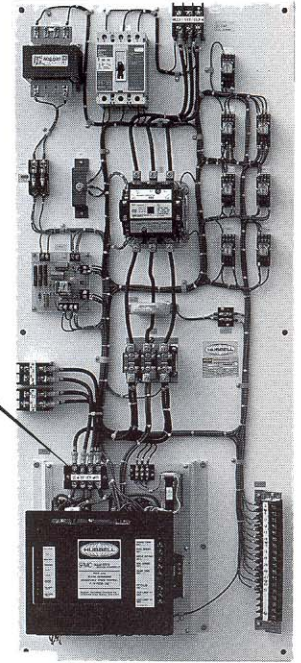
# Thyristor Power Module (TPM)

## 10–40 hp

The TPM's rated 40 hp and lower have the SCR's encapsulated into a power pack with the snubber/MOV protective devices mounted adjacent to the TPM. The power packs are suitable for mounting on aluminum sheet (10 hp & 20 hp assemblies) or aluminum extrusions with heat dissipating fins (40 hp assemblies).

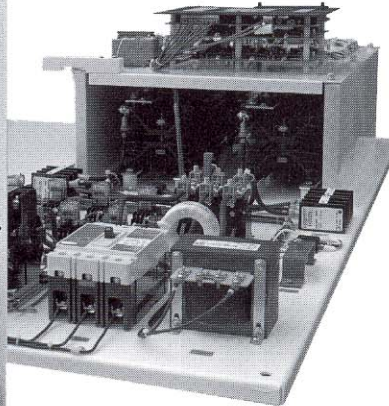
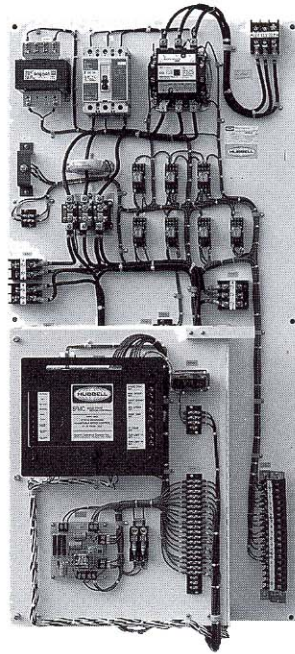


Type 4922C static reversing lift bridge 3 phase drive with 40 hp SCR modules located under adjustable speed control module

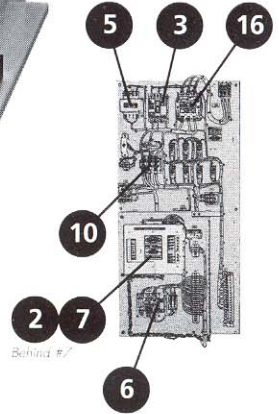


## 50 hp & Higher

TPM's rated over 40 hp have the SCR's mounted in heat sinks with the snubber/MOV protection devices mounted on the heat sink assembly. The TPM's can be panel mounted underneath the adjustable speed control module that is mounted on a hinged swing-out panel as shown in the photo at right or the TPM's can be mounted adjacent to the ASC module as shown in the far left photo on page 2.



Type 4922C static reversing lift bridge with 100 hp SCR modules located behind swingout panel



## Thyristor Power Module Protection

Thyristor power modules (TPM's) are SCR/SCR, full wave assemblies available in several horsepower ratings from 10–500 hp in ambients up to 140°F (60°C). Each assembly is configured as an inverse parallel bridge with snubbing circuit and voltage transient protection as shown in the illustration.

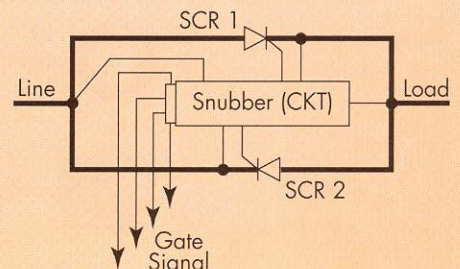
The TPM's are the control units that vary the applied voltage to

the motor on primary thyristor controls, or vary the slip voltage/current on secondary thyristor controls.

The snubbing circuit, comprised of a capacitor and a resistor, is connected in parallel with the SCR's across the bridge. The function of the snubbing circuit is to limit the rate of rise of applied voltage. Transient voltage protection is provided by the metal ox-

ide varistor, MOV, which is also connected in parallel across the bridge. The MOV is a non-linear resistive device that will limit or clamp the transient voltage to a safe level. The snubbing circuit in conjunction with the MOV provides

complete transient voltage protection for the TPM's.





# Major Components

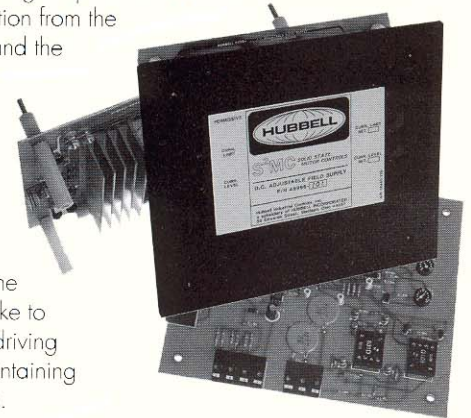
## Adjustable Speed Control Module

Hubbell's Adjustable Speed Control Module is the heart of the S<sup>2</sup>MC compact control line. This rugged control module is designed for use in high moving equipment temperature without the need for external air conditioning, isolation transformers, shielded control cable, shock mounting, or other environment modifying equipment. All adjustments and test points are conveniently located up front for ease in setup and maintenance.



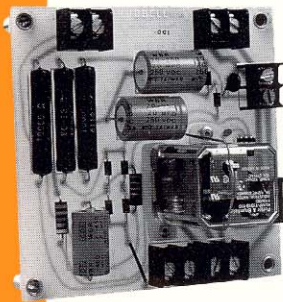
## Eddy Current Brake Control

Hubbell's Eddy Current Brake Control module is used with either the 4925C or 4945C controller providing an efficient method of controlling the eddy current brake. The eddy current brake provides a retarding torque in relation to the DC excitation from the control module and the speed of the ECB, allowing loads to be lowered at controlled speeds. During lowering operations, the module adjusts the eddy current brake to minimize motor driving torque while maintaining speed regulation.



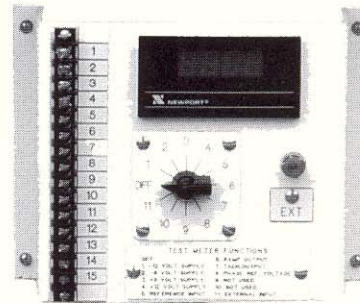
## Tach Continuity Module

Hubbell's Tachometer Continuity Module performs continuity verification of an external tachometer circuit. If the tachometer open circuits, the module disables the controller to prevent mis-operation.



## Test Module

The Test Module with LED display allows simple setup and adjustment of the S<sup>2</sup>MC controller without the need for VOM's or other test equipment. Available either as a panel mounted device or hand held to test/setup multiple controllers.



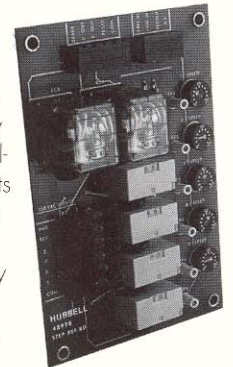
## Tach/Overspeed Switch

Hubbell's Tachometer/Overspeed Switch consists of a mechanical DC tachometer generator and a Hubbell 2210 Speed Switch. The tachometer output is used as a speed feedback signal for speed regulated primary thyristor controllers. The centrifugally operated speed switch provides overspeed protection. The assembly is available in NEMA 1 indoor, 3R outdoor or 4 water tight enclosures.



## Step Reference Card

The S<sup>2</sup>MC static controllers require a 0-5 VDC speed reference input from a potentiometer located in the master switch or pendant pushbutton station. For controller applications that have a PLC or multi-speed master switch/pendant as the speed reference input, the step reference card modification provides the necessary interface. The step reference card is available with two to five speed position inputs with each speed position programmable from 10-100% of full load speed. The step reference card can be used with any of the S<sup>2</sup>MC controllers or any variable speed controller requiring stepped inputs.



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