Hubbell Industrial Controls, Inc.

S^2MC Compact Primary Thyristor Controller 4922C

For Hoists Without Mechanical Or Eddy Current Brakes

Catalog 4922C • May 1993

General

The Type 4922C S^2MC primary thyristor static reversing controller system provides speed-regulated control of hoist with wound rotor motors and without load brakes. The Type 4922C system includes the controller and for separate mounting the Type 5410 tachometer/overspeed switch assembly and Type 3000 secondary resistor.

The operator control is a Type 4216 stepless mill master switch. Type 4211 stepless mini master switch or Type 2015/6/7 stepless pendant pushbutton station. Full range of motor speed from minimum to maximum is adjusted by the stepless operator. Hoisting speed, with or without load, is closely controlled by varying the motor primary voltage with thyristors. No-load lowering speed is handled in the same manner. Lowering speed of an overhauling load at subsynchronous speeds is controlled via counter-torque control.

4922C controllers are available from 10 to 250 HP at 460/3/60 VAC.

Operation

Hoisting: When the hoisting direction is selected, the M contactor closes and hoisting torque is produced by the motor when selected primary thyristor modules begin conduction. The amount of thyristor modules begin conduction. The amount of thyristor conduction and hence, motor hoisting torque, is determined by the master switch speed reference signal and the tachometer speed feedback signal. In this manner, stepless adjustable speed control is obtained for hoisting.

Lowering: When the lowering direction is selected, the M contactor closes and the selected primary thyristor modules begin conduction.

If the hook is empty or lightly loaded, the controller will maintain the motor in a stepless speed regulated "driving lower" condition.

If the load overhauls the motor, the controller will turn off (2) of the thyristor modules and turn on the other (2) thyristor modules. This transition converts the motor operation from a driving lower condition to a counter-torque condition with hoisting torque controlling the descending overhauling load in a controlled stepless manner.

As full speed is reached, the controller reverts back to a drive down mode and the motor is placed into regeneration. When leaving the regenerative lowering mode, the controller reverts back to counter-torque lowering.

Features

The Type 4922C standard controller includes the following major components/features:

S^2MC Compact Variable Speed Control Assembly consisting of (1) regulator PC board and (2) firing circuit board. All adjustments, potentiometers, and test points for setup and fine-tuning plus status lights are front-panel-mounted and clearly identified. Simple test setup readings require use only of a VOM meter.

Five (5) conservatively rated **Type 5410 Full Wave Thyristor Power Modules** with MOV transient voltage protection and snubbing circuits to limit rate of voltage rise. Thyristor modules for 40HP/460 volt and under are mounted with the S^2MC Compact Speed Regulator Assembly. Over 40HP the thyristor modules are separate mount within the controller enclosure.

S^2MC Tachometer Continuity Module monitors the tachometer feedback signal and shuts down the controller in the event of an open tachometer signal.

In addition to the S^2MC modules the Type 4922C controller features a three-pole main knife switch. NEMA rated mainline contactor, (3) Inverse time trip overload relays, fused control knife switch, 120 volt control transformer, low voltage relay and a shunt brake relay.

Optional Features

Full Speed Contactor: The 4945C hoist system requires a secondary slip resistor to provide optimum torque at reduced speeds, but results in a 20% slip at full load/full speed. The full speed contactor shorts out this resistor at high speed and allows the motor to obtain its maximum rated base speed.

Extended Slow Speed Operation: This option allows the hoist to operate at reduced speeds for an extended period of time. Recommended for die handling cranes and turbine handling cranes.

Five Step Reference Board: This option allows the controller to operate from a standard 5 step sequential master switch or pendant. Each step can be independently set for a fixed speed.

Multi-panel Construction: This option provides two or more controllers to be mounted in a common enclosure and interwired with a mainline contactor panel.

Other standard modifications and options are available. Consult factory for assistance.

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S²MC Compact Secondary Thyristor Controller **4922C**

For Hoists with Eddy Current Brakes

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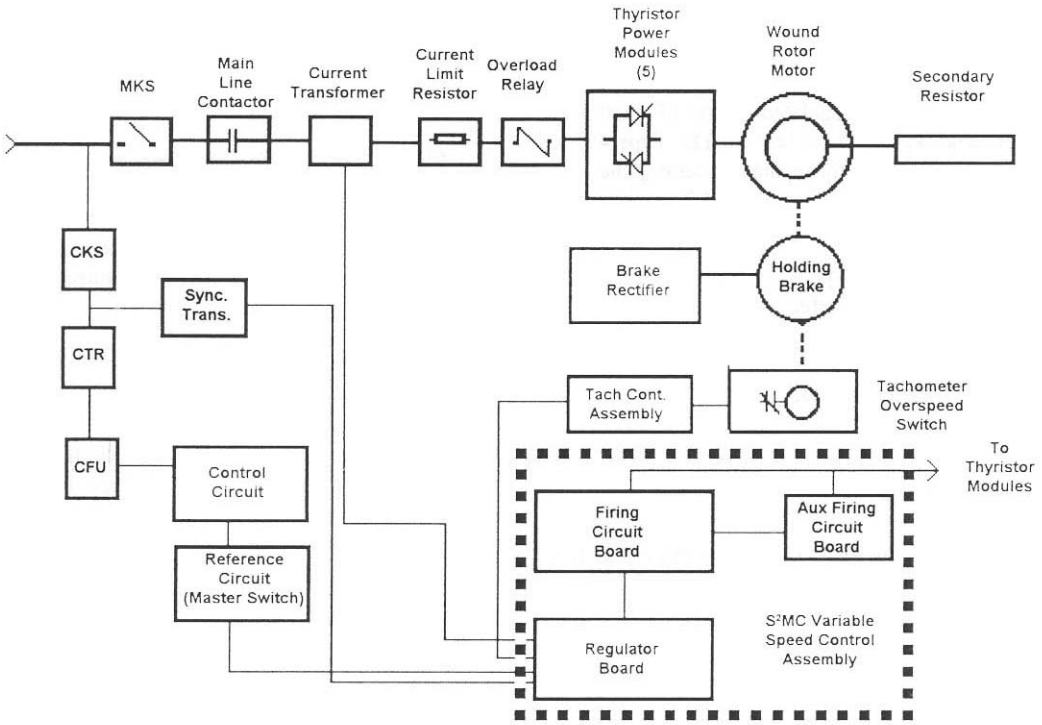
Block Diagram



Specifications

Input Power	Standard: 230/460 60hz., Other voltages available
Horsepower Range	5 - 30HP for Compact Construction. 50 - 250HP with external SCR's
Speed Range	Typical 10 to 1
Speed Regulation	10% Typical
Control Configuration	Static reversing.
Temperature Range	- 40 degree C to + 55 degree C.

Bill of Material (Standard)

Description	Symbol	Qty.
Type 4922C Variable Speed Control Assembly	VSC	1
Type 5410 Thyristor Power Module	TPM	5
Directional Relays	CR	2
Syncronous Transformer	ST	1
Current Transformer	CT	1
Main Knife	MKS	1
Main Line Contactor	M	1
Overload Relay	OL	3
Control Circuit Knife Switch	CKS	1
Control Circuit Transformer	CTR	1
Control Circuit Fuses	CFU	2
Tachometer Continuity Assembly	TCA	1

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