

General

The Type 4922C S²MC primary thyristor static reversing controller system provides speed regulated control of lift bridges with wound rotor motors. The Type 4922C system includes the controller and for separate mounting the Type 5410 tachometer/overspeed switch assembly and Type 3000 secondary resistor.

System operation is controlled by six remote command contacts; 1. Run; 2. Raise; 3. Lower; 4. Minimum Speed; 5. Reduced Speed; 6. Reduced Torque.

4922C controllers are available in 1, 2, or 4 motor configurations from 10 to 250 HP at 460/3/60 VAC.

Operation

The operation of lift bridge controllers vary depending on the bridge type (basculer, lift, rotate, etc.) and the number of leafs (one or two). The following is a general overview of the operation of a single motor, single leaf controller.

Raise: When the raise command is initiated the M contactor closes and lifting torque is produced by the motor when selected primary thyristor modules begin conduction. The amount of thyristor conduction and hence, motor lifting torque, is determined by the acceleration ramp rate, bridge structure loading and tachometer speed feedback signal.

Nearly Open: At the nearly open position, the 4922C controller will decelerate the motor to a creep speed through the use of counter-torque.

Fully Open: When fully open the controller de-energizes the motor and sets the brake.

Lower: When the lowering direction is selected, the M contactor closes and selected primary thyristor modules begin conduction. If the structure does not overhaul the motor the controller accelerate the motor in a stepless speed regulated manner to full speed.

As the bridge structure lowers and a motor overhauling condition occurs or if the bridge structure overhauls the motor from the start, the controller will turn off (2) of the thyristor modules and turn on the other (2) thyristor modules. This transition converts the torque condition with lifting torque controlling the descending speed in a controlled manner.

Nearly Closed: As the bridge structure approaches the seating position, the minimum speed and reduced torque commands are initiated. The 4922C controller will smoothly control both speed and torque during the seating operation. Once seated the controller sets the brake and de-energizes the motor.

Features

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

S²MC 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 S²MC Compact Speed Regulator Assembly. Over 40HP the thyristor modules are separate mount within the controller enclosure.

S²MC 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 S²MC 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 Regenerative Lower: The 4922C hoist system lowers in counter-torque. This option allows the motor to lower in regeneration returning power to the AC incoming power lines.

Noise Filters: Noise filters are provided to reduce the effects of line noise on the controller and noise that is generated within the controller back to the line.

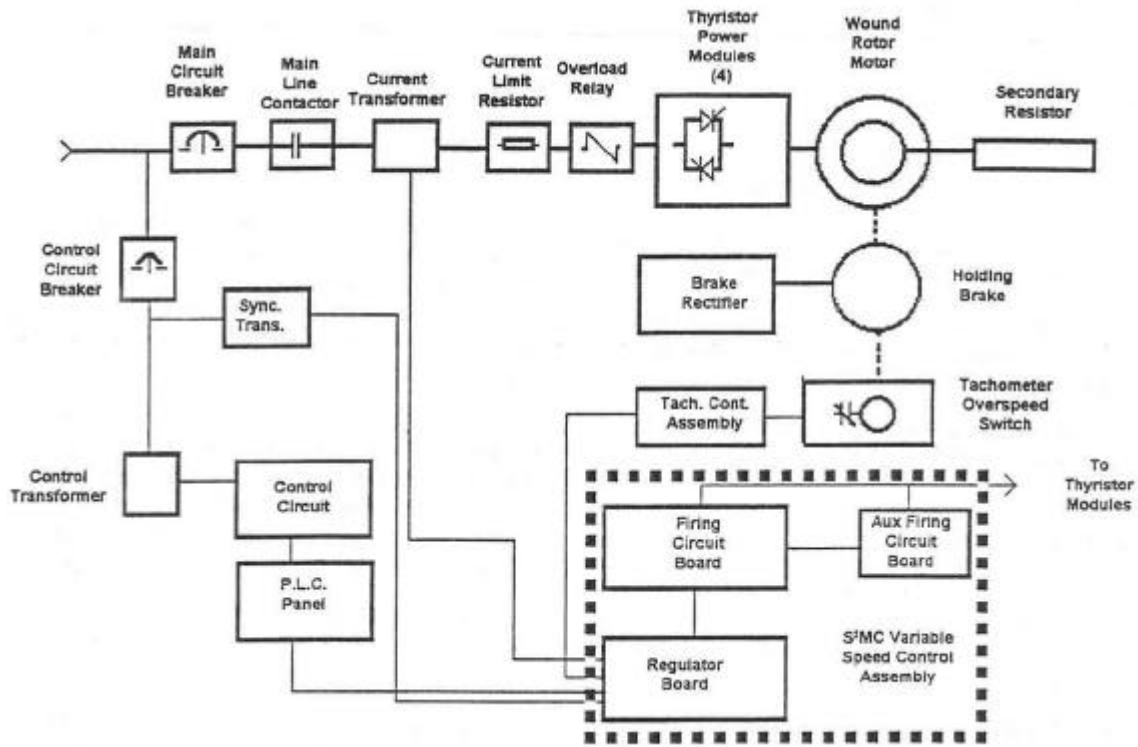
3 Phase Control: The standard 4922C is provided with 2-phase control. The optional 3-phase control provides balanced three phase currents and reduces motor heating.

Test Module: The TMA test module simplifies setup and maintenance of the controller.

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



Block Diagram



Specifications

Input Power	230/460 V, 3 Phase, 60 Hz.
Horsepower Range (at 460V)	5 - 40 HP Compact Construction 50 -250 HP with external SCR's
Speed Range	Typical 10 to 1
Speed Regulation	Better than 1%
Control Configuration	Static Reversing
Temperature Range	- 40 degree C to + 55 degree C.

Bill of Material (Standard)

Description	2 Phase Controller	3 Phase Controller
Type 4922C Variable Speed Control Assy.	1	1
Type 5410 Thyristor Power Module.	4	5
Seating Torque Relay	1	1
Control Relay	5	5
Synchronous Transformer	1	1
Current Transformer	1	1
Motor Circuit Breaker	1	1
Main Line Contactor	1	1
Overload Relay	3	3
Control Circuit Breaker	1	1
Control Circuit Transformer	1	1
Control Circuit Fuses	2	2
Tachometer Continuity Assembly	1	1



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