

General

The Type 4944C S²MC primary thyristor controller system provides torque and/or speed regulated control of reversing/plugging travel drives or reversing hoists with mechanical load brakes using wound rotor or NEMA D squirrel cage motors. The Type 4924c system includes the controller and for separate mounting the Type 5410 tachometer (for speed regulated controllers) and Type 3000 secondary resistors (when used with wound rotor motors).

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. Travel speed, with speed regulated controllers, and smooth acceleration & plugging control are closely controlled by varying the motor primary voltage with thyristors.

Type 4224c controllers are available from 10 to 250 HP at 460/60 VAC.

Operation

An inverse parallel/full wave controlled thyristor module is used in each of the three primary lines. Balanced voltages and currents are present at the motor at all times, optimizing the torque per ampere relationship, allowing the motor to deliver power to its full capability. Direction of rotation is determined by a primary reversing contactor controller by the master switch handle.

Speed regulated controllers provide adjustable AC voltage producing motor speed in proportion to the master switch handle position. The feed back signal is provided by means of a tachometer generator. Speed is held constant, independent of load, for any given master switch position by the **S²MC Compact Variable Speed Control Assembly**.

Torque limiting controllers provide accelerating torque proportional to the displacement of the master switch handle. Motor speed is dependent on the load.

For wound rotor motor applications the permanent secondary resistor can be located adjacent to the motor and not require collectors or festooning back to the controller.

Features

The Type 4924C standard controller includes the following major components/features:

S²MC Compact Speed Regulator Assembly consisting of (1) regulator PC board and (1) firing circuit board. All adjustments, potentiometers, and test points for setup and fine-tuning plus station lights are front-panel-mounted and clearly identified. Simple test setup readings require use only of a VOM meter.

Three (3) 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 40 HP the SCR modules are separate mount within the controller enclosure.

In addition to the S²MC modules the Type 4924C controller features a three pole main knife switch, NEMA rated reversing contactor, (3) Inverse time trip overload relays, fused control knife switch, 120 volt control transformer and low voltage relay.

Optional Features

Full Speed Contactor: The 4924C system requires a secondary slip resistor to provide optimum torque at reduced speeds, which results in a 20% slip at full load/full speed when used with hoists with mechanical load brakes. The full speed contactor shorts out this resistor at high speed and allows the motor to obtain its maximum rated base speed. The 4924C used with travel drives do not require a full speed contactor.

Tachometer Continuity Module. This option monitors the tachometer feedback circuit of speed regulated controllers. If the tachometer open circuits the controller is shut down via the tachometer continuity module. Recommended if the tachometer signal is festooned or subject to possible damage.

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.

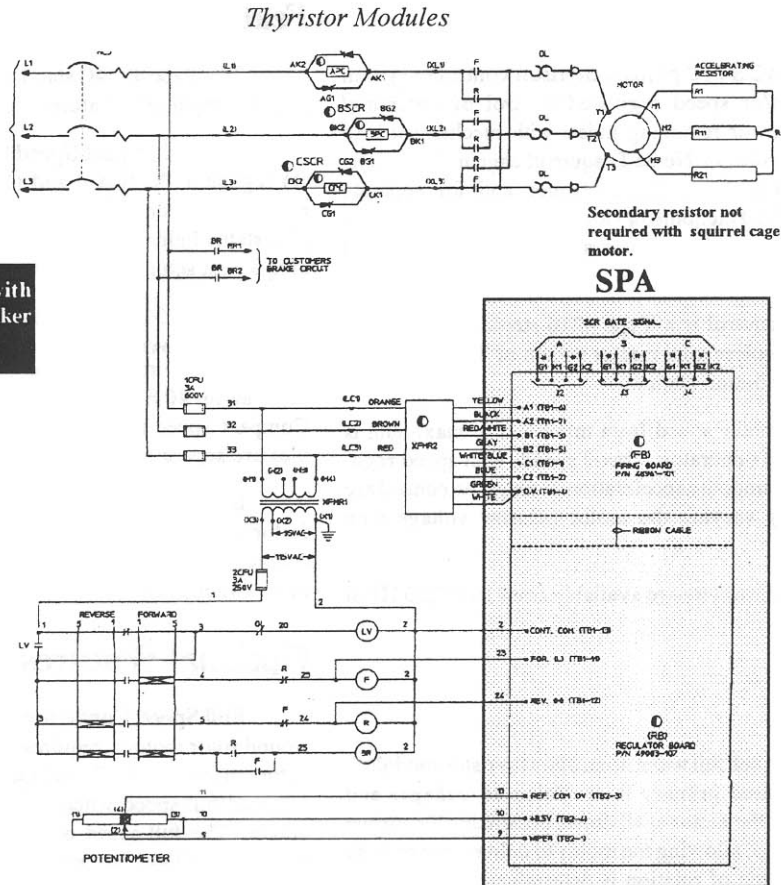
Shunt Brake Relay. Required if the controller is used in conjunction with an AC disk or DC shunt brake as motor connections cannot be connected to the motor "T" leads.

Duplex Operation. Parallels two motors from one controller. This option adds an additional set of overload relays.

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



Schematic Wiring Diagram (Torque Limiting Controller)



Note, Circuit shown with optional main circuit breaker and shunt brake relay.

Specifications

| | |
|-----------------------------------|--|
| Input Power | 230V or 460V, 3 Phase, 60Hz. |
| Horsepower Range (at 460V) | 5 - 40HP for Compact Construction 50 - 250 HP with external SCR's |
| Speed Range | Typical 10 to 1 |
| Speed Regulation | Better than 1% (speed regulated controllers). |
| Control Configuration | Contactor reversing with plugging control. |
| Temperature Range | - 40 degree C to + 55 degree C. |

Bill of Material (Standard)

| Description | Symbol | Qty. |
|--------------------------|--------|------|
| Main Knife Switch | MKS | 1 |
| Reversing Contactor | F/R | 1 |
| Speed Regulator Assembly | SPA | 1 |
| Thyristor Modules | SCR | 3 |
| Overload Relays | OL | 3 |
| Control Knife Switch | CKS | 1 |
| Control Fuses | CFU | 3 |
| Control Transformer | XFRR1 | 1 |



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