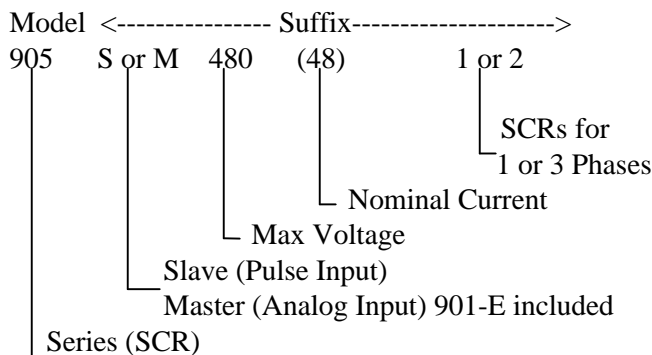


905 Series SCR's are available in two configurations. The Master SCR is inclusive of a 905-M (M Suffix) Series Interface which is capable of directly accepting proportional analog signals. The 905-S (S Suffix) Slave SCR is capable of only accepting a DC "Pulse Width" Modulated signal. The 905-S SCR can be converted to a 905-M by adding a 901 Series Interface Logic to the 905-S.

These Class I Line voltage controllers are designed to provide the maximum reliability of proportionally controlling power to a resistive single phase or three phase load. Limitations may preclude total line currents of 48 Amps per circuit; the number of circuits are limited only by the load being imposed.

The 905-M and 905-S Series multi-voltage power switching modules have been designed for two voltage ranges. 208V through 480V AC at 50 or 60 hertz, and 208V through 600V AC at 50 or 60 hertz. The example of the model number below indicates the nomenclature that readily describes the various features, function or limitations of the model.



Three Phase 905-M (Master) & 905-S (Slave)

Note: A Master may be factory assembled, or a 901 Series Interface can be OEM assembled to a 905-S Slave to convert the assembly to a 905-M Series Master. These Class I components are designed UL & CSA, recognized/approved.

DESIGN / RELIABILITY

The design of the heat sink is critical to the reliability of the product. The most efficient shape for dissipating heat is an "H type" profile. This profile is incorporated in this Series. This design allows equal flow of the dissipation of heat from the SCR component. This occurs because the component heat generating surfaces are located symmetrically around the center axis of the "H" profile. The ability of the heat to be uniformly rejected around 360 degrees, provides equal distribution of heat at the lowest allowable temperature.

In addition to the heat sink's superior ability to reject heat, another unique design feature is inherent in the "H" design profile. By providing a louvered opening at the top and bottom of the heat sink side exposed to the electrical control panel, ambient air is allowed to draft (vent) over the SCR due to thermal convection that naturally occurs. This design of venting of ambient air through this section of the "H" heat sink, further reduces the level of the junction temperature of the SCR; making the controller more reliable.

THERMAL PROTECTION

An Accessory 905-TCO Thermal Cutout may be provided to protect against excessive "Junction Temperature" (heat) produced by the SSR. Details of the Function and Application of this integrated circuit protection device is discussed in detail in the 905-TCO Product Data.

TERMINALS

The line voltage terminals are specifically designed to accept stranded copper wiring down to #8 AWG. Larger wire sizes of # 6 & # 4 require a "box lug". Maximum wire is #4 AWG for all 905-S or M Series controllers. Low voltage polarized terminals are located opposite the line voltage terminals.

MOUNTING

All SCR heat sinks are rated and required to be mounted with the fins in a vertical position. The heat sink also has a top and bottom in relation to vertical, and is noted so on the assembly. Multiple SCR sections should not be mounted vertically end to end; staggering and 2" separation in preferred. EXCEPTION: Any two Single Phase sections, may be mounted end to end.

The SCR can be surface mounted internally in a ventilated control panel, or an externally mounted heat sink only, with connections internally accessible in the panel.

SPECIFICATIONS

Model 905-M & 905-S Series SCR's

Configuration

Master (accepts 0-10V DC, 4-20mA or 135 ohms)	905-M
Slave (accepts pulse width)	905-S

Multi Voltage, Range	208 to 480V AC
Range	208 to 600V AC

Current, @ rated ambients	25A/48A/74A
Ambient, Components, Min/Max	0°F/32°F Min. 75°C/167°F Max.
Heat Sink, Max.	50°C/122°F
Humidity	Non-condensing

Heat Sink, configuration	"H"
feature	Ventilated

		L x W x H
Size	25A	5"x5.85"x3"
	48A	10"x5.85"x3"
	74A	10"x5.85"x3"

		L x W
Cutout	25A	4.85"x3.25"
	48A	8.75"x3.25"
	74A	8.75"x3.25"

Input, Master	0-10V DC, 4-20mA, 135 ohm
Slave	Pulse Width Modulated

Indicator, 905-M, 905-S, 901Series	LED
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De-ratings	See I&O Instructions
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SCR Connection Requirements, line voltage

Maximum Wire, direct connected to SCR	8 AWG
Add box lug under terminals; Maximum wire size.	4 AWG

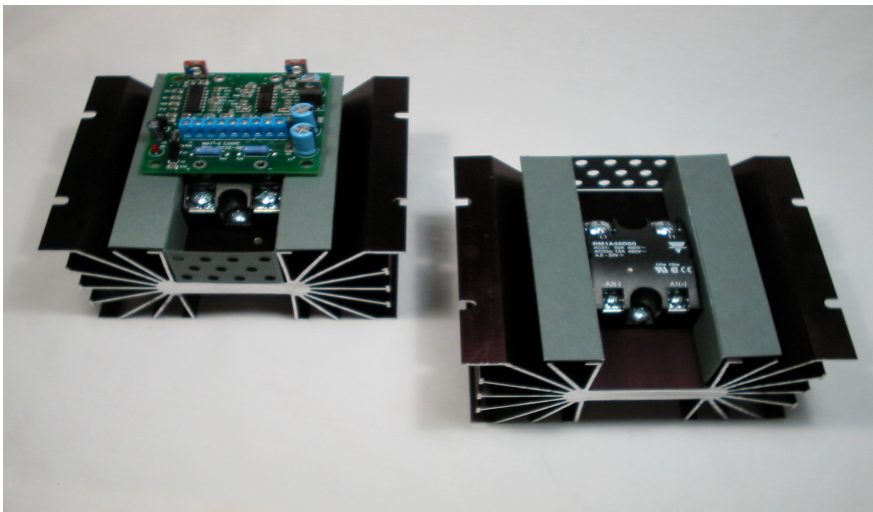
INSTALLATION

Models Available

- 1) Inside Louvered Cabinet or Heat sink only external to cabinet. (See Specifications and I&O Instructions for operating limitations)
- 2) Internal Heat Sources within the control panel that effect temperature must be considered.
- 3) Heat sink fins must be installed vertically to meet product rating specifications.
- 4) De-rated curves for maximum current for applications where components are in ambients in excess of specifications are available. (See 905 Series De-Rating Curves)
- 5) For detailed Installation and Mounting Information, see this manufacturer's I&O Instructions for specific applicable models.

Model #	Voltage Range	Max Amps	Phase	*Type
905-S	208-480V	25	1&3	Slave
905-M	208-480V	25	1&3	Master
905-S	208-480V	48	1&3	Slave
905-M	208-480V	48	1&3	Master
905S	208-480V	74	1&3	Slave
905-M	208-480V	74	1&3	Master
905-S	208-600V	25	1&3	Slave
905-M	208-600V	25	1&3	Master
905-S	208-600V	48	1&3	Slave
905-M	208-600V	48	1&3	Master
905-S	208-600V	74	1&3	Slave
905-M	208-600V	74	1&3	Master

Note: Masters include 901-E Series Interface.
Slaves do not include 901-E Interface.

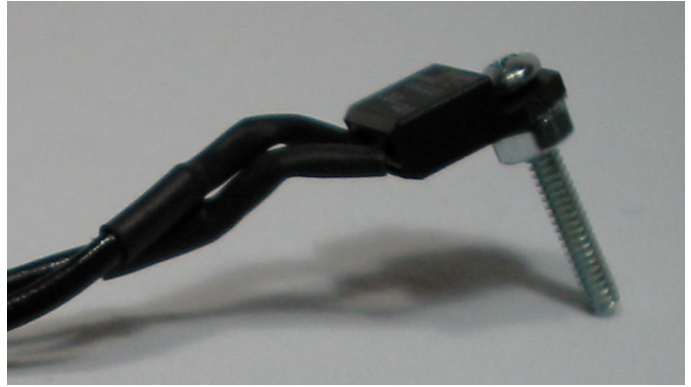


905-M (Master) & 905-S (Slave) Single Phase

Accessory

General

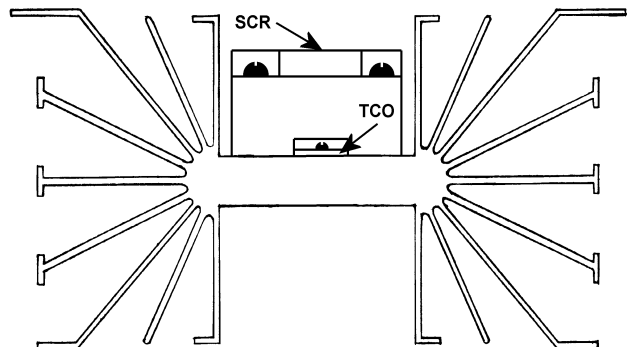
Electronic Power Switching Controls are used to proportion energy to Resistive, and sometimes Inductive loads to control the energy to match the load for accomplishing a desired result. These controls typically must switch the energy ON or OFF beginning with “zero crossing” of Alternating Voltage & Current. In this process, a very small percent drop in voltage occurs across the SCR device. This small voltage drop creates energy which must be dissipated. Because this energy results in a rise in Temperature an external heat sink is required to adequately remove this heat. When the SCR is attached to a heat sink, it allows the device to perform in a specific ambient that meets the design of that product, in which the SCR is installed. The amount of current flow is proportional to the energy that must be dissipated by the component.



905-TCO Thermal Cutout

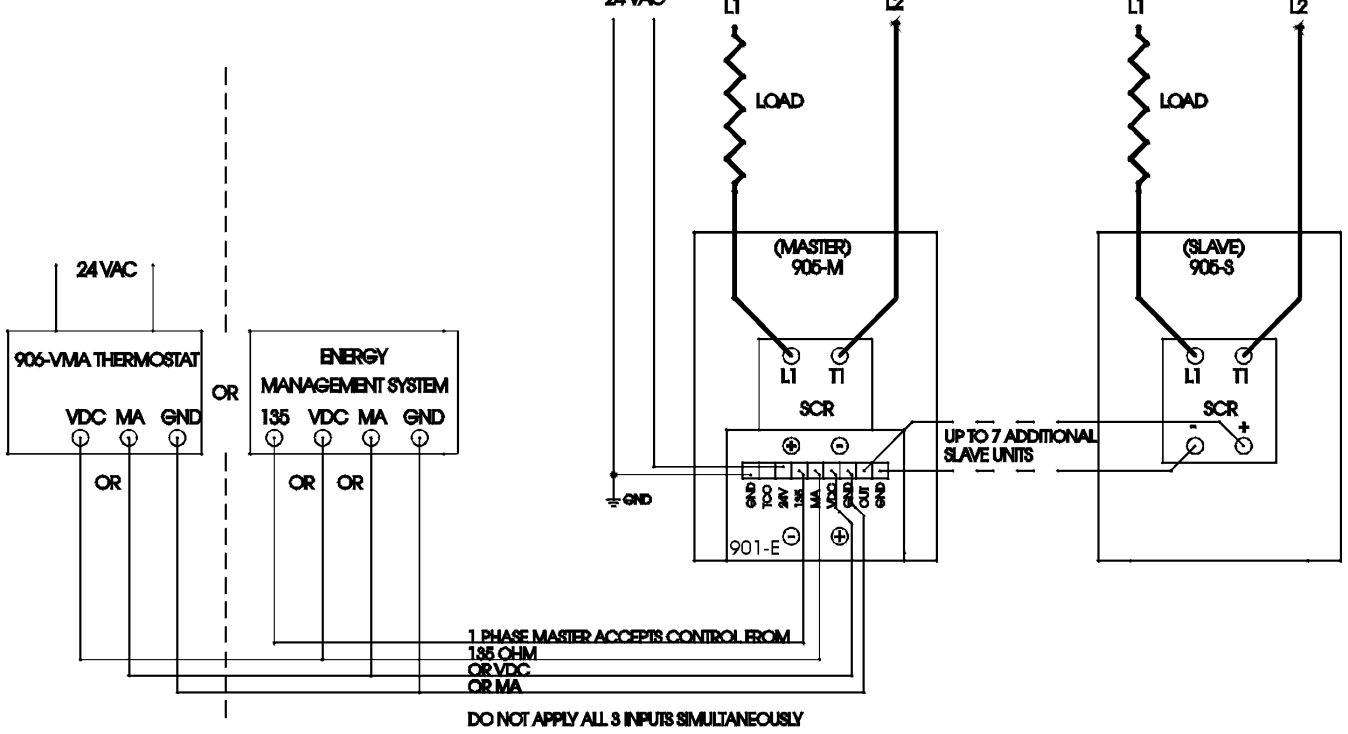
Heat destroys the integrity of the device, and left to continue uncontrolled will ultimately reduce the reliability of the component or cause the device to fail. In this regard, it is prudent that limitations be set utilizing these components designed into the product’s “safety factor”. 905 Series SCRs are designed to limit the maximum junction temperature in the specified ambient considerably below the specific devices maximum allowable limit. The design limit (acceptable de-rated temperature) imposed, not only preclude the maximum design temperature of the device not be reached, but a selected design limit de-rated temperature that assures well guarded reliability. A sensor installed in the ambient air near the device does not assure overheating protection of the device. The only way to sense junction temperature is to actually sense the temperature of the semi conductor on the heat sink where the heat is generated.

905-S Series controllers are designed to allow a Thermal Cutout, (precision semi conductor integrated circuit) to be installed on the heat sink directly at the surface of the SCR for measuring this critical temperature. To further increase reliability and life, a temperature below the maximum allowed for the device, is built into the design of this controller. This allows the 905-S to meet stringent reliability requirements. This is possible because the “H” cross section design of the 905-S heat sink, provides access directly at the “centered axis source” of the heat. (See 905-S Cross Sectional Profile.)

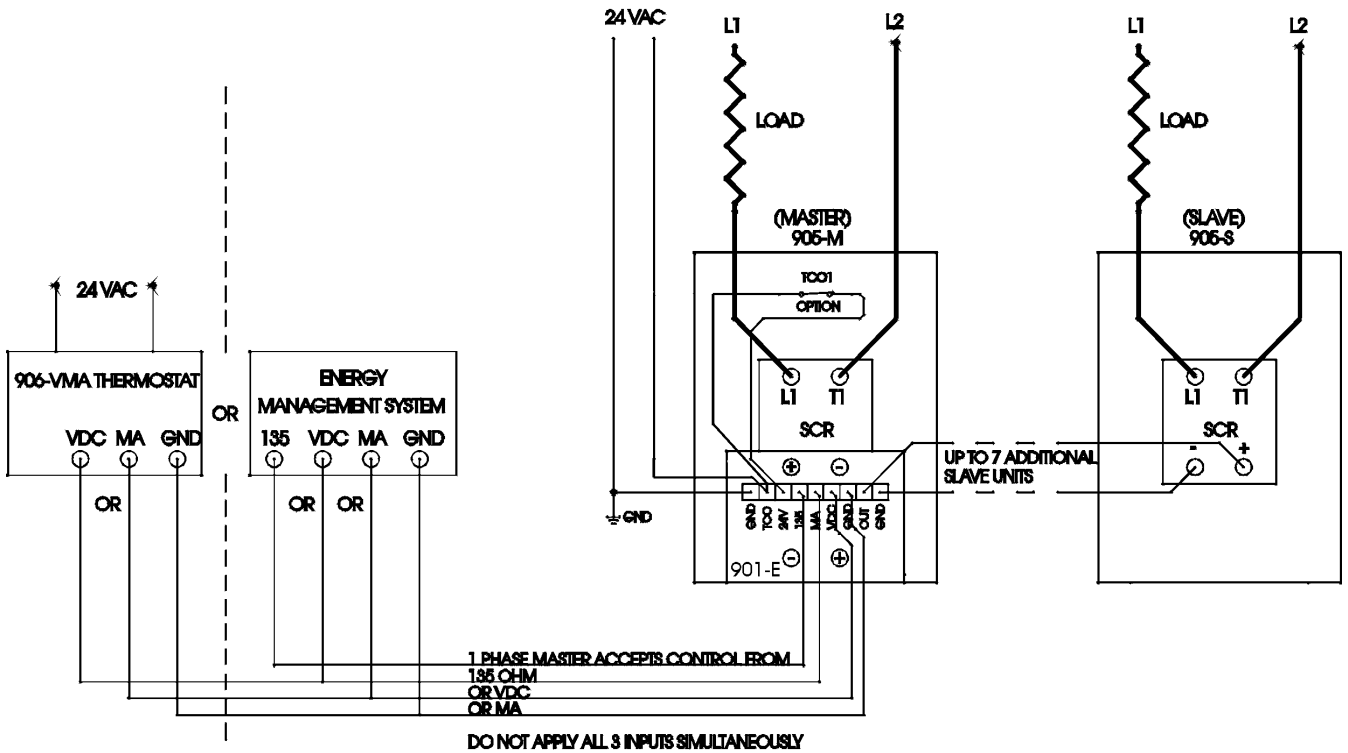


905-S Cross Sectional Profile

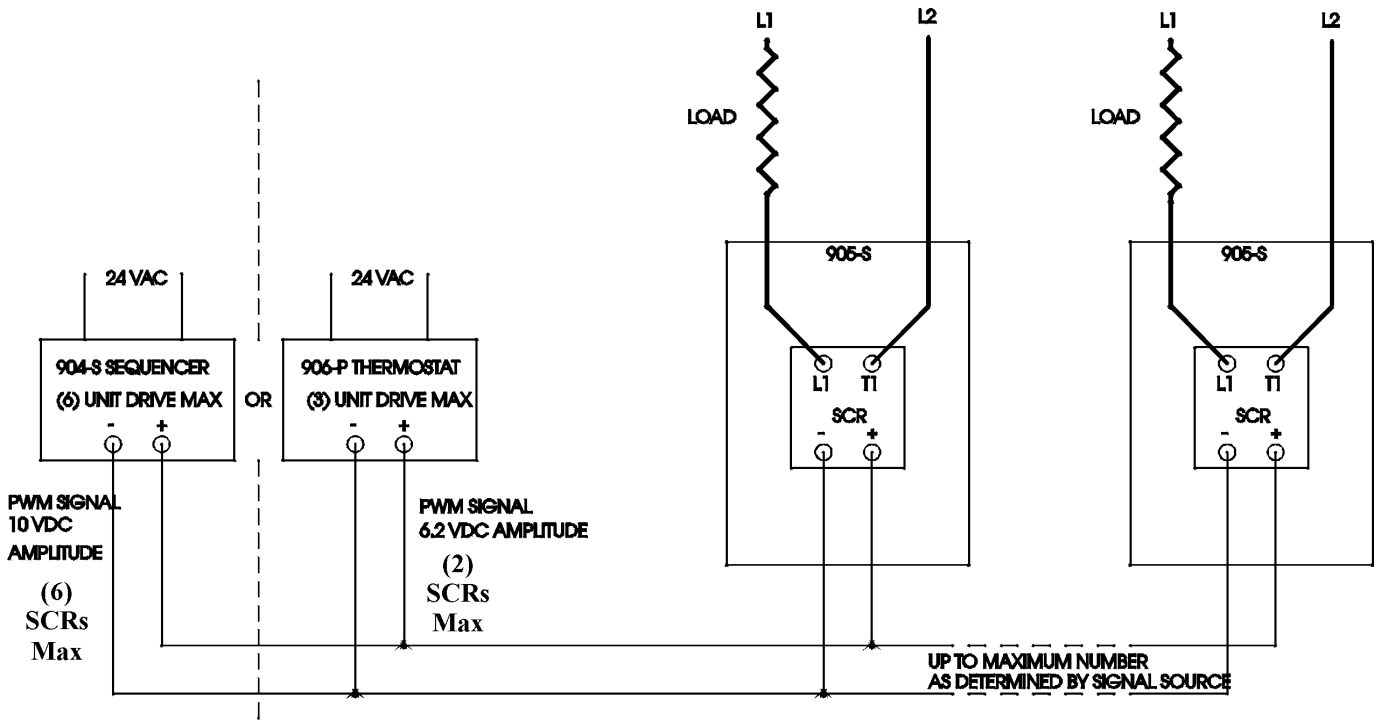
This design assures that the actual heat developed at the SCR’s junction is accurately monitored. When this de-rated temperature is allowed to open the circuit to the controller, it assures that the design maximum temperature is never reached, and the selected de-rated temperature imposed will “turn off” the control. Once the temperature returns to a safe level, the controller will be allowed to resume normal operations.



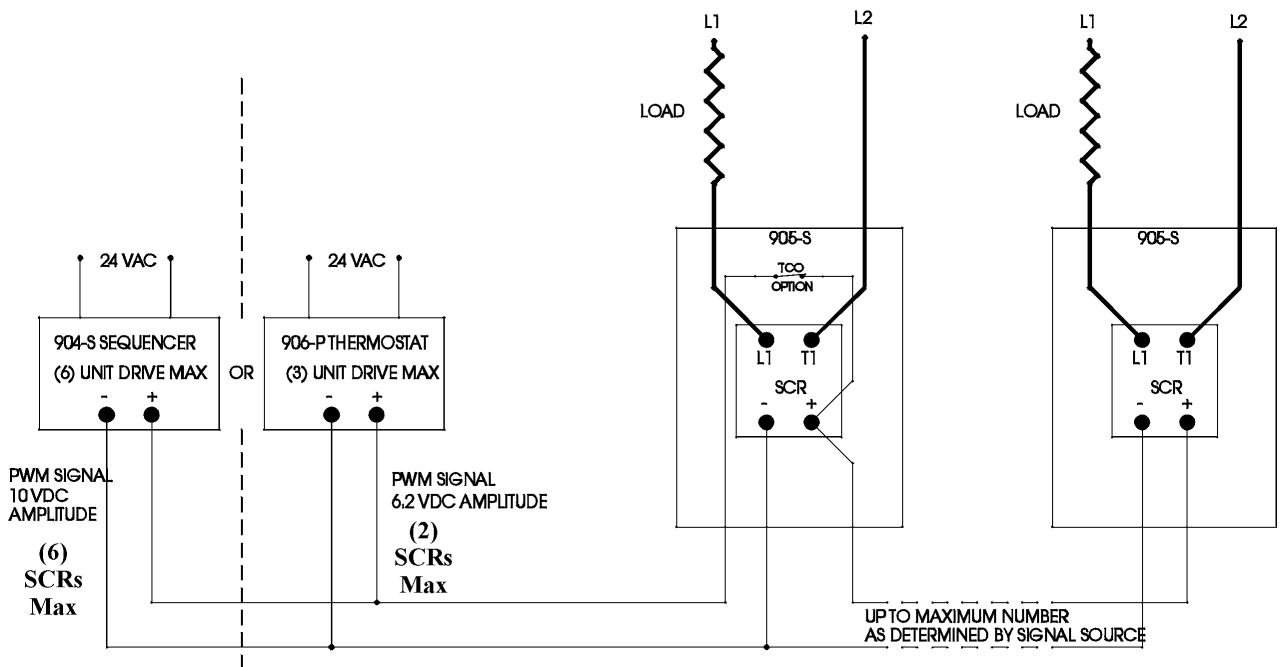
Single Phase 905-M (Master) & 905-S (Slaves) Less TCO



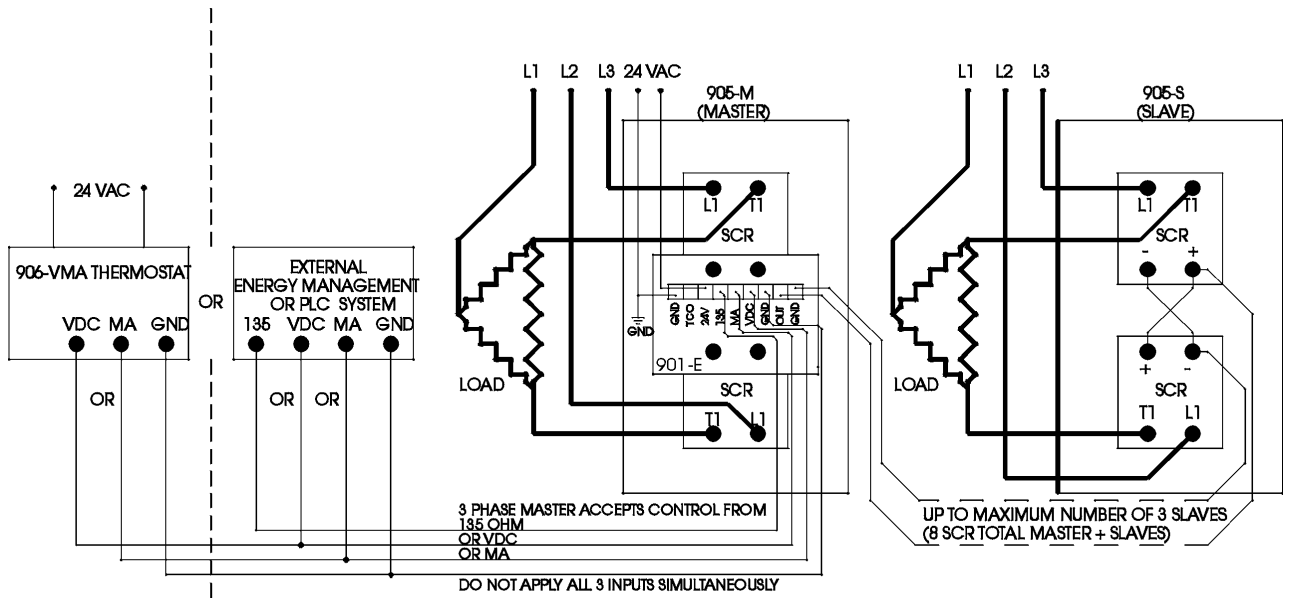
Single Phase 905-M (Master) & 905-S (Slaves) With (1) TCO



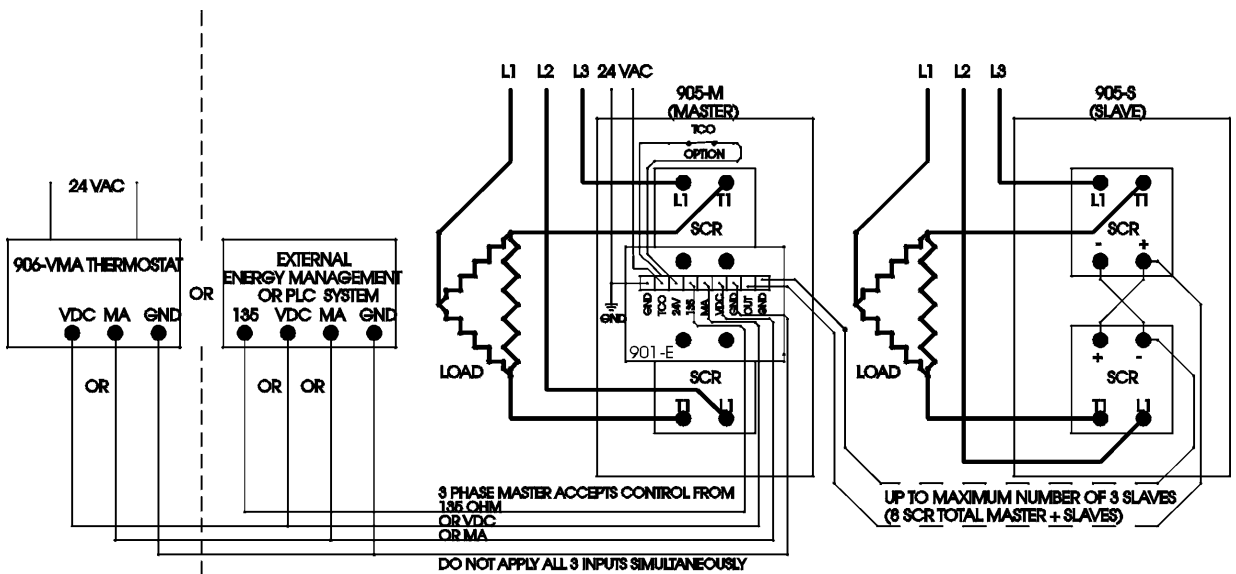
Single Phase 905-S (Slaves) Less TCO



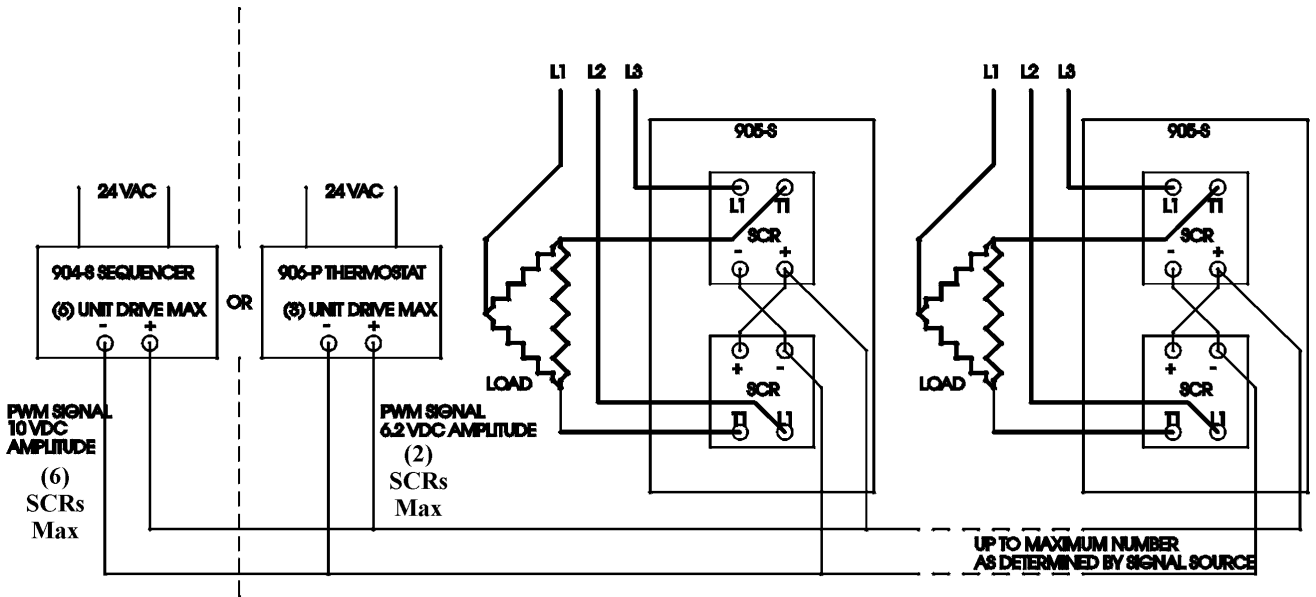
Single Phase 905-S (Slaves) with (1) TCO



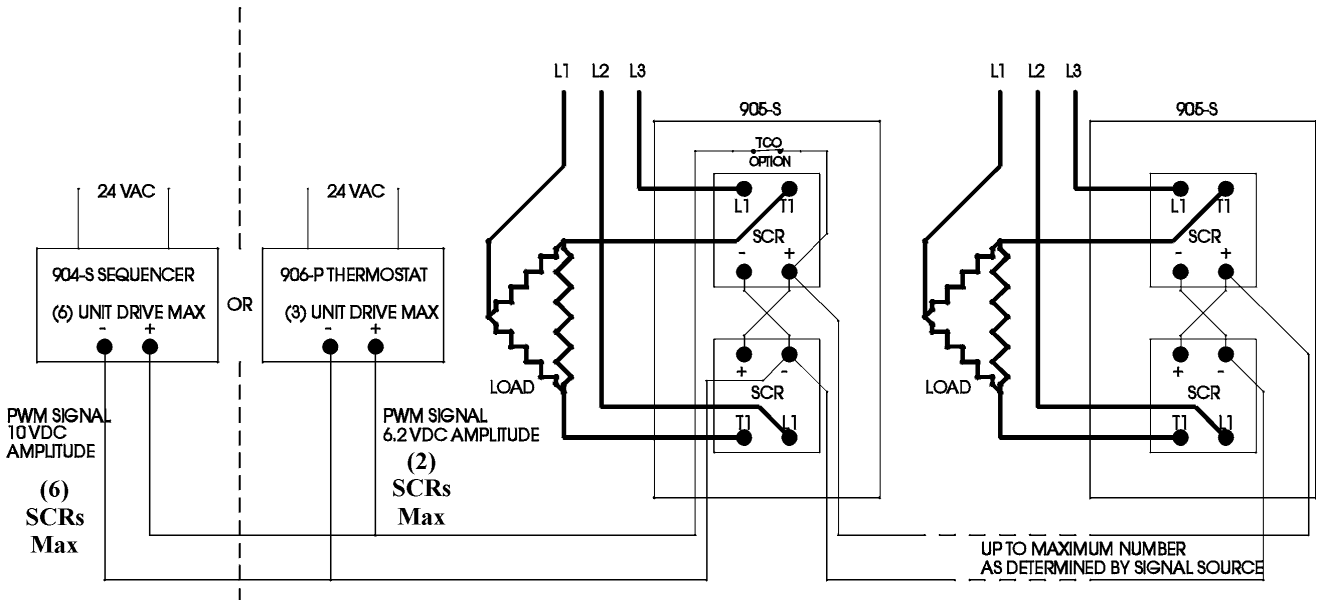
Three Phase 905-M (Master) & 905-S (Slaves) Less TCO



Three Phase 905-M (Master) & 905-S (Slaves) With (1) TCO on Master



**Three Phase
905-S (Slaves)
Less TCO**

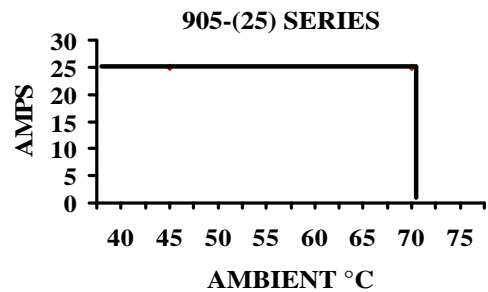
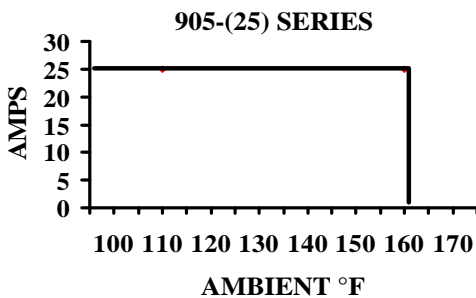


**Three Phase
905-S (Slaves)
With (1) TCO**

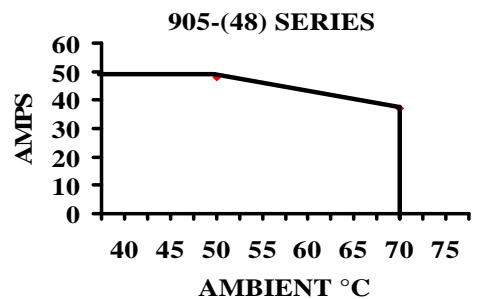
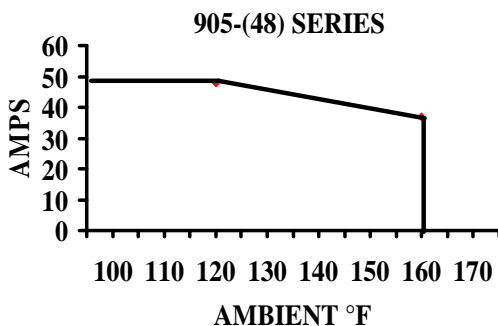
Power De-rating Guidelines

These Power De-rating Guideline curves apply to all voltage (208/240V AC, 480V & 600V) 905 Series SCR power switching modules. They apply to the ambient air surrounding the 905 heat sink assembly in a natural convection air movement environment.

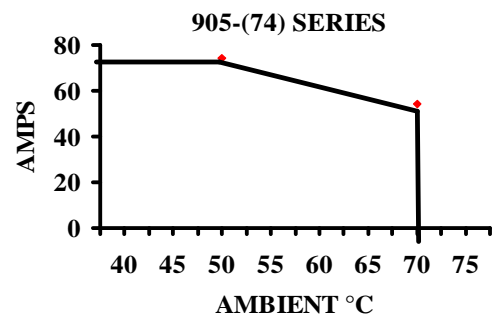
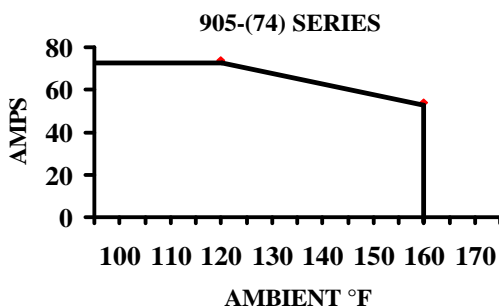
The 905 Series SCR may be mounted vertically inside a ventilated control panel, or vertically outside (See Model Installation & Operating instructions). The 905-M Series logic board electronic components are rated for a maximum operating temperature of 167°F (75°C). The heat sink assembly is rated for a maximum of 122°F (50°C) or may be de-rated up to 158°F (70°C), by limiting the maximum operating current (AMPS) per the following guidelines:



905-(25) Series, 25 Amp Model rating: No de-rating required to 158°F (70°C).



905-(48) Series, 48 Amp Model rating: 48A @ 122°F (50°C) to 37A @ 158°F (70°C).



905-(74) Series, 74 Amp Model rating: 74A @ 122°F (50°C) to 54A @ 158°F (70°C).

