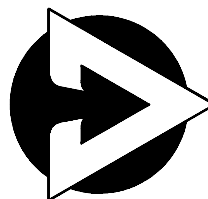


CONTROL CONCEPTS INC.

INSTRUCTION MANUAL MODEL 1024A



***CONTROL
CONCEPTS***

8077 CENTURY BLVD
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DESCRIPTION:

The model 1024A is a zero-cross, solid state, normally open switch, capable of blocking 600Vac or more in the "OFF" state and conducting up to 70 amps in the "ON" state.

The device (known as an SSR module) is "ON" when a signal greater than 90 volts AC is applied to the input terminals. (Maximum allowable input voltage is 280 volts AC.) The input terminals are electrically isolated from the load and supply voltages. When the command or control signal is applied to the SSR module it will turn "ON" the next time that the sinusoidal applied load voltage passes through zero. When the control signal is removed, the SSR module turns "OFF" the next time the instantaneous load current through it is zero. The term zero-cross is derived from the fact that the SSR module can turn "ON" only when the instantaneous value of the applied voltage is zero and can turn "OFF" only when the instantaneous current through it is zero.

The SSR module consists of two silicon controlled rectifiers (SCRs) arranged as an inverse parallel (back-to-back) pair allowing the SSR module to switch AC power. These SCR's, a dv/dt circuit and the circuit providing electrical isolation and zero-cross logic are contained in the SSR module. The mounting or base plate of the module is electrically isolated. An aluminum heatsink is provided to dissipate the heat generated by the SSR module. The SSR module is protected from line voltage transients by metalized oxide varistors (MOV's) connected across the line and load terminals. The MOV's allow voltage transients to pass that would otherwise damage the SCRs.

The 1024A power controller has no inherent wear out modes as do mechanical switching devices. The zero-cross feature provides transient free switching.

SPECIFICATIONS:

CONTROL SIGNAL:	Voltage range:	90 to 280Vac
	Impedance:	40K ohms
	Must turn-off voltage:	10.0 Vac
	Max. reverse voltage:	32Vdc
SURGE CURRENT:	1 cycle:	10.0 times rated current
	1 second:	3.0 times rated current
AMBIENT TEMPERATURE:	Operating:	20 to +80°C
	Storage:	-40 to +100°C
HUMIDITY:	Operating and Storage:	0 to 95% Non-condensing.
ELECTRICAL ISOLATION:	Input to Output Isolation:	4000V
	Input/Output to Ground Isolation:	2500V
	Max. capacitance:	
	input/output:	8 pf (typ)
MAX Off State LEAKAGE (rms):	20 mA	
MINIMUM Off-State DV/DT:	200 V/us	

MOUNTING DIMENSIONS:

THE POWER CONTROLLER MUST BE MOUNTED ON A VERTICAL SURFACE, ORIENTED SUCH THAT THE HEATSINK FINS ARE VERTICAL SO THAT AIR MAY PASS THROUGH THEM UNRESTRICTED. THE CONTROLLER MAY BE MOUNTED ABOVE, BELOW OR NEXT TO OTHER CONTROLLERS.

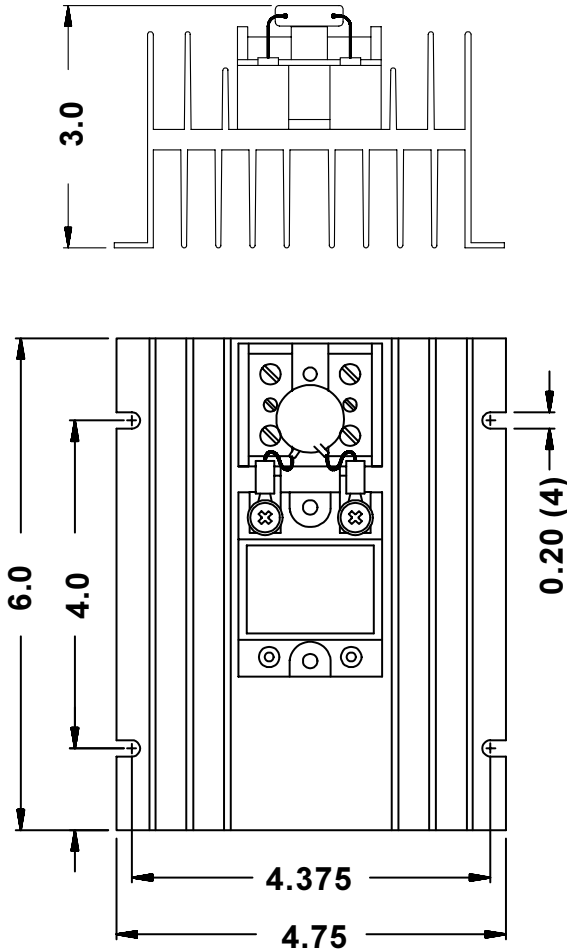


Figure 1. 10 - 40 Amp controller.

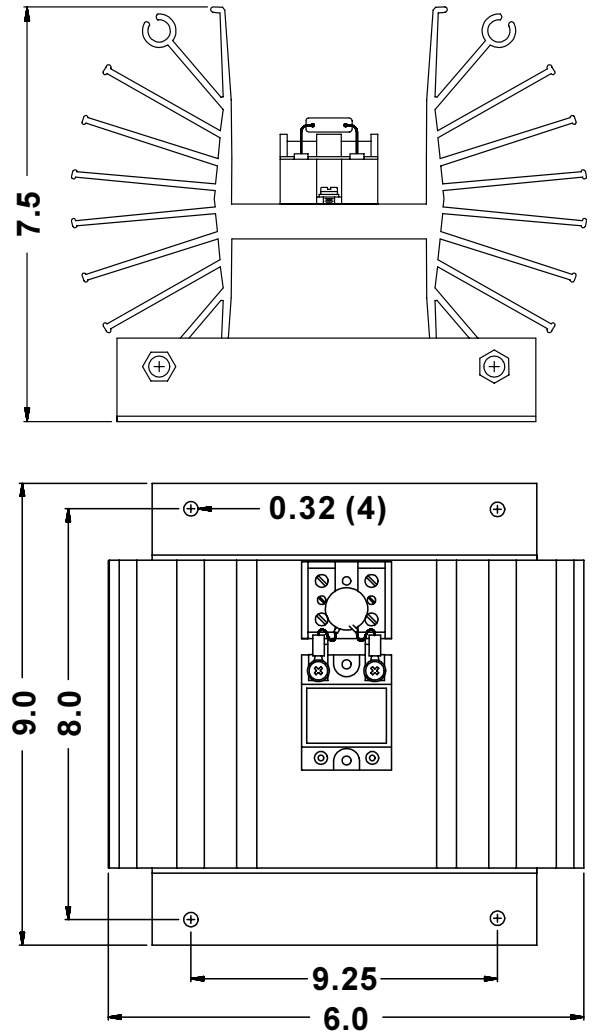


Figure 2. 70 Amp controller.

TORQUE TABLE FOR USD CONNECTORS



Wire Size	Recommended Torque
10 - 14 ga	35 in-lbs
8 ga	40 in-lbs
4 - 6 ga	45 in-lbs
2-3 ga	50 in-lbs

ELECTRICAL CONNECTIONS:

NOTE: CLASS "T" FUSES RECOMMENDED FOR SCR AND LOAD PROTECTION.

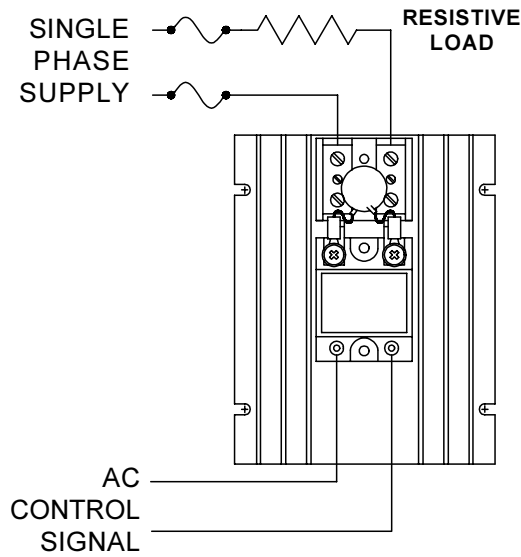


Figure 3.
Single phase control:

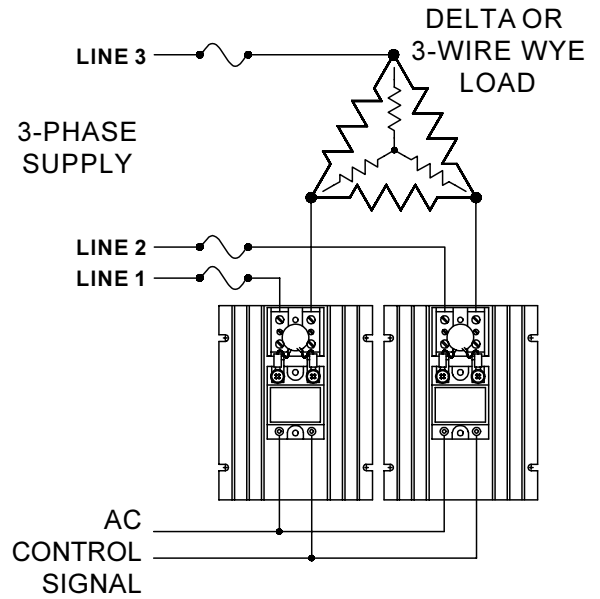


Figure 4.
Three-phase, 2-leg control.

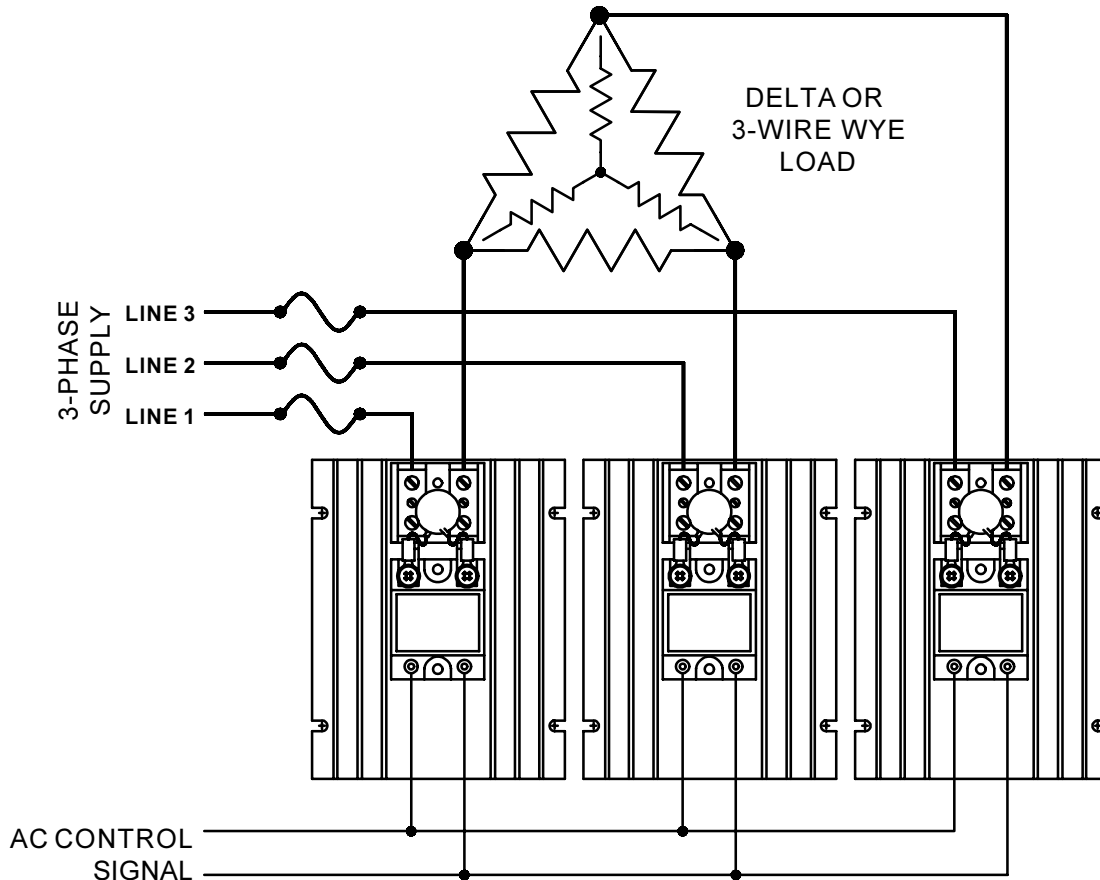


Figure 5. Three-phase, 3-leg control.

TROUBLESHOOTING:

CAUTION: USE EXTREME CARE DURING MAINTENANCE OR REPAIR TO AVOID ELECTRICAL SHOCK. ALWAYS REMOVE SYSTEM POWER BEFORE MAKING CONTACT WITH ANY HIGH VOLTAGE COMPONENTS.

SYMPTOM: FULL OR PARTIAL POWER IS ALWAYS APPLIED TO THE LOAD.

Determine that the command signal is zero. (Remove the command signal if necessary to assure that the command is zero.) Note: If the controller is operated with one of Control Concepts circuits and the LED on the circuit is "ON" the problem is associated with the circuit card or the command signal applied to the circuit. If full power is applied with zero command signal, both SCR modules have probably failed. If partial power is applied and the command signal is zero, one of the SCR modules has failed.

To determine which module has failed, measure the voltage across each module with a volt meter. In the "OFF" state the voltage across each SCR module should be equal to the line or supply voltage. If the voltage across the module is 70% or less replace the SCR module.

NOTE: Current and voltage measurements should be taken with true RMS measuring instruments. Averaging responding meters may not provide correct measurements.

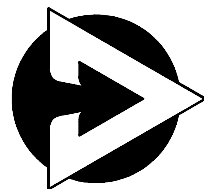
SYMPTOM: NO POWER OR ONLY PARTIAL POWER CAN BE APPLIED TO THE LOAD.

If no power can be applied to the load, determine that a command signal of 3.5 Vdc or greater is applied to the input terminals. If a Control Concepts circuit is used to control the model 1024A power controller and the LED is not "ON" continuously, the problem is probably associated with the circuit or the control signal to the circuit. Determine that the correct supply voltage does exist on all three phases and that all fuses are satisfactory. The voltage across the line and load connections on the SCR module should be less than 10 volts when at least 3.5Vdc but no more than 32Vdc is applied to the control terminals.

The SCR module may have one of the following failure modes:

1. One of the SCRs is shorted and cannot be turned off.
2. The SCR module will not turn on and therefore no current will be conducted through the module.
3. One of the two SCRs fails to turn on. In this situation only DC current will pass through the SCR module and full load power will not be possible.

MANUFACTURED BY:



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SCR REPLACEMENT:

1. Remove power from the controller.
2. Remove electrical connections from SCR module. Mark the wires to insure that they will be returned to the correct terminal.
3. Remove the SCR module from the mounting surface. Be sure to retain ALL screws, and mounting hardware.
4. With a clean dry cloth or paper towel, remove the thermal compound from the surface of the heat sink. Determine that there are no particles of dirt or old thermal compound on the mounting surface.
5. A thermal conductive pad is supplied with the replacement SCR module. Remove the protective brown paper from both sides of the thermal conductive pad. Apply the thermal conductive pad to the surface on which the SCR module is to mount. Place the module in the mounting position.
6. Assemble the SCR module on the mounting surface. Use the spring washers to ensure a constant mounting force. Tighten the screws evenly applying as much torque as possible without damage.
7. Reassemble the electrical connections to the SCR module.

MODEL No. DESCRIPTION:

1024A - VV - AA - (MP6)

1024A = 1 Phase, Zero-Cross SSR Assembly

VV = Nominal Line Voltage (+10% - 80%)
12 = 120 Vac 50/60 Hz
24 = 240 Vac 50/60 Hz
48 = 480 Vac 50/60 Hz

AA = Rated RMS current
10 = 10 Amps RMS
20 = 20 Amps RMS
30 = 30 Amps RMS
40 = 40 Amps RMS
70 = 70 Amps RMS

MP6 = (Optional Baseplate,
with 2 Pole fuseblock)
(Order Fuse Kit separately)

RECOMMENDED REPLACEMENT SCR:		RECOMMENDED FUSES (typical) (Alternative fuse size is 125% of max. load current)		
MODEL:	ASSEMBLY PART No. *	CCI PART #	BUSSMAN #	CCI FUSEKIT **
1024A-12-10	1651A-12-10	42110-0460-315	JJS-15	FK\62T15
1024A-12-20	1651A-12-20	42110-0460-325	JJS-25	FK\62T25
1024A-12-30	1651A-12-30	42110-0460-335	JJS-35	FK\62T35
1024A-12-40	1651A-12-40	42110-0460-350	JJS-50	FK\62T50
1024A-12-70	1651A-12-70	42110-0460-390	JJS-90	FK\62T90
1024A-24-10	1651A-24-10	42110-0460-315	JJS-15	FK\62T15
1024A-24-20	1651A-24-20	42110-0460-325	JJS-25	FK\62T25
1024A-24-30	1651A-24-30	42110-0460-335	JJS-35	FK\62T35
1024A-24-40	1651A-24-40	42110-0460-350	JJS-50	FK\62T50
1024A-24-70	1651A-24-70	42110-0460-390	JJS-90	FK\62T90
1024A-48-10	1651A-48-10	42110-0460-315	JJS-15	FK\62T15
1024A-48-20	1651A-48-20	42110-0460-325	JJS-25	FK\62T25
1024A-48-30	1651A-48-30	42110-0460-335	JJS-35	FK\62T35
1024A-48-40	1651A-48-40	42110-0460-350	JJS-50	FK\62T50
1024A-48-70	1651A-48-70	42110-0460-390	JJS-90	FK\62T90

* The assembly includes one SCR relay, one thermal conductive pad, one MOV and an instruction sheet.

** The fuse kit includes two fuses of appropriate rating for the frame size, and a fuseblock.

Control concepts recommends that fuses be rated at 120 to 125% of maximum load current.