

PQSI Coil-Lock ... Hold-in-Device

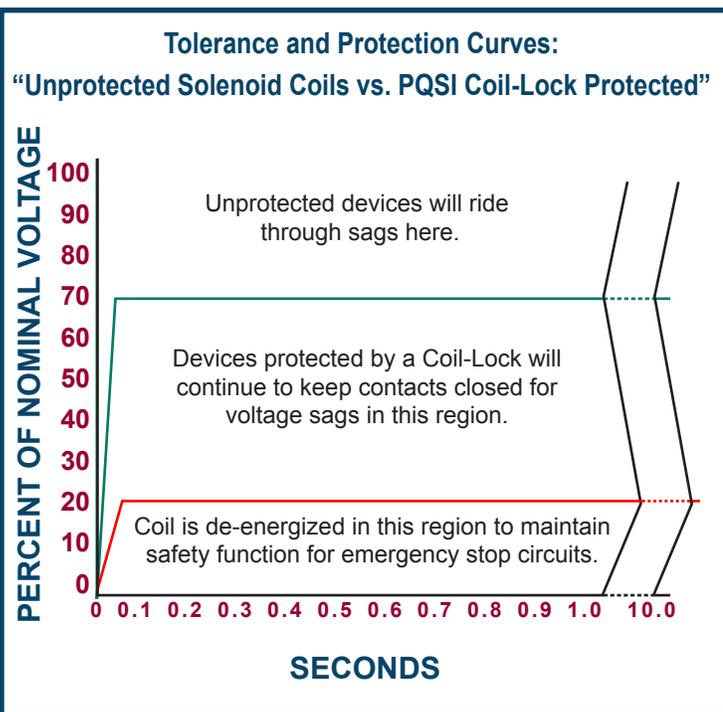
From Power Quality Solutions Inc.

Coil-Lock Applications: Relays, contactors, and motor starters are used extensively in commercial and industrial facilities to control business machines and process equipment. These devices often have a low tolerance to electric service voltage sags, and are diagnosed as “weak links” in automated production lines. During common voltage sags, the solenoid coils in these motor-driven systems may de-energize long enough to cause the power circuit mechanical contacts to open, and the connected electrical equipment to shutdown. This situation can disrupt business operations and impact an entire manufacturing facility. The Coil-Lock eliminates costly process downtime, installs in minutes, and can be a cost-effective alternative to other voltage sag protection methods. The Coil-Lock product is available in different models to be compatible with most relays, contactors, or solenoid coils, and is ideal for protecting master control relays, and E-stop circuits.

The Coil-Lock is designed to ensure that at any time input voltage is present (down to ~25% of nominal voltage), the protected AC coil will maintain enough energy to hold-in the critical process element. When the input voltage goes below 25% of nominal, the Coil-Lock releases the coil, thereby ensuring that safety is not compromised, and the “on/off state” operation of the existing process functions as intended. The key to properly applying Coil-Locks is to determine the DC resistance of the AC coil of the relay/contactant unit you want to protect from deep voltage sags. Once you have the AC coil’s DC resistance value, the next step is to select the appropriate model Coil-Lock listed on the back of this brochure.



Coil-Lock Specifications: [1] Provides continuous output voltage to hold-in relay and contactor coils for all IEEE Std.P1159 defined voltage sags to approximately 25% of nominal. [2] Designed to act as a discrete on/off device and will turn off the coil voltage if the Coil-Lock input voltage is interrupted beyond a few cycles (depending on the relay/contactant rating and vendor model). [3] Provides required high inrush coil current during startup. [4] Provides transient voltage surge suppression for the relay/contactant coil circuit. [5] Designed to survive ANSI/IEEE C62.41 Category A and Category B defined transient voltage surges to 6kV/500A. [6] Designed to be compatible with stress and vibration common to typical commercial and industrial applications. [7] Ambient Operating Range: -29° C (-20°F) to +55° C (131°F).



PQSI Coil-Lock Warranty: Unconditional free Coil-Lock replacement for one year from date of purchase. Neither PQSI nor its business associates are responsible for any production loss or damage caused by a Coil-Lock misapplication or Coil-Lock failure.

For Technical and Pricing Information Contact:



Phone: 865-671-8364 Fax: 800-881-2893

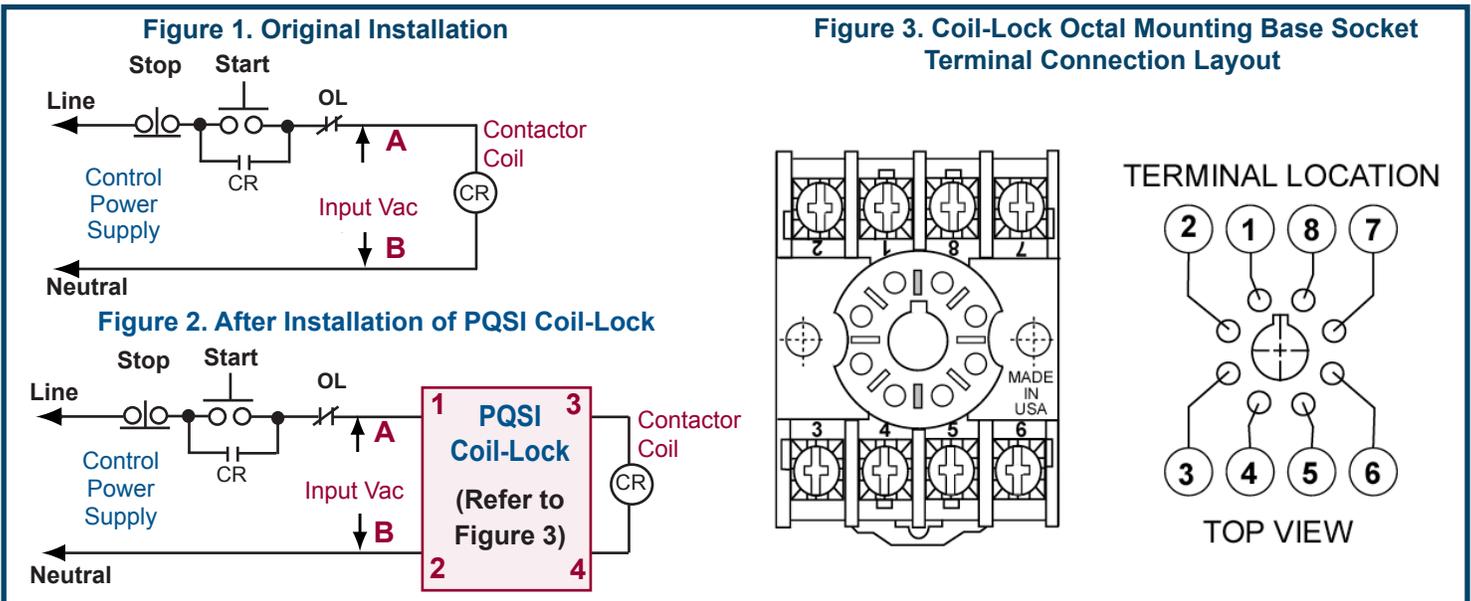
**Visit our website at www.pqsi.com
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PQSI Coil-Lock Installation, and Advisory Notes

- Step #1** – Remove wires A and B, shown in Figure 1, from the relay/contactor coil and connect to octal mounting base socket terminals 1 and 2, shown in Figure 2.
- Step #2** – Connect new wires from the octal mounting base socket terminals 3 and 4 to the relay/contactor where you removed the wires in Step #1.
- Step #3** – Figure 3 below shows the physical orientation, locations, and terminal numbers of the octal mounting base socket to provide a clearer understanding of terminal connections.

Application Advisories and Notes:

- [a] Coil-Locks are intended to interface with AC solenoid coil operated devices and may not be compatible with DC coil operated devices or coils that have integral electronic circuitry as part of their operating strategy.
- [b] In some AC coil applications, coil energy “discharge” devices such as rectifier diodes are pre-wired across the AC coil. These devices should be removed before installing the Coil-Lock. After the Coil-Lock is installed, the Coil-Lock’s internal circuitry provides the required AC coil discharge feature.
- [c] For proper Coil-Lock operation, observe conventional isolation and grounding techniques on all Coil-Lock terminal points and avoid any “sneak” ground paths.
- [d] The Coil-Lock should be installed in an electrical / fire enclosure that complies with the applicable safety standard.
- [e]  **Safety Caution:** Read all instructions thoroughly prior to installation. If this equipment is used in a manner not specified, the protection provided by this equipment may be impaired.
- [f]  **Safety Caution:** Risk of electric shock if this equipment is not connected in accordance with Figures 2 and 3 below.
- [g] On equipment with LEDs to indicate the coil device is energized, while the coil device will operate properly, the LED may not illuminate, since the Coil-Lock output voltage is pulsed and polarized.



Coil-Lock 120V and 240V Models *(All Coil-Locks Include Din-Rail Octal Mounting Base Socket)*

Model Number	AC Coil Resistance Measured w/DC Ohmmeter	Comments
1000-120V	801 to 4.5k Ohms [1]	UL Compliant File E255764
1001-120V	201 to 800 Ohms [1]	UL Compliant File E255764
1002-120V	8 to 200 Ohms [1]	UL Compliant File E255764
1002-120V-CE	8 to 200 Ohms [1]	 UL & CE Compliant (50 ma no load, 0.4 Amps w/8 Ohm Coil)
1003-120V	3 to 7.9 Ohms [1]	UL Compliant File E255764
1001-240V	601 to 17.5k Ohms [2]	UL Compliant File E255764
1002-240V	155 to 600 Ohms [2]	UL Compliant File E255764
1003-240V	20 to 154 Ohms [2]	UL Compliant File E255764

[1] For use with 100 to 125 Vac 50/60 Hz relays and AC solenoid coil operated contactors only.
 [2] For use with 200 to 240 Vac 50/60 Hz relays and AC solenoid coil operated contactors only.

PQSI NiceCube* ... Completely Integrated Voltage Sag Tolerant Module From Power Quality Solutions Inc.

Industrial electrical equipment is often affected by power supply disturbances, most notably voltage sags. Numerous electric power quality studies have found that common, general purpose AC relays often contribute to these electrical equipment shutdowns. Typically referred to as an "ice cube" relay due to its clear plastic cover that resembles a square ice cube, these AC-powered relays may be susceptible to many voltage sags that do not affect other elements of a control system. Therefore, they present an "Achilles heel" that may cause an entire machine, processing line, or entire factory to shut down during minor voltage sags.

With an average dropout at or near 70 percent of nominal for a cycle or less, these simple but sensitive devices contribute to an average 13 or more equipment related process shutdowns per year in typical distribution-fed commercial or industrial facilities. Modern industry requires a more robust alternative to the standard AC ice cube relay. If SEMI F47-compliant units are made available, many power quality-related shutdowns could be avoided. Furthermore, industrial plants could be expected to save from several hundred thousand to several millions of dollars each year in downtime and lost revenue. Worldwide, such improvements could have a significant impact.

Power Quality Solutions Incorporated (PQSI) has successfully developed and had tested by UL/CSA a "NiceCube" design that has proven to be a viable solution to this vexing problem. The NiceCube design offers a simple, elegant, and completely integrated module solution that includes a voltage sag tolerant general purpose DC DPDT relay that allows for the quick, easy replacement of an existing AC DPDT sensitive 24Vac or 120Vac relay for retrofit or new applications. This solution vastly improves the voltage sag ride-through characteristics of previously vulnerable electrical control system circuits such as emergency off circuits (EMO) in semiconductor tools and industrial production lines—with no capacitance incorporated in the design. Therefore, with no time delay for dropout, the NiceCube also finds application in chiller and air compressor controls as well.

120 Vac Solution

PQSI NiceCube VNC 120Vac Input



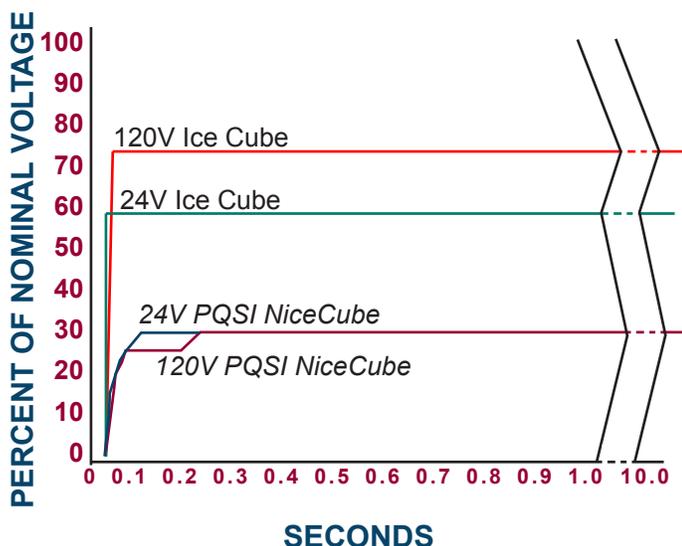
24 Vac Solution

PQSI NiceCube VNC 24Vac Input



A typical NiceCube weighs approximately 7 Oz. (02 kg) and measures 5"H x 1.625"W x 2.25"D

Tolerance and Protection Curves: "Ice Cubes vs. PQSI NiceCubes"



NiceCube Specifications: [1] Provides continuous DPDT relay operation for all IEEE Std. P1159 defined voltage sags to approximately 25% of nominal. [2] Designed to act as a discrete on/off device and will turn off the DPDT relay if the NiceCube input voltage is interrupted for a few cycles. [3] Designed to survive ANSI/IEEE C62.41 Category A and Category B defined transient voltage surges to 6kV/500A. [4] Compatible with stress and vibration common to typical commercial and industrial applications. [5] Ambient Operating Range: -29° C (-20°F) to +55° C (131°F).

PQSI NiceCube Warranty: Unconditional free NiceCube replacement for one year from date of purchase. Neither PQSI nor its business associates are responsible for any production loss or damage caused by a NiceCube misapplication or NiceCube failure.

For Technical and Pricing Information Contact:

PQSI

Power Quality Solutions, Inc.

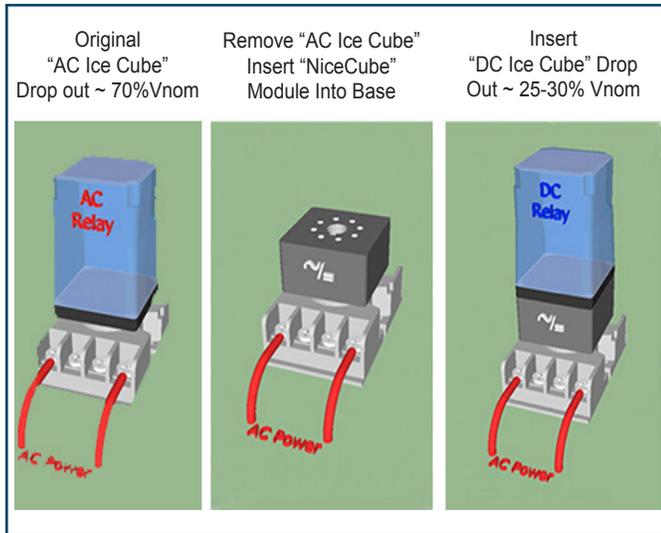


Phone: 865-671-8364 Fax: 800-881-2893
Visit our website at www.pqsi.com
or e-mail us at customerservice@pqsi.com

* Source: Electric Power Research Institute, Inc.

PQSI NiceCube Applications, Installation, and Advisory Notes

[a] The PQSI NiceCube eliminates costly process downtime, installs in minutes for new or retrofit applications (see below figure), and can be a cost-effective alternative to other voltage sag protection methods.



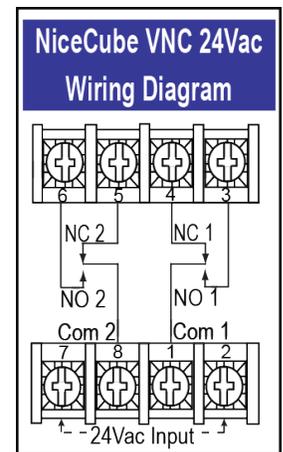
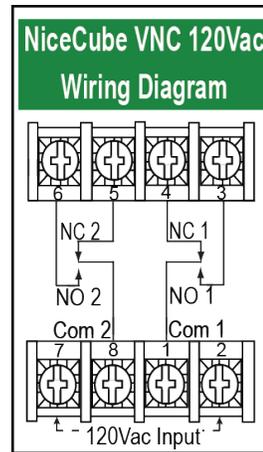
General Specifications (UL 508)		750XBX	
Contact Characteristics		Units	Standard
Number and type of Contacts			DPDT
Contact materials			Silver Alloy
Thermal (Carrying) Current		A	16
Maximum Switching Voltage		V	300
Switching Current @ Voltage		Resistive	16A @ 277V 50/60Hz
		Resistive	16A @ 120V 50/60Hz
		Resistive	16A @ 28V
		HP	1/3 @ 120VAC
		HP	1/2 @ 240 VAC
		Pilot Duty	B300
		A	3 @ 150VDC
Current rating with magnetic blowout - Code 69			
Minimum Switching Requirement		mA	100 @ 5VDC (.5W)
Coil Characteristics			
Voltage Range		V	6...240
		V	6...125
Operating Range	% of Nominal		85% to 110%
			80% to 110%
Average consumption		VA	3
		W	1.4
Drop-out voltage threshold			15%
			10%
Performance Characteristics			
Electrical Life (UL508)	Operations @ Rated Current (Resistive)		100,000
Mechanical Life	Unpowered		5,000,000
Operating time (response time)		ms	20
Dielectric strength	Between coil and contact	Vrms	1500
	Between poles	Vrms	1500
	Between contacts	Vrms	1500

- [b] For proper NiceCube operation, observe conventional isolation and grounding techniques on all NiceCube terminal points and avoid any “sneak” ground paths.
- [c] The NiceCube should be installed in an electrical / fire enclosure that complies with the applicable safety standard.
- [d] **Safety Caution:** Read all instructions thoroughly prior to installation. If this equipment is used in a manner not specified, the protection provided by this equipment may be impaired.
- [e] **Safety Caution:** Risk of electric shock if this equipment is not connected in accordance with Figure 1. below.

Figure 1. NiceCube Octal Mounting Base Socket Terminal Connection Layout

In new applications, proceed as follows:

- Step #1** Determine whether the AC-powered relay application is 120Vac or 24Vac. For 120Vac input electric service use the PQSI Model NiceCube VNC 120Vac Input, and for 24Vac input electric service use the PQSI Model NiceCube VNC 24Vac Input.
- Step #2** For 120Vac input electric service, connect the wires to the NiceCube VNC 120Vac input module’s octal mounting base socket terminals 7 and 2. For 24Vac input electric service, connect the wires to the NiceCube VNC 24Vac module’s octal mounting base socket terminals 7 and 2.
- Step #3** Referring to the wiring diagrams on the right of this figure, select the locations for the Com, NO and NC DPDT contact arrangements and terminal numbers on the octal mounting base socket that correspond with your Com, NO, and NC circuit applications. Note connect to Com 1 through octal mounting base socket terminal 1, NO 1 through terminal 3, and NC 1 through terminal 4. In a similar way, connect to Com 2 through octal mounting base socket terminal 8, NO 2 through terminal 6, and NC 2 through terminal 5.



In existing or retrofit applications, proceed as follows:

- Step #1** Determine whether the AC-powered relay application is 120Vac or 24Vac. For 120Vac input electric service select the PQSI Model NiceCube VNC 120Vac Input, and for 24Vac input electric service select the PQSI Model NiceCube VNC 24Vac Input.
- Step #2** Remove the “AC Ice Cube” and insert the selected PQSI Model NiceCube VNC module with DC relay into the existing octal mounting socket assembly.

PQSI VNC 120Vac and 24Vac Models

PQSI NiceCube Models	Comments
NiceCube VNC 120Vac Input	UL/CSA Compliant File E255764
NiceCube VNC 24Vac Input	UL/CSA Compliant File E255764