The Application of Solenoid Key Release Units and Time Delay Key Release Units in Key Interlock Systems

A White Paper by Kirk Key Interlock Company

Introduction

Although key interlock systems are mechanical in nature, there are electrical accessories available that are quite effective when designing an interlocking system. It is often necessary to make sure a key is held for a certain length of time following shut down of a controlled device or until a specific circuit is energized allowing the interlocking scheme to be initiated. Solenoid Key Release Units and Time Delay Key Release Units are designed for those purposes.

Solenoid Key Release Units

Generally used in conjunction with other keyed interlocks, a Solenoid Key Release Unit (Kirk SKRU or SKPM) is designed so that a key (or more than one key) is trapped in the interlock and cannot be released until the unit receives an external electric signal to the solenoid. The key absolutely will not turn until the solenoid is energized. The solenoid key release unit also contains auxiliary switches for status indication or control circuitry.

Figure 1. *A type SKRU (unhoused), a type SKRU (housed), and a type SKPM*

Though utilized in many ways, a solenoid key release unit can prevent entrance to a breaker vault, operation of a non-load break switch, or any number of hazardous situations. For example, the solenoid of the key release unit is energized when the circuit breaker is open so as to permit removal of the key. Removal of the key operates the auxiliary switch in the key release unit and disables the closing circuit of the circuit breaker. The key can then be used in combination with other keyed interlocks to enter a breaker vault or operate a non-load break disconnect switch.

Indicating lights, showing that the solenoid is energized, and push buttons, to allow the solenoid to be energized, are common accessories for solenoid key release units. Solenoid key release units are available mounted in a housing for protection from the elements depending upon the type of setting in which they are installed; however, they are most often installed by mounting them behind a panel with the key cylinder (and perhaps a push button or indicating light) protruding through the panel.

Time Delay Key Release Units

Also used in conjunction with other keyed interlocks, the Time Delay Key Release Unit (Kirk TDKRU) is designed to introduce a minimum time delay between two operations in an operating sequence. An initiating key is brought to the time delay unit and turned to start the time delay relay. After a given delay, the solenoid is energized (a signal light shows the operator that the solenoid has been energized), permitting a previously held key to be turned and withdrawn for further operations. The initiating key is held captive until the second key is returned to the unit.

Like the Solenoid Key Release Unit described above, the Time Delay Key Release Unit incorporates an auxiliary switch for status indication or control circuitry. Should an operator accidentally remove the initiating key during the time delay period, the timing device instantly returns to its original position.

The Time Delay Key Release Unit has many applications. For example, it can be utilized to prevent worker access to an enclosure around rotating equipment (or a fan) until the machinery has had time to come to a complete stop after shutdown or to allow a capacitor bank to fully discharge before releasing a key to permit access.

Figure 2. *A type TDKRU.*

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