finder
SWITCH TO THE FUTURE

99
SERIES

Coil indication and EMC suppression modules 90/92/94/95/96/97 series

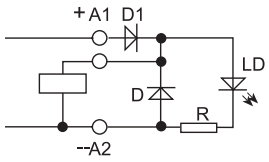
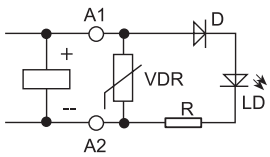
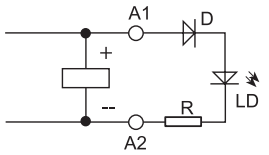
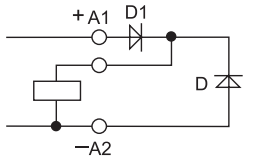
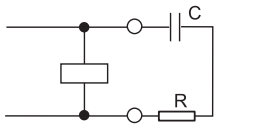
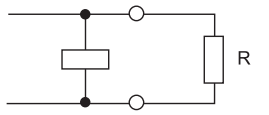
- Panels for electrical distribution
- Control panels
- Carousel warehouses
- Escalators
- Road / tunnel lighting
- Hoists and cranes



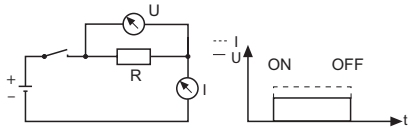
99.02



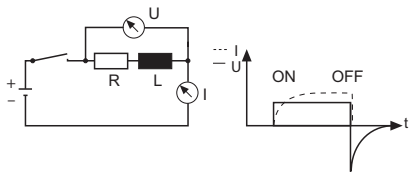
Approvals (according to type):

Diagrams	Code	Functions
	99.02.9.024.99 99.02.9.060.99 99.02.9.220.99	**Green LED + diode module (standard polarity) - ATEX compliant (Ex ec)*** Recovery diode modules + LED are used for DC only. The reverse voltage peaks of the coil are short circuited by the recovery diode (positive to terminal A1). The release time increases by an approximate factor from 3 to 5. If an increase of the release time is undesirable use a Varistor or RC module. The LED indicator lights up when the coil is energized.
	99.02.0.024.98 99.02.0.060.98 99.02.0.230.98	**Green LED + Varistor module - ATEX compliant (Ex ec)*** LED modules + Varistor are used for both AC and DC coils. The reverse voltage peaks of the relay coil are limited by the Varistor to approximately 2.5 times the nominal voltage of the supply. When using DC coils it is essential that positive is connected to terminal A1. The relay release time increases insignificantly.
	99.02.0.024.59 99.02.0.060.59 99.02.0.230.59	**Green LED module - ATEX compliant (Ex ec)*** LED modules are used for AC and DC. The LED indicator lights up when the coil is energized. When using DC it is essential that positive is connected to terminal A1.
	99.02.3.000.00	**Diode module (standard polarity)** Recovery diode modules are used for DC only. The reverse voltage peaks of the coil are short circuited by the recovery diode (positive to terminal A1). The release time increases by an approximate factor from 3 to 5. If an increase of the release time is undesirable use a Varistor or RC module.
	99.02.0.024.09 99.02.0.060.09 99.02.0.230.09	**RC module** RC circuit modules are used for AC and DC coils. The reverse voltage peaks of the coil are limited by the RC module to approximately 2.5 times the nominal voltage of the supply. The relay release time increases insignificantly.
	99.02.8.230.07	**Residual current bypass module** Bypass modules are advisable if 110 or 230 V AC relays show any tendency to fail to release. Failure to release can be caused by residual currents from AC proximity switches or inductive coupling caused through long parallel lying AC control lines. Additional 0.9 W power dissipation.

Voltage-current characteristic when switching a resistive load (fig. 1).



Voltage-current characteristic when switching a relay coil (fig. 2).



Switching Relay Coils.

When switching a resistive load, the current follows the phase of the voltage directly (Fig 1).

When switching relay coils the current and voltage waveforms are different due to the inductive nature of the coil (Fig 2). A brief explanation of this mechanism is as follows.

On energisating the coil, the build up of the magnetic field gives rise to counter electromotive forces which in turn delay the rise in coil current. On de-energisation, the sudden interruption of the coil current causes a sudden collapse of the magnetic field, which in turn induces a high voltage of reverse polarity across the coil. This reverse polarity voltage peak can reach a value typically 15 times higher than the supply voltage, and as a consequence can disturb or destroy electronic devices.

To counteract this potentially damaging effect, relays coils can be suppressed with a Diode, a Varistor (voltage dependent resistor) or a RC (resistor/capacitor) module – dependent on the operating voltage. (See above for descriptions of the various Modules available.)

Whilst the above description is based on the working of a DC coil, the reverse polarity voltage peak on de-energisation applies similarly to AC coils. However, when energising AC coils there will also be a coil inrush current of 1.3 to 1.7 times the nominal coil current – dependent on coil size. If coils are fed via a transformer (and particularly if several are energised at the same time) then this may need to taken into account when calculating the VA rating of the transformer.

* 99.02 modules are also Atex certified to be used with 58 Atex interface.