Entry-Master® Option-2

Installation Guide

Simply Secure™

Appendix A. Using the Transistor Outputs

While the use of transistor outputs may seem confusing, it can really be summed up in one simple fact: "... the collector always drops to ground when the transistor is activated."

The "collector" is the middle pin of the 3-pin connector for either transistor output on an Option-2 board. There are three (3) ways of utilizing the transistor output: in the first method, the Option-2 board actually powers the locking mechanism, providing *voltage* to the lock coil. In this case, only the collector (**C**) and (**+V**) connectors are utilized (See **Figure 1** below).

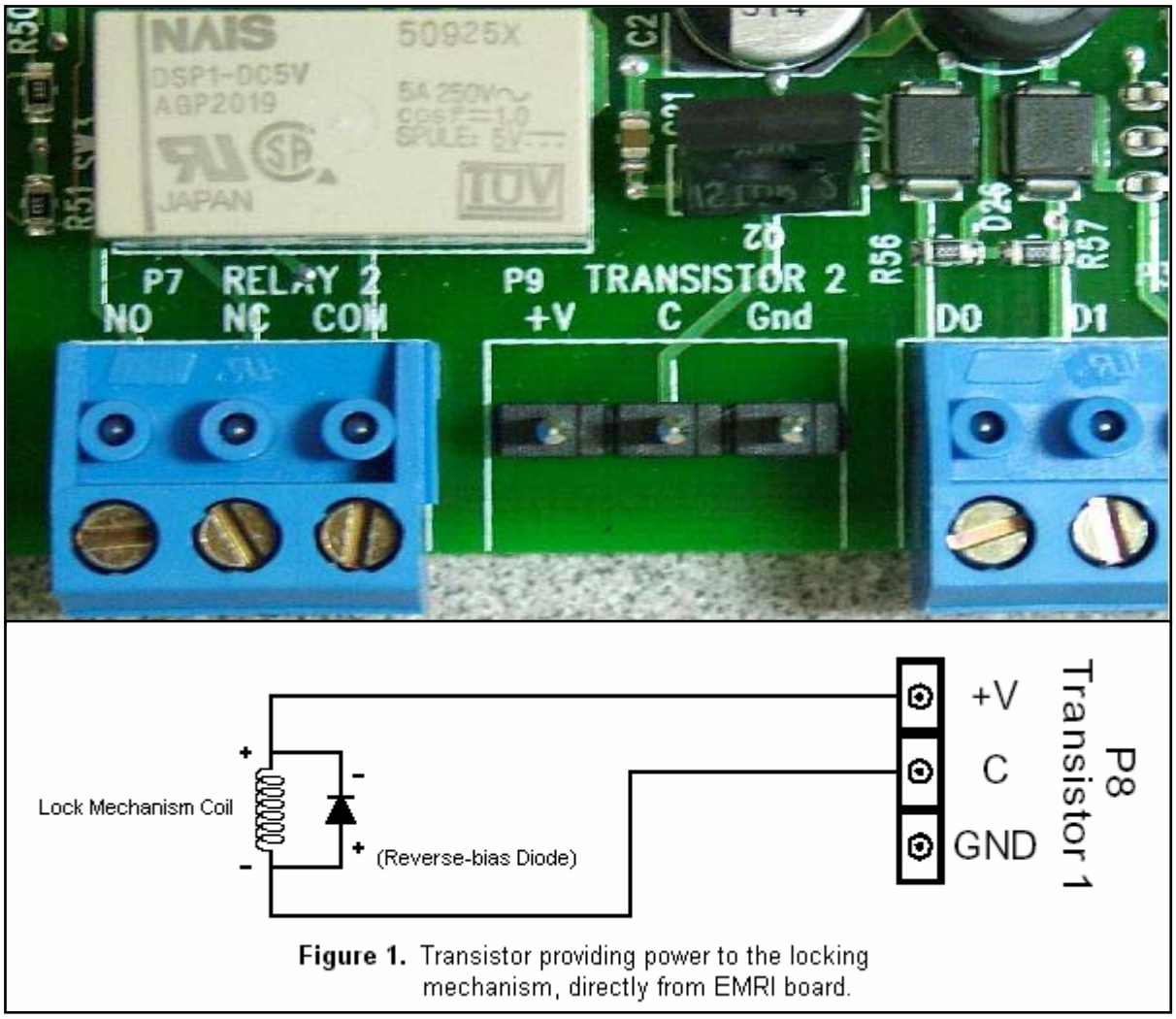

Figure 1. Transistor providing power to the locking mechanism, directly from EMRI board.

When the transistor output is not active, the collector "hovers" at a voltage close to **+V**. But when the transistor output switches to "active" the collector essentially "drops" to ground, creating a voltage potential between the collector (**C**) and (**+V**) pins, thus providing power to the locking mechanism.

The second method employs the use of an external power supply, and acts very much like a relay output, except that in this case, only the ***negative*** power lead can be interrupted via the collector (**C**) output and the ground (**Gnd**) connector (see **Figure 2** below). In this case, when the transistor output is active, the collector output "drops" to ground, thus allowing the current from the external power source to flow into the locking mechanism.

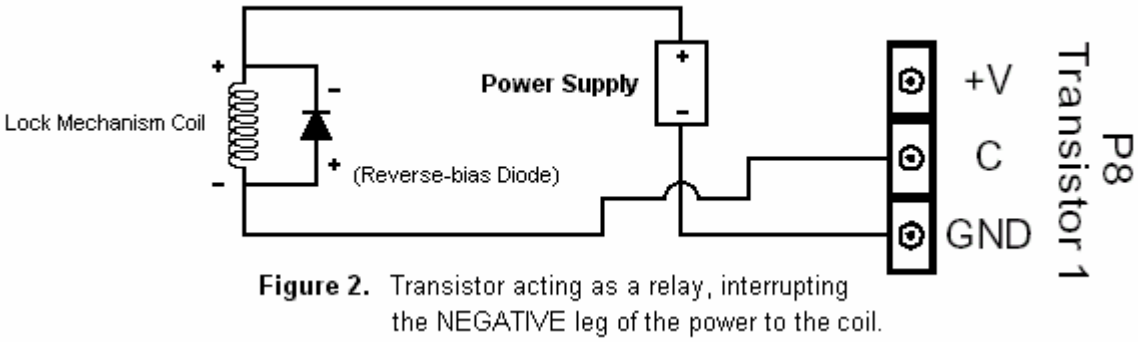

Figure 2. Transistor acting as a relay, interrupting the NEGATIVE leg of the power to the coil.

Please note that in both cases, a reverse-bias diode is employed across the coil, in order to prevent negative back-feed on the circuit. A diode of type *1N4001* is recommended.

The installation of diodes is necessary and extremely important!!!

Failure to follow these instructions may damage the Option-2 board!!!

The third method involves the use of an *isolation relay*, powered directly by the transistor. The advantages of this method are: (1) the use of **AC** locking mechanisms (the first two methods can operate only with **DC** power); (2) the voltage and current limitations are dictated by the isolation relay, not the transistor; (3) *either* the positive or negative leg of the lock power may be interrupted by the relay (when using a **transistor** output, only the *negative* leg may be interrupted); and (4) it is a little more straight-forward for those who are accustomed to using relays.

In this method, an external power supply is used, but the transistor actually powers the isolation relay (see **Figure 3** below). ***Please note*** that a reverse-bias diode is installed across *both* the relay coil *and* the locking mechanism coil.

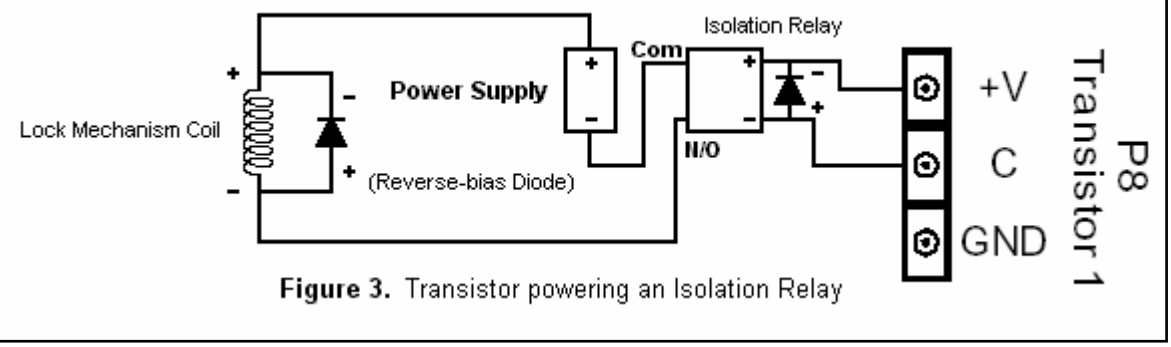

Figure 3. Transistor powering an Isolation Relay

Things to remember when using Transistor Outputs:

- ***Always*** use reverse-bias diodes across and as physically close to the locking mechanism coil as possible.
- ***NEVER*** attempt to connect any type of **AC** device directly to the transistor output (for **AC** locks, you must use an isolation relay, as described above).
- Always be sure that the peak voltage being used by the transistor is *no greater* than **24 VDC** and *no greater* than **1 ampere** of current.
- When using a transistor output as a "relay" (i.e. as in method #2), you must always break the ***negative*** side of the external power supply to the locking mechanism coil.
- Fail-safe and fail-secure functionality is accomplished through DIP switches 3 and 4 on the Option-2 board. See the *EMRI-2 Board Installation Guide* for further details.
- Always check polarities, current draw and measure voltages before connecting devices to a transistor output.
- When the transistor is energized or active, the voltage should read about **0.6V** between the collector (**C**) and ground (**Gnd**). If the voltage reads zero volts, then either there is no power through the transistor or you have connected something improperly.

Obtaining Clear, Up to Date Installation/Engineering Drawings

The drawings in this manual may not be as clear as you need. To obtain full-page, clear drawings depicting how to connect perpherals to the Option-2 board, use your Internet browser to go to the ***Entry-Master*** *Documentation Page,* located at the following URL:

http://www.entry-master.com/document.shtml

The following documents are located on this web page:

- Option-2 System Cut-Sheet **http://www.entry-master.com/Opt-2cut.pdf**
- Option-2 Wiring Diagram **http://www.entry-master.com/Opt2dwg.pdf**
- Option-2 Installation Guide **http://www.entry-master.com/Opt2_hw.pdf**
- Option-X Software Manual **http://www.entry-master.com/OptX_sw.pdf**

These documents are also located on the **Installation CD** contained in the Option-2 enclosure, and can be found in the following directory:

d:\Manuals, where "**d:**" is the drive letter of your CD-drive.