



## Wiring Relays to Control Field Equipment

In my last column on selecting relays for controlling AC equipment, the discussion ended when we were set to start hooking up cables and make wiring connections. Let's pick it up here by stating two general relay-wiring principles that will help you make sense of what follows.

- Like a home light switch, a relay only breaks the hot wire when switching. Do not connect any 120 VAC neutral wire to an output relay switch.
- Also like a home light switch, a relay must be energized from a constant power source so switching potential is always available.

### System Wiring Guidelines

Any electronic scale system containing relays to field equipment should observe several rules:

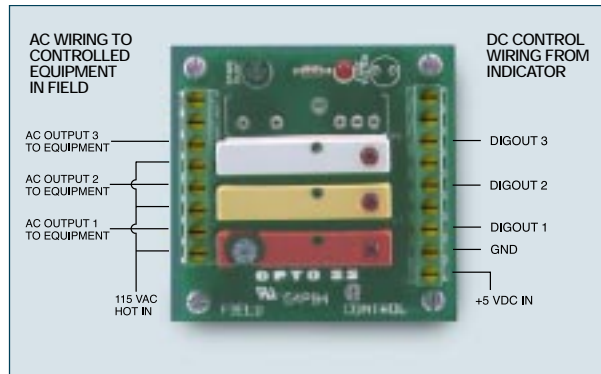
- Never try to operate the weight indicator on the same AC circuit used to run AC field equipment. Always use a dedicated AC circuit for clean power to the indicator.
- To prevent interference, do not mount mechanical contact isolation relays within a digital indicator enclosure.
- Do not connect AC-AC isolation relays directly to setpoint TTL outputs. You'll need a DC-AC solid-state relay between a setpoint output and an AC isolation relay.
- If your setpoints and relays are used in a batch routine to control processing

equipment, check final relay operation with a dial-type load cell simulator. When relays "make," an LED will light or you'll hear an audible click. Alternately, use a continuity tester.

Do not, I repeat, do *not* turn the batch start switch "ON" and hope everything's right. Murphy's Law applies when a batch routine is run before testing each relay. I can tell you some horrific stories...this is hard experience talking here.

### Indicator (Control) Side Wiring

All relays of the DC side of OPTO 22 relay racks have interconnected power feed pins. That means you need run only one set of 5 VDC power feed wires to each relay rack to energize all relays as shown below.



- On the IQ plus 800/810, run the 5 VDC hot and ground wires from the indicator's J4 terminal (pins 9 and 10) to the OPTO 22 DC control side + (1) and - (2) power feed pins.

- If you're driving more than eight load cells, more than four relays, or operating in an EMI/RFI "noisy" environment, use a separate 5 VDC power supply. Don't depend on the indicator's hard-working 5 VDC supply.

Sometimes solid state DC-DC relays with triacs will pass a residual trickle current to the field side even though the relay has not tripped. To eliminate that trickle current, add a 2 K $\Omega$ , 5-watt resistor to the circuit to block the current leakage.

### Equipment (Field) Side Wiring

For obvious safety reasons, the high-voltage AC side of the relay rack does not have interconnected power feed pins. You'll have to energize each relay individually.

- After feeding 120 VAC hot power to pin 2 (which energizes AC output 1), you must wire a hot line to the even-numbered pin of each AC output you plan to use (see diagram at left). If the same AC circuit will be used for all outputs, jumper the feed from pin 2 (115 VAC HOT IN).
- To prevent interference, keep all 120 VAC lines away from 5 VDC lines and terminals. Maintain at least 3" clearance when these lines parallel, and make line crosses at right angles.
- When switching high-inductance electric motors with DC-AC relays, a surge can travel back to the relay and indicator when starting and stopping the motor. Use a snubber, or Quencharc<sup>®</sup> across the relay's output pins to prevent this damaging back surge.

Using weight setpoints and relays to operate processing equipment has revolutionized modern batch processing. Follow these wiring guidelines to help your customers have a painless and pleasant first experience with this amazing technology.

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Rice Lake Weighing Systems  
230 W. Coleman St. • P.O. Box 272  
Rice Lake, WI 54868 USA  
TEL: 715-234-9171 • FAX: 715-234-6967  
WWW: [www.rlws.com](http://www.rlws.com)  
E-MAIL: [prodinfo@rlws.com](mailto:prodinfo@rlws.com)  
[intlsales@rlws.com](mailto:intlsales@rlws.com)

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