



## Design Engineer's Guide to Series 50 Solid State Relay Selection

### Introduction

Modern OEM systems demand reliable, compact, and maintenance-free switching devices to bridge the gap between low-power sensors and high-power AC loads. Compac Engineering's Series 50 Solid State Relays (SSR) are tailored to meet this need—eliminating contact wear, arcing, and audible clicking common to mechanical relays. These relays provide quiet, dependable control for motors, solenoids, alarms, and pumps operating from 24–240 VAC. Series 50 relays are particularly suited for coupling with reed switches in fluid level sensing applications, but their utility goes far beyond.

### Series Overview

The Series 50 lineup consists of two models designed for distinct switching behaviors:

- 50-NP-AC5 (NistorPac): A non-latching AC relay that turns ON when its input switch is closed and turns OFF when opened.
- 50-LP-AC5 (LatchPac): A latching AC relay that activates when both the Start and Stop switches are closed and remains ON until both inputs open—enabling hysteresis control with wide differential logic.

Both models use screw terminals and support input control from low-voltage dry contacts, typically from reed switches but also compatible with other types of SPST sensors.

### Operating Principles

Series 50 relays are solid state and require no mechanical contacts. The 50-NP-AC5 switches the AC load ON whenever the sensor input closes. It turns OFF immediately upon sensor opening. The 50-LP-AC5 differs in that it latches ON only when both Start and Stop switches are closed, and stays ON until both are open again. This is ideal for level sensing, but the latching logic can be applied in many other control scenarios.

### Relay Selection Guide

- Choose the 50-NP-AC5 for simple ON/OFF control where no hysteresis is needed.
- Choose the 50-LP-AC5 for wide-differential, two-point triggering—where the relay should stay latched ON until two distinct OFF conditions are met.
- Use with any dry contact or passive SPST switch that meets the 5VDC, 1000 ohm input requirements—reed switches, bimetallic switches, magnetic contacts, float switches, thermostats, and pressure switches.

### Electrical Ratings and Heat Management

Both relays are rated as follows:

- Input: 24–240 VAC, 50/60 Hz
- Max Continuous Load: 5A (NP), 10A (LP)
- Max Inrush Current: 40A
- Max Surge Current: 15A
- Input Sense Voltage: 5VDC
- Max Sensor Resistance: 1000 Ohms
- Heat Sink Required: >0.75A continuous load

Solid state construction dissipates ~0.92 watts per AMP switched. Mount relays to metal surfaces for cooling, especially in tight enclosures or warm environments.

## **OEM Integration Best Practices**

- Use AWG 20+ for signal wiring and AWG 18+ for line/load wiring.
- Avoid mechanical contact bounce and sensor chatter by choosing clean-switching devices.
- Protect input circuits from surge events; isolate inductive loads with snubbers if needed.
- Mount relays away from high-heat sources and provide airflow if loads are >0.75A.
- Use fused lines and check against applicable UL, CSA, or IEC standards.

## **Typical Fluid Level Applications**

- Sump pump control using high/low level reed switches
- Overflow protection in rinse stations or chemical tanks
- Valve sequencing for drain/fill cycles in fluid processing
- Backup pump control in flood response systems
- Dual float logic for controlling IBC totes or storage tanks

## **Additional OEM Applications (Non-Level Based)**

- **\*\*Thermal Shutdown Interlock\*\***: Using a Series 11 bimetallic temperature switch, trigger a relay to kill power to heating elements if over-temp is detected.
- **\*\*Door Interlock Safety Circuits\*\***: Use magnetic contact switches on doors or panels to activate/deactivate machinery.
- **\*\*Pressure Triggered Relay\*\***: Pair with a dry-contact pressure switch to energize compressors, alarms, or pump stages based on system pressure.
- **\*\*Flow Verification Circuits\*\***: Use inline flow sensors to trigger a relay output when fluid flow begins or stops.
- **\*\*Mechanical Timer Replacement\*\***: Simulate delayed response behavior using switch-controlled latching relays without a PLC.
- **\*\*Sanitation System Interlocks\*\***: Allow relay activation only when rinse water temperature or detergent injection thresholds are met.
- **\*\*HVAC Duct Damper Control\*\***: Relay triggers blower or damper activation based on thermostat or position switches.
- **\*\*Low-Cost Automation\*\***: Enable light-duty material feeders or mixers to run based on simple contact closure events.

## **Conclusion**

The Series 50 family of solid state relays offers far more than basic level sensing. With compatibility across a range of passive SPST switches—reed, pressure, temperature, magnetic, and mechanical—these AC relays solve numerous control problems in compact OEM systems. Their latching and non-latching modes offer options for differential logic, signal hold-on, and direct load activation with minimal parts. For engineers designing automation without full PLCs, these relays enable smart, modular switching logic in a hardened solid-state package.