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Application Note

Replacement of Electromechanical Differential Relays

In protective relaying, electromechanical relays were the industry standard for many years. Valued for their long life and design, many electromechanical relays exist in operation to this day. Despite these benefits, they must be tested and recalibrated frequently in order to remain dependable. Many bus differential electromechanical relays are currently in service and are subject to these drawbacks. This application note showcases how a retrofit version of the Basler Electric BE1-87B single-phase, high-speed, high-impedance bus differential relay is the optimal, solid-state solution for replacing aging electromechanical bus differential relays.

Figure 1 - BE1-87B (9282300111) retrofit components for PVD 21B/21D applications

Solid-State Solution

Solid-state relays were introduced to the industry as an improvement over electromechanical relays due to their reliability and minimal maintenance needs. Because of this, the solid-state BE1-87B retrofit relay is inherently more reliable and cost-effective than its electromechanical counterpart, the GE PVD21B/21D. The solid-state BE1-87B is not subject to drift or changes in performance over time, so recalibration is never necessary.

The BE1-87B retrofit relay is identified by part number 9282300111 and functions as a direct retrofit for GE PVD21B and PVD21D differential voltage relays. The BE1-87B retrofit relay is supplied in a draw-out cradle assembly that installs, without modification, in an existing M1 PVD21B/21D case. A relay cover is secured to the case through a cover adapter. Figure 1 illustrates the BE1-87B retrofit relay components for PVD21B/21D applications. Only minor wiring changes are required. Therefore, upgrading to the BE1-87B retrofit relay is simple and economical without the need for expensive cabinet redesign.

The Retrofit Process

The BE1-87B retrofit relay installation process is straightforward and requires no modification to the existing design of the cabinet. This process consists of only six steps:

1. Select the desired settings on the BE1-87B relay.
2. Remove the existing PVD21B/21D relay from its case.
3. Attach the relay cover adapter to the PVD21B/21D case and secure it with the provided screws.
4. Place the BE1-87B relay in the case and secure it by closing the cradle latches.
5. Install the connection plug.
6. Install the relay cover and secure it by tightening the fastener at the bottom of the cover.

Minimal wiring changes are necessary. Table 1 compares the connections of the GE PVD21B/21D with those of the BE1-87B retrofit relay.

Terminal	Terminal Functions	
	PVD21B/21D	BE1-87B (9282300111)
1	Trip+	DC+ (for power supply/trip)
2	Trip–	Trip
3	86	86 (Za)
4	CT Common	CT Common
5	CT Common	CT Common
6	CT+	CT+ (Ia)
7	Auxiliary Trip+	Chassis Ground
8	Auxiliary Trip+	Power Supply–
9	Trip+	Relay Trouble+
10	Trip –	Relay Trouble–

Table 1 - Comparison of PVD21B/21D and BE1-87B (9282300111) terminal assignments

Due to the simplicity of this process, installation of the BE1-87B retrofit relay requires minimal downtime and expense. Long-term reliability and freedom from the requirements for calibration and frequent testing make the BE1-87B retrofit relay the obvious choice for economical retrofitting of GE PVD21B/21D relays.

Other Retrofit Options

Basler Electric also offers retrofit solutions for electromechanical overcurrent and reclosing relays. BE1-50/51B Overcurrent Relays replace GE IAC relays and Westinghouse CO relays without any wiring changes. One BE1-50/51B model can replace more than 100 IAC or 40 CO relay models. Additionally, the Basler Electric BE1-79A Reclosing Relay replaces GE ACR relays. The BE1-50/51B is shown in Figure 2 and the BE1-79A is shown in Figure 3.

Like the BE1-87B retrofit relay, these relays have the same advantages over electromechanical relays. They require no calibration and installation is straightforward and economical. For more information about these retrofit solutions, visit our website.

Figure 2 - BE1-50/51B Retrofit Relay

Figure 3 - BE1-79A Retrofit Relay

For More Information

For further assistance with product orders or questions, contact Basler Electric Technical Support at 618-654-2341.

For additional information on the BE1-87B, including product bulletin and the instruction manual, visit www.basler.com, contact your Application Engineer, or contact Technical Support at 618-654-2341.

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