



SCOPE

This test procedure covers the testing of the Basler BE1-46N negative sequence current relay. Refer to IM 9170000990 Rev. L (12/12) for testing support information and component level identification. Especially see pg.4-10 through 4-12 for wiring schematics and Section 5 for manufacturer test procedures.

SAFETY

In the field, withdraw the lower test paddle first to open the trip circuit. Removing the upper paddle first may cause an inadvertent trip.

Be sure DC power is applied safely to terminals 3-4. Use caution during testing.

Per IM pg. 1-3, do not apply more than 10 amps continuous or 250 amps for 1 second to the relay.

INTRODUCTION

The type BE1-46N relay is used for negative sequence current protection of generators and motors. It monitors I_2 current and responds based on settings that correspond to machine characteristics.

TOOLS, EQUIPMENT, AND MATERIALS

- One, two, or three variable ac current, variable phase-angle sources
- Variable dc voltage/current source
- Contact continuity check method

INSPECTION

1. Take the cover off the relay, taking care to not shake or jar other relays around it.
2. Withdraw the lower relay test paddle to disable the trip circuit, then withdraw the upper paddle.
3. Lift the relay out of the case.
4. Visually check the relay for any obvious problems.
5. Clean the relay thoroughly.
6. Check that all relay connections are tight.

TEST PROCEDURE

There is a test procedure in the IM, Section 5, that can be used.

ALTERNATE TEST PROCEDURE

The test procedures below begin with the relay set as follows:

Tap Adjust - G (4.4)
Cal - fully CW
Pickup - 30
Alarm - 20
K Set - 10
Max Time - 01

If you are testing a relay in service with settings, adjust this test procedure to verify that the relay responds correctly to the in-service settings.

TESTING THE MINIMUM PICKUP

1. Set the relay as above.
2. Calculate what the pickup and alarm current will be.
3. Apply dc voltage to Terminals 3 and 4 to energize the relay.
4. Connect (a) current(s) to Terminals 9-8, 14-13, and / or 16-15. The relay assumes ABC rotation under normal conditions.
5. Ramp up current in one phase until the Alarm LED lights, record it, continue ramping current until the Pickup LED lights, record, ramp the current back down until the LED goes out and record. Turn current off. The results should be 3(Tap x Alarm) and 3(Tap x Pickup). The drop out should be above 98% of the pickup. The output contacts won't assert until the corresponding time transpires.
6. You can try this test with 3 phases in reverse sequence or with 2 phases 180⁰ apart. The result with 3 phases will be the setting value x tap, the 2 phase will be the setting x tap x 1.73.

TESTING THE ALARM TIME

1. Set up a sense lead that will time the Alarm output contact.
2. Apply negative sequence current above the Alarm setting.
3. The Alarm output should close after 3 seconds.

TESTING THE K SET INVERSE TIME CURVE

1. Looking at IM Figure 3-2 (46N Timing), find where the K = 10 curve crosses 30% Negative Sequence Current and determine the expected time.
2. Set the Max Time to 00 (1,000 sec) so it won't interfere with the K time.
3. Set up to sense on the trip output.
4. Apply the appropriate current and time the trip output.
5. Repeat the process for a higher current to verify the curve.

TESTING THE MAX TIME SETTING

1. Set the Max Time back to 01 (x10). This is ORed with the K timer.
6. Set up to sense on the trip output.
7. Apply the current as for the first K time test and time the trip output.