MicroVersaTrip Plus™ and MicroVersaTrip PM™ Conversion Kits

for ITE® KD3000 and KE4000 Low-Voltage Power Circuit Breakers

INTRODUCTION

GE Conversion Kits are designed for upgrading existing ITE® low-voltage power circuit breakers, rather than replacing the entire breaker. The Conversion Kits include MicroVersaTrip Plus™ or MicroVersaTrip PM™ Trip Units, the latest technological advance in GE trip systems.

MicroVersaTrip Plus and MicroVersaTrip PM Conversion Kits are designed and tested to conform to ANSI Standard C37.59, allowing the retrofitter to properly install the kit and acceptance test the breaker.

This publication covers installation of MicroVersaTrip Plus and MicroVersaTrip PM Conversion Kits on ITE® KD3000 and KE4000 low-voltage power circuit breakers. Each Conversion Kit contains all the components needed to convert from the existing trip system.

SECTION 7. TESTING AND TROUBLE-SHOOTING

> ***WARNING:*** Do not change taps on the current sensors or adjust the trip unit settings while the breaker is carrying current.

Testing

1. Verify that the trip unit is securely installed by performing a continuity test on the CT wiring and the trip unit.
   - **a.** Disconnect the black CT wires at each phase sensor.
   - **b.** Check for continuity with a continuity tester or VOM from the white lead of the phase A CT to the white lead of the phase B CT.
   - **c.** Repeat this continuity test for the white leads of the phase A and phase C CTs.
   - **d.** Measure the resistance across each phase sensor and compare the values measured to the values listed in Table 1.
   - **e.** Reconnect the black CT leads to all of the phase sensors. Ensure that this is done before continuing with performance testing of the breaker.

> ***CAUTION:*** In addition to the continuity test described in Step 1 and before performance testing of the converted breaker, each phase of the breaker should be primary injected with a current level of about 10%, but no more than 20%, of the CT rating. During the application of test current, activate the trip unit screen by depressing the battery button on the trip unit face and check that the test current is displayed on the screen for each phase tested. If the trip unit fails to display the test current, stop the test immediately and verify the installation of the trip unit and wire harness before proceeding with any additional testing.

> ***WARNING:*** If the converted breaker is energized or tested by primary injection with a sufficiently high test current with a loose or open circuit between the CTs and the trip unit, damage will occur to the trip unit, wire harness, 36-pin trip unit connector, and CTs. Failure to adhere to these instructions will void all warranties.

2. Check the insulation on the primary circuit with a 1,000-volt Meggar.
3. Measure the resistance across the line and load terminals for each phase using a micro-ohmmeter or millivolt tester. If the resistance differs considerably from phase to phase, the electrical connections may not be properly tightened or it could also indicate improper contact wipe.
4. To verify that the breaker has been properly retro-fitted, perform a primary injection test on each phase. This test will check the CTs, bus, wiring harness, flux shifter, and trip unit as a complete system.
   - **a.** A high-current, low-voltage power supply should be connected across each line and load terminal to simulate an overcurrent fault.
   - **b.** Set the long-time trip at 0.5 to minimize the breaker stress.
   - **c.** When ground fault is installed, the test can be performed by wiring two adjacent poles in series or by using the GE Digital Test Kit, cat. no. TVRMS2. This will prevent the breaker from tripping because of an unbalanced current flow.

> ***CAUTION:*** Do not attempt to use GE Test Kit cat. no. TVTS1 or TVRMS on this trip unit.

Trouble-Shooting

When malfunctioning is suspected, first examine the breaker and its power system for abnormal conditions such as the following:

- The breaker is not tripping in response to over-current conditions or incipient ground faults.
- The breaker is remaining in a trip-free state because of mechanical interference along its trip shaft.
- The shunt trip (if present) is activating improperly.

Nuisance Tripping on Ground Fault-Equipped Breakers

When nuisance tripping occurs on breakers equipped with ground fault trip, a probable cause is the existence of a false ground signal. Each phase sensor is connected to summing circuitry in the trip unit. Under no-fault conditions on three-wire load circuits, the currents add to zero and no ground signal is developed. This current sum is zero only if all three sensors have the same electrical characteristics. If one sensor differs from the others (such as a different rating or wrong tap setting), the circuitry can produce an output sufficient to trip the breaker. Similarly, a discontinuity between any sensor and the trip unit can cause a false trip signal.

The sensors and their connections should be closely examined if nuisance tripping is encountered on any breaker whose MicroVersaTrip Plus or MicroVersaTrip PM trip unit has previously demonstrated satisfactory performance. After disconnecting the breaker from all power sources, perform the following procedure:

1. Check that all phase sensors are the same type (current range).
2. Verify that the tap settings on all three phase sensors are identical.
3. Verify that the wiring harness connections to the sensors have the proper polarity (white lead to common, black lead to tap), as shown in the cabling diagram in Figure 21.

4. On ground fault breakers serving four-wire loads, check that the neutral sensor is properly connected, as indicated in Figure 21. In particular, check the following:
   a. Verify that the neutral sensor has the same rating and tap setting as the phase sensors.
   b. Verify continuity between the neutral sensor and its equipment-mounted secondary disconnect block. Also check for continuity from the breaker-mounted neutral secondary disconnect block through to the trip unit wiring harness connector.
   c. If the breaker's lower studs connect to the power source, then the neutral sensor must have its load end connected to the source.
   d. Verify that the neutral conductor is carrying only the neutral current associated with the breaker's load current (the neutral is not shared with other loads).
5. If the preceding steps fail to identify the problem, then measure the sensor resistances. The appropriate values are listed in Table 1. Since the phase and neutral sensors are electrically identical, their resistances should agree closely.

Breaker	CT Rating, A	Resistance, Ω
LA-600	150 225 600	10.1–15.2 14.5–22 47–58
LA-1600	800 1600	54–81 110–166

Table 1. CT resistance values.

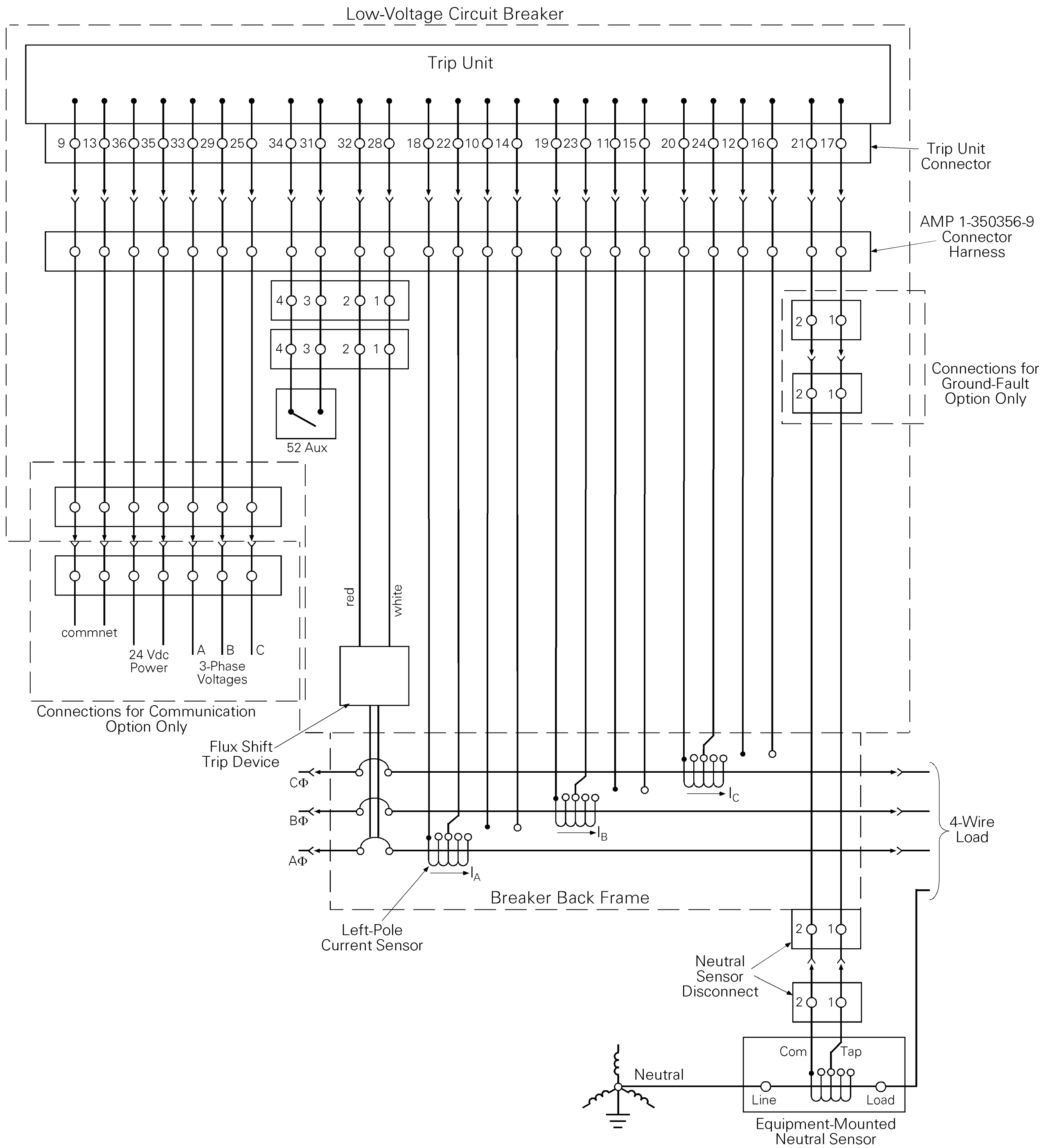

Figure 21. Cabling diagram for MicroVersaTrip Plus™ and MicroVersaTrip PM™ trip units with ground fault on four-wire loads.

These instructions do not cover all details or variations in equipment nor do they provide for every possible contingency that may be met in connection with installation, operation, or maintenance. Should further information be desired or should particular problems arise that are not covered sufficiently for the purchaser's purposes, the matter should be referred to the GE Company.

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