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DEH-127B Supplementary Instructions

MicroVersaTrip â Plus and MicroVersaTrip â PM Conversion Kits

For Installation of MicroVersaTrip® Plus & MicroVersaTrip® PM Programmer Trip Units or Wire Harness Assemblies on Low Voltage Power Circuit Breakers

SUPPLEMENTARY INSTRUCTIONS ONLY

This publication must be used in conjunction with the specific MicroVersaTrip® Plus or PM Conversion Kit installation instructions for your type of Low Voltage Power Circuit Breaker.

INTRODUCTION

GE Conversion Kits are designed to upgrade existing Low Voltage Power Circuit Breakers, rather than replacing the entire breaker. The Conversion Kits contain enhanced solid-state MicroVersaTrip® Plus or MicroVersaTrip® PM Trip Units, representing the latest technological advancement in GE trip systems.

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

This supplementary publication covers specific instructions for the installation of MicroVersaTrip® Plus and MicroVersaTrip® PM Conversion Kit programmer trip units or wire harness assemblies on Low Voltage Power Circuit Breakers. The information included in this manual may be similar to the installation instructions provided with your MicroVersaTrip® Plus or MicroVersaTrip® PM Conversion Kit but this supplementary publication should be referenced as the latest instructions available for the installation of the programmer trip unit or wire harness assembly on Low Voltage Power Circuit Breakers.

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The sections listed above are to be used in conjunction with the installation instructions included with the MicroVersaTrip® Plus and MicroVersaTrip® PM Conversion Kits. This supplementary publication does not detail all aspects of the conversion kit installation process.

SECTION 1 INSTALLING THE WIRE HARNESS ASSEMBLY

Wire Harness Connector Assembly and Installation

The wire harness includes a 36-pin programmer connector, which must be assembled and installed to the programmer bracket prior to the installation of the programmer unit.

WARNING: THE ADAPTER BRACKET MUST BE INSTALLED ONTO THE PROGRAMMER 36-PIN CONNECTOR AND PROGRAMMER BRACKET AS DETAILED BELOW. FAILURE TO DO SO WILL RESULT IN HARNESS PLUG FAILURE AND THE PROGRAMMER WILL NOT PROVIDE PROTECTION. IF THE CONVERTED BREAKER IS ENERGIZED OR PRIMARY INJECTED WITH THE ADAPTER BRACKET NOT INSTALLED OR INSTALLED IMPROPERLY, DAMAGE WILL RESULT TO THE PROGRAMMER UNIT, WIRE HARNESS, 36-PIN CONNECTOR, AND CT'S. FAILURE TO ADHERE TO THESE INSTRUCTIONS WILL VOID ALL WARRANTIES.

Step 1.
Slide the adapter bracket onto the 36-pin programmer connector (Figs. 1a & 1b). Be sure that the beveled corners of the programmer connector are facing toward the right side, the adapter bracket slides in place behind the notches on either side of the connector body, and that the connector's tabs align with the notches provided on the bottom of the adapter bracket.

Step 2.
Hold the adapter bracket tight to the programmer connector and bend the two (2) locking tabs provided on the adapter bracket over the connector body (Fig. 1c).

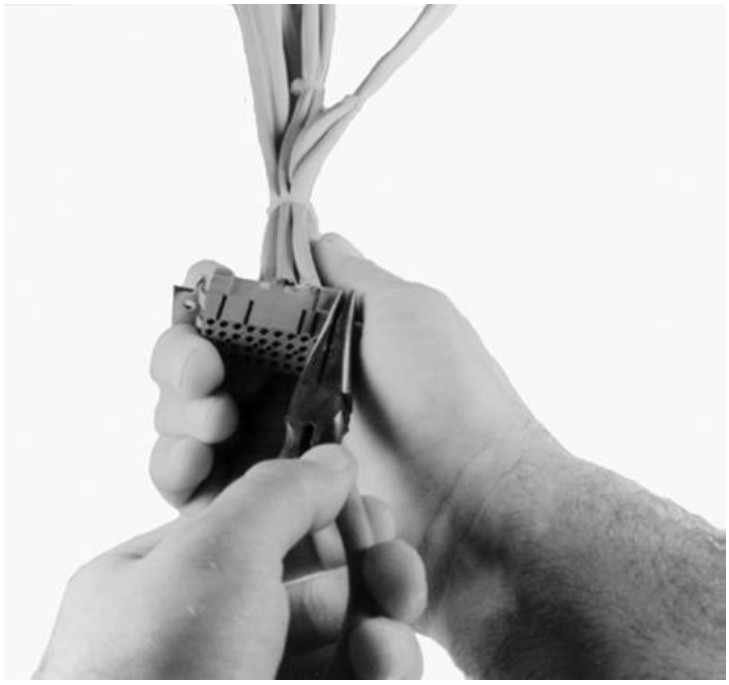

Fig. 1c. Adapter Bracket Locking Tabs

Fig. 1a. 36-Pin Programmer Connector

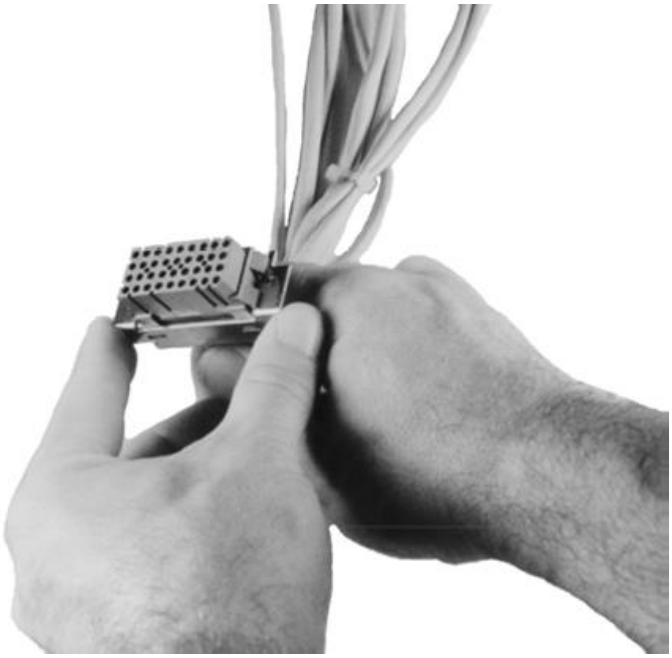

Fig. 1b. Adapter Bracket

SECTION 1 INSTALLING THE WIRE HARNESS ASSEMBLY (CONTINUED)

Wire Harness Connector Assembly and Installation (Continued)

Step 3.
Slide the adapter bracket and connector assembly over the guide pins of the programmer bracket. Press the two (2) steel push nuts provided onto the guide pins using a nut driver until the assembly is held firmly against the programmer bracket (Fig. 1d).

Step 4.
While holding the adapter bracket and connector assembly firmly in place against the programmer bracket, bend the two (2) locking tabs on the programmer bracket into the mating notches on the adapter bracket using a screwdriver (Fig. 1e).

Step 5.
Refer to the installation instructions provided with the MicroVersaTrip Plus® or MicroVersaTrip PM® conversion kit to complete the wire harness installation process.

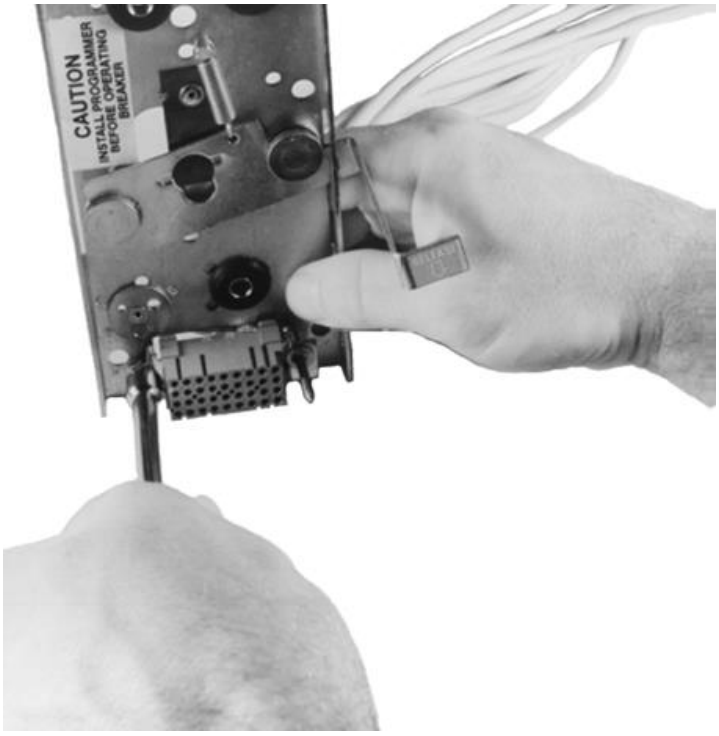

Fig. 1d. Installing Push Nuts

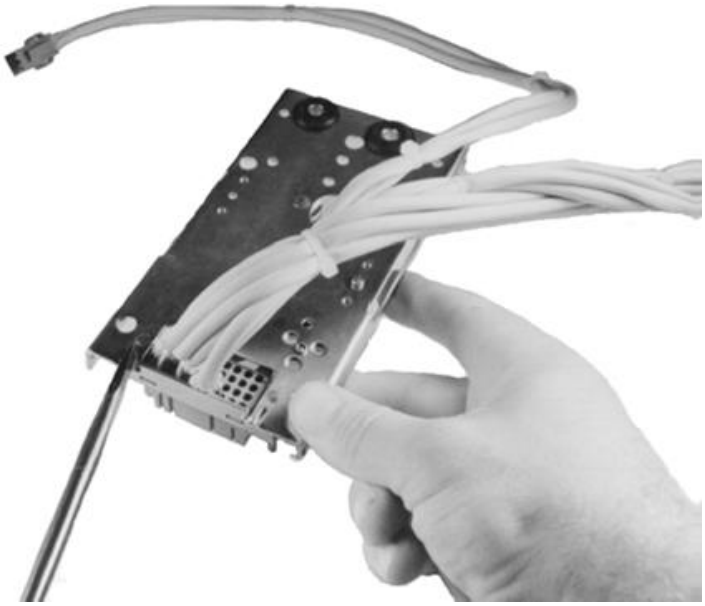

Fig. 1e. Programmer Bracket Locking Tabs

SECTION 2 INSTALLING THE PROGRAMMABLE TRIP UNIT

The programmer is attached to the programmer mounting bracket. The guide pins in the bracket mate with the holes on either side of the programmer box. The guide pins provide the necessary alignment for the connector engagement. The locking lever engages with the pin, which is assembled to the programmer unit, and secures the programmer to the mounting bracket.

To Install the Programmer:

Step 1.
Insert the guide pins into the holes and push on the programmer. This will engage the connectors and release the locking lever which will move upwards (Fig. 2).

Step 2.
Verify that the locking lever actually engaged with the pin on the rear of the programmer.

To remove the programmer, pull the locking lever down, thus releasing the programmer pin. Then, remove the programmer.

WARNING: BE SURE TO PERFORM THE CONTINUITY TEST DETAILED IN STEP 1 OF TESTING ON PAGE 6 PRIOR TO ENERGIZING OR PRIMARY INJECTING THE CONVERTED BREAKER. FAILURE TO DO SO MAY RESULT IN DAMAGE TO THE PROGRAMMER UNIT, WIRE HARNESS, 36-PIN PROGRAMMER CONNECTOR AND CT'S. FAILURE TO ADHERE TO THESE INSTRUCTIONS WILL VOID ALL WARRANTIES.

Fig. 2. Programmer Installation

SECTION 3 TESTING AND TROUBLESHOOTING

Once the breaker has been converted, but before it is energized, it must be tested. See below for testing and troubleshooting details.

Testing

Before installing a converted breaker back into service, perform the following steps:

Step 1.
Verify that the programmable trip unit is securely installed by performing a continuity test on the CT wiring and programmer. Disconnect the black CT wires at each phase sensor. Then using a continuity tester or V.O.M., check for continuity from the white CT wire lead of the phase "A" CT to the white CT wire lead of the phase "B" CT. Repeat this continuity test for the white CT wire leads of phase "A" and phase "C". Next, measure the resistance across each phase sensor and compare the values measured to the values listed in table 3-1. Be sure to reconnect the black CT wire leads to all of the phase sensors prior to performance testing the breaker.

CAUTION: In addition to the continuity test described above and prior to performance testing 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, the programmer's screen should be activated by depressing the battery button on its face and check that the test current is displayed on the screen for each phase tested. This test along with the continuity test will confirm that no open circuits exists in the CT harness and that the trip unit is mounted properly. If the programmer fails to display the test current, the test should be stopped immediately and the programmer/wire harness installation should be verified prior to proceeding with any additional testing.

WARNING: IF THE CONVERTED BREAKER IS ENERGIZED OR PRIMARY INJECTED USING A SUFFICIENT LEVEL OF TEST CURRENT WITH A LOOSE OR OPEN CIRCUIT BETWEEN THE CT'S AND THE PROGRAMMER, DAMAGE WILL OCCUR TO THE PROGRAMMER UNIT, WIRE HARNESS, 36-PIN PROGRAMMER CONNECTOR AND CT'S. FAILURE TO ADHERE TO THESE INSTRUCTIONS WILL VOID ALL WARRANTIES.

Step 2.
Meggar the breaker primary circuit using a 1,000-Volt Meggar.

Step 3.
Measure the resistance across the line and load terminals for each phase using a Micro-Ohmmeter or Milli-Volt tester. If the resistance differs considerably from phase to phase, the electrical points may not be properly tightened. Also, it may indicate improper contact wipe.

Step 4.
To verify that the breaker has been properly retrofitted, a primary injection test should be performed on each phase. This test will check the CT's, bus, wiring harness, flux shifter, and trip unit as a complete system. A high current, low voltage power supply should be connected across each line and load terminal to simulate an overcurrent fault. The long-time may be set at 0.5 to minimize the breaker stress. When ground fault is installed, the test can be performed by wiring two adjacent poles in series or by using the GE test kit Cat. No. TVRMS2. This will prevent the breaker from tripping due to an unbalanced current flow.

Do not attempt to use GE test kit Cat. No. TVTS1 or TVRMS on this programmer.

Troubleshooting

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

1. Breaker tripping in proper response to overcurrents or incipient ground faults.

2. Breaker remaining in a trip-free state due to mechanical interference along its trip shaft.

3. Inadvertent shunt trip activations.

WARNING: DO NOT CHANGE TAPS ON THE CURRENT SENSORS OR ADJUST THE PROGRAMMER TRIP UNIT SETTINGS OR REMOVE THE PROGRAMMER TRIP UNIT WHILE THE BREAKER IS CARRYING CURRENT. FAILURE TO ADHERE TO THESE INSTRUCTIONS WILL VOID ALL WARRANTIES.

SECTION 3 TESTING AND TROUBLESHOOTING (CONTINUED)

False Tripping Breakers Equipped with Ground Fault

When nuisance tripping occurs on breakers equipped with the ground fault trip element, a probable cause is the existence of a false "ground" signal. Each phase sensor is connected to summing circuitry in the programmer. Under no-fault conditions on 3-wire load circuits, the currents add to zero, and no ground signal is developed. This current sum will be zero only if all three sensors have the same electrical characteristics. If one sensor differs from the others (i.e., different rating or wrong tap setting), the circuitry can produce output sufficient to trip the breaker. Similarly, 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 components have previously demonstrated satisfactory performance. After disconnecting the breaker from all power sources, perform the following steps:

Step 1.
Check that all phase sensors are the same type (ampere range).

Step 2.
Make sure that the tap settings on all three phase sensors are identical.

Step 3.
Verify that the harness connections to the sensors meet the polarity constraints indicated by the cabling diagram detailed in the installation instructions included with the conversion kit.

Step 4.
On ground fault breakers serving four-wire loads, check that the neutral sensor is properly connected. Refer to the cabling diagram . In particular, check the following:

a. Verify that the neutral sensor has the same rating and tap setting as the phase sensors.

b. Check 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 the female harness connector.

c. If the breaker's lower studs connect to the supply source, then the neutral sensor must have its load end connected to the source. Refer to the cabling diagram detailed in the installation instructions included with the conversion kit.

d. Make sure that the neutral conductor is carrying only that neutral current associated with the breaker's load current (neutral not shared with other loads).

Step 5.
If the preceding steps fail to identify the problem, then measure the sensor resistance's. Since the phase and neutral sensors are electrically identical, their resistance's should closely agree.

Table 3-1. CT Resistance Values

Refer to the CT Resistance Values detailed in the installation instructions included with the MicroVersaTrip Plus â or PM Conversion Kit

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

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