

MODIFICATION AVAILABLE – PERFORMANCE ENHANCEMENT  
 CHARGEABLE TO CUSTOMER SERVICE / RELIABILITY  
 ENHANCEMENT CHARGEABLE TO CONTRACT IF THERE IS ONE.

**3458A-11A**

**S E R V I C E N O T E**

Supersedes:  
 3458A-11

**3458A Multimeter**

**Serial Numbers: 2823A04300 / 2823A05200**

**Reduction of AC Noise When Measuring ACV and Using Twisted Shielded Pair Cables**

**To Be Performed By: Agilent-Qualified Personnel**

**Parts Required:**

P/N	Description	Qty.
8120-5441	Cable Assembly 500mm	2

**Situation:**

3458A Multimeters in the above range of serial numbers may inject sufficient noise current from the Guard terminal that some ACV readings (especially low level readings) will be marginal with respect to the performance test limits. These marginal readings can be moved much closer to nominal by adding inductive toroids inside the 3458A on the cables connected to both the front and rear Guard terminals.

**ADMINISTRATIVE INFORMATION**

SERVICE NOTE CLASSIFICATION:		
<b>MODIFICATION AVAILABLE</b>		
ACTION CATEGORY:	AGREEABLE TIME	X PERFORMANCE ENHANCEMENT <input type="checkbox"/> SERVICE / RELIABILITY ENHANCEMENT
LOCATION CATEGORY:	<input type="checkbox"/> CUSTOMER INSTALLABLE <input type="checkbox"/> ON-SITE <input checked="" type="checkbox"/> SERVICE CENTER	AVAILABLE UNTIL:
AUTHOR: DLL    PRODUCT LINE: 09E		
ADDITIONAL INFORMATION:		

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**Solution/Action:**

The following test will determine if marginal ACV readings can be improved by adding the inductive toroids. This test can be performed at any of the ACV verification points that are reading “high” (or erratic) because of the injected current (noise) coming from the Guard connection. This test should be preformed at marginal ACV verification points after both an ACAL and ACV calibration have been completed.

- 1) Use a twisted pair shielded cable to connect to the ac source being used as the calibration source. The twisted pair is used to connect the source HI terminal to the 3458A HI terminal and to connect the source LO terminal to the 3458A LO terminal. Connect the shield to the Guard at the 3458A and to the Guard terminal at the source (connect the shield to the source LO terminal if the source does not have a Guard terminal). The “LO terminal” for some sources will be earth ground (chassis). Set the 3458A Guard switch such that LO is connected to Guard (Guard switch in).
- 2) Apply the test signal to the 3458A. If the 3458A has injected current (noise) coming from the Guard terminal the reading on the 3458A will be erratic or high.
- 3) Disconnect the 3458AGuard terminal from the shield. With the test signal applied between the 3458A’s HI and LO terminals the noise (erratic or high) readings should be closer to the nominal value.
- 4) Re-connect the shield to Guard. The noise should reappear.
- 5) Connect an inductor in series between the shield and 3458A Guard terminal. The inductor should have a value between 10uH to 500uH. The noise should once again disappear.

NOTE: If the inductors used in step 5) do not cause the noise to disappear; then continuing with this procedure and adding the inductive toroids will not resolve the problem with this 3458A. Additional analysis by a trained technician will be required to resolve the problem with this particular 3458A.

Once the problem is verified, the internal guard cables (one each for front and rear terminals) should be replaced\*\* with new cables that have toroids or the existing cables modified\*\* such that the toroids are added.

CAUTION: Follow appropriate ESD precautions when internal circuits of the 3458A are accessible (such as grounded work station, grounded wrist straps and etc.).

- 1) Disconnect the line cord from the 3458A.
- 2) Remove the top cover and top shield per the disassembly instructions in the 3458A Assembly Level Repair Manual.
- 3) Locate the two separate blue guard cables running from the front and rear Guard terminals to the Front/Rear Switch Assembly.

NOTE: Verify that these two blue leads do not already have the toroid present. DO NOT PROCEED if they already have toroids present – this is not the source of the unit’s ACV noise problems.

- 4) \*\*Cut each cable in half and splice in the new cables with the toroids. Eliminate excess cable length by trimming them to an acceptable length. Cover the cable splices with appropriate insulation (sleeve or shrink tubing).

NOTE: The process described in 4) above is preferred to the complete replacement of the cables. Complete replacement requires a lengthy disassembly of the 3458A and additional replacement steps.

- 5) Re-assemble the 3458A.
- 6) Complete the ACV performance verification tests.