MODIFICATION RECOMMENDED

U1401B-02

S E R V I C E N O T E

Supersedes:
NONE

U1401B Handheld multi-function calibrator or meter

Serial Numbers: See appendix (A)

Constant current output may be out of specification

Parts Required:

P/N	Description	Qty.
NONE		

ADMINISTRATIVE INFORMATION

SERVICE NOTE CLASSIFICATION:

MODIFICATION RECOMMENDED

ACTION CATEGORY: X ON SPECIFIED FAILURE [[]] AGREEABLE TIME	STANDARDS LABOR: 0.5 Hours	
LOCATION CATEGORY: x CUSTOMER INSTALLABLE [[]] ON-SITE **(active On-site contract required)** X SERVICE CENTER [[]] CHANNEL PARTNER	SERVICE INVENTORY: [[]] RETURN [[]] SCRAP [[]] SEE TEXT	USED PARTS: [[]] RETURN [[]] SCRAP [[]] SEE TEXT
AVAILABILITY: PRODUCT'S SUPPORT LIFE	NO CHARGE AVAILABLE UNTIL: 31 August 2016	
X Calibration Required [[]] Calibration NOT Required	PRODUCT LINE: WC AUTHOR: KT	
ADDITIONAL INFORMATION:. . 1 This service note is only valid within the 1st year of shipment AND for 1 time only 2.Calibration required for constant current output path only as describe below		

Printed in U.S.A.

February 11, 2015
Rev. 1

KEYSIGHT TECHNOLOGIES

Situation:
Unit with the Serial number listed below may experience the constant current output failing its guaranteed performance specification when shipped out from factory.

Loopback Verification procedure:
Users can verify if the unit is impacted by performing the following steps below

i. Connect the output terminal to the input terminal on U1401B.
Photo needed…

ii. Turn the rotary switch to the (constant current output/input) positions.

iii. Press SHIFT to access the shifted operations of the keypad. The SHIFT annunciator will appear on the display.

iv. Press MODE to cycle through ±25 mA, SCAN ±25 mA, and ±25 mA output modes. Select the ±25 mA output mode for constant output.

v. With the instrument in standby mode (you should see the SBY annunciator on the display; if not, press OUTPUT), you can adjust the amplitude of the output by pressing ◀ and ▶ to select the digit to be adjusted, and then pressing ▲ and ▼ to adjust the value of the selected digit.

vi. Press OUTPUT to start the source output. The OUT annunciator will appear on the display.

The impacted units will have the actual current output different from the setting current output. Please refer to example picture as below.

- Setting: +01.000 mA
- Specification: 01.000 mA **±**0.010mA (output specification + input specification)
- Measured: -08.835 mA(out of specification)

Solution/Action:
Users can choose to

I. readjust the unit's constant current output back to meet the performance specification by following the steps below OR
II. Contact the nearest Service Center to have the unit's constant current output recalibrated.

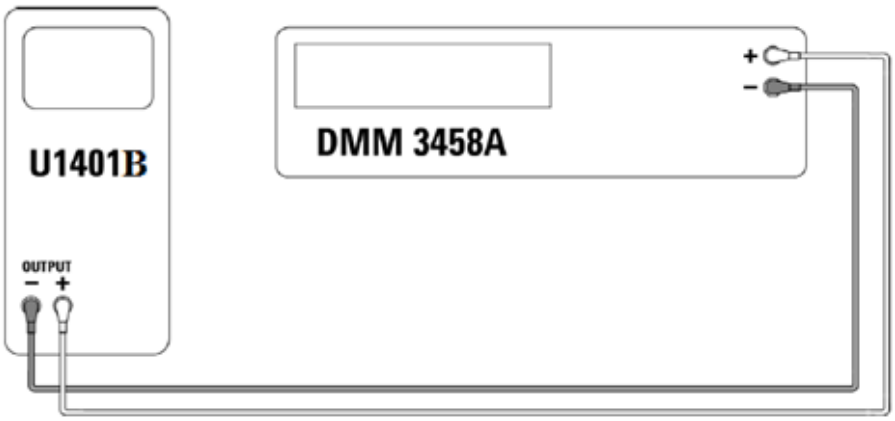
Recommended Instrument:
3458A 8.5 digits Digital Multi Meter

Output calibration

1. Set the slide switch to the M/S position
2. Allow the instrument to warm up for 10 minutes before performing the calibration.
3. To enter the calibration mode, press ⏦ and DUAL for more than one second. The primary display will indicate "CHEEP".
4. Press Hz to enter the input calibration mode.
5. Turn the rotary switch the "current Input/Voltage output" positions, and press **SHIFT** for more than one second to enter the output calibration mode.

CAL-0 & CAL-1
In the output calibration mode, the primary and secondary display will show "CAL-0" and "-rdy-" respectively.

Connect the output terminals to the voltage input terminals of 3458A multimeter as show in below picture. Set the 3458A to measure DCV, 100mV and NPLC = 100.



Output voltage verification

•**CAL-0**:

1. Press **OUTPUT**. The primary and secondary displays show "CAL-0" and "00000" respectively.
2. Wait until the instrument reading becomes stable, and then record DCV value on the 3458A.

•**CAL-1**:

1. Press **MODE**. The primary and secondary displays show “CAL- 1” and “- rdy” respectively.
2. Press **OUTPUT**. The primary and secondary displays show “CAL- 1” and “00000” respectively.
1. Press ▲ or ▼ to adjust the output voltage until the reading on the 3458A is the same as the **CAL-0** value recorded above.
2. Press **MODE** to finish the **CAL-0** and **CAL-1** calibration.

After finishing the **CAL-0** and **CAL-1** calibration procedures, the instrument will automatically enter the 1.5 V output calibration modes.

Output voltage calibration

Follow the steps below to perform calibration for the output voltage ranges and values listed in Table1-1:

1. As you enter each calibration step, the primary and secondary displays show the *output voltage value* and “-rdy-” respectively.
2. Press **OUTPUT**. The primary and secondary displays show the *output voltage value* and “00000” respectively, which means the present output level is as shown on the primary display.
3. Press ▲or ▼ to adjust the output voltage until the 3458A reading is the same as the value shown on the primary display.
4. Press **MODE** to enter the next calibration step.

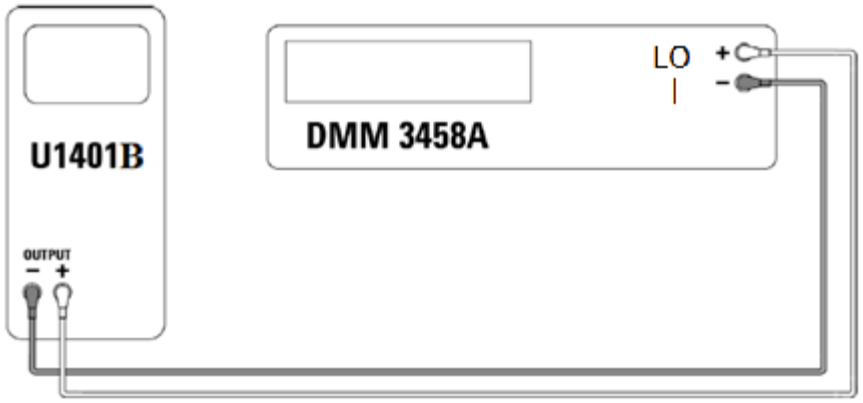
Table 1-1 Output voltage calibration steps

Voltage range	Calibration step	Output voltage value	3458A range
1.5V	1	+0.0000 V	100mV
	2	+1.1000 V	1V
	3	–1.1000 V	1V
15V	4	+00.000 V	100mV
	5	+11.000 V	10V
	6	–11.000 V	10V

At the end of the last calibration step, the primary display will show “PASS” after the **MODE** button is pressed.

Output current calibration

1. Without exiting the calibration mode, turn the rotary switch to the “Current Input/Current Output” positions.
2. Connect the output terminals to a 3458A multimeter as show in below picture. Set the 3458A to measure DCI and NPLC = 100.



Output current verification

Follow the steps below to perform calibration for the output voltage ranges and values listed in Table 1-2:

1. As you enter each calibration step, the primary and secondary displays show the *output current value* and “-rdy-” respectively.
2. Press **OUTPUT**. The primary and secondary displays show the *output current value* and “00000” respectively, which means the present output level is as shown on the primary display.
3. Press ▲or to ▼ adjust the output current until the 3458A reading is the same as the value shown on the primary display.
4. Press **MODE** to enter the next calibration step.

Table 1-2 Output current calibration steps

Current range	Calibration step	Output current value	3458A range
25mA	1	+00.000 mA	100uA
	2	+11.000 mA	10mA
	3	–11.000 mA	10mA

At the end of the last calibration step, the primary display will show “PASS” after the **MODE** button is pressed. The output calibration is completed. To exit from calibration mode, press the ≂◄) & DUAL button for more than one second. The DUT's will be restarting, indicated by all display segment briefly shown for approximately 3 seconds.

Lastly, do the output performance verification tests as per table 7-4 in the service guide pages 137.

Table 7-4 Output performance verification tests

Step	Function	Recommended test equipment and connection	Range or parameter	U1401B output	Nominal error within 1 year
1	Turn the rotary switch to any one of the positions.	Connect the U1401B output terminals to the 3458A Multimeter.	±1.5000 V	–1.5 V	±0.75 mV
				0 V	±0.3 mV
				+1.5 V	±0.75 mV
			±15.000 V	–15 V	±7.5 mV
				0 V	±3 mV
				+15 V	±7.5 mV
2	Turn the rotary switch to any one of the positions.	Connect the U1401B output terminals to the 3458A Multimeter.	±25.000 mA	–25 mA	±12.5 µA
				+25 mA	±12.5 µA

Remark: Detail calibration process is available in the service guide.

Appendix (A)

MY53030018	MY54240043	MY53520004	MY54060023	MY54320058	MY54480002
MY53100005	MY54240044	MY53520006	MY54060025	MY54470021	MY54480006
MY53300001	MY54240050	MY54060004	MY54060041	MY54470024	MY54480007
MY53300003	MY54240052	MY54060005	MY54060043	MY54470025	MY54480008
MY53300004	MY54240055	MY54240067	MY54060047	MY54470027	MY54480009
MY53300005	MY54240056	MY54240068	MY54070007	MY54470029	MY54480015
MY53300014	MY54240057	MY54240075	MY54070008	MY54470036	MY54480017
MY53300016	MY54240058	MY54240078	MY54070023	MY54470037	MY54480020
MY53300022	MY54240059	MY54240079	MY54070024	MY54100018	MY54500002
MY53390001	MY54240060	MY54270001	MY54070032	MY54100021	MY54500004
MY53390006	MY54240061	MY54270002	MY54070034	MY54130025	MY54500005
MY53390008	MY54240062	MY54270004	MY54070041	MY54130029	MY54500008
MY53390010	MY53440018	MY54270005	MY54070047	MY54130031	MY54500009
MY53400003	MY53440020	MY54320001	MY54090006	MY54130036	MY54500010
MY53420002	MY53460004	MY54320002	MY54100009	MY54130043	MY54500012
MY53420003	MY53460025	MY54320005	MY54100016	MY54130048	MY54500014
MY53420006	MY53460028	MY54320006	MY54320025	MY54130056	MY54500015
MY53420009	MY53460034	MY54320008	MY54320026	MY54130061	MY54500016
MY53420015	MY53460037	MY54320011	MY54320027	MY54160008	MY54500017
MY53440017	MY53500001	MY54320014	MY54320028	MY54160026	MY54500018
MY54230017	MY53500007	MY54320015	MY54320029	MY54170016	
MY54240002	MY53500008	MY54320017	MY54320031	MY54170023	
MY54240003	MY53500010	MY54320018	MY54320040	MY54170029	
MY54240014	MY53500054	MY54320023	MY54320044	MY54180007	
MY54240018	MY53500058	MY54060006	MY54320045	MY54180019	
MY54240026	MY53500059	MY54060011	MY54320048	MY54220009	
MY54240037	MY53500060	MY54060016	MY54320049	MY54230013	
MY54240042	MY53520002	MY54060022	MY54320051	MY54230016	

Revision History:

Service Note Revision	Date	Author	Reason For Change
01	1/29/15	KT	As published