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# 11683AZ Option K01 and K02 Power Meter Range Calibrator

# Notices

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# 1 Special Supplement

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## Description

The 11683AZ-K01/11683AZ-K02 is a Field Upgrade of a standard 11683A range calibrator to 11683AZ-H01. This kit is used to modify the unit so that it operates with either the Internal DC-Reference source, or an external programmable DC-Reference source.

## Assembly Process

### Material List for 11683AZ-K01

**Table 1-1** Material List for 11683AZ-K01

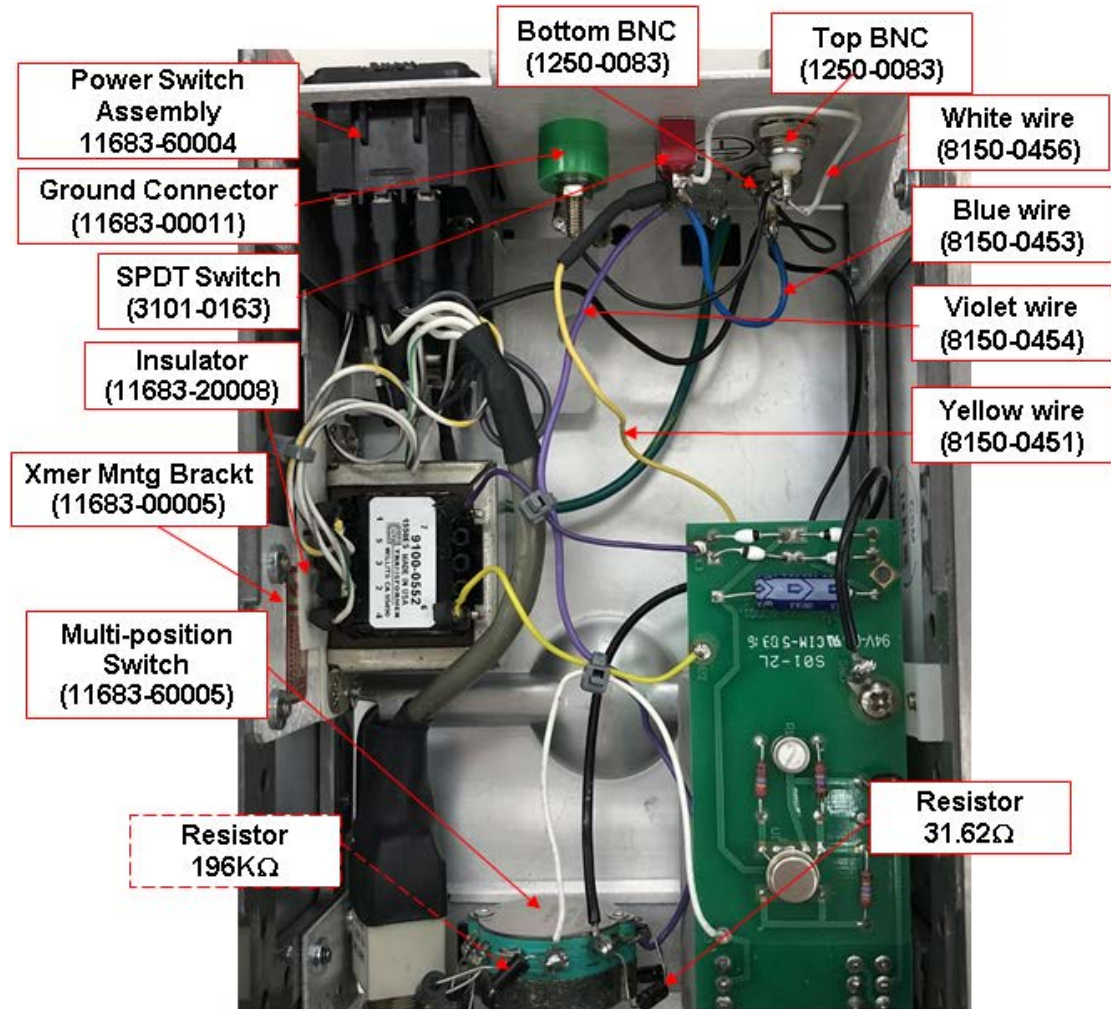
Item	Part Number	Quantity	Description
1	1250-0083	2	BNC Connector
2	3101-0163	1	SPDT Switch
3	0360-1190	2	Terminal Lug
4	11683-00012	1	Rear Panel Option H01
5	8150-0447	1	50 mm Black Wire
6	8150-0447	1	40 mm Black Wire
7	8150-0447	1	150 mm Black Wire
8	8150-0456	1	50 mm White Wire
9	8150-0453	1	50 mm Blue Wire
10	2950-0043	2	Nut
11	2190-0016	2	Washer
12	11683-00011	1	Ground Connector
13	8150-0451	1	130 mm Yellow Wire
14	8150-0454	1	200 mm Violet Wire

## Material List for 11683AZ-K02

**Table 1-2** Material List for 11683AZ-K02

<b>Item</b>	<b>Part Number</b>	<b>Quantity</b>	<b>Description</b>
1	1250-0083	2	BNC Connector
2	3101-0163	1	SPDT Switch
3	0360-1190	2	Terminal Lug
4	11683-00012	1	Rear Panel Option H01
5	8150-0447	1	50 mm Black Wire
6	8150-0447	1	40 mm Black Wire
7	8150-0447	1	150 mm Black Wire
8	8150-0456	1	50 mm White Wire
9	8150-0453	1	50 mm Blue Wire
10	2950-0043	2	Nut
11	2190-0016	2	Washer
12	11683-00011	1	Ground Connector
13	8150-0451	1	130 mm Yellow Wire
14	8150-0454	1	200 mm Violet Wire
15	11683-00005	1	Xmer Mounting Bracket
16	11683-60004	1	Power Switch Assembly
17	2360-0115	2	Screw
18	2420-0001	2	Hexagonal Nut
19	11683-20008	1	Insulator

Figure 1-1 11683AZ Option K01 and K02



## Procedure

- 1 Use the same material from 11683A rear panel and refer to [Figure 1-1](#) to locate the K01/K02 material.
- 2 For K02 option, install Power Switch Assembly (11683-60004) into Rear Panel (11683-00012). Paste Insulator (11683-20008) onto the bracket (11683-00005). Install transformer into bracket (11683-00005) and tighten with 2 screws (2360-0115) and 2 hex-nuts (2420-0001).
- 3 Fit BNC's (1250-0083) into 'D' holes using nut (2950-0043) and washer (2190-0016).
- 4 Fit SPDT switch (3101-0163) into hole marked INT above and EXT below.
- 5 Fit ground connector (11683-00011) next to above.
- 6 Remove resistor (196K?) that is between yellow and violet wire (8150-0454) from multi-position switch (11683-60005)
- 7 Keep violet wire (8150-0454) on multi-position switch (11683-60005) but remove yellow wire (8150-0451) from multi-position switch (11683-60005) for next step.

- 8** Crimp and solder one end of yellow wire (8150-0451) to the resistor (196K?) and cover with heat shrink.
- 9** Crimp but do not solder other end of resistor (196K?) to center pin of the SPDT switch (3101-0163).
- 10** Solder one end of blue wire (8150-0453) into bottom BNC (1250-0083).
- 11** Crimp other end of blue wire (8150-0453) and resistor (196K?) pin lead to center pin of the SPDT switch (3101-0163), this time solder in place.
- 12** Crimp and solder one end of white wire (8150-0456) to top position of the SPDT Switch (3101-0163).
- 13** Solder other end of white wire (8150-0456) into top BNC (1250-0083).
- 14** Crimp and solder one end of 50 mm black wire (8150-0447) to lug on ground connector.
- 15** Crimp other end 50 mm black wire (8150-0447) to top BNC Lug (0360-1190) but do not solder.
- 16** Crimp one end of 40 mm black wire (8150-0447) to lug (0360-1190) on top BNC, solder both wires.
- 17** Crimp other end of 40 mm black wire to bottom BNC lug (0360-1190) along with one end of 150mm black wire, solder both wires.
- 18** Wire comes as standard instrument, except for the below additions adjusting lengths as required.
- 19** Remove violet wire (8150-0454) from bottom BNC pin (1250-0083) to bottom position of SPDT switch (3101-0163).
- 20** Solder black wire (8150-0447) from bottom BNC lug (0360-1190) to 31.62K resistor on multi-position switch (11683-60005).
- 21** Ensure yellow wire from middle of SPDT switch (3101-0163) to the feed through going to the power sensor housing was solder.

## Test Procedure

- 1 Test 11683AZ-H01 in accordance to the standard instruments, with the 'DC REF' switch in the 'INT' position.
- 2 Toggle 'DC REF' switch to 'EXT' position.
- 3 Connect a #18AWG or heavier jumper between the terminal with a green wire on 'DC REF' switch and the center pin of the top BNC connector (DC REF IN)
- 4 Repeat steps 3.3.1 to 3.4.2. in production test procedure, A-11683-90003-1.
- 5 Remove jumper and toggle 'DR REF' switch to 'INT' position.
- 6 Repeat steps 3.3.1 to 3.3.4.

## Specifications

External DC Reference is the same as the Internal Reference.

## Operation

The 11683A Option H01 range calibrator allows a user to select either an internal or an external DC-Reference source. With the **REF SELECT** switch in the **INT** position, the range calibrator is operating manually with the Internal DC-Reference source. With the **REF SELECT** switch in the **EXT** position, the range calibrator can be programmed remotely with a programmable DC source. In this mode of operation, the **REF SELECT** switch disconnects the internal DC source, and connects the external DC source to the sampling gate assembly (A3).

In all other respects, the 11683AZ-H01 operates the same as the standard 11683A.

The typical input voltages corresponding to the different range settings are:

Range	Volts
100 mW	15.800 V
30 mW	4.7121 V
10 mW	1.4641V
1 mW	145.00 mV
3 mW	458.00 mV
300 $\mu$ W	45.837 mV
100 $\mu$ W	14.494 mV
30 $\mu$ W	4.5832 mV
10 $\mu$ W	1.4501 mV
3 $\mu$ W	458.69 $\mu$ V

The above calculated voltages for range 100 mW to 300  $\mu$ W are based on the table shown in the 11683A Operating and Service Manual (11683-90014). The remaining voltages are based in the

voltage divider circuit (A1), and the input resistance (A1R1, A3A1U1R1 and A3R1), of the sampling gate assembly shown in the 11683A Operating and Service Manual (11683-90014).

All voltage calculations assume that the internal reference voltage has adjusted to 145.00 mVDC, with the range switch set at 1 mW position.

## Performance Test

### Internal DC reference

With REF SELECT switch in INT position, range switch performance can be tested as described in the 11683A Operating and Service Manual (11683-90014). Power supply and FET balance adjustments can also be performed as described in the 11683A Operating and Service Manual (11683-90014).

### External DC reference

#### Description:

Use the internal DC reference source to test the EXT. DC reference.

#### Equipment:

Recommended equipment for performing these tests are a digital voltmeter with 5 digits resolution, a jumper (#18 awg or heavier wire), and a banana connector to the BNC 4-wire cable.

#### Procedure:

Set the range as follows:

RANGE	100 mW
FUNCTION	STANDBY
POLARITY	NORMAL

- 1 Set the digital voltmeter controls for automatic DC voltage measurements.
- 2 Connect one end of the 4-wire cable to the digital voltmeter, and the other end to the DC REFERENCE OUTPUT on the rear panel of the 11683A, as shown in the 11683A Operating and Service Manual (11683-90014).
- 3 Disconnect the 11683AZ-H01 Range Calibrator from the power line and remove the top cover.
- 4 Connect the jumper between the DC REF INPUT BNC wire and the RANGE switch wire using an alligator test clip.
- 5 Set the REF SELECT switch to EXT.
- 6 Connect the 11683AZ-H01 Range Calibrator to the power line and turn it ON.

**CAUTION**

A good connection is important for low resistance measurements.

- 7 Set the 11683A FUNCTION CONTROL to CALIBRATE. Record the DC voltage measured in each range from 100 mW to 300 mW. Voltage measured in each range should be within  $\pm 0.02\%$  of the voltage shown in the table of **Operation** section.
- 8 Set the 11683A FUNCTION switch to STANDBY. Set the digital voltmeter controls to  $\approx 4W$  to measure resistance.
- 9 Measure the resistance at each setting from 300 mW to 3 mW to 5-digit resolution, and record the reading on the table below. Verify that each reading falls within the limits shown.

**Table 1-3** Digital voltmeter reading (OHM)

Range	Minimum	Actual	Maximum
300 $\mu W$	3134.3	.....	3157.1
100 $\mu W$	995.90	.....	1000.2
30 $\mu W$	315.14	.....	316.52
10 $\mu W$	99.749	.....	100.18
3 $\mu W$	31.580	.....	31.718

- 10 Disconnect the 4-wire cable and jumper from the 11683A. This concludes the external DC-reference circuit performance test. If any of the voltage or resistance readings are incorrect, refer to the troubleshooting information in the 11683A Operating and Service Manual (11683-90014).

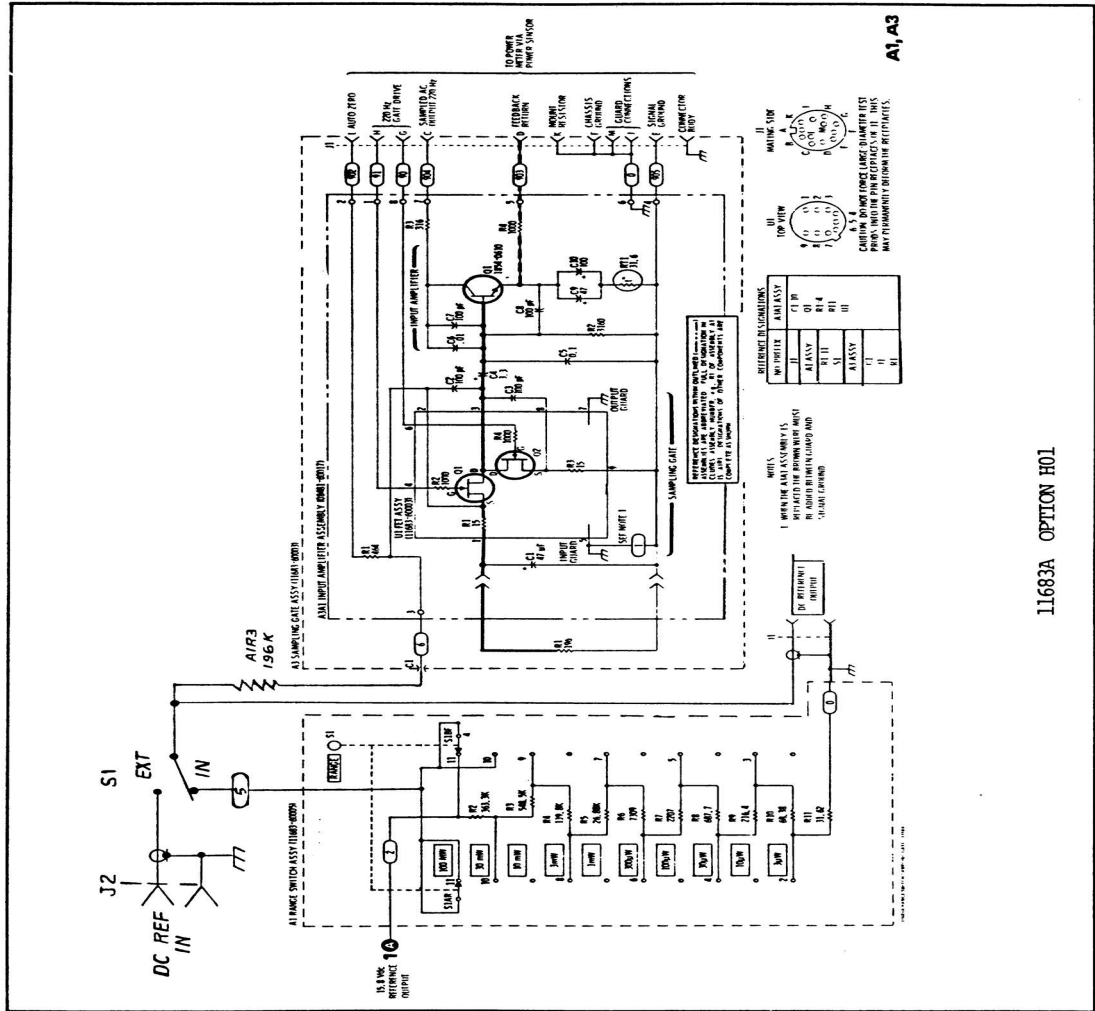
## Replacement Parts

**Table 1-4** Replacement Parts

Item	Part Number	Quantity	Description	Option
1	1250-0083	2	BNC Connector	K01, K02
2	3101-0163	1	SPDT Switch	K01, K02
3	0360-1190	2	Terminal Lug	K01, K02
4	11683-00012	1	Rear Panel Option H01	K01, K02
5	2950-0043	2	Nut	K01, K02
6	2190-0016	2	Washer	K01, K02
7	11683-00011	1	Ground Connector	K01, K02
8	11683-00005	1	Xmer Mounting Bracket	K02
9	11683-60004	1	Power Switch Assembly	K02
10	2360-0115	2	Screw	K02
11	2420-0001	2	Hexagonal Nut	K02
12	11683-20008	1	Insulator	K02

In other words, the 11683AZ Option H01 is similar to the standard 11683A and the information in the Operating and Service Manual for the standard 11683A applies to this instrument.

Figure 1-2 Range Switch/Sampling Gate Schematic Diagram



11683A OPTION H01

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