
DISPLAY PCB TESTING PROCEDURE

INSP3446/I5/R1

TITLE: Instruction for Inspection and Testing of PA79/687 PCB for 250A/400A/600A model (SINGLE/DUAL DISPLAY) (WITH SHUNT).
(ERP CODE: **017.01.008.0347**) and (ERP CODE: **017.01.008.0352**)

1 SCOPE:

- 1.1 Applicable for testing of 250A/400A/600A model (SINGLE/DUAL DISPLAY) (WITH SHUNT).

2 DETAILS OF THE INSTRUCTION:

- 2.1 Inspection / Measuring / Test Equipment:
 - 2.1.1 Digital Multimeter.
 - 2.1.2 Wire boom for test.
 - 2.1.4 Record the test results (OK / NOT OK) in the test report as the testing progress. (REF: INSP4677/I5/R0).

3 VISUAL INSPECTION:

- 3.1 Check for software version number in description of hex file same should appear on power on.
- 3.2 Check the components on the PCB according to BOM.

4 ELECTRICAL TEST:

Note: After testing keep toggle switches and knobs to their default position.

4.1 NO LOAD TEST:

- 4.1.1 Switch ON power supply of TEST JIG.
- 4.1.2 Keep SHUNT/HALL SENSOR switch to SHUNT position and keep VOLT/ISOLATOR toggle switch on TEST JIG in VOLT position.
- 4.1.3 Vary Feedback Current POT from MIN to MAX position and check voltage at respective test point (from 0mV-75mV) on TEST JIG.

- 4.1.4 Vary Feedback Voltage POT from MIN to MAX position and check voltage at respective test point (from 0V-20V (+/- 2V)) on TEST JIG.
- 4.1.5 Now switch off the TEST JIG and connect the PCB under test. Switch ON the power supply.
- 4.1.6 Now check the voltage levels at the test points with respect to ground as follows on Test PCB.

For Display PCB PA79/687 (017.01.008.0347) & (017.01.008.0352)	
TEST POINT	VOLTAGE
TP1	+5 Volt
TP2	GND

(Note: LD1 (Green LED) will be ON when display PCB is switched ON)

- 4.1.7 Program the TEST PCB
(Microcontroller – PIC18F46K40 and Programming connector CN6 on TEST PCB. Match Pin 1 of both Pickit and CN6)
Note: Ensure the correct software revision is displayed during power on of PCB (Refer 3.1).
- 4.1.9 Set Current pot: P1, Arcforce pot: P2, Hotstart pot: P3.
- 4.1.10 Ensure CN9 connector with P4 & P5 is connected to PCB. Set voltage of both POTS to 1V.
- 4.1.10 Model selection: Short JP1 with jumper. Switch ON the PCB. On display it shows 250/400/600 by changing setcurrent pot P1. When model selected remove the jumper JP1. **By default, 400 is selected (Only for information purpose).**

4.2 VOLTAGE CALIBRATION:

- 4.2.1 Keep VOLT/ISOLATOR toggle switch on TEST JIG in VOLT position and HALL SENSOR/SHUNT toggle switch in SHUNT position.
- 4.2.2 Check the voltage at the respective banana terminal above the FEEDBACK VOLTAGE pot. It should vary (from 0V-20V (+/- 2V)) for MIN-MAX pot position.
- 4.2.3 For 017.01.008.0347 PCB it shows SET CURRENT and ACTUAL VOLATGE/ FEEDBACK VOLTAGE. For 017.01.008.0352 PCB shows only SET CURRENT.

4.2.4 Now rotate the FEEDBACK VOLTAGE pot on TEST JIG to maximum position, voltage on seven segment display should show voltage same as that at FEEDBACK VOLTAGE terminals on test jig.

4.2.5 Feedback voltage on display can be calibrated by using pot 'VR2' on display PCB. For 22V from VOLTAGE FEEDBACK pot 0.72V at TP5 will be there.

4.3 CURRENT CALIBRATION:

4.3.1 Keep VOLT/ISOLATOR toggle switch on TEST JIG in VOLT position and HALL SENSOR/ SHUNT toggle switch in SHUNT position.

4.3.2 Check the voltage at the respective banana terminal above the FEEDBACK CURRENT pot. It should vary from 0-75mV for MIN-MAX pot position.

4.3.3 Check set current on display by varying set current pot P1 according to the model selected. (Note: Increase or decrease the set current by varying set current pot in clockwise or anticlockwise direction, intensity of REF led must go on increasing with increasing set current and vice versa. If the REF led does not work, check voltage at TP8 w.r.t TP2.)

4.3.4 Now rotate the FEEDBACK CURRENT pot on TEST JIG, current on display should be set according to the model selected.

MODEL	250A	400A	600A
MAXIMUM	250A	400A	600A

4.3.5 Feedback current on display can be calibrated by using pot 'VR1' of display PCB.

4.4 CURRENT VARIATION IN MMA/TIG MODE WITH REMOTE:

4.4.1 With the help of pot P6 on (REMOTE) current can be varied within the following limits.

MODEL	250A	400A	600A
MINIMUM	10A		20A
MAXIMUM	250A	400A	600A

4.5 KEY FUNCTIONALITY:

- 4.5.1 Toggle rocker switch SW1 to change mode from MMA to TIG or vice versa. Display indicates the change by showing respective mode on display.

4.6 MMA mode:

- 4.6.1 Press Rocker switch SW1 to select MMA mode.
- 4.6.2 Set current to 100A by pot P1 and arcforce pot P2 to max, and hotstart pot P3 to max. Set FEEDBACK VOLTAGE above 30V (**By VR2: only for testing purpose after complete testing calibrate voltage same as that at FEEDBACK VOLTAGE terminals on test jig**). Now rotate the FEEDBACK CURRENT pot on TEST JIG.
- 4.6.3 Voltage at TP8 will be increased for 1.5s from the time FEEDBACK CURRENT is given. This means hotstart mode is on.
- 4.6.4 Now decrease FEEDBACK VOLTAGE pot of TEST JIG between 10V-30V, voltage at TP8 will be gradually increased as FEEDBACK VOLTAGE is decreasing from 30V to 10V. This means arcforce mode is on. (Note: Observe PWM Indicator REF LED vary the FEEDBACK VOLTAGE pot on Test Jig to different position PWM LED intensity goes on increasing and vice versa).
- 4.6.5 Now decrease FEEDBACK VOLTAGE pot of TEST JIG below 10V, voltage at TP8 will be decreased and remain constant. This means antistick mode is on.
- 4.6.6 Set FEEDBACK VOLTAGE above 70V (**By VR2: only for testing purpose after complete testing calibrate voltage same as that at FEEDBACK VOLTAGE terminals on test jig**).
- 4.6.7 Press rocker switch SW2 to select VRD ON. Wait for 3 mins (180 secs), then Monitor LD2 or SHDN led on test jig. If timing to be changed then short JP1. In place of set current display show VRD count. Set the count to 18. Remove JP1 and set current will be displayed again. Press rocker switch SW2 to select VRD ON.
- 4.6.8 Monitor LD2 or SHDN led on test jig (if SHDN led does not work then connect digital multimeter at CN3.1 and CN3.3 and monitor 5V). When LD2 will glow 5V will appear at CN3.1 w.r.t CN3.3.
- 4.6.9 Press rocker switch SW2 to select VRD OFF. LD2 & SHDN led (or 5V) will remain off (0V).

4.7 TIG mode (LD4 ON):

4.7.1 Press Rocker switch SW1 to select TIG mode.

4.7.3 Check set current on display by varying pot P1 according to the model selected.
(Note: Increase or decrease the set current by rotating pot P1 in clockwise or anticlockwise direction, intensity of REF led must go on increasing with increasing set current and vice versa. If the REF led does not work, check voltage at TP8 w.r.t TP2).

4.7.4 Rotate the FEEDBACK CURRENT pot on TEST JIG, current on display 1 should vary according to the model selected, indicating welding is ON.

4.8 TRIP SECTION

4.8.1 Ensure CN9 connector connected to both P4 & P5 to PCB.

4.8.2 By rotating P4 & P5 observe the following error message on display.

Sr. No	POT Selection	Voltage across R54 resistor	Error code	Error message
1	P4	2.39 – 3.3 (V)	Errr 0001	Under Voltage
2		3.7 – 4.0 (V)	Errr 0003	Thermal Error
		Voltage across R50 resistor		
3	P5	2.3 – 4.5 (V)	Errr 0002	Over Voltage
4	Remove P4 & P5	< 0.5 (V)	Errr 0011	Connection Error

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