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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**)

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1 SCOPE:

Applicable for testing of 250A/400A/600A model with SHUNT (ERP CODE: 017.01.008.0347 DUAL DISPLAY) and (ERP CODE: 017.01.008.0352 SINGLE DISPLAY

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/R3).

3 VISUAL INSPECTION:

3.1 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**.** Keep +VE/ -VE current Feedback toggle switch at -VE

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 CN1 connector to the Test PCB. Switch ON the power supply.

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

4.1.7 Now check the voltage levels at the test points with respect to ground as follows on Test PCB.

TEST POINT	VOLTAGE
TP1	+5 Volt
TP2	GND

4.1.8 Program the TEST PCB
(Microcontroller – PIC18F46K40 and Programming connector CN6 on TESTPCB. Match Pin 1 of both Pickit and CN6)

Note: Ensure the correct software revision is displayed during power on of PCB.

4.1.9 Switch off the supply. Connect all connector to the test PCB except CN7.

4.1.10 For 017.01.008.0347 PCB it shows SET CURRENT/ ACTUAL CURRENT and ACTUAL VOLATGE (FEEDBACK VOLTAGE).
For 017.01.008.0352 PCB shows only SET CURRENT/ ACTUAL CURRENT.

4.1.11 Set CURRENT POT (P1), ARC FORCE POT (P2), HOTSTART POT (P3) at MIN position.

4.1.12 Set the 1VDC at P4 (+VE) & P5 (+VE) (banana socket) wrt GND (banana socket) with help of P4 & P5 pot respectively.

4.1.13 **Model selection:** Short JP1 with jumper. Switch ON the PCB. On display it shows 250/400/600 by changing CURRENT POT (P1). Remove the jumper JP1 after model selection is completed.
By default, 400 is selected (Only for information purpose).

4.2 KEY FUNCTIONALITY:

4.2.1 Toggle MMA/TIG switch to change mode from MMA to TIG or vice versa. Display indicates the change by showing respective mode on display.

4.3 CURRENT CALIBRATION in MMA mode:

4.3.1 Keep MMA/ TIG mode switch at MMA position. Keep the VOLTAGE FEEDBACK pot on MAX (20VDC+/-2VDC).

4.3.2 Check set current on display by varying CURRENT POT (P1), according to the model selected.
(Note: Increase or decrease the set current by varying CURRENT POT (P1) in clockwise or anticlockwise direction. The intensity of REF led on test jig 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.)

MODEL	250A	400A	600A
MIN CURRENT	10A	10A	20A
MAX CURRENT	250A	400A	600A

4.3.3 Keep CURRENT POT (P1) at max position. Now rotate the FEEDBACK CURRENT pot on TEST JIG, current on display should be set according to the model selected. To calibrate the feedback current on display, use pot 'VR1'of display PCB (Anticlockwise decrease, Clockwise increase)

4.3.4 Keep CURRENT POT (P1), FEEDBACK CURRENT pot at Min position.

4.4 VOLTAGE CALIBRATION in MMA mode:

4.4.1 Keep MMA/ TIG mode switch at MMA position. Keep the FEEDBACK VOLTAGE pot on TEST JIG to maximum position. For MAX Feedback voltage, set TP5=0.72VDC +/-0.05 on display PCB using VR2 pot. (only for 017.01.008.0352) (Anticlockwise decrease, Clockwise increase)

4.4.2 Voltage on seven segment display should show voltage same as that at FEEDBACK VOLTAGE terminals on test jig. If not, adjust using VR2 pot (only for 017.01.008.0347) (Anticlockwise decrease, Clockwise increase).

4.5 CURRENT VARIATION IN MMA/TIG MODE WITH REMOTE:

4.5.1 Keep MMA/ TIG mode switch at MMA position. Connect CN7 connector to the test PCB. With the help of REMOTE (P6) current can be varied within the following limits.

MODEL	250A	400A	600A
MIN CURRENT	10A	10A	20A
MAX CURRENT	250A	400A	600A

4.5.2 Keep MMA/ TIG mode switch at TIG position. With the help of REMOTE (P6) current can be varied same as above table.

4.5.3 Remove the CN7 connector & keep MMA/ TIG mode switch at MMA position.

4.6 HOT START mode:

4.6.1 Keep CURRENT FEEDBACK POT at MIN position & VOLTAGE FEEDBACK at MAX position on TEST JIG. Keep MMA/TIG switch at MMA mode.

4.6.2 SET CURRENT to 100A by CURRENT POT (P1) and HOT START POT(P3) to MAX position.
For 017.01.008.0352, set TP5 at 1VDC (+/-0.2VDC) using VR2 pot.
For 017.01.008.0347, set FEEDBACK VOLTAGE on seven segments above 31V using VR2 pot.

4.6.3 Rotate the CURRENT FEDBACK pot towards MAX. Voltage at TP8 will be Decreased for 1.5s from the time FEEDBACK CURRENT is given. This means HOT START mode is on.

4.6.3 Rotate the HOT START pot, CURRENT FEEDBACK POT towards MIN position. & Keep other setting as it is.

4.7 ARC FORCE mode:

4.7.1 Rotate the ARC FORCE pot at max position. Now rotate FEEDBACK VOLTAGE pot of TEST JIG towards MIN.

4.7.2 Voltage at TP8 will be gradually increased as FEEDBACK VOLTAGE on seven segment is decreasing from 30V to 10V (For 017.01.008.0347).

4.7.3 Voltage at TP8 will be gradually increased as VOLTAGE FEEDBACK on test jig (banana socket) is decreasing up to 10V. (For 017.01.008.0352).

4.7.4 This means ARCFORCE mode is on.

4.7.5 Now decrease FEEDBACK VOLTAGE pot of TEST JIG below 10V, voltage at TP8 will be remain constant. This means ANTISTICK mode is on.

4.7.6 Keep the ARC FORCE POT at MIN position. VOLTAGE FEEDBACK at MAX position

4.8 VRD mode in MMA mode:

4.8.1 Set FEEDBACK VOLTAGE above 70V by keeping TP5 = 2.3V (+/- 0.5VDC) using VR2 POT (for 017.01.008.0352)

Set FEEDBACK VOLTAGE above 70V on voltage seven segment using VR2 POT (for 017.01.008.0347)

4.8.3 Press rocker switch VRD ON/VRD OFF to select VRD ON. Wait for 2 sec, then Monitor LD2 or SHDN led on test jig. The LED should glow. Default time is 2 sec (000 will display in VRD setting mode)

4.8.4 Press VRD switch to select VRD OFF. LD2 & SHDN led (or 5V) will remain off (0V).

4.8.5 Check 3 min VRD time for 10% of the PCBs in the batch by changing the VRD time as below. Please mention the PCB sr. no in the report.

- If timing to be changed, keep SW2 at VRD OFF, short JP1.
- In place of set current display show VRD count.
- Default count will be 000 as 2sec.Set the count to 18 with help of HOT START (P3) pot.
- Remove JP1 and set current will be displayed again. Press rocker switch SW2 to select VRD ON to check the VRD.
- After testing, set VRD time to 2 sec default time.

4.8.6 **VRD Mode is only applicable MMA mode**. In TIG mode VRD mode is disabled. LD2 will not glow in TIG MODE.

4.9 TIG mode

4.9.1 Press MMA/TIG switch to select TIG mode.

4.9.2 Check set current on display by varying CURRENT 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).

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

4.10 TRIP SECTION

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

4.10.2 After Checking Sr. no 1 & 2, set P4(+ve) at 1VDC & check next points.

Sr. No	Error code	Use pot	Voltage (VDC) wrt GND (banana Socket)		Error description
1	Err 001	P4	**Across P4 (+ve) (+/-0.05)**	2.9– 3.9	Under Voltage
2	Err 003	P4		4.3– 4.65	Thermal Error
3	Err 002	P5	**Across P5 (+ve) (+/-0.05)**	3.7– 5	Over Voltage
4	Err 011	P4 & P5	**Across P4 (+ve) & P5 (+ve) wrt GND (banana socket)**	< 0.5	< 0.5 (V)

4.11 PCB tested successfully.

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