DISPLAY PCB TESTING PROCEDURE

INSP3452/I5/R0

TITLE: Instruction for Inspection and Testing of motor driver control PCB PA79/682/B (ERP CODE: **017.01.008.0343**) along with display PCB PA79/684 (ERP CODE: **017.01.008.0354**) for 400A MIG machine

1 SCOPE:

1.1 Applicable for testing of 400A machine

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: INSP4688/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.

017.01.008.0354: - PCB1
017.01.008.0343: - PCB2

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 HALL SENSOR position. Vary the feedback current pot from min to max position and check the voltage at respective banana connector at max position. It will be 4V on TEST JIG.

4.1.3 Keep VOLT/ISOLATOR toggle switch on ISOLATOR position. Vary the feedback voltage pot from min to max position and check the voltage at respective banana connector at max position. It will be 12V on TEST JIG.

4.1.5 Now switch off the TEST JIG and connect CN1 to the PCB2 under test. Switch ON the power supply. Green LED LD1 will be "ON" of PCB 1.

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

For Display PCB PA79/682/B (PCB 2)		
TEST POINT	**VOLTAGE**	**Remark**
TP1	+5 Volt	2-pin supply connector to CN1
TP2	GND	
TP3	+5V Isolated	2-pin supply connector to CN2
TP4	GND Isolated	

After checking voltage reconnect the 2-pin supply connector to CN1

4.1.7 Program the TEST PCB
(Microcontroller – DSPIC30F6014A-30I/PF IC and Programming connector CN9 on TEST PCB2. Match Pin 1 of both Pickit and CN9)
Note: Ensure the correct software revision is displayed during power on of PCB (Refer 3.1).

4.1.8 Connect all connectors except CN7

4.1.9 SET CURRENT POT/ CRATER CURRENT: P1, ARC FORCE POT/ CRATER VOLTAGE: P2, HOT START POT/ INDUCTANCE: P3, CURRENT FEEDBACK, VOLTAGE FEEDBACK, SET CURRENT SET VOLTAGE at MIN position.

4.1.10 Ensure CN3 connector with P4 & P5 is connected to PCB. Set voltage of both POTS to 1V.

4.2 Program Selection:

Program	**Action (PCB1)**	**Result (PCB1)**
MMA	Press S1 key	LD2, LD8, LD7 will be ON
TIG	Press S1 key	LD3, LD8, LD7 will be ON
MIG	Press S1 key	LD4, LD9, LD7, LD6 will be ON

4.3 MMA Mode:

4.3.1 Press S1 switch on to select MMA mode & check the respective LEDs are ON.

4.3.2 Rotate the SET CURRENT POT/ CRATER CURRENT (P1) pot to check the set current varies from 10A to 400A on LHS display.

4.3.3 Set a FEEDBACK VOLTAGE pot at max position. On RHS display, 99.9 (+/-1) will display. If not, the adjust by VR3 pot on PCB2. (TP11: - 2V +/- 0.5V, TP10: - 4.8V +/-0.5V). Keep as it is.

4.3.4 Set a SET CURRENT POT/ CRATER CURRENT (P1) at max position. Rotate FEEDBACK CURRENT pot at max position. On RHS display, 400 will display. If not, the adjust by VR2 pot on PCB2. (TP8: - 1.2V +/- 0.3V, TP9: - 3.6V +/-0.3V).

4.3.5 Rotate FEEDBACK CURRENT, SET CURRENT POT/ CRATER CURRENT (P1) at min position. Keep FEEDBACK VOLTAGE pot at max position.

4.4 ARC FORCE in MMA Mode:

4.4.1 Set 100A on LHS display using SET CURRENT POT/ CRATER CURRENT (P1), ARC FORCE POT/ CRATER VOLTAGE (P2) pot at max position

4.4.2 Rotate the FEEDBACK CURRENT to wards the max & set feedback current as 100A on LHS display.

4.4.3 Rotate the FEEDBACK VOLTAGE pot towards the min position. Check the voltage at TP7 wrt TP2.

4.4.4 TP7 voltage will gradually increase from 30V to 10V on RHS. This means, ARC FORCE is ON. TP7 will change from 1.19VDC +/-0.05 to 1.63 VDC +/-0.05.

4.4.5 Now decrease FEEDBACK VOLTAGE pot below 10V, voltage at TP7 will be decreased to 0.5VDC and remain constant. This means ANTISTICK mode is ON.

4.4.6 Keep ARC FORCE POT/ CRATER VOLTAGE (P2) pot, FEEDBACK CURRENT POT at MIN position, FEEDBACK VOLTAGE pot at MAX Position. Remaining POTs keep as it is.

4.5 HOT START in MMA Mode:

4.5.1 Keep the HOT START POT/ INDUCTANCE (P3) at MAX position.

4.5.2 Rotate the FEEDBACK CURRENT POT Toward max. for 1.5 sec, TP7 voltage will increased & after 1.5 sec it will become constant. TP7 will change from 1.19VDC +/-0.05 to 1.63 VDC +/-0.05.

4.5.3 It means HOT START is ON.

4.5.4 Keep the FEEDBACK CURRENT POT, SET CURRENT POT/ CRATER CURRENT (P1), HOT START POT/ INDUCTANCE(P3) at MIN Position.

4.6 REMOTE in MMA/ TIG Mode:

4.6.1 Connect the CN7 Connector. Rotate the REMOTE (P6) from min to max position & check the current on LHS varies as per table. After checking Remove the CN7 connector.

MODEL	MINIMUM	MAXMUM
400A	**10A**	**400A**

4.7 MIG MODE:

4.7.1 Select the MIG mode, by pressing S1 switch & check for the respected LEDs will be ON.

4.8 MOTOR CALIBRATION:

4.8.1 Set the wire speed at maximum position by varying the set voltage pot on jig towards Max position to set wire speed=20m/min on LHS display. Make torch switch ON (upward direction). Set the feedback current pot at 'MAXIMUM' position within 4 Seconds.

4.8.2 Check the motor voltage at FEED MOTOR Test point on TEST JIG. Calibrate maximum motor voltage by varying 'VR1' on display PCB.

MODEL	MOTOR VOLTAGE(V)	WIRE SPEED(m/min)
400	35(+/-0.5 Vdc)	20

Keep feedback current pot at 'MINIMUM' position. Turn OFF the torch switch(downward direction) on TEST JIG.

4.9 FUNCTIONALITY IN MIG MODE:

4.9.1 Check the functionality as per below table.
Press the switch S3 (2T/4T logic) on PCB1 to select the LD6 (2T mode).

Note: *: After verification of function, place respective switch at OFF position (Initial Position). ***When torch switch is turn ON set the feedback current pot at 'MAXIMUM' position within 4 Seconds .Keep feedback current pot at 'MINIMUM' position after turning OFF the TORCH switch.***

Sr. No	Function	Action (TEST JIG)	Message on Display
1	Set Voltage	Vary set current pot of machine from min position towards max position.	RHS display shows voltage as per model. Min 40.0 Max 14.7
2	Wire speed	Vary set voltage pot of machine from min position towards max position	LHS display shows wire speed. (2.0-20m/Min) Min 2.0 Max 20.0
3	Torch switch*	Toggle the TORCH switch of machine to ON position (upward direction). GAS RL Led, REF Led will ON.	'LD9' will OFF & 'LD8' will ON.
4	Inch switch*	Toggle INCH switch of machine to ON position.	LHS display shows 'Inc.' RHS display shows incremental count from 00.0 to 10.0

5	Wire feeder error	Remove the CN13 connector of PCB. After verification reconnect.	Display shows 'Err-006'
6	No current error*	***Keep feedback current pot to minimum position*** and toggle the TORCH switch of machine to ON position (upward position) and wait for 4 sec. **Don't set feedback current pot. Ignore Note*.**	Display shows 'Err-004'
12	Gas Check	Press the switch S2 of PCB1. GAS RL led turns on.	LHS display shows 'GAS.' RHS display shows Decremental count from 010 to 000
14	PWM REF*	Turn TORCH switch of machine to ON position (upward position) Then vary SET voltage POT from MIN to MAX & observe intensity of REF led from high to low.	
15	Hall sensor Error	Keep feedback current pot at MAXIMUM position when torch switch is OFF.	Display shows 'Err-009'

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.