XM POWER SUPPLY CURRENT CALIBRATION USING A LOAD BANK

1. INTRODUCTION

This procedure is used to calibrate the XM System Power Supply Module current functions to assure accurate and reliable control of the welding power supply. This procedure applies to all XM Power Supply Modules.

2. RESPONSIBILITIES

Performer	Responsibility
Technician	After assuring prerequisites are met, performs a calibration and check of the XM Power Supply Current Control function using steps 4.1.1 through 4.1.24. Performs a calibration and check of the XM Power Supply Current Feedback functions using steps 4.2.1 through 4.2.16. If the Power Supply fails to calibrate properly, initiate troubleshooting with assistance of AMET Technical Support.

3. PREREQUISITS

Record the XM Module serial number in Section 5, *RECORDS*. The following tolls and equipment are required to perform thia calibration:

- 3.1 DC Voltmeter. The calibration of this meter must be verified and current.
- 3.2 DC Current Shunt (1,000 amps @ 100 millivolts).
- 3.3 Load Bank sized to handling the maximum rating of the welding power supply.

4. INSTRUCTIONS

4.1 Current Control Calibration

- 4.1.1 Connect the load bank to the welding power supply. Verify that the welding Work lead runs through the current transducer in order for current feedback to be calibrated properly.
- 4.1.2 Install the DC current shunt in series with the load bank Work lead and connect the voltmeter in parallel with the shunt. Set the voltmeter to read DC millivolts. Use this reading to calibrate the current control.
- 4.1.3 Prior to applying power to the welding power supply, verify all connections from the welding power supply to the load bank and DC shunt are connected properly and tight. Turn the welding power supply ON.
- 4.1.4 Turn the XM System ON. Press the SET UP Mode Button on the controller.
- 4.1.5 Use the SELECT MODULE Programming Knob to highlight the Power Supply Module being calibrated.
- 4.1.6 Press the CALIBRATE Programming Knob to enter the CALIBRATION Mode.

4.1.7 Use the ADJUST CURRENT Programming Knob to adjust the SET CURRENT value to 20 amps.

4.1.8 Press the **Start** Sequence Button and monitor the millivolt reading on the voltmeter.

4.1.9 If the millivolt reading is representative of 20 amps (2.0 ± 0.2 millivolts [refer to Appendix A]) proceed with step 4.1.12. If the millivolt reading does not represent 20 amps continue with step 4.1.10.

4.1.10 Use the SELECT PARAMETER Programming Knob to highlight the COARSE OFFSET parameter under the CURRENT CNTL calibration section.

4.1.11 Use the ADJUST VALUE Programming Knob to adjust the value of the COARSE OFFSET to obtain a reading on the voltmeter representative of 20 amps (2.0 ± 0.2 millivolts). If you cannot obtain a correct value on the voltmeter by using the COARSE OFFSET, adjust the FINE OFFSET to obtain the correct reading.

4.1.12 Press the **Stop** Sequence Button to open the weld contactor on the welding power supply.

4.1.13 Use the ADJUST CURRENT Programming Knob to adjust the SET CURRENT value to approximately 5 amps below the maximum output current of the welding power supply.

4.1.14 Press the **Start** Sequence Button and monitor the millivolt reading on the voltmeter.

4.1.15 If the millivolt reading is representative of the current set point, proceed with step 4.1.18. If the millivolt reading does not represent the correct current continue with step 4.1.16.

4.1.16 Use the SELECT PARAMETER Programming Knob to highlight the COARSE GAIN parameter under the CURRENT CNTL calibration section.

4.1.17 Use the ADJUST VALUE Programming Knob to adjust the value of the COARSE GAIN to obtain a reading on the voltmeter representative of the current set point. If you cannot obtain a correct value on the voltmeter by using the COARSE GAIN, adjust the FINE GAIN to obtain a correct reading.

4.1.18 Press the **Stop** Sequence Button to open the weld contactor on the welding power supply.

4.1.19 Repeat steps 4.1.7 through 4.1.18 until no further adjustments are needed.

4.1.20 Use the ADJUST CURRENT Programming Knob to adjust the SET CURRENT value to 20 amps.

4.1.21 Press the **Start** Sequence Button and monitor the millivolt reading on the voltmeter.

4.1.22 Use the ADJUST CURRENT Programming Knob to adjust the SET CURRENT value in increments of 25 amps from 20 amps to 5 amps below the max rating of the welding power supply. Each time a new current set point value is entered, you must press the **Start** Sequence Button for the new value to take effect. Record the voltmeter readings in Section 5, Table 1, *Current Control Calibration Linearity Check*, at each setting.

4.1.23 Press the **Stop** Sequence Button to open the weld contactor on the welding power supply.

4.1.24 Verify that the millivolt readings on the voltmeter are representative (setting ± 0.2 millivolts) of all current set point values entered.

4.2 Current Feedback Calibration

4.2.1 Use the ADJUST CURRENT Programming Knob to adjust the SET CURRENT value to 20 amps.

4.2.2 Press the **Start** Sequence Button and monitor the CURRENT readout on the controller display. If the CURRENT readout reads 20 amps then proceed with step 4.2.5. If the CURRENT readout does not read 20 amps then proceed with step 4.2.3.

4.2.3 Use the SELECT PARAMETER Programming Knob to highlight the COARSE OFFSET parameter under the CURRENT FDBK calibration section.

4.2.4 Use the ADJUST VALUE Programming Knob to adjust the value of the COARSE OFFSET to obtain a reading of 20 amps. If you cannot achieve a correct value by using the COARSE OFFSET, adjust the FINE OFFSET to obtain a correct reading.

4.2.5 Press the **Stop** Sequence Button to open the weld contactor on the welding power supply.

4.2.6 Use the ADJUST CURENT Programming Knob to adjust the SET CURRENT value to approximately 5 amps below the maximum output current of the welding power supply.

4.2.7 Press the **Start** Sequence Button and monitor the CURRENT readout on the controller display. If the CURRENT readout represents the current set point value then proceed with step 4.2.10. If the CURRENT readout does not represent the current set point value then proceed with step 4.2.8.

4.2.8 Use the SELECT PARAMETER Programming Knob to highlight the COARSE GAIN parameter under the CURRENT FDBK calibration section.

4.2.9 Use the ADJUST VALUE Programming Knob to adjust the value of the COARSE GAIN to obtain a correct reading. If you cannot achieve a correct value by using the COARSE OFFSET, adjust the FINE OFFSET to obtain a correct reading.

4.2.10 Press the **Stop** Sequence button to open the weld contactor on the welding power supply.

4.2.11 Repeat steps 4.2.1 through 4.2.10 until no further adjustments are needed.

4.2.12 Use the ADJUST CURRENT Programming Knob to adjust the SET CURRENT value to 20 amps.

4.2.13 Press the **Start** Sequence Button and monitor the CURRENT readout on the controller display.

4.2.14 Use the ADJUST CURRENT Programming Knob to adjust the SET CURRENT value in increments of 25 amps from 20 amps to 5 amps below the maximum current value of the welding power supply. Each time a new current set point value is entered, you must press the **Start** Sequence Button for the new value to take effect. Record the indicated CURRENT readings in Section 5, Table 2, *Current Feedback Calibration Linearity Check*, at each setting.

4.2.15 Press the **Stop** Sequence Button to open the weld contactor on the welding power supply.

4.2.16 Verify that the CURRENT readout on the controller is representative (set point ± 2 amps) of all current set point values.

5. RECORDS

Technician: _____ Date: _____

XM Module Serial Number: _____

Table 1, Current Control Calibration Linearity Check

Step 4.1.22, Set Current Value (Amps)	Shunt Voltage Measured (Millivolts)	Expected Value (Millivolts)
20.0		1.8 – 2.2
45.0		4.3 – 4.7
70.0		6.8 – 7.2
95.0		9.3 – 9.7
120.0		11.8 – 12.2
145.0		14.3 – 14.7
170.0		16.8 – 17.2
195.0		19.3 – 19.7
220.0		21.8 – 22.2
245.0		24.3 – 24.7
270.0		26.8 – 27.2
295.0		294.8 – 29.7
320.0		31.8 – 32.2
345.0		34.3 – 34.7
370.0		36.8 – 37.2
395.0		39.3 – 39.7
420.0		41.8 – 42.2
445.0		44.3 – 44.7
470.0		46.8 – 47.2
495.0		49.3 – 49.7

Table 2, Current Feedback Calibration Linearity Check

Step 4.2.14, Set Current Value (Amps)	Indicated CURRENT readout (Amps)	Expected Value (Amps)
20.0		18.0 – 22.0
45.0		43.0 – 47.0
70.0		68.0 – 72.0
95.0		93.0 – 97.0
120.0		118.0 – 122.0
145.0		143.0 – 147.0
170.0		168.0 – 172.0
195.0		193.0 – 197.0
220.0		218.0 – 222.0
245.0		243.0 – 247.0
270.0		268.0 – 272.0
295.0		293.0 – 297.0
320.0		318.0 – 322.0
345.0		343.0 – 347.0
370.0		368.0 – 372.0
395.0		393.0 – 397.0
420.0		418.0 – 422.0
445.0		443.0 – 447.0
470.0		468.0 – 472.0
495.0		493.0 – 497.0

6. RECORDS

None

7. DEFINITIONS

None

8. REFERENCES

8.1 XM System Manual, SM-001

8.2 XM Maintenance Manual, MM-001 (DRAFT)

9. APPENDIXES

9.1 Appendix A, DC Current Shunt Ampere to Millivolt Conversion Chart

Appendix A

DC Ampere to Millivolt Conversion Chart
(1,000 Ampere, 100 mVolt DC Shunt)