

AC & DC POWER GROUPS

Rev A, Rev F

Important Benefits:

- Comprehensive Mil-Std 704 Compliance test sequence suite saves months of test development time
- Includes both AC and DC power groups for maximum test coverage
- Available for all AFX Series models at power levels from 6kVA to 60kVA for AC testing and 4.2kW to 42kW for DC testing
- Supports both Single and Three phase AC power groups
- Supports both 28Vdc (LDC) and 270Vdc (HDC) DC power groups
- Comprehensive Test Reports to document compliance
- Revisions A and F available
- Test Sequences can be customized as needed to meet changing requirements
- VISA Calls and VB Script support allows other test equipment integration into tests
- LAN, USB, RS232 and GPIB Support
- PPSC Test Manager Software Required to execute test sequences



Department of Defense, Mil-Std 704 Scope

MIL-STD-704 is published by the US Department of Defense and provides test requirements for both AC and DC power buses on military aircraft. Both fixed 60Hz and 400Hz frequency AC power buses as well as variable (wild) frequency power buses ranging from 360Hz to 800Hz are covered by Revision F of the standard. These tests are performed to ensure compliance of electrical equipment used on military airplanes. The MIL-STD-704A test option is available to support legacy avionics systems that were placed in operation under revision A. Both versions can be installed on the same PC.

Comprehensive Coverage & Convenience

Using our extensive library of test sequences and the PPSC Test Manager Windows software, the AFX Power source turns into a powerful and easy to use compliance test system. No need to spend weeks developing your own test procedures, just connect you EUT and select what test to run. User observation of EUT behavior and additional measurement equipment to monitor EUT output is required in addition to the AFX power source.

Extensive Coverage

The ability of the AFX Series to provide both AC, DC, AC+DC and DC+AC output reduces the amount of additional test equipment and coupling devices needed to perform most tests. It also provides great test coverage for EMC Test labs to meet client's test requirements.



THE POWER OF EXPERTISE



Supported Power Groups

The MIL-STD-704 standard covers both AC and DC powered products. The Pacific Power Source MIL-STD-704 A & F test options cover all power groups contained in the test standard as shown in the table below. Note that MIL-STD-704A covers fixed frequency only.

Power Group	Description	Nominal Voltage	Nominal Frequency	Phase Modes
SAC	Single-Phase, 400 Hz Constant Frequency, 115 V	115Vrms L-N	400Hz	Single Phase
TAC	Three-Phase, 400 Hz Constant Frequency, 115 V	115Vrms L-N	400Hz	Three Phase
SVF	Single-Phase, Variable Frequency, 115 V	115Vrms L-N	360 – 800Hz	Single Phase
TVF	Three-Phase, Variable Constant Frequency, 115 V	115Vrms L-N	360 – 800Hz	Three Phase
SXF	Single-Phase, 60 Hz Constant Frequency, 115 V	115Vrms L-N	60Hz	Single Phase
LDC	28VDC utilization equipment MIL-STD-704 compliance tests	28Vdc	n/a	Single & Three Phase Test Sequences included
HDC	270VDC utilization equipment MIL-STD-704 compliance tests	270Vdc	n/a	

AC Power Test Execution Samples – MIL-STD-704

The following screens provide some typical captured output voltage waveforms from the AC Power Source during MIL-STD-704 Test Sequence execution. Samples shown

reflect two different test conditions from Table I, Figure 3 in the MIL-STD-704 document (Voltage Transients) see Figure 1 and a Momentary Power Interruption, see Figure 2.

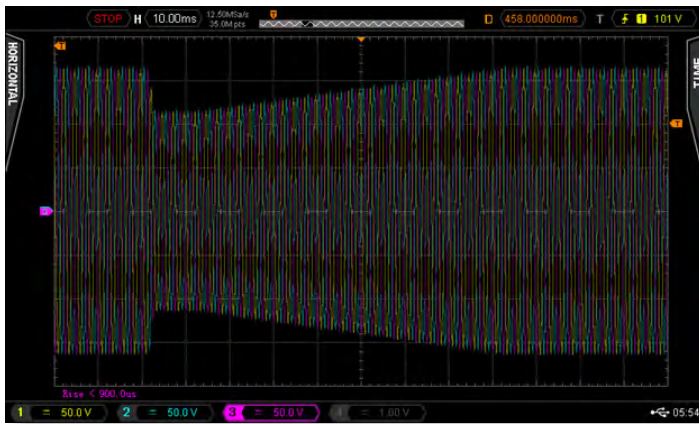


Figure 1: MIL-STD-704F, Power Group TAC, Section 109, Test Condition KK



Figure 2: MIL-STD-704F, Power Group TAC, Section 601, Test Condition A

DC Power Test Execution Samples – MIL-STD-704

The following screens provide some typical captured output voltage waveforms from the DC Power Source during MIL-STD-704 Test Sequence execution. Samples shown

reflect two different test conditions, LDC105 complete sequence (Figure 3) and HDC 201 detail view (Figure 4).

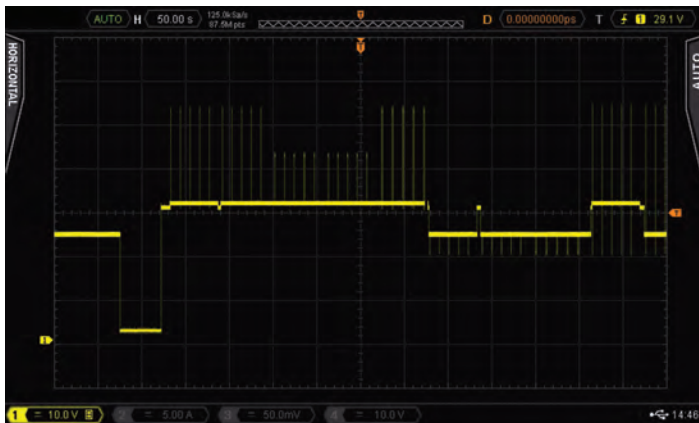


Figure 3: MS704F, LDC 105 sequence @ 50 S/div – Multiple Test Conditions

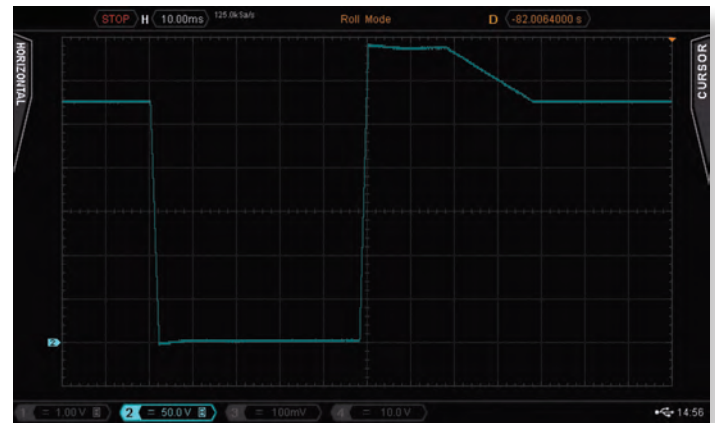


Figure 4: MIL-STD-704 Rev F, HDC 201 Cond K @ 10 mS/div – Detail

Compliance Matrix MIL-STD-704F

Test	Description	SAC	TAC	SVF	TVF	SXF	Notes
Normal Operation (1xx)							
101	Load and Current Harmonics Measurements	Y	Y	Y	Y	Y	Additional Power Measurement Equipment recommended for capturing for UUT performance
102	Steady State Limits	Y	Y	Y	Y	Y	
103	Voltage Phase Difference	N/A	Y	N/A	Y	N/A	Not applicable for Single phase UUT's
104	Voltage Modulation	Y	Y	Y	Y	Y	
105	Frequency Modulation	Y	Y	Y	Y	Y	
106	Voltage Distortion Spectrum	R	R	R	R	R	Requires Function Generator, Spectrum Analyzer, 50uH inductors, 10uF Cap
107	Total Voltage Distortion	Y	Y	Y	Y	Y	
108	DC Voltage Component	Y	Y	Y	Y	Y	AFX in AC+DC Mode
109	Normal Voltage Transients	Y	Y	Y	Y	Y	
110	Normal Frequency Transients	Y	Y	Y	Y	Y	
Transfer (2xx)							
201	Power Interrupt	Y	Y	Y	Y	Y	
Abnormal Operation (3xx)							
301	Abnormal Limits for Voltage and Frequency	Y	Y	Y	Y	Y	
302	Abnormal Voltage Transients	Y	Y	Y	Y	Y	
303	Abnormal Frequency Transients	Y	Y	Y	Y	Y	
Emergency Operation (4xx)							
401	Emergency Limits for Voltage and Frequency	Y	Y	Y	Y	Y	
Starting (5xx)							
501	Not Typically Required	N/A	N/A	N/A	N/A	N/A	Not applicable to AC powered equipment
Power Failure (6xx)							
601	Power Failure	Y	Y	Y	Y	Y	
602	One Phase and Two Phase Power Failures	N/A	Y	N/A	Y	N/A	
603	Phase Reversal	Y	Y	Y	Y	Y	

DC Test	Description	LDC	HDC	Notes
101	Load Measurements	Y	Y	External Measurement Equipment recommended
102	Steady State Limits for Voltage	Y	Y	
103	Voltage Distortion Spectrum	Y and R	Y and R	Test sequence provided for external equipment use as well
104	Total Ripple	Y and R	Y and R	Test sequence provided for external equipment use as well
105	Normal Voltage Transient	Y	Y	
201	Power Interrupt	Y	Y	
301	Abnormal Steady State Limits for Voltage	Y	Y	
302	Abnormal Voltage Transient (Over/Under)	Y	Y	
501	Starting Voltage Transients	Y	Y	
601	Power Failure	Y	Y	
602	Polarity Reversal	Y	Y	AFX in Bipolar DC mode

Notes: Y = Full support. No additional equipment is needed to perform the required stimulus
 R = Requires additional equipment. See notes for details
 N = Not supported

N/A = Not Applicable - No Test required



Test Executive

Rather than being fixed with no ability for customizing or enhancements, Pacific Power Source's Test Sequences are developed within its PPSC Test Manager test executive environment. The PPSC Test Manager is a plug-in to the standard Pacific Power Source PPSC Manager windows software and provides complete access to the underlying Test Sequence implementation.

It also provides powerful tools for controlling test execution, collecting measurement data from the AC Power Source and or the unit under test and integration of other aspects of compliance testing such as temperature environment control capability into provided test routines.

Other instruments can be controlled through the PPSC Test Manager executive using VISA drivers and VB Scripting, thus providing powerful tools to test engineers. Alternatively, the Test Sequences can be run as provided, controlling just the Pacific Power Source AC Source with no further customization required.

Test Sequence libraries can be password protected by the user to prevent unauthorized modifications. Revision control of test procedures is built into the PPSC Test Manager executive.

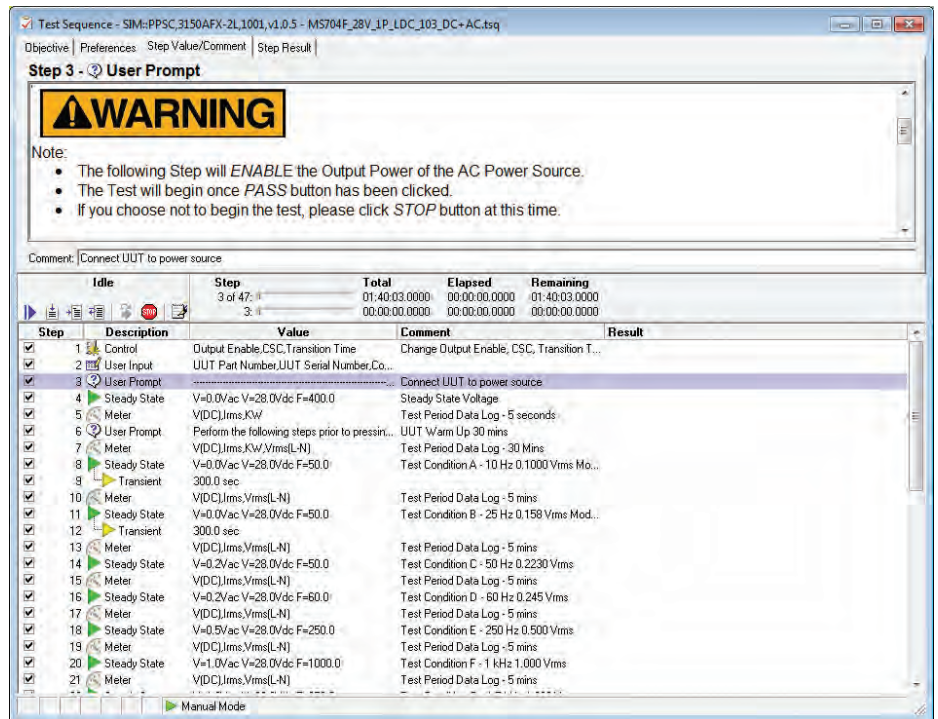


Figure 5: MIL-STD-704 Rev F, LDC 103 Test Manager Screen - User Prompt Step

Ordering Information

Option	Description	Part Number
MIL-STD704F	Provides Test Sequences for DoD Mil-Std 704, Revision F, Dated March 2004, Aircraft Electrical Power Characteristics. AC Power groups SAC, SVF, SXF for Single phase equipment and TAC, TVF for Three phase equipment at 115V nominal are provided. DC Power groups: LDC 28Vdc, HDC 270Vdc. DC Tests require AFX Series power source. Distribution revision 1.3 or higher required for AFX Series.	149101
MIL-STD704A	Provides Test Sequences for DoD Mil-Std 704, Revision A, Dated August 1966, "Electrical Power, Aircraft Characteristics and Utilization". AC Power groups SAC for Single phase equipment and TAC for Three phase equipment at 115V nominal are provided. DC Power group: LDC 28Vdc. DC Tests require AFX Series power source.	149112
PPSC Manager	Basic PPSC Manager functions (PPSC Control, Output Sequence Browser, Waveform Editor) . Does not include PPSC Test Manager license for access to Test Sequences and Test Plans. No cost license.	Free license with registration
PPSC Test Manager	Registration and access to PPSC Test Manager Software. Create, Open, and Edit Output Test Sequences using PPSC Manager Features	Separate License required for each power source

Deliverables

- Test Sequence Installer Download Link
- User Documentation PFD Download Link



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