



Low-Voltage Switchgear Functional Performance Test

Equipment ID	[Equipment ID]
Building	[Building]
Location	[Room]

System Description

Description:

Operational Assumptions:

Initial Test	Start Date	End Date	Initials
Results (Check one) <input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> Partial Test w/Corrective Actions <input type="checkbox"/> Complete Test w/Corrective Actions <input type="checkbox"/> Other	Explanation:		

Re-Test 1	Start Date	End Date	Initials
Results (Check one) <input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> Partial Test w/Corrective Actions <input type="checkbox"/> Complete Test w/Corrective Actions <input type="checkbox"/> Other	Explanation:		

Re-Test 2	Start Date	End Date	Initials
Results (Check one) <input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> Partial Test w/Corrective Actions <input type="checkbox"/> Complete Test w/Corrective Actions <input type="checkbox"/> Other	Explanation:		



Deferred/Seasonal Test	Start Date	End Date	Initials
Results (Check one) <input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> Partial Test w/Corrective Actions <input type="checkbox"/> Complete Test w/Corrective Actions <input type="checkbox"/> Other	Explanation:		

Test Participants

Organization	Required	Optional
General Contractor	<input type="checkbox"/>	<input type="checkbox"/>
Mechanical Contractor	<input type="checkbox"/>	<input type="checkbox"/>
Electrical Contractor	<input type="checkbox"/>	<input type="checkbox"/>
TAB Contractor	<input type="checkbox"/>	<input type="checkbox"/>
Controls Contractor	<input type="checkbox"/>	<input type="checkbox"/>
Owner's O&M Personnel	<input type="checkbox"/>	<input type="checkbox"/>

Test Instruments (To Be Provided By the Contractor)

Recommended Test Equipment (or Equivalent):

Test	Equipment Description
Bolt Torque	Calibrated torque wrench
Wiring Impedance	Low impedance ac millammeter
Sound Level	Calibrated decibel meter

System Readiness Summary Checklist

Description	Yes	No	Date
System Ready for Test	<input type="checkbox"/>	<input type="checkbox"/>	
Required Personnel Available	<input type="checkbox"/>	<input type="checkbox"/>	
Required Tools/Test Equipment/Supplies Available	<input type="checkbox"/>	<input type="checkbox"/>	
Required Safety Equipment Available	<input type="checkbox"/>	<input type="checkbox"/>	

**Functional Performance Test --** (Verify all components are ready before energizing or operating the system.)

The Commissioning Authority will make and document any changes/addition/deletions to this test procedure required by current system conditions (i.e. weather, system load, utility availability, etc.).

R = Retest (Check (✓) retest required)

C = Corrected (Check (✓) when correction verified)

Y = Checked and Passed

N = Not Passed

ACTION	REQUIRED REACTION	Y (✓)	N (✓)	COMMENTS	R (✓)	C (✓)
PRE-TEST VISUAL MECHANICAL INSPECTION						
1. Safe conditions (protective gear in- place, available & procedures observed)		<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Record issues				Issue Log Item:		
				Initial	Date	
2. Verify panelboard installations	Isolation transformer installed with electrostatic shield between primary and secondary winding and connected to ground.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	Completed panelboard schedules.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	Appropriate anchorage.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	Required area clearances. 3 ft in front and 30 in wide.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	No physical damage.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	Breaker casing does not have cracks.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	Correct alignment.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Record issues				Issue Log Item:		
				Initial	Date	
3. Inspect panelboard doors, panels, and sections	Free of Corrosion, dents, scratches, fit.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	No missing screws.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>



ACTION	REQUIRED REACTION	Y (✓)	N (✓)	COMMENTS	R (✓)	C (✓)
	No open unused knockouts.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	No missing hardware.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Record issues				Issue Log Item:		
				Initial	Date	
4. Verify panelboard configuration and nameplate data matches shop drawings, one-line diagram and specification	Volts:_____.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	Bus Amps: _____A.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	3ph, 4W.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	Frequency: 60hZ.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	Enclosure: _____.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	Transformer _____KVA.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	Transformer _____V.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	Transformer class _____ insulation rating.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	Transformer 60Hz.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	Main Breaker Max. Rating. _____ Amp.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	Panelboard arrangement _____ # of circuits.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	_____ Percent Spares.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	_____ Space.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	Neutral size _____.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>



ACTION	REQUIRED REACTION	Y (✓)	N (✓)	COMMENTS	R (✓)	C (✓)
	LIM installed provides continuous monitoring of impedance of each phase to ground.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	LIM combined analog and digital display.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	LIM capable of detecting all combinations of capacitive, resistive, balanced, unbalanced and hybrid faults.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	LIM contains audible alarm and alarm silence button.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	LIM contains Indication LEDs.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	LIM contains Test Button.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	LIM contains remote terminal connections.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Record issues				Issue Log Item:		
				Initial	Date	
5. Verify panelboard equipment grounding	Solid neutral mounted in main circuit breaker compartment with main lugs, is insulated.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	Neutral is bonded to ground.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	Frame and enclosure connected to ground bus.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	Breaker and feeder equipment grounding conductors/conduit are connected to ground bus.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Record issues				Issue Log Item:		
				Initial	Date	



ACTION	REQUIRED REACTION	Y (✓)	N (✓)	COMMENTS	R (✓)	C (✓)
6. After testing is performed on the panelboard, verify tightness of main connections	Primary feeder cable connections properly torqued and marked.	<input type="checkbox"/>	<input type="checkbox"/>	Bolted torque should comply with NETA Table 100.12 unless manufacturer specified values are listed on the equipment. Test Name: Feeder Termination Torque Reference Equip. Table	<input type="checkbox"/>	<input type="checkbox"/>
Record issues				Issue Log Item:		
				Initial	Date	
<p align="center">CAUTION:</p> <p>Before performing the next step, verify that all "Lock-Out / Tag-Out" safety precautions have been adhered to.</p>						
7. Operate each circuit breaker (5) times to ensure smooth operation	Breaker opens and closes in a smooth motion without binding.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Record issues				Issue Log Item:		
				Initial	Date	
ELECTRICAL INTEGRITY						
8. Measure sound level of isolation transformer	25dB for 5kVA or less transformer.	<input type="checkbox"/>	<input type="checkbox"/>	Test Name: Sound level Reference Equip. Table	<input type="checkbox"/>	<input type="checkbox"/>
	30dB for 7.5 kVA transformer.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	35dB for 10 and 15kVA transformers.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	40dBfor 20 and 25kVA transformers.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Record issues				Issue Log Item:		
				Initial	Date	



ACTION		REQUIRED REACTION		Y (✓)	N (✓)	COMMENTS	R (✓)	C (✓)
9.	Perform continuity check on each branch circuit	Correct continuity is verified.		<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Record issues						Issue Log Item:		
						Initial	Date	
10.	Measure each isolated wiring impedance to ground	Impedance shall exceed 200,000 ohms.		<input type="checkbox"/>	<input type="checkbox"/>	Test Name: Wire Impedance Reference Equip. Table Record results as a reference for subsequent line-impedance evaluation. Record results in Data Table	<input type="checkbox"/>	<input type="checkbox"/>
Record issues						Issue Log Item:		
						Initial	Date	
LINE ISOLATION MONITOR								
11.	Isolation power panel is in normal operation	Green signaling lamp is indicated on the panel.		<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
		Green signal shall be indicated at the remote monitoring station.		<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Record issues						Issue Log Item:		
						Initial	Date	
12.	Ground each line of the energized distribution system through a resistor 200 times the measured line voltage	Red signaling lamp is illuminated and local alarm is annunciated.		<input type="checkbox"/>	<input type="checkbox"/>	Record results in Data Table	<input type="checkbox"/>	<input type="checkbox"/>
		Green signal shall be indicated at the remote monitoring station.		<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
		Alarm resets automatically after ground is removed.		<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Record issues						Issue Log Item:		
						Initial	Date	



ACTION	REQUIRED REACTION	Y (✓)	N (✓)	COMMENTS	R (✓)	C (✓)
13. During each line grounding test press the audible alarm silence button	Local and Remote Audible alarm silences.	<input type="checkbox"/>	<input type="checkbox"/>	Record results in Data Table	<input type="checkbox"/>	<input type="checkbox"/>
	Local and Remote Red indicating light remains illuminated.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Record issues				Issue Log Item:		
				Initial	Date	
14. Activate test switch	Red signaling lamp is illuminated and local alarm is annunciated.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	Red signal shall be indicated at the remote monitoring station.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	Alarm resets automatically after release of test switch.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Record issues				Issue Log Item:		
				Initial	Date	
FINAL INSPECTION						
15. At the conclusion of testing, inspect interior hardware and electrical terminations	All hardware in place and properly torqued.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
	Compartments clear of tools and hardware.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Record issues				Issue Log Item:		
				Initial	Date	

**Test Equipment Used:**

Test Name	Manufacturer	Model Number	Serial Number	Calibration (Date)

Panel Data

Parameter	Data
Equipment ID:	
Manufacturer:	
Model Number:	
Serial Number:	
Mfgr. Date:	
Bus Amps:	
Volts:	
Phase/Wire/Frequency:	
Enclosure NEMA Rating:	
Short Circuit Rating:	
Isolation Transformer KVA	
Isolation Transformer Voltage	
LIM Manufacturer	

**Feeder Termination Torque** (Newton Meters or Foot-Pounds)

Bolt or Lug	A	B	C	N	G
Feeder Lugs					
Feeder Lugs					

Sound Level

Transformer	KVA	Sound Level (Decibel)

Wire Impedance (200,000 OHMS)

Conductor		Torque Verified		DLRO/DVM		Continuity Verified	Date
From (A)	To (B)	(A)	(B)	(A)	(B)		

**Final Sign-Off**

Commissioning Agent	Printed Name	Initials	Date
CONTRACTOR	PRINTED NAME	INITIALS	DATE
General Contractor (GC)			
Mechanical Contractor (MC)			
Electrical Contractor (EC)			
TAB Contractor (TAB)			
Controls Contractor (CC)			
Owner's O&M Personnel			