

**WESTERN POWER DISTRIBUTION ("WPD")**

**Commissioning test requirements for non-Type Tested Generating Units to G59/3.**

Over and Under Voltage Protection Tests LV											
Calibration and Accuracy Tests											
Phase	Setting	Time Delay	Pickup Voltage				Time Delay Setting plus or minus 4V				
Stage 1 Over Voltage			Lower Limit	Measured Value	Upper Limit	Result	Test Value	Lower Limit	Measured Value	Upper Limit	Result
L1 - N	262.2V 230V system	1.0s	258.75		265.65	Pass/Fail	266.2	1.0s		1.1s	Pass/Fail
L2 - N						Pass/Fail					Pass/Fail
L3 - N						Pass/Fail					Pass/Fail
Stage 2 Over Voltage			Lower Limit	Measured Value	Upper Limit	Result	Test Value	Lower Limit	Measured Value	Upper Limit	Result
L1 - N	273.7V 230V system	0.5s	270.25		277.15	Pass/Fail	277.7	0.5s		0.6s	Pass/Fail
L2 - N						Pass/Fail					Pass/Fail
L3 - N						Pass/Fail					Pass/Fail
Stage 1 Under Voltage			Lower Limit	Measured Value	Upper Limit	Result	Test Value	Lower Limit	Measured Value	Upper Limit	Result
L1 - N	200.1V 230V system	2.5s	196.65		203.55	Pass/Fail	196.1	2.5s		2.6s	Pass/Fail
L2 - N						Pass/Fail					Pass/Fail
L3 - N						Pass/Fail					Pass/Fail
Stage 2 Under Voltage			Lower Limit	Measured Value	Upper Limit	Result	Test Value	Lower Limit	Measured Value	Upper Limit	Result
L1 - N	184.0V 230V system	0.5s	180.55		187.45	Pass/Fail	180	0.5s		0.6s	Pass/Fail
L2 - N						Pass/Fail					Pass/Fail
L3 - N						Pass/Fail					Pass/Fail

<b>Over and Under Voltage Protection Tests LV</b>							
<b>Stability Tests</b>							
Test Description	Setting	Time Delay	Test Condition ( 3-Phase Value )	Test Voltage all phases ph-n	Test Duration	Confirm No Trip	Result
Inside Normal band	-----	-----	< OV Stage 1	258.2V	5.00s		Pass/Fail
<b>Stage 1 Over Voltage</b>	<b>262.2V</b>	<b>1.0s</b>	> OV Stage 1	269.7V	0.95s		Pass/Fail
<b>Stage 2 Over Voltage</b>	<b>273.7V</b>	<b>0.5s</b>	> OV Stage 2	277.7V	0.45s		Pass/Fail
Inside Normal band	-----	-----	> UV Stage 1	204.1V	5.00s		Pass/Fail
<b>Stage 1 Under Voltage</b>	<b>200.1V</b>	<b>2.5s</b>	< UV Stage 1	188V	2.45s		Pass/Fail
<b>Stage 2 Under Voltage</b>	<b>184.0V</b>	<b>0.5s</b>	< UV Stage 2	180V	0.45s		Pass/Fail
<b>Additional Comments / Observations::</b>							

**Over and Under Voltage Protection Tests HV**  
referenced to 110V ph-ph VT output

Calibration and Accuracy Tests											
Phase	Setting	Time Delay	Pickup Voltage				Time Delay measured value plus or minus 2V				
Stage 1 Over Voltage			Lower Limit	Measured Value	Upper Limit	Result	Test Value	Lower Limit	Measured Value	Upper Limit	Result
L1 - L2	121V 110V VT secondary	1.0s	119.35		122.65	Pass/Fail	Measured value plus 2V	1.0s		1.1s	Pass/Fail
L2 - L3						Pass/Fail					Pass/Fail
L3 - L1						Pass/Fail					Pass/Fail
Stage 2 Over Voltage			Lower Limit	Measured Value	Upper Limit	Result	Test Value	Lower Limit	Measured Value	Upper Limit	Result
L1 - L2	124.3V 110V VT secondary	0.5s	122.65		125.95	Pass/Fail	Measured value plus 2V	0.5s		0.6s	Pass/Fail
L2 - L3						Pass/Fail					Pass/Fail
L3 - L1						Pass/Fail					Pass/Fail
Stage 1 Under Voltage			Lower Limit	Measured Value	Upper Limit	Result	Test Value	Lower Limit	Measured Value	Upper Limit	Result
L1 - L2	95.70V 110V VT secondary	2.5s	94.05		97.35	Pass/Fail	Measured value minus 2V	2.5s		2.6s	Pass/Fail
L2 - L3						Pass/Fail					Pass/Fail
L3 - L1						Pass/Fail					Pass/Fail
Stage 2 Under Voltage			Lower Limit	Measured Value	Upper Limit	Result	Test Value	Lower Limit	Measured Value	Upper Limit	Result
L1 - L2	88.00V 110V VT secondary	0.5s	86.35		89.65	Pass/Fail	Measured value minus 2V	0.5s		0.6s	Pass/Fail
L2 - L3						Pass/Fail					Pass/Fail
L3 - L1						Pass/Fail					Pass/Fail

**Over and Under Voltage Protection Tests HV**  
referenced to 110V ph-ph VT output

<b>Stability Tests</b>							
Test Description	Setting	Time Delay	Test Condition ( 3-Phase Value )	Test Voltage All phases ph-ph	Test Duration	Confirm No Trip	Result
Inside Normal band	-----	-----	< OV Stage 1	119V	5.00s		Pass/Fail
<b>Stage 1 Over Voltage</b>	<b>121V</b>	<b>1.0s</b>	> OV Stage 1	122.3V	0.95s		Pass/Fail
<b>Stage 2 Over Voltage</b>	<b>124.3V</b>	<b>0.5s</b>	> OV Stage 2	126.3V	0.45s		Pass/Fail
Inside Normal band	-----	-----	> UV Stage 1	97.7V	5.00s		Pass/Fail
<b>Stage 1 Under Voltage</b>	<b>95.7V</b>	<b>2.5s</b>	< UV Stage 1	90V	2.45s		Pass/Fail
<b>Stage 2 Under Voltage</b>	<b>88V</b>	<b>0.5s</b>	< UV Stage 2	86V	0.45s		Pass/Fail
Additional Comments / Observations:							

<b>Over and Under Frequency Protection Tests</b>											
<b>Calibration and Accuracy Tests</b>											
Setting		Time Delay	Pickup Frequency				Time Delay				
<b>Stage 1 Over Frequency</b>		Lower Limit	Measured Value	Upper Limit	Result	Freq step	Lower Limit	Measured Value	Upper Limit	Result	
51.5Hz	90s	51.40		51.60	Pass/Fail	51.2-51.8Hz	90.0s		90.9s	Pass/Fail	
<b>Stage 2 Over Frequency</b>		Lower Limit	Measured Value	Upper Limit	Result	Freq step	Lower Limit	Measured Value	Upper Limit	Result	
52Hz	0.5s	51.90		52.10	51.2-51.8Hz	51.7-52.3Hz	0.50s		0.60s	Pass/Fail	
<b>Stage 1 Under Frequency</b>		Lower Limit	Measured Value	Upper Limit	Result	Freq step	Lower Limit	Measured Value	Upper Limit	Result	
47.5Hz	20s	47.40		47.60	51.2-51.8Hz	47.8-47.2Hz	20.0s		20.2s	Pass/Fail	
<b>Stage 2 Under Frequency</b>		Lower Limit	Measured Value	Upper Limit	Result	Freq step	Lower Limit	Measured Value	Upper Limit	Result	
47Hz	0.5s	46.90		47.1	51.2-51.8Hz	47.3-46.7Hz	0.50s		0.60s	Pass/Fail	
<b>Stability Tests</b>											
Test Description		Setting	Time Delay	Test Condition		Test Frequency	Test Duration	Confirm No Trip	Result		
Inside Normal band		-----	-----	< OF Stage 1		51.3Hz	120s		Pass/Fail		
<b>Stage 1 Over Frequency</b>		51.5Hz	90s	> OF Stage 1		51.7Hz	89.0s		Pass/Fail		
<b>Stage 2 Over Frequency</b>		52Hz	0.5s	> OF Stage 2		52.2Hz	0.45s		Pass/Fail		
Inside Normal band		-----	-----	> UF Stage 1		47.7Hz	30s		Pass/Fail		
<b>Stage 1 Under Frequency</b>		47.5Hz	20s	< UF Stage 1		47.3Hz	19.5s		Pass/Fail		
<b>Stage 2 Under Frequency</b>		47Hz	0.5s	< UF Stage 2		46.8Hz	0.45s		Pass/Fail		
Additional Comments / Observations:											

Loss-of-Mains (LOM) Protection Tests - RoCoF								
Calibration and Accuracy Tests								
Ramp in range 49.5-50.5Hz	Pickup (+ / -0.005Hzs <sup>-1</sup> )				Time Delay RoCoF= <b>+0.05Hz/s</b> above setting			
Setting = 0.125 / 0.20 Hzs <sup>-1</sup>	Lower Limit	Measured Value	Upper Limit	Result	Test Condition	Measured Value	Upper Limit	Result
Increasing Frequency	0.120 0.195		0.130 0.205	Pass/Fail	0.175 Hzs <sup>-1</sup> 0.25 Hzs <sup>-1</sup>		<0.5s	Pass/Fail
Reducing Frequency	0.120 0.195		0.130 0.205	Pass/Fail	0.175 Hzs <sup>-1</sup> 0.25 Hzs <sup>-1</sup>		<0.5s	Pass/Fail
Stability Tests								
Ramp in range 49.5-50.5Hz	Test Condition	Test frequency ramp		Test Duration	Confirm No Trip	Result		
Inside Normal band	< RoCoF ( increasing f )	Higher of 0.12 Hzs <sup>-1</sup> or ROCOF - 0.01 Hzs <sup>-1</sup> ) = _____		5.0s		Pass/Fail		
Inside Normal band	< RoCoF ( reducing f )			5.0s		Pass/Fail		
Additional Comments / Observations:								

Loss-of-Mains (LOM) Protection Tests - Vector Shift								
Calibration and Accuracy Tests								
Vector Shift	Pickup ( ± 0.5 degree )				Time Delay			
					Vector shift = 2 deg above setting			
Setting = 6 / 12 degrees	Lower Limit	Measured Value	Upper Limit	Result	Test Condition	Measured Value	Upper Limit	Result
Vector Shift : Lagging Angle	5.5 11.5		6.5 12.5	Pass/Fail	8 deg 14 deg		<0.5s	Pass/Fail
Vector Shift : Leading Angle	5.5 11.5		6.5 12.5	Pass/Fail	8 deg 14 deg		<0.5s	Pass/Fail
Stability Tests								
Test Description	Test Condition	Test vector shift		Test Duration	Confirm No Trip	Result		
Inside Normal band	< Vector Shift ( Lagging f )	Higher of 5 degrees or vector shift -1 degree				Pass/Fail		
Inside Normal band	< Vector Shift ( Leading f )	= _____				Pass/Fail		
Additional Comments / Observations:								

Insert here any additional tests which have been carried out

**Declaration – to be completed by Generator or Generators Appointed Technical Representative.**

I declare that the **Generating Unit** and the installation comply with the requirements of G59/3 and the additional commissioning checks noted above have been successfully completed in addition to those required for all **Generating Unit** installations (see Appendix 13.2)

Signature:

Date:

Position.

**Declaration – to be completed by DNO Witnessing Representative**

I confirm that I have witnessed the tests in this document on behalf of \_\_\_\_\_ and that the results are an accurate record of the tests

Signature:

Date:

**Please forward this form to:**

**For South West England & South Wales**

Western Power Distribution  
Records Team  
Lostwithiel Road  
Bodmin  
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Email: [wpdnewsupplies@westernpower.co.uk](mailto:wpdnewsupplies@westernpower.co.uk)  
  
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Ensuring you have quoted the WPD enquiry reference number if this has already been given to you.