

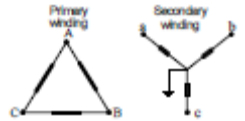


DISTRIBUTION COMMISSIONING TEST SHEET – MPS DISTRIBUTION TRANSFORMER
HPC-4DL-07-0019-2014

This commissioning test sheet covers the checking, testing and commissioning of all replacement or new installations of modular package substation (MPS) ground-mounted transformers up to 630 kVA before energisation.



NOTE: Tests must be carried out after the installation, alteration or repair and before putting back to service.
SAFETY: At all times maintain suitable clearance to all other electrical equipment and verify planned escape routes.
 In preparation for the tests, wherever possible, disconnect the cables from the equipment on both sides and make the area safe.



DATE:		Project No.		Name of Officer	
Transformer Location:					

1. TRANSFORMER DESCRIPTION

Rated Voltages	kV	V	Rated kVA	kVA	Stock code	Serial Number	
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2. VISUAL INSPECTION AND SAFETY CHECK

Inspect the following: <ul style="list-style-type: none"> • Rating plate • Tank and bushings • Tap setting • Oil level • HV terminations • LV terminations • Neutral connection • MEN/N-E connections 	1	Check that the installation complies with the distribution construction standards (Part 10 G3) and applicable design drawings.	<input type="checkbox"/>	
	2	Check that Public Safety has been considered (e.g. cabinets secured and locked, trip hazards removed where applicable).	<input type="checkbox"/>	
	3	Check the supply to the transformer, that it is switched off and isolated as per switching sheet and permit.	<input type="checkbox"/>	
	4	Confirm (with approved testing device) that the transformer is de-energised.	<input type="checkbox"/>	
	5	Ensure that the earth system is complete, undamaged and bonded to earth points. Check 2 m clearance to conductive services or structures, and 15 m clearance to Telstra/NBN pits.	<input type="checkbox"/>	
	6	Check that the nearest conductive material is at least two (2) metres away from the earth ring/system (take a photo if possible).	Measured distance	m <input type="checkbox"/>
	7	Transformer voltage rating matches system voltage.	<input type="checkbox"/>	
	8	Transformer tap is at the position of previously installed transformer or per network planning requirements.	<input type="checkbox"/>	
	9	Transformer oil level is satisfactory (if visible).	<input type="checkbox"/>	
	10	Transformer tank and bushings in good condition (no oil leaks).	<input type="checkbox"/>	
	11	HV cables are properly terminated and connected on transformer bushings.	<input type="checkbox"/>	

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	12	The dead-end plugs are the correct voltage rating and correctly installed (transformer with 2 sets of HV bushings).	<input type="checkbox"/>
	13	LV cables are properly terminated and connected on transformer LV fuseways.	<input type="checkbox"/>
	14	Check neutral connected to neutral bar, earth connected to earth bar, check MEN link present	<input type="checkbox"/>
	15	All labels fitted and numbered correctly.	<input type="checkbox"/>

3. EARTH RESISTANCE TEST

1	Test earth resistance using one of the following DCT's and record value in 3.4.					<input type="checkbox"/>
2	New earth stakes, use HPC-4DL-07-0004-2014 DCT- Earth Testing of Distribution Substation, to test the earths.					<input type="checkbox"/>
3	Existing earth stakes, use HPC-4DL-07-0037-2017 DCT- Earth Testing of Altered Systems, to test the earths.					<input type="checkbox"/>
4	Previous test value if known	= _____ Ω	Measured value	= _____ Ω	Value acceptable	Yes <input type="checkbox"/> No <input type="checkbox"/>
	Measured value would be acceptable if below 10 Ohms or a value between 0.8 and 1.2 which is obtained when dividing the Measured value by the Previous test value. Note: If previous test value is not known a value less than or equal to, 10 Ohms is acceptable.					<input type="checkbox"/>
5	Earth stake resistance above 10 Ohms or outside of an acceptable value must be communicated to the formal leader or Asset manager.					<input type="checkbox"/>

4. INSULATION RESISTANCE TEST

1	Ensure that the high voltage (HV) and low voltage (LV) windings of the transformer are de-energised.				<input type="checkbox"/>
2	Ensure all electrical connections have been disconnected, including MEN links.				<input type="checkbox"/>
3		Test Connection	Test Voltage	Expected Results	Test Results
Using an insulation resistance tester for a minimum of 1 minute for a stable reading test the following: (Short circuit all winding terminals of the source of the same voltage level together.)		Primary HV to Tank	2.5 kV	>1,000 MΩ	Ω
		Primary HV to Secondary/LV	1 kV	>100 MΩ	Ω
		Secondary/LV to Tank	1 kV	>100 MΩ	Ω

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Using an insulation resistance tester for a minimum of 1 minute for a stable reading test the low voltage (LV) board busbar: (LV fuse ways open, including the transformer LV disconnecter.)	Red phase to white phase	1 kV	>100 MΩ	Ω	
	White phase to blue phase	1 kV	>100 MΩ	Ω	
	Blue phase to red phase	1 kV	>100 MΩ	Ω	
	Red phase to earth	1 kV	>100 MΩ	Ω	
	White phase to earth	1 kV	>100 MΩ	Ω	
	Blue phase to earth	1 kV	>100 MΩ	Ω	
4	Confirm transformer has been discharged after each test.				<input type="checkbox"/>

5. CABLE RECONNECTION

1	Reconnect phase cables, tighten bolts with recommended torque stated below.	<input type="checkbox"/>
2	Reconnect neutral cables, tighten bolts with recommended torque stated below.	<input type="checkbox"/>
3	Reconnect neutral-to-earth links, tighten bolts with recommended torque stated below.	<input type="checkbox"/>

Suggested bolt torques:
M10 stainless steel bolts: 38 Nm
M12 stainless steel bolts: 66 Nm
M14 stainless steel bolts: 106 Nm
M16 stainless steel bolts: 162 Nm

6. HANDOVER OF RESPONSIBILITY FOR THE COMPLETION OF SECTION 1 TO 5

I hereby certify that section 1 to 5 has been completed with satisfactory results and transfer responsibility to the commissioning officer.

Testing Officer: _____ Pay Number: _____

Signature: _____ Date: DD/MM/YY Time: HH:MM



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7. ENERGISATION OF TRANSFORMER WITHOUT LOAD

<p>Check that the transformer LV is not connected to the LV network Check the HV fuse rating before energising the transformer HV Conduct a voltage and phase rotation test on the LV once the transformer is energised.</p>	Check that the HV fuses are correct.				Fuse Rating	A	<input type="checkbox"/>
	Energise the transformer HV as per HV switching program (check for abnormal noise)				Program No.		<input type="checkbox"/>
	Test Connection	Minimum Values	Test Results	Test Connection	Minimum Values	Test Results	
	Red to neutral	226 – 254 V	V	Red to white	390 – 440 V	V	
	White to neutral		V	White to blue		V	
	Blue to neutral		V	Blue to red		V	
Conduct a voltage and phase rotation test on LV side of transformer, preferably at LV disconnect.							<input type="checkbox"/>
Phase rotation (123 or ABC or RWB)				Rotation			

8. PHASING TEST

<p>Conduct a phasing test at the open points of the LV network, where the LV supply is coming from another transformer.</p>	<p>Conduct the phasing test under switching schedules on points of the LV network where the potential of the energised transformer can be matched with the potential of another energised transformer. This test ensures that the interconnections of transformers are made or can be made for operational purposes.</p> <ul style="list-style-type: none"> If the LV conductors are energised from an interconnected transformer, conduct the phasing test at the new transformer's LV disconnect or fuse box. If the LV conductors are not energised, proceed to section 6 and conduct the phasing test on normally open points where it can be interconnected from another transformer.
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9. ENERGISATION OF THE LV NETWORK

<p>Conduct a voltage and phase rotation test on the LV once the transformer is energised.</p>	If applicable, ensure all short-circuiting equipment is removed from LV network.			<input type="checkbox"/>
	If applicable, check that the LV fuses are correct		Rating	<input type="checkbox"/>
	Energise the LV circuits as per LV switching program.		Program No.	<input type="checkbox"/>
	Ensure that the LV network is returned to its normal operating configuration. If applicable, ensure that the LV circuits are not interconnected with any other transformers and are supplied only from the supply transformers.			<input type="checkbox"/>
	Conduct a voltage test on the LV disconnect of the new transformer to ascertain whether the transformer supply is within statutory limits during load conditions.			<input type="checkbox"/>



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Test Connection	Allowed Range	Test Results	Test Connection	Allowed Range	Test Results	
Red to neutral	226 – 254 V	V	Red to white	390 – 440 V	V	
White to neutral	226 – 254 V	V	White to blue	390 – 440 V	V	
Blue to neutral	226 – 254 V	V	Blue to red	390 – 440 V	V	
Conduct a service connection test on all installations where the service connections have been disturbed.						<input type="checkbox"/>

10. OPERATIONAL HANDOVER

The commissioning officer must ensure that all checks are completed and the test results comply with the minimum standards.

I hereby certify that all sections have been completed with satisfactory results and transfer responsibility to the network operating authority. This equipment is ready to be **SAFELY** energised.

Commissioning Officer: _____

Pay Number: _____

Signature: _____

Date: DD/MM/YY Time: HH:MM

1. Ensure the work area is left tidy with no hazards to the public.
2. Hand over responsibility to the operating authority
3. This sheet is a record of commissioning is required for the Handover Certificate.
4. Attach as-built drawings and datasheets to this sheet and send to relevant regional asset manager.