

Service connection testing

Workers who perform Service connection testing must continue to use the current SCT Guideline and SCT form (Published 31/01/2024) until they have received training and been authorised to use the new SCT Work instruction and SCT form. Refer to [Information Bulletin \(EDM 67914986\)](#).

This work instruction provides the minimum requirements that must be met when performing a service connection test (SCT) after reconnection to the network.

1. Parameters

Service connection tests (SCT) must be performed at installations where a New Connection to the network is being made, the consumer connection has been worked on (disconnected/reconnected), or disturbed (e.g., where mechanical load has altered at connections in the MCB or point of connection at any time because of works).

The METREL Polarity Plus® (Metrel) is the approved instrument to be used for testing service connections to the Western Power network.

Workers who perform SCT must hold a current authorisation for service connection testing. The authorisation must be renewed annually.

Service connection test results must be recorded:

- on the [Service Connection Test Form \(EDM 53524214\)](#), for general works after the service has been reconnected, and for a new service.
- on the [Service Connection Test - Meter Commissioning Form \(EDM 66652102\)](#), for a meter replacement only.

Record all test results on the SCT form. Where a result is not required, enter N/A (not applicable)

The reference for this work instruction is [Australian Standard AS 4741-2010 - Testing of connections to low voltage electricity networks](#).

Workers actively performing the SCT must wear PPE 1, protective eyewear, and LV gloves with protective outers throughout the test process. See [PPE Procedure \(EDM 27090942\)](#).

Workers must ensure that they are not distracted in any way during testing (e.g., by mobile phones, customers, fellow workers not involved in SCT). When testing is interrupted, the test must be re-started from the beginning, i.e., Step 9.

Refer to [Appendix 1 - Generic arrangements](#) for Service connection terminology and connection diagrams as provided in the West Australian Service Installation Requirements.

Where resources allow, Team leaders must assign a second SCT-trained worker to assist in performing a SCT. The second worker must sign on to the risk assessment as the assistant but is not required to sign the completed SCT form.

2. Instructions

2.1 Pre-work checks

2.1.1 Risk assessment

Perform risk assessment. The [Customer Connections & Metering - WRAP \(EDM 41399226\)](#) is recommended.

For embedded generation (EG) installations (Including solar and battery), Workers must check and monitor for hazardous voltage on the load side of the Service Protection Device (SPD) or meter terminals after disconnection (including neutral terminals). For more on this, see section [2.4.4 De-energising the meter or meter board - SCT form step 4](#), and the [Customer installation assets at the network interface work instruction \(EDM 41899675\)](#).

2.1.2. Customer assets assessment

Where customer assets are found or suspected to be damaged or degraded, refer to the [Customer installation assets at the network interface work instruction \(EDM 41899675\)](#) for information on assessment of the customers assets.

2.2 Service connection testing (SCT)

The following shows sections of the [Service Connection Test Form \(EDM 53524214\)](#) for general works after the service has been reconnected, or for a new service.

The [Service Connection Test - Meter Commissioning Form \(EDM 66652102\)](#) has similar fields and provides for the same tests but is intended for use in meter exchange programmes. Refer to the [Service connection testing - Meter commissioning work instruction \(EDM 66646743\)](#).

2.3 Installation information

INSTALLATION ADDRESS					DATE:	
Job Description:						
Existing meter number			New meter number			W/O#
DIRECT <input type="checkbox"/>	MMM <input type="checkbox"/>	DISTRIBUTED <input type="checkbox"/>	CT <input type="checkbox"/>	UMS (no meter) <input type="checkbox"/>	Pre-76 Earth Wire <input type="checkbox"/>	
Single Phase - ANNA <input type="checkbox"/>		Three Phase - AA AA AA NN <input type="checkbox"/>			Split Phase - AA XX AA NN <input type="checkbox"/>	
Service connection test point:		Meter terminals (Direct) <input type="checkbox"/>			SPD for installation (MMM) <input type="checkbox"/>	

Record the required details at the head of the SCT form as follows:

- Installation address (include Standalone Power System (SPS) asset ID)
- Existing/current meter number (if applicable)
- The Service Order number
- The installation type - Direct or Multiple Master (MMM), Distributed (DMM), Current Transformer metering (CT), Unmetered supply (UMS), and whether it has a Pre '76 MEN arrangement.
- The meter terminal connection configuration (Single Phase, Three phase or Split phase). For split-phase metering a three-phase meter is used, but the "white" terminals are not used.
i.e., connect AA, --, AA, NN

Service connection test point

Depending on the reasons for testing, and the type of installation; record the test point either at the meter terminals (Direct), or at the SPD (MMM, Distributed, CT, and UMS). Refer to [Appendix 1 - Generic arrangements](#):

- **Direct** – testing at the meter terminals when a meter is installed/replaced at any installation, or where street works have affected a typical domestic single-meter installation (where the meter is fed directly from the installation SPD).

- **MMM, Distributed, CT, UMS** – Test the consumer mains supply from the network at the **line side of the SPD**.

Test Instrument type	PAT ID or Serial No	Calibration date

Before proceeding, record the details of the approved test instrument, i.e., Metrel MI 3106, PAT ID or the instrument serial number, and the Date of its last calibration (must be within 12-months). Where a different instrument is used for the second part of the SCT process (reenergising), the instrument details must also be recorded in the space provided.

2.4 Disconnection

2.4.1. Touch test – SCT form step 1

1.	Direct and MMM, DMM, CT, UMS: Prove test instrument function. Conduct a touch voltage test from independent earth (>2.0m from the installation/meter box/earthed equipment) to the customer earth test point. Expected result <6V AC. If meter box is non-metallic, record test location below:			v
	Customer's neutral link or Neutral bar (consumers side) <input type="checkbox"/>	Customer's earth stake (check it is connected to the earth wire) <input type="checkbox"/>	Metallic (water) pipe (check it is connected to the earth wire) <input type="checkbox"/>	

Perform a pre-use inspection and test the instrument(s) on a known source to ensure that they are functioning correctly. This can be on the existing supply to the installation or by using a portable power source. Make sure that all three leads and probes are included in the proof test.

Install the independent earth stake of the Metrel > 2.0m from the installation/meter box/earthed equipment, to be used throughout the testing process.

Before accessing the installation/meter box, perform a touch (safety) test and record the voltage between the independent earth and the metal installation/meter box (must be less than 6V).

If the enclosure is non-metallic; open the enclosure and/or search the premises and find a suitable earth test point. It is essential to access an earth-bonded **Customer earth test point** on the customer's side of the installation for the touch test.

Suitable **Customer earth test points** could include, but are not limited to:

- Metallic meter box (check it is connected to the earth wire)
- Customer's neutral link (check it is connected to the earth wire)
- Customer's earth stake (check it is connected to the earth wire)
- Metallic (water) pipe (check it is connected to the earth wire)

Continuity between the selected **Customer earth test point** and the neutral terminal at the meter must be proven before continuing.

Where a suitable Customer earth test point cannot be found, workers must request assistance from their formal leader.

Example customer earth test points are illustrated in the below figure:



Record this **Customer earth test point** in Step 1 on the SCT form.

If the Touch voltage exceeds 6V, perform tests/fault finding within the scope of your authority and competence. If the problem cannot be found and corrected, call Western Power's CSC (13 13 51) to initiate the TCS process (Faults).

Meter tampering

Where meter tampering is evident, refer to Sect. 2.1 in the [Customer installation assets at the network interface work instruction \(EDM 41899675\)](#).

2.4.2. Initial loop impedance test – SCT form step 2

2.	Direct only: Z-Line loop impedance (Z line) – Line Active to Customer Earth Test Point. Expected result <1.0Ω.	Ω
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DIRECT only: Perform an initial line impedance test to establish a baseline reading for this same test when performed during the SCT Reconnection phase (step 15).

- a. Connect the Metrel RED lead to line active.
- b. Connect the BLACK lead to the Customer Earth Test Point.
- c. Connect the GREEN lead to the independent earth electrode.
- d. Record the loop impedance at step 2.

Note – Use the same test location as your touch test.

If the installation is a post-76 DIRECT wired installation (i.e., MEN downstream of the meter), an earthed component can be used.

If the customer's neutral link is easily accessible, use this point.

If the above are not feasible, document this as part of the WRAP and Comments section of the SCT and proceed to step 3.

Where necessary, workers may remove escutcheon plates for the purpose of performing testing.

This step is not applicable for testing at **MMM, DMM, CT and UMS** installations.

2.4.3. Customers Main switch – SCT form step 3

3.	Direct only: Record position of customer’s main switch(es) (ON/OFF) if accessible. Switch customer’s main switch(es) (including EG main switches) OFF. Note additional switches in ‘Comments’ below.	ON <input type="checkbox"/>	OFF <input type="checkbox"/>	Remote <input type="checkbox"/>
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Applicable when testing at the **Meter** after meter installation/replacement or for direct wired installations, as shown in [Appendix 1 - Generic arrangements \(1. Meter fed off SPD\)](#).

This step is not applicable for testing at the SPD for **MMM, DMM, CT and UMS**.

Record the ‘as found’ status of the customer’s main switch on the SCT form. Circle either found ‘ON’ or found ‘OFF’ to ensure that the customer’s main switch will be left in the same state on completion of SCT.

Turn the customer’s main switch OFF, and any embedded generation (EG) switches marked “Main Switch”. Make a note of these on the SCT form in the ‘Comments’ section, and ensure they are returned to their original state on completion of the SCT.

For a remote/inaccessible main switch, record this on the SCT form and proceed to Step 4 on the SCT form.

2.4.4. Phase rotation - SCT form step 4

4.	Confirm voltage(s) are within supply limits and record 3-phase rotation (e.g., 1;2;3)	Phase rotation:
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Confirm correct voltages at the meter line terminals for **Direct** or at the line side of the SPD for **MMM, DMM, CT and UMS** testing.

Connect RED Metrel lead to Red Ø, BLACK Metrel lead to White Ø, GREEN Metrel lead to Blue Ø at the existing meter line terminals for **Direct** (or SPD for **MMM, DMM, CT and UMS**). Select the Metrel to ‘Voltages’.

Record the phase rotation on the SCT form.

Ensure that the phase rotation remains the same when reconnecting (at step 9).

2.4.5. De-energising the meter or meter board - SCT form step 5

5.	Direct: Isolate SPD. Confirm no voltage. Apply “Do not access or alter” tag. MMM, DMM, CT, UMS: Isolate SPD. Confirm no voltage on load side of SPD. Apply “Do not access or alter” tag to the SPD.	<input type="checkbox"/> OR <input type="checkbox"/>
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For **Direct** installations, de-energise the supply to the meter. Test to prove the meter is de-energised at all the meter terminals.

For embedded generation installations, confirm no voltage between load actives, neutral and independent earth.

If voltage is still detected, confirm all the customer’s main switch(s) are OFF. (Including switching off main switches that have labels such as “MAIN SWITCH (INVERTER)”, or “MAIN SWITCH (BATTERY INVERTER)” or similarly labelled main switches).

If this does not remove the voltage, refer to [Section 2.7 Failed results](#). This also applies for a remote main switch.

For **MMM, DMM, CT and UMS** switch the SPD OFF. Test to prove the board is de-energised at the load terminals of the SPD. It may be required to access behind cover panels. If voltage is still detected at the SPD load terminals, refer to Section 2.7 Failed results.

Refer to Appendix 1 - Generic arrangements for information and definition of SPD and Meter fuses.

For any isolation point, attach a 'Do not access or alter' label to the point of isolation. Labels are ordered through ARIBA (Code 1051529 or 1051531).

2.4.6. Disconnection - SCT form step 6

For reference purposes, it is recommended that workers photograph the meter connections before disconnection.

6.	<p>Direct: Remove LOAD active(s) first and then LOAD neutral/Pre 1976 earth wire from the meter terminals, and L1.</p> <p>MMM, DMM, CT, UMS: Remove and secure the LINE neutral from the MEN/Neutral link bar.</p>	<input type="checkbox"/> OR <input type="checkbox"/>
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For a supply outage (e.g., street/upstream works) where the service connection will be affected:

Direct: Remove all the LOAD actives first (including L1) and then LOAD neutral/pre-1976 earth wire from the meter terminals. Ensure that they are identifiable and will not be transposed when reconnected.

Insulate the load tails with insulated caps.

For meter installation/replacement:

- For meters with two neutrals (line and load) confirm no current in the load neutral.
- Ensure that all the wiring is identifiable and will not be transposed when reconnected.
- Replace the meter.

MMM, DMM, CT and UMS: Disconnect the LINE neutral from the MEN/Neutral link bar. A neutral identifier tie must be attached to the disconnected line neutral and to the terminal from where the line neutral was disconnected. This is to ensure the LINE neutral is reinstated into the correct location. An insulated cap must be applied to the end of the line neutral to ensure:

- There is no possibility of energising the panel if reverse polarity occurs.
- That it is easily identifiable
- To prevent inadvertent contact with the consumer mains cable when energised for testing.

Disconnect line neutral from the MEN/Link bar

- Panels might need to be removed to access the neutral bar, once accessed the line neutral must be disconnected. This is done to ensure that the installation is completely disconnected from the network. By doing this, if a reverse polarity were to occur, the customer's installation and anyone within the installation premises are protected against an electric shock. The disconnected neutral must be made safe to prevent inadvertent contact with the other cores of the customer mains cable when it is energised during testing.
- Where there is a risk identified which require manual handling of a panel to access the MEN/ LINE neutral, or there is a risk of contact to exposed hardware, the following step can be carried out.
 - Conduct steps 1-4 of the SCT form
 - Disconnect supply from network
 - Manually remove the panel to gain access to MEN/LINE neutral.
 - Reconnect active conductors to the network

- Continue and complete test.
- Disconnect active conductors from network

NOTE: the neutral connection is NOT to be disconnected.

- Replace meter panel
- Reconnect active conductors to the network
- Complete step 8 of the SCT again, this is to ensure the readings you obtained remained the same or better (New form not required at this point)
- Record on SCT form no changes recorded after panel was replaced and active conductors reconnected.
- For CT metering installations, multiple master metering installation or distributed master metering installations, where the line neutral is terminated at a neutral link, disconnection of the line neutral is required when service connection work is being performed upstream of the neutral link. Insert a 'Neutral identifier tie' in neutral link terminal upon disconnection of the line neutral.

2.4.7. Certify

I, _____ <small>Write full name</small> _____ certify that I have performed all the above tests in sequence and confirm that the service is correctly disconnected from the network.		
BNA:	Date & Time:	Signature:

After disconnection, the SCT-authorized worker must record their name and BNA, and sign the Disconnection section on the SCT form, certifying that all the steps have been completed.

2.5 Reconnection - SCT form step 7, 8, 9

RECONNECTION		
	<small>PAT ID or Serial No</small>	<small>Calibration date</small>

Record the Metrel details if the instrument being used for this part is different from above.

Step 7:

7.	<p>Direct: Confirm all Main Switches, including EG, are in the same position as recorded in SCT form step 3, including additional switch positions in comments. Confirm that only the LINE neutral and the LINE active/s are connected to the meter.</p> <p>MMM, DMM, CT, UMS: confirm SPD switched off</p>	<input type="checkbox"/>
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MMM, DMM, CT and UMS: This step is not applicable for testing at the line side of the SPD.

Direct: Check that the customer's main switch and any EG switches are still switched OFF. Connect the LINE neutral and the LINE active(s) only.

For a replacement meter in a MMM panel, the reference neutral must be reconnected into the LINE neutral terminal.

The meter terminal connection configuration must be correct. Double check meter wiring positions:

Single phase:	A _{line}	N _{line}	N _{load}	A _{load}				
Three phase:	A _{line}	A _{load}	A _{line}	A _{load}	A _{line}	A _{load}	N _{line}	N _{load}
Split phase:	A _{line}	A _{load}	Blank	Blank	A _{line}	A _{load}	N _{line}	N _{load}

Step 8:

8.	Prove test instrument function. Direct: Install SPD. Confirm voltage(s). Remove “Do not access or alter” label. MMM, DMM, CT, UMS: Confirm voltage to line side of SPD. Leave SPD switched OFF.	<input type="checkbox"/> OR <input type="checkbox"/>
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Confirm that the Metrel instrument, leads, and probes are still functioning correctly.

Confirm/install the independent earth >2m from the meter box or earthed equipment.

For a supply outage (e.g., street works) after reconnection of the service:

- **Direct:** Remove the ‘Do not access or alter’ label and energise the LINE side of the meter. The LOAD tails including L1 (if present) must not be re-connected at this stage.
- For pre-1976 type installations, the pre-1976 earth wire must remain disconnected from the meter terminal (Line neutral) whilst SCT is being performed. This is to be reconnected later.
- **MMM, DMM, CT and UMS:** Energise the supply to the line side of the SPD. Leave the SPD in the OFF position.

For meter installation:

- Install the new meter and connect LINE neutral and LINE actives only. All the Load tails including L1 (if present) must not be re-connected at this stage. There are to be reconnected later.
- For pre-1976 installations, do not reconnect the pre-1976 earth wire into the line neutral meter terminal. This is to be reconnected later.
- Remove the ‘Do not access or alter’ label from the isolation point and energise the LINE side of the meter.

Step 9:

9.	Confirm phase rotation is the same as found in STEP 4 (e.g., 1;2;3)	Phase rotation:
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If the installation is three phase, record the phase rotation and confirm it is the same as recorded in Step 4 of the SCT form.

2.5.1. Testing – SCT form step 10

10.	Line impedance, polarity, and voltage test (at meter position or SPD). Record results in the table below:
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For **Direct** installation: the service connection tests must be performed at the meter LOAD terminals with all the load tails removed, L1 and pre '76 earth wire also disconnected (if present).

For **MMM, DMM, CT and UMS:** the service connection tests must be performed at the LINE side of the SPD and the disconnected line neutral.

For results outside of the prescribed ranges, or if the Metrel indicates ‘FAIL’, refer to [Section 2.7 - Failed results](#) in this work instruction.

For three phase voltage tests:

a) V - 3-Phase Voltages (if applicable)	390V - 440V	U1-2	V	U1-3	V	U2-3	V
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- a) Connect RED Metrel lead to Red Ø, BLACK Metrel lead to White Ø, GREEN to Blue Ø at the meter load terminals for **Direct** (or SPD for **MMM, DMM, CT and UMS**). Select the Metrel to ‘Voltages’.

- The Metrel displays the phase-to-phase voltages and phase sequence as 1; 2; 3.
Displayed results for three-phase system:
U1-2: Voltage between R Ø and W Ø
U1-3: Voltage between R Ø and B Ø
U2-3: Voltage between B Ø and W Ø
- Record the line voltages on the SCT form (Expected voltages 390V–440V)
- Single phase voltage will be recorded at step 'd'

For line impedance and polarity, test one phase at a time:

b) Z- Line loop impedance (Z Line)	<1.0Ω	Ω	Ω	Ω
c) Z- R - Earth (RE)	<10kΩ	kΩ	kΩ	kΩ
d) V- Line Active – Line Neutral	226V - 254V	V	V	V
e) V- Line Active – Independent Earth	226V - 254V	V	V	V
f) V- Line Neutral – Independent Earth	<6V	V		

- Connect the Metrel RED lead to line active, the BLACK lead to line neutral and the GREEN lead to the independent earth electrode. Select the desired test function on the test instrument (Metrel) and record:
 - Line loop impedance - ZL (less than 1Ω) per phase
 - Earth resistance - RE (less than 10kΩ)
 - Active/Neutral voltage per phase (226V–254V)
 - Active/independent earth voltage per phase (226V–254V)
 - Neutral/independent earth voltage (< 6V)

Additional tests are required depending on the supply/installation:

g) V - Split Phase to Phase Volts (if applicable)	451V to 509V	V		
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- Split phase voltage (451V-509V) if applicable.

Confirm the MEN electrically at steps h) and i):

h) V - Line Active to Metal Meter Enclosure	Within 5V of test d)	V		
i) V - Line Active – Load Neutral/ Pre-1976 earth wire/Neutral bar	Within 5V of test d)	V		

- Proves Customer's earth test point is grounded.
 - Record the voltage between Line active and the Customer's earth test point result must be within 5V of the Line active to Line neutral voltage (at step d).
- Test to prove the customer load neutral connection to earth (MEN):
 - Direct - Test for voltage between Line active and the disconnected load neutral or pre-1976 earth wire.
 - MMM, DMM, CT and UMS – test between line active at the SPD and the neutral bar (Line neutral is still disconnected).
 - Result must be within 5V of the Line active to Line neutral voltage (at step d).

The MEN test cannot be performed where there is no MEN connection, e.g., for some DMM installations the earth is brought back from a Unit Distribution Board (DB) to the Main DB (where the MEN must be tested along with the Network supply connection). Testing at the unit DB where the load neutral is not directly earthed (no MEN) will provide an incorrect result as the disconnected load neutral is 'floating'. For more information on service connection arrangements, refer to the [Western Australian Service and Installation Requirements \(WASIR\) \(EDM 27130164\)](#)

The MEN connection at the Main DB can be proven by performing a continuity test in the Unit DB between the meter line neutral terminal and the earth wire connection in the Unit DB.

Where necessary, workers may remove escutcheon plates for the purpose of performing testing.

2.5.2. Reinstatement/commissioning - SCT form step 11, 12

11.	Direct: Isolate SPD. Confirm no voltage. MMM, DMM, CT, UMS: Confirm voltage between LINE neutral and Neutral bar is <6V.	<input type="checkbox"/> OR <input type="checkbox"/>
12.	Direct: Reconnect LOAD neutral/pre-76 earth wire first, and then LOAD active(s) and L1. MMM, DMM, CT, UMS: Reconnect the LINE neutral to the Neutral bar.	<input type="checkbox"/> OR <input type="checkbox"/>

On completion of testing the following actions must be performed to re-instate the service connection to the network.

For **Direct** (testing performed at the meter):

- De-energise the meter and confirm no voltage at all terminals.
- Reconnect LOAD neutral into the load neutral terminal and the pre-1976 earth wire into the line neutral terminal.
- Connect LOAD active(s) to the meter terminals - ensure correct wiring configuration.
- Connect L1 tail (if present).

Ensure that conductor tail strands are twisted tightly together before inserting into the meter terminals. Tails must be inserted into the terminal tunnels to the full depth of the tunnel and all screws and bolted connections tightened firmly. 6mm² wire must be twisted and doubled over to ensure a good connection.

For testing performed at the **MMM, DMM, CT and UMS:**

- Ensure the SPD is still OFF, confirm less than 6V between LINE neutral and neutral bar.
- Reinstale the LINE neutral to the MEN/Neutral link bar.

2.5.3. Checking connections - SCT form step 13, 14, 15

Mechanical test:

13.	PULL TEST ALL CONNECTIONS WITH PLIERS	<input type="checkbox"/>
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After reconnection, ALL connections must be checked for tightness. Pliers must be used to check for side-to-side (lateral) movement and a pull test (downward) on all the tails in the meter terminals.

Functional test:

14.	Direct only: Install SPD. Using a load tester prove the meter function.	<input type="checkbox"/>
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- **Direct:** Reinstale supply to the meter. Confirm correct voltage(s) and prove the meter function using a load tester at the load terminals (connect in turn across each phase and the neutral).
- **MMM, DMM, CT and UMS:** Leave the SPD OFF

Final loop impedance test:

15.	Direct only: (repeat step 2): Z - Line loop impedance (Z line) – Line Active to Customer Earth Test Point. Expected result same as step 2.	Ω
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Direct: Repeat step 2 - Perform a final line impedance test to prove (electrically) that the load neutral has been correctly reconnected:

- Use the same test point location from Step 2 for this test. Connect the Metrel and record on the form the line loop impedance between the customer earth test point and the line active terminal at the meter.
 - a. Connect the Metrel RED lead to line active.
 - b. Connect the BLACK lead to the Customer Earth Test Point.
 - c. Connect the GREEN lead to the independent earth electrode.
 - d. Record the loop impedance at step 15.

This step is not applicable for testing at **MMM, DMM, CT and UMS** installations.

2.5.4. Reinstating supply - SCT form step 16


16.	Direct: Confirm Customers Main Switch as found in STEP 3 (including EG main switches)	ON	OFF	Remote
	MMM, DMM, CT, UMS: Remove "Do not access or alter" label. Switch SPD ON, confirm voltage.			<input type="checkbox"/>

Direct: Ensure the customer's main switch is left in the same state as recorded in Step 3 on the SCT form, circle the 'as left' status. The "MAIN SWITCH (INVERTER)", or "MAIN SWITCH (BATTERY INVERTER)" or similarly labelled MAIN switches that were switched off must also be reinstated at this time.

For a remote main switch, the installation will be re-energised when the meter supply is reinstated.

MMM, DMM, CT and UMS: Switch the SPD ON. Confirm voltages at the load terminals of the SPD and remove the "Do not access or alter" label.

2.5.5. Check touch potential - SCT form step 17, 18

17.	Repeat Step 1: Touch voltage test from independent earth to the customer's earth test point, or pre '76 neutral link. Expected result <6V AC.		V
18.	Photograph the meter panel showing the meter number and confirming all tails connected correctly. For MMM , also photograph the Line Neutral connected to the customer's neutral bar.		<input type="checkbox"/>

Repeat step 1: Record the touch voltage from the independent earth to the customer's earth test point. Perform the test at the same location as recorded in step 1. Expected result <6V AC.

If the customer earth test point has a voltage of 6V or more, refer to [Section 2.7– Failed results](#)

Direct: Take a photograph of the meter to show the meter number and all tails connected correctly.

MMM, DMM, CT and UMS: Take a photograph of the neutral link showing the LINE neutral reinstated.

Apply meter/switchboard covers and seals.

2.5.6. Completion

I, <u>Write full name</u> certify that I have performed all the above tests in sequence and confirm that the service connection is safe and correctly connected to the network.		
BNA	Date & Time:	Signature:

The SCT-authorized worker must record their name and BNA, and sign the Reconnection section on the SCT form, certifying that all the steps have been completed, that all the tests have been performed, and the service is safely and correctly connected to the network.

The completed form and the photo must be archived with the project documentation.

2.6 Standalone Power System (SPS) sites

At SPS sites a loop impedance higher than 1Ω could be measured at the kWh meter terminals. This is usually caused by the internal impedance of the SPS unit, and not the supply loop.

The SPS unit usually runs in 'Inverter' mode unless it has been *switched* to 'Generator bypass' mode. This must be verified if the generator is running. Switching to 'Generator bypass' mode can only be performed by workers that are trained and authorised to perform this operation.

Refer to the SPS impedance sticker (Fig 1) in the meter box. The impedances shown are the internal impedance of the SPS unit measured at the SPS terminals.

Subtract the applicable figure from the loop impedance measured at the kWh meter terminals (either Inverter or Generator bypass) – confirm the mode before testing.

SPS Internal Impedance		westernpower		
SPS SITE ID: 19070-04		23/11/2023		
Inverter Mode:	L1: 1.14	L2: N/A	L3: 1.14	Ω
Generator Mode:	L1: 0.39	L2: N/A	L3: 0.41	Ω

Fig 1: SPS internal impedance sticker

Example: With SPS in inverter mode, measured loop impedance at kWh terminals: $1.37\ \Omega$

In Inverter mode, the actual (corrected) loop impedance would be: $1.37 - 1.14 = 0.23\ \Omega$ ✓

This calculation (e.g., $1.37 - 1.14 = 0.23\ \Omega$) must be shown in the "Comments" section of the SCT form.

If the corrected loop impedance is still above 1Ω , and all the circuit connections between the test point at the meter and the SPS terminals have been checked, refer to [Section 2.7 Failed results](#).

2.7 Failed results

2.7.1. Responding to failed results

Where voltage is detected on the installation after disconnection from the network:

- If possible, confirm all switches identified as “Main switch” are OFF, do not proceed with work at the customers installation.
- Call CSC (13 13 51), Issue a customer pack (Temporary disconnection) – EG not effectively isolating, voltage detected on disconnected installation.

1. If results for step 2 are not within the required range:

Try alternate test point locations.

If an acceptable result is not achieved, record this in the WRAP and SCT Comments section and proceed to step 3. In this scenario you will not be able to perform step 15. Double check the load neutral is neat and secure in the meter’s terminal for step 15.

2. If a failed result is observed for step 15:

Ensure the same test point location is being used.

De-energise the site and confirm the integrity of the installation’s neutrals via a visual and pull test.

When working on the meter terminations, you may have disturbed the other end of the load neutral. Confirm the load neutral has not become loose or disconnected at the customer’s neutral link.

Repeat step 15. If a failed result is still observed, seek guidance from your formal leader and follow the disconnection process.

3. If results are not within the required ranges indicated during testing or the Metrel indicates FAIL; before disconnecting or issuing a Customer Pack, complete the following:

- Recheck all supply connections to ensure their integrity.
- Perform fault-finding within authority and capability limits.
- Confirm the test results by retesting (ensure that test probes, crocodile clips and spring-loaded clips have made good contact).

4. If the ‘failed’ results are confirmed after retesting:

- For supply problems on the Western Power network, e.g., high neutral-earth voltage, or high loop impedance, a Network Response Officer must be requested to attend.
- For faults in the customer’s installation, e.g., open circuit MEN, call the CSC (13 13 51) and issue the customer with a Western Power Customer Pack (Temporary disconnection).

5. For SPS ‘high’ loop impedance result:

- Some units have a high internal impedance in generator mode. Non-SPS workers must contact their formal leader or an SPS technician on the SPS On-Call number - 0428 293 095 for further information or guidance.

2.7.2. Customers with Life Support Equipment (LSE)

For LSE customers, do not disconnect/isolate until arrangements to supply the customer can be made. Discuss with the Fault response unit and formal leader and consider options, inform the customer if possible, and issue a Western Power Customer Pack.

3. Deviations

The content of this work instruction summarises the minimum legislative/compliance requirements to provide safe systems of work and cannot provide details to cover all operational scenarios.

When deviation from this work instruction is required to be managed at site, the following applies:

- Deviation(s) must be recorded in the WRAP. The documented deviation controls must be equivalent to, or better (greater) than the existing control(s) for the tasks to be performed. Deviation controls must be communicated to all impacted workers
- Site coordinator/person in charge of site must review/sign off the deviation in the WRAP prior to works commencing
- The duration of deviation must not be longer than one shift
- The deviation must not contravene any existing regulation or any legislation.

If a recurring deviation to this work instruction is required, the following applies:

- Deviation must be justified through a risk assessment and approved by the relevant Head of Function in consultation with the SEQT Head of Function (see *Work Health and Safety (WHS) General Risk Assessment Tool (EDM 53756142)*)
- The deviation must not contravene any existing regulation or any legislation
- The risk assessment must demonstrate that the deviation controls are equivalent to, or better (greater) than, the existing control(s) for the tasks to be performed
- The risk assessment and controls must be documented and communicated to all impacted workers
- The duration of the deviation must be clearly indicated on the HoF approval
- A record of approval by the Head of Function and the consultation with SEQT HoF must be retained for audit purposes. Copy of this record must be provided to SEQTMS@westernpower.com.au for inclusion into the consultation register.

If a permanent deviation is required for a specific group/area, please contact the Safety, Health and Environment Management System Team via SEQTMS@westernpower.com.au.

4. Dictionary

Term	Meaning
Consumer Mains	The conductor that runs from the point of supply (frame, pillar) to the main switchboard.
Current Transformer (CT)	CT metering refers to non-direct wired metering where CTs are used to provide to measure current in conductors. The CT secondary output is the coupled to the meter to record current in the main conductor. Usually used in installations where constant current is >80A
Customer earth test point	Any earthed point in the installation that is connected to the load neutral via the MEN. This could be the metallic meter enclosure, or the customers neutral link, the customer's earth stake, a metallic water pipe.
Distributed Master Metering (DMM)	Refer to the <u><i>WASIR (EDM 27130164)</i></u> Sect 11.12 – Distributed Master Metering: Distributed master metering allows for each consumer to have their own master meter located at their respective unit within a group of units. This form of metering applies only to units with an effective fire division from the other units of the installation.
Main switch (MS)	Customer's main switch on the load side of the meter.
Multiple Master Metering (MMM)	Refer to the <u><i>WASIR (EDM 27130164)</i></u> Sect 11.11 – Multiple Master Metering:

Term	Meaning
	A multiple master metering installation provides metering options for domestic and commercial consumers in single/multi-storey developments regardless of whether the units have ground level access. Generally, it is preferred that the site main switchboard and the complete master metering installation be sited at the same location.
Service Protection Device (SPD)	A fuse, circuit breaker or other device installed as required by the network operator for interrupting the supply to an electrical <i>installation</i> on a consumer's (customer) premises from the supply main. (Clause 1.4.106 of AS/NZS 3000). This <i>installation</i> could be a single meter, or a main switch board for a DMM installation, or a multiple master meter panel.
Unmetered supply (UMS)	Used where power consumption is not being metered.

5. References

Australian Standard 4741-2010 (Testing of connections to low voltage electricity networks)

Australian Standard 3000 Wiring Work

Electricity Regulations 1947 (WA)

Western Australian Service and Installation Requirements (WASIR).

6. Related documents

Title	EDM reference
Customer advisory note - disconnection not required	See Ariba stationery contract
Customer advisory note - disconnection required	See Ariba stationery contract
Customer Connections & Metering - WRAP	41399226
Customer installation assets at the network interface work instruction	41899675
Customer requested appointments Work Instruction	41853904
De-energising a SWER transformer for service core replacement Work Instruction	41891333
Gifted assets note	See Ariba stationery contract
Maintaining overhead service cables work instruction	41891561
Management and assessment of private low voltage electrical installation assets Procedure	32264496
Meter movement form	45738396
Personal protective equipment procedure	27090942
Replacing a meter panel work instruction	41888335
Revenue meter communications equipment work instruction	43633306
Revenue meter maintenance, removal, and replacement work instruction	43635644
Sealing revenue meters, fuses, and terminal blocks work instruction	41890669
Service Connection Test Form	66654214
Service Connection Test - Meter Commissioning Form	66652102
Service Connection Test Form and Guideline consultation register	46024770

Title	EDM reference
Service connection testing - Meter commissioning work instruction	<u>66646743</u>
Service de-energisation/re-energisation and disconnection /reconnection Work Instruction	<u>41885504</u>

7. Review

This work instruction will be reviewed and evaluated by the content owner at least once in every three-year period taking into account the purpose of the work instruction and the outcome of the compliance review.

8. Content owner

Full name	Role title	Business unit
Julian McPherson	Meter Provision Manager	Strategy Delivery

9. Content approver

Full name	Role title	Business unit
Sue Nesci	Head of SEQT (Acting)	People

10. Approval history

Version	Approved by	Date of approval	Notes
1.0	Sue Nesci	30/06/2026	First version.

Disclaimer

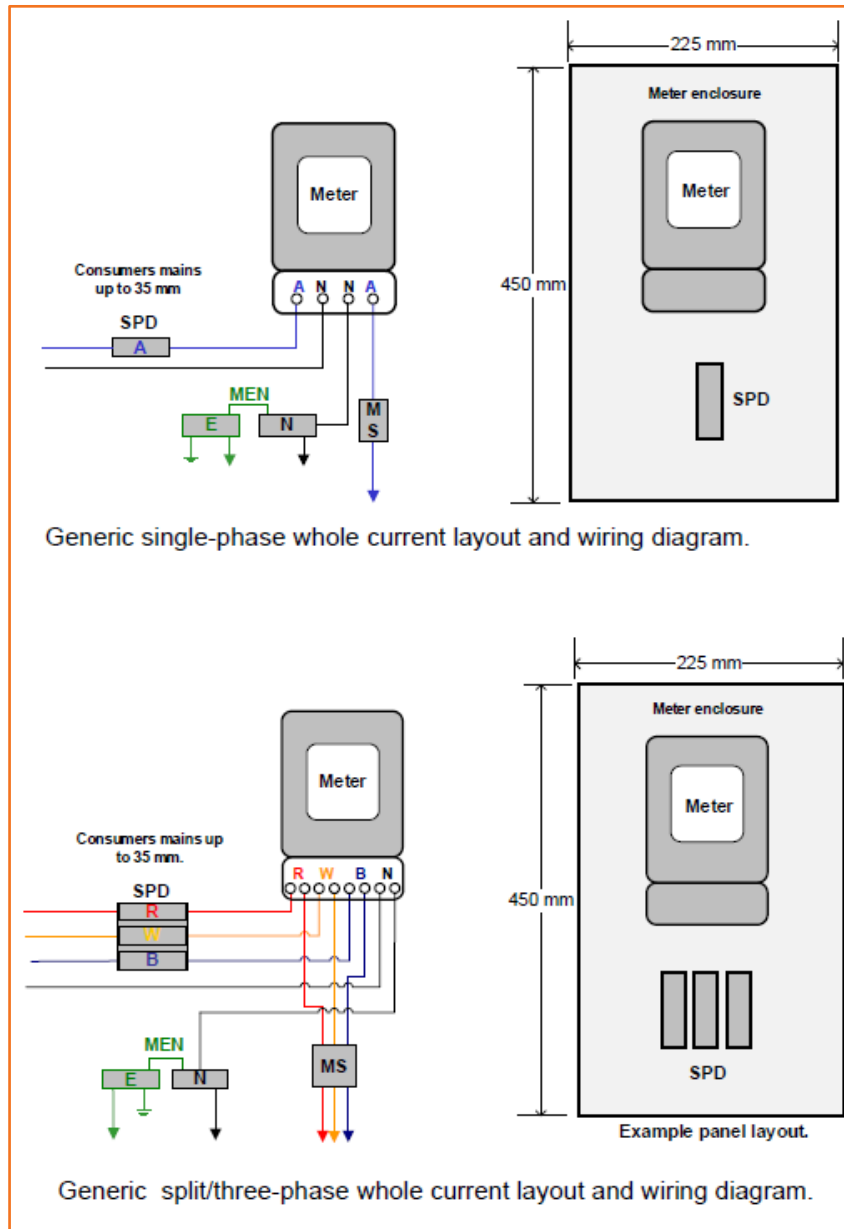
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Appendix 1 - Generic arrangements

The below are extracted from the Western Australian Service and Installation Requirements (available online).

1. Meter fed off SPD

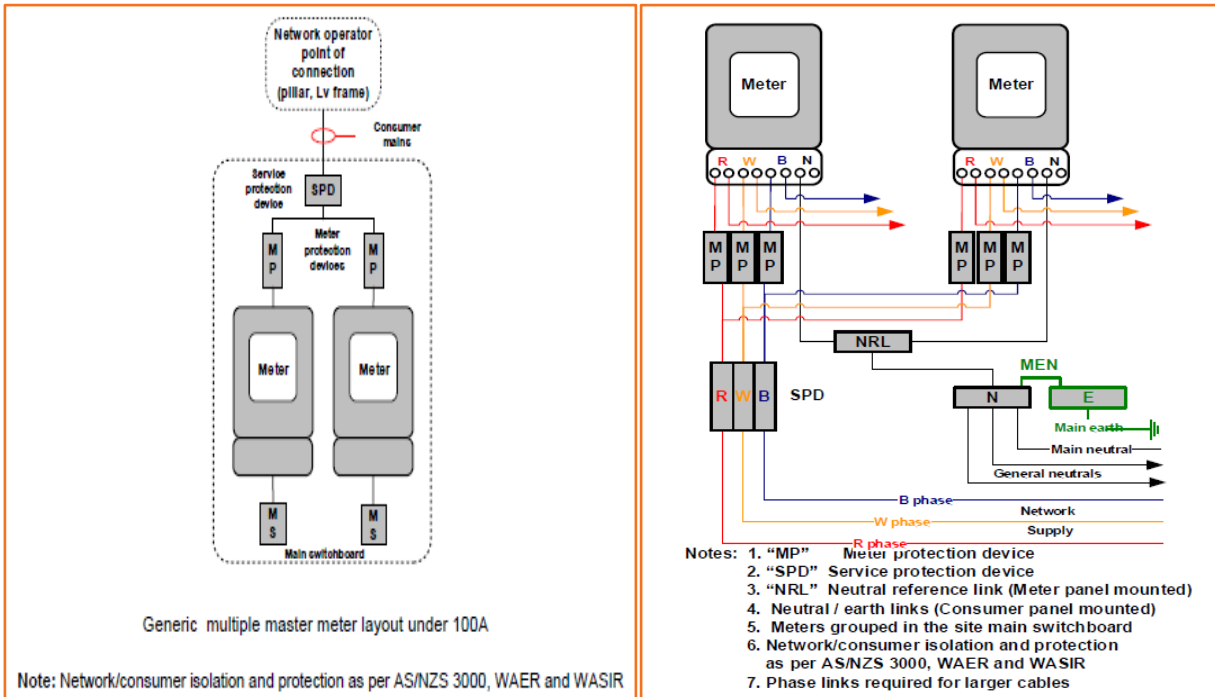
- Typical domestic single dwelling arrangement
- SCT is to ensure correct connection of Consumer mains to the Network.
- SPD – Service protection device for Network isolation point to the meter and installation.
- MS – Customer’s main switch (could be several if there is embedded generation)



Typical single and three/split phase direct wired arrangement

2. Multiple master meter arrangement

- Meters are typically fed off sub-mains and meter fuses.
- SCT is to ensure correct connection of **Consumer mains** to the Network and is performed at the line side of the SPD and neutral link.
- SPD – Service protection device for supply to the whole Multiple Master Metering (MMM) panel, same for CT and DMM.
- MP – Meter protection. For meter exchange isolate the meter at ‘MP’.
- MS – Customer’s main switch; turned off for meter exchange.



Typical MMM arrangement <100A