



SA Power Networks Commissioning Witnessing Checklist (AS4777.2:2020)

LOGGER NUMBER:

LOGGER IP ADDRESS: 10.225.126.

ORDER NUMBER: 90001

CUSTOMER NAME:

ADDRESS:

SITE NUMBER:

NMI:

TRANSFORMER NUMBER:

SOLAR PV APPROVED CAPACITY: kVA (AC) kVA (DC)

BATTERY APPROVED CAPACITY: kVA (AC)

OPERATING PHILOSOPHY: IMPORT CONTROL / EXPORT CONTROL

MAXIMUM EXPORT kW (AC): MAXIMUM IMPORT kW (AC):

ON SITE TECHNICIAN:

INSTALLER ACCREDITATION NUMBER: ELECTRICAL (PGE) SOLAR (CEC):

INSTALLED DATE:

WITNESSING DATE: ____ / ____ / ____ (dd/mm/yyyy)

SITE CONTACT NAME:

SITE CONTACT MOBILE PHONE NUMBER:

COMMISSIONING OFFICER:

ENGINEERING REPORT NUMBER:

Checklist Release Date: 18/08/2021

PART A: Pre-Connection Off-Line Testing

Table 1 details all required documentation that must be provided prior to SA Power Networks commissioning officer attending site for commissioning witnessing. All documentation is to be sent to the Project Manager before any commissioning witnessing booked for appointment.

| Documentation Provided Prior to Witness Booking Date |
|---|
| Protection test results for the protection relay(s) |
| Written statement from protection technician |
| Protection Settings Report |
| Commissioning Plan |
| Compliance Monitoring Plan |
| Single Line Diagrams (as built) |
| Incomer CB injection testing, earth grid testing results (for new sites connected at HV) |
| All new inverters with nominal voltages <1kV are compliant with the Smarter Homes Regulation requirements for voltage ride through and are included in the Technical Regulator's list of approved Inverters |
| A copy of the instructions to be followed by the installer to commission the Remote disconnection / reconnection technical solution per the provider's specifications. |

Table 1: Documentation Checklist

| Pre-Commissioning Smarter Homes Compliance Checks | Response | | Prop | SAPN |
|---|----------|---------------------|------|------|
| Relevant Agent appointed for the generating system | | | | |
| Technical solution used for Remote disconnection and reconnection | | | | |
| New plant installed is as per the original approved application. The proponent accepts responsibility to rectify this if found to be incorrect. | Yes | No (do not proceed) | | |

Table 2: Pre-Commissioning Smarter Homes Regulations Checks

Table 3 details the required pre-connection checks carried out by the SA Power Networks commissioning officer prior to proceeding to compliance testing in Part B.

| Pre-Connection Checks | | Proponent | SAPN |
|---|--|-----------|------|
| Electrical Certificate of Compliance for the Generating System(s) | | | |
| Installers Electrical Certification Viewed | | | |
| Inverters will disconnect when rotary generator operates | | | |
| Bi-directional/import/export meter installed | | | |
| Protection relay installed and ready for testing | | | |
| Site National Meter Identifier (NMI) Correct as per Engineering Report | | | |
| Site additional NMI (parent/meshed) | | | |
| Power quality logger installed for 7-day measure (2 days prior to gen online) | | | |

Table 3: Pre-Connection Checklist

| Outstanding Issues |
|---|
| Any observed defects affecting safety (ie AS/NZS3000/S&IR non-compliance) communicated to owner/installer (D)Note: also apply DEI process if required |
| |
| |
| |

For new or altered installations, the installation is subject to electrical checks as per table 4 below. The connection of generation (without altering the supply) is to be regarded as an alteration to the installation (but not the connection) and must not compromise any existing functionality or compliance. The **marker (M)** denotes **mandatory** compliance for witness procedure, while **(D)** denotes **defect or concern to be noted** with record of communication to REC to be kept (this paperwork). Note that these checks do not constitute approval of compliance to the Service & Installation Rules by the SA Power Networks commissioning officer and the onus remains on the Customer/Proponent to ensure the installation complies with the relevant rules.

| Item | Rule | Comment | Checked |
|---|--|---------|---------|
| Connection Point – Common Point of Coupling – Main Switch Board | | | |
| Confirm revenue meter aligns with NMI. (Available from PM) _(M) | Aligns with SEG/LEG approval | | |
| Meter, CTs, voltage taps etc. physically and electrically located correctly. _(M) | S&IR 7.5.1, 8.5, 8.14 | | |
| No unmetered equipment or connections. _(M) | S&IR - 7.8.2.3 | | |
| PV labels at MSB. _(M) | AS/NZS 4777.1 6.5 | | |
| ‘Main Switch’ label(s) correct size / colour. _(M) | AS/NZS 4777.1 - 6 AS/NZS3000 - 2.3.3.5 | | |
| Drawing showing generating units’ location(s) _(D) | AS/NZS 4777.1 6.4 | | |
| Switchboard – Main or Sub-boards | | | |
| Fire panel labels and drawings in place _(D) | AS/NZS 4777.1 – 6.1 | | |
| Main Switch for inverter able to be secured in the open position. _(M) | AS/NZS 4777.1 – 3.4.3(b) AS/NZS3000 - 2.3.3.6 | | |
| Isolation switches are readily available | AS/NZS 4777.1 – 5.3.1 | | |
| Maximum of two solar main switches | AS/NZS 4777.1 – 5.5.3.2 | | |
| Drawing showing generating units’ location(s) _(D) | AS/NZS 4777.1 6.4 | | |
| Solar Distribution Board | | | |
| Solar Meets Restricted Access Requirements. _(D) | AS/NZS 4777.1 - 1.3.27 | | |
| Main Isolator Label. _(M) | AS/NZS 4777.1 - 6 | | |
| Shut Down Procedure Label. _(M) | AS/NZS 4777.1 - 6.7 | | |
| Network Protection Unit | | | |
| Main Isolator Isolates Entire Board. _(D) | AS/NZS 4777.1 - 3.4.3 | | |
| Motorised CB or isolator used as isolator must be able to be secured in the open position and not able to be overridden. _(M) | AS/NZS3000 - 2.3.3.6 | | |
| Number of Main Isolators. _(D) | AS/NZS 4777.1 - 5.5.1 AS/NZS 3000 - 2.3.3.3 | | |
| Protection Relay Label. _(M) | SAPN Requirement | | |

Table 4: Electrical Checklist

PART B: Compliance Testing

Table 5 details the required anti-islanding protection setting check on the installed inverters to ensure compliance to AS4777.2 and the requirements in the Engineering Report. Note that

| Inverter Protection | Setting | | Trip Time | | Inverter No 1-10 | | | | | | | | | | Prop | SAPN |
|---------------------------------|----------------|------|-----------------|--------|------------------|--|--|--|--|--|--|--|--|--|------|------|
| Over Voltage Level 1 (V) | 265V | 115% | 1.0sec | 50cyc | | | | | | | | | | | | |
| Over Voltage Level 2 (V) | 275V | 120% | 0.2sec | 10cyc | | | | | | | | | | | | |
| Under Voltage Level 1 (V) | 180V | 78% | 10.0sec | 500cyc | | | | | | | | | | | | |
| Under Voltage Level 2 (V) | 70V | 30% | 1.0sec | 50cyc | | | | | | | | | | | | |
| 10min Average Sustained Voltage | 258V | 112% | | | | | | | | | | | | | | |
| Over Frequency (f) | 52Hz | 104% | 0.2sec | 10cyc | | | | | | | | | | | | |
| Under Frequency (f) | 47Hz | 94% | 1.0sec | 50cyc | | | | | | | | | | | | |
| Active anti-islanding | Displayed | | Function Tested | | | | | | | | | | | | | |
| Soft Ramp Up after Reconnect | Enabled 16.67% | | | | | | | | | | | | | | | |
| Reconnect Time | 60sec | | | | | | | | | | | | | | | |

Table 5: Inverter Settings Checklist

SA Power Networks commissioning officer to check multiple inverters. Ensure at least one is checked for every string of inverters. Number of inverters Kw Number of Inverters Kw

Inverter Serial Numbers as per COC: Yes / No

| No | Inverter Serial No | No | Inverter Serial No | No | Inverter Serial No |
|----|--------------------|----|--------------------|----|--------------------|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

Table 6 details the power quality response setting check on the installed inverters to ensure compliance to AS4777.2 and the requirements in the Engineering Report, **if applicable**.

| Inverter Power Quality Response | Setting | On/Off | Proponent | SAPN |
|---|----------------|--------|-----------|------|
| Fixed Power Factor mode (if required) | pf | | | |
| Volt-VAr response mode | As per Table 6 | | | |
| Volt-VAr reaction time | 6sec 300cyc | | | |
| Volt-Watt response mode | As per Table 8 | | | |

Table 6: Power Quality Response Setting Checklist

| Reference | Voltage in Volts | VAr % rated VA | Inverter No 1-10 | | | | | | | | | |
|----------------|----------------------|--|------------------|--|--|--|--|--|--|--|--|--|
| V ₁ | 207 (90% of nominal) | +44% leading (Supplying VArS, 3.4%/Volt) | | | | | | | | | | |
| V ₂ | 220 (96%) | 0 | | | | | | | | | | |
| V ₃ | 240 (104%) | 0 | | | | | | | | | | |
| V ₄ | 258 (112%) | -60% lagging (absorbing VArS, 3.3%/Volt) | | | | | | | | | | |

Table 7: Reactive Power - Volt-VAr response mode (Table 3.7 of AS 4777.2-2020 per the Australia A Region)

| Reference | Voltage in Volts | Power % rated Power | Invert No 1-10 | | | | | | | | | |
|----------------|----------------------|---------------------------|----------------|--|--|--|--|--|--|--|--|--|
| V ₁ | 207 (90% of nominal) | 100% (default) | | | | | | | | | | |
| V ₂ | 220 (96%) | 100% (default) | | | | | | | | | | |
| V ₃ | 253 (110%) | 100% (default) | | | | | | | | | | |
| V ₄ | 260 (113%) | 20% (default, 11.4%/Volt) | | | | | | | | | | |

Table 8: Active Power- Volt-Watt response mode (Table 3.6 of AS 4777.2-2020 per the Australia A Region)

Table 9 details the required protection setting check¹ on the installed protection relay to ensure compliance to AS4777.1 and the requirements in the Engineering Report.

Protection Relay Make/Model: _____ Relay Serial Number: _____
 Voltage, (Ø-N): (R) _____ V, (W) _____ V, (B) _____ V Grid frequency: _____ Hz

| Relay Protection | Setting ² | | Trip Time | | Proponent | SAPN |
|---|-----------------------|------|-----------------|----------|-----------|------|
| Reference Voltage | 230 | | 400 | | | |
| Control Device | Contactor | | Circuit Breaker | | | |
| Change - Auto Fault Reset Delay Time | 5sec | | | | | |
| Over Voltage Level 1 | 265V | 115% | 2sec | 100cyc | | |
| Over Voltage Lv 1 Function Test Value | | | | | | |
| Over Voltage Level 2 | 275V | 120% | 0.2sec | 10cyc | | |
| Over Voltage Lv 2 Function Test Value | | | | | | |
| Under Voltage Level 1 | 180V | 78% | 11sec | 550cyc | | |
| Under Voltage Lv 1 Function Test Value | | | | | | |
| Under Voltage Level 2 | 70V | 30% | 2sec | 100cyc | | |
| Under Voltage Lv 2 Function Test Value | | | | | | |
| Sustained Overvoltage (average 10 mins) | 258V | 112% | Instantaneous | | | |
| Over Frequency | 52Hz | 104% | 2sec | 100cyc | | |
| Over Frequency Function Test Value | | | | | | |
| Under Frequency | 47Hz | 94% | 2sec | 100cyc | | |
| Under Frequency Function Test Value | | | | | | |
| Select one: ROCOF Stage 1 (preferred) | ±4 Hz/Sec | | 0.25sec | 12.5cyc | | |
| or ROCOF Stage 2 | ±3 Hz/Sec | | 1sec | 50cyc | | |
| Vector Shift | Disabled ³ | | | | | |
| Current Unbalance ⁴ | 21.7 A | | 30sec | 1,500cyc | | |
| Voltage Imbalance | 3 % | | 0.4 sec | | | |
| Auto Fault Reset | Enabled | | 60sec | 3,000cyc | | |
| Minimum Import / Zero Export (if applicable) | (limit) | | (delay) | | | |
| Tamper seal serial number | | | | | | |
| Protection Relay Password | | | | | | |

Table 9: Protection Relay Settings Checklist

¹ The settings must be verifiable via visual inspection either on the protection relay panel or software on device connected to the relay.

² Settings are for LV connected systems only and the V% is based on 230V nominal.

³ Vector Shift must remain disabled unless special SA Power Networks approval is given.

⁴ Only applicable for installations of single-phase inverter capacity above 5kVA.

Injection Testing ☐ (Applicable only to installations above 200kVA and/or if controlled testing could not be performed)
If the protection elements in the relay are to be demonstrated via an injection test kit, SA Power Networks commissioning officer to witness the correct settings being applied and the appropriate breaker being operated. A copy of the log of events are to be provided to SA Power Networks at the end of the testing.

Controlled Testing ☐
If the protection elements are to be demonstrated via set-point manipulation on the relay, the set-points will be adjusted to cause a trip under normal operational conditions. ie Under Voltage will be tested by setting the trip point to 245V. Table 9 details the manipulated settings and whether the breaker has operated and all IES isolated from the Network.

Ensure that all set points are returned to correct settings as listed in Table 9. ☐

Check fail-safe operation of relay(s): Inverters isolated on loss of supply to the relay. ☐

Check Circuit Breaker Fail operation (if applicable). ☐

PART C: On-Line Commissioning

Table 10 details tests (if applicable) that are to be demonstrated to SA Power Networks that the generating system meets the requirements of the Engineering Report after connection to the network.

| Pre-Commission Control Checks | | | | Settings | | | Proponent | SAPN | |
|---|--|--|--|----------|---------|----------|-----------|------|--|
| Loss of supply all inverters isolate from network | | | | No | | Yes | | | |
| Rotary generator interlock | | | | Tested | Viewed | None | | | |
| Radio frequency remote interlock | | | | Tested | Viewed | None | | | |
| Control Method | | | | PLC | Manager | Inverter | | | |
| Export / Import controller | | | | PLC | Manager | Inverter | | | |

| Export / Import - Protection Relay Control Test | | | | Setting | | Proponent | SAPN | |
|---|--|-----------|---------------|------------|----------------|-----------|------|--|
| Control method of disconnection | | | | Hard | | Soft | | |
| Connection point control trip value | | Export | Import | | | | | |
| Connection point fixed power factor value | | | | | | | | |
| Export / Import - Control Manager / Inverter / PLC Tests | | | | Load | Inverter | Proponent | SAPN | |
| Control device - serial number | | | | Contactor | Breaker | | | |
| Remove all control – record total generation & load | | | | | | | | |
| Apply 50% control of recorded generation | | | | | | | | |
| Apply 20% control of recorded generation | | | | | | | | |
| Apply 0% control of recorded generation | | | | | | | | |
| Disconnect communication cable to reference meter | | | | | | | | |
| Protection relay status for above condition | | | | Stays On | | Trips | | |
| Control manager /PLC/ Inverter status for above condition | | | | Ramp to 0 | | Trips | | |
| Reconnect communication cable – system ramp or instant | | | | 0 – 100% | | 100% | | |
| Apply all control –record total generation & load | | | | | | | | |
| Battery Control Test | | | Battery Value | Load Value | Inverter Value | Proponent | SAPN | |
| Remove all controls values | | Export | | Import | | | | |
| Record total generation, battery, load - values | | | % | | | | | |
| Isolate meter isolator – record revenue meter display | | | | On | | Off | | |
| Battery inverter status for above condition | | Discharge | | Backup | On | Off | | |
| Solar inverter status for above condition | | | | On | | Off | | |
| Record total generation, battery, load - values | | % | | | | | | |
| Switch on meter isolator – record revenue meter display | | | | On | | Off | | |
| Change over times | | | sec | sec | sec | | | |
| Charge battery from grid charge - rate | | | % | Kw | Kw | | | |
| Discharge battery to grid - rate | | | % | Kw | Kw | | | |
| Reinstate all controls | | Export | | Import | | | | |

| SCADA ⁵ Control Test | | | | | | |
|---|-------------|-------------------|-------|-----|------|--|
| Contact NOC and sign on to the feeder | | NOC operator Name | | | | |
| Instruction | Exp-Limit | GDL | Pf | Kva | VARs | |
| SCADA Voltage 0% Generation | Red | | White | | Blue | |
| Instruction | | | Pf | Kva | VARs | |
| Remove all controls – record system maximum values | | | | | | |
| GDL Limit Control Test | Exp - Limit | GDL | Pf | Kva | VARs | |
| Alter GDL - Export Limit Max | | | 0.95 | | | |
| Ramp up 10% of Max Value | | | | | | |
| Ramp 50% of Max Value | | | | | | |
| Ramp 100% of Max Value | | | | | | |
| SCADA Voltage 100% Generation | Red | | White | | Blue | |
| Export Limit Control Test | Exp-Limit | GDL | Pf | Kva | VARs | |
| Alter Export limit – Keep GDL Max | | | 0.95 | | | |
| Ramp down to 50% Max Value | | | | | | |
| Ramp down to 10% Max | | | | | | |
| Ramp system to 100 % Max | | | | | | |
| Permission denied – record time taken to 0% | | min | | | | |
| Power Factor Limit Control | Exp - Limit | GDL | Pf | Kva | VARs | |
| Set GDL Max | | | | | | |
| Set Exp – Limit to Max | | | | | | |
| Permission granted – record time taken to 100% | | min | | | | |
| Alter power factor | | | 1.00 | | | |
| SCADA Voltage | Red | | White | | Blue | |
| Alter power factor | | | 0.95 | | | |
| SCADA Voltage | Red | | White | | Blue | |
| Alter power factor | | | 0.90 | | | |
| SCADA Voltage | Red | | White | | Blue | |
| Alter power factor | | | 0.85 | | | |
| SCADA Voltage | Red | | White | | Blue | |
| Alter Power Factor | | | 0.95 | | | |
| SCADA Voltage | Red | | White | | Blue | |
| Alter Power Factor | | | 0.85 | | | |
| SCADA Voltage | Red | | White | | Blue | |
| Set required power factor | | | | | | |
| Set required GDL | | | | | | |
| Set Required Export Limit | | | | | | |
| System should now be in what will be normal / Auto operation mode | | | | | | |

⁵ These tests should be undertaken with SA Power Network's NOC or ADMS resources available to issue the applicable set points.

| Final Agreement | Proponent | SAPN |
|---|-----------|------|
| Go ahead has been received from all parties | | |
| Site Witness sticker placed on NPU panel | | |

| Smarter Homes Regulations Check | | |
|--|-------------------|------|
| Parameter | Prop. (Signature) | Date |
| The Proponent of the designated electricity generating plant confirms that they have commissioned the Remote disconnection / Reconnection technical solution as per the provider's instructions and is capable of performing the function at the time of installation. | | |

Table 11: Remote disconnection and reconnection confirmation

| Customer/Proponent Representative | |
|-----------------------------------|--|
| Name: | |
| Signed: | |
| Date: | |

| SA Power Networks Representative | |
|----------------------------------|--|
| Name: | |
| Signed: | |
| Date: | |

DISCLAIMER:

SA Power Networks takes no responsibility for any damage to any of the customer/proponent's infrastructure during periods when the inverter(s) may be operating at voltages outside of the current Australian Voltage Standard.

Appendix A – Alternate Tables for HV Inverters (Where Applicable Only)

PART B: Compliance Testing

The following table is for use in place of Table 5 when inverters are connected at HV:

| Inverter Anti-Islanding Protection | Setting | Trip Time | | Customer/Proponent | SAPN |
|---|----------------|---------------|--------|--------------------|------|
| Over Voltage Level 1 (V) | 115% | 1.0sec | 50cyc | | |
| Over Voltage Level 2 (V) | 120% | 0.2sec | 10cyc | | |
| Under Voltage Level 1 (V) | 78% | 10sec | 500cyc | | |
| Under Voltage Level 2 (V) | 30% | 1.0sec | 50cyc | | |
| Sustained Overvoltage (average 10 mins) | 112% | Instantaneous | | | |
| Over Frequency (f) | 104% | 0.2sec | 10cyc | | |
| Under Frequency (f) | 94% | 1.0sec | 50cyc | | |
| Active anti-islanding | Enabled | | | | |
| Soft Ramp Up after Reconnect | Enabled 16.67% | | | | |
| Reconnect Time | 60sec | | | | |

Table 5A: HV Inverter Settings Checklist

The following table is for use in place of Table 9 when the NPU relay's VT is are connected at HV:

| Relay Protection | Setting | Trip Time | | Customer/Proponent | SAPN |
|---|-----------|---------------|-----------|--------------------|------|
| Over Voltage Level 1 | 115% | 2sec | 100cyc | | |
| Over Voltage Level 2 | 120% | 0.2sec | 10cyc | | |
| Under Voltage Level 1 | 78% | 11sec | 550cyc | | |
| Under Voltage Level 2 | 30% | 2sec | 100cyc | | |
| Sustained Overvoltage (average 10 mins) | 112% | Instantaneous | | | |
| Over Frequency | 104% | 2sec | 100cyc | | |
| Under Frequency | 94% | 2sec | 100cyc | | |
| Select one: ROCOF Stage 1 (preferred) or ROCOF Stage 2 | ±4 Hz/Sec | 0.25sec | 12.5cyc | | |
| | ±3 Hz/Sec | 1sec | 50cyc | | |
| Vector Shift | Disabled | | | | |
| Minimum Import / Zero Export (if applicable) | | | | | |
| Auto Fault Reset | Enabled | 60sec | 3,000 cyc | | |
| Relay Delay Time Change | | | | | |

Table 9A: HV Protection Relay Settings Checklist

Appendix B– Alternate Tables for Rotating Generating Units (Where Applicable Only)

PART B: Compliance Testing

Commissioning of rotating generating units does not require witness commissioning of Table 5, Table 7, and Table 8 (p4).

The following table is for use in place of Table 6 for rotating generating units:

| Power Quality Response | | Setting | Customer/Proponent | SAPN |
|---|---------|---------|--------------------|------|
| Fixed Power Factor mode (as per Engineering Report if stated) | | pf | | |
| Ramp Rate | Enabled | % | | |

The following table is for use in place of Table 9 when the NPU relay's VT is are connected at LV:

| Relay Protection | Setting | Trip Time | | Customer/Proponent | SAPN |
|---|----------------------|-----------|---------|--------------------|------|
| Over Voltage | 110% | 0.4sec | 20cyc | | |
| Under Voltage | 94% (LV) or 90% (HV) | 0.4sec | 20cyc | | |
| Over Frequency | 104% | 0.4sec | 20cyc | | |
| Under Frequency | 94% | 0.4sec | 20cyc | | |
| Select one: ROCOF Stage 1 (preferred) or ROCOF Stage 2 | ±4 Hz/Sec | 0.25sec | 12.5cyc | | |
| | ±3 Hz/Sec | 1sec | 50cyc | | |
| Vector Shift | Disabled | | | | |
| Minimum Import / Zero Export (if applicable) | | | | | |
| Auto Fault Reset | Disabled | | | | |
| Relay Delay Time Change | | | | | |

Table 9B.1: Rotating Protection Relay Settings Checklist

The following table is for use in place of Table 9 when the NPU relay's VT is are connected at HV:

Table 9B.2: HV Rotating Protection Relay Settings Checklist

Appendix C– Witness Commissioning Inter-trip Protection Schemes (Where Applicable Only)

PART B: Compliance Testing (cont.)

The requirements for an inter-trip will be captured within the Engineering Report for rotating generating system not using *Minimum Import*, or inverter generating systems that are *not AS 4777* compliant. Prior to commencing 'PART C: On-line Commissioning', proceed with the following **inter-trip** process.

If the protection does not respond as intended, **do not proceed with witness commissioning**. The rotating generating units may not connect to the network until the defect is rectified.

At the time of confirming the appointment:

Confirm with the Project Manager who will be the responsible site contact ☐
(Contact Substation Operations – David Skein).

Included in the appointment will be a check sheet that needs to be completed at the time of a testing.

At the time of confirming the appointment:

1. Record the name of the substation(s) the trip signal will be sent from

| | Substation |
|---|------------|
| 1 | |
| 2 | |

2. Confirm with the Substation Operate the inter-trip labelling at the substation is correct ☐

3. Record the nominated circuit breaker(s) that will be operating, and the breaker labelling is correct.

| Circuit Breaker No | Label | Trip from Sub 1 | Trip from Sub 2 |
|--------------------|-------|-----------------|-----------------|
| | | | |
| | | | |
| | | | |
| | | | |

| Circuit Breaker No | Label | Trip from Sub 1 | Trip from Sub 2 |
|--------------------|-------|-----------------|-----------------|
| | | | |
| | | | |
| | | | |
| | | | |

4. Confirm with the Substation Operator what the expectations will be when the signal is sent; explain this process to the customer.
5. Operate the generator (which must be running) at level acceptable to the customer. Expect this to be low in order to avoid damage to generating unit equipment.
6. Request the Substation Operator to simulate the trip signal.
7. The trip signal needs to be received and the nominated breaker(s) should trip instantaneously. Confirm the nominated breaker(s) tripped.
- 8.
9. Check the generating units cannot start (try force start the generation, force close of contact or PLC) ☐
10. Allow 30sec to check if there is any auto reclose function. This may not occur.
11. Request the Substation Operator release the latch signal (ie. restore to system normal).
12. Allow customer to start generator and ramp to an acceptable level.
13. Repeat for substation 2 (if applicable).

14. Proceed with 'PART C: On-line Commissioning'.

Note: Permission denied on rotating systems must result in the generator circuit breaker(s) opening (not immediately but upon a ramp down to a low enough level without causing potential damage to gen).