



CM2001

Network Connection Standard

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CM2001 Network Connection Standard

Overview

Document status
Draft ☐**In Service** ☒Under Review ☐Archived ☐
Document purpose

This document sets out the technical and operational requirements for connecting to Unison's network.

Note

This document does not apply to Transpower.

This document is intended to:

- support the provision of appropriate capacity and performance on Unison's network, and
- ensure that the network operates in a safe and efficient manner.

This document defines the electrical constraints imposed so that:

- disturbances to other consumers on Unison's network are minimised, and
- the network continues to operate in a safe and efficient manner.

Use of System Agreement (UoSA)

The provisions of this document are enforceable through the Use of System Agreement (UoSA) made:

- between Unison and the retailer, or
- directly with the consumer where an appropriate contractual relationship exists.

Refuse to connect

Unison reserves the right to disconnect or refuse to connect any consumer that does not comply with this standard.

Content

The contents of this standard may vary over time as:

- changes in industry practice and available technology allow improved performance and/or more cost effective standards, and/or
- required to meet legislative or regulatory change.

Intended audience

This document applies to any consumer who wants to connect to Unison's network and their electricity retailer.

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Overview, Continued

Clarification Clarification of any matter referred to in this document should be directed to:

Energy Solutions Manager
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HASTINGS

Ph (06) 873 9300 or 0800 2 UNISON

Revision Revision, consultation and approval processes must be:

- instigated by the Energy Solutions Manager, and
- made available for public comment during the revision process, when the changes made are significant.

Retailers must be notified directly of proposed changes during the revision process.

Document contributors

Contributors	Name and Position Title	Approval Date
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Authoriser	General Manager – Commercial	27/03/2020
Approver	General Manager – Networks and Operations	27/03/2020

Key dates **Published Date** 30/03/2020

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Overview, Continued

Related references

Legislation

- Electricity Act 1992
- Electricity Industry Act 2010
- Electricity Industry Participation Code 2010
- New Zealand Electrical Codes of Practice (NZCEP)
- Electricity (Hazards from Trees) Regulations 2003
- Electricity (Safety) Regulations 2010

External Standards

- AS/NZS 61000:2013 Electromagnetic compatibility
- AS/NZS 3000:2018 Electrical installations (known as the Australian/New Zealand Wiring Rules)
- NZECP36:1993 New Zealand Electrical Code of Practice for Harmonic Levels

Unison Policies

- FC0021 Capital Contributions Policy
- CM0001 Unison Pricing Policy and Schedules

Unison Standard

- CM0003 Applications and Standards for Connection to a Distributed Generation of 10kW or Less in Total

Other References

- Use of System Agreement (UoSA)
- Regulatory Asset Management Plan (RAMP)
- ESANZ Engineers Institute, February 1982, Committee Report – Motor Starting Current for AC Motors

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1. Definitions/Abbreviations

AMD	Assessed Maximum Demand – the average of the three highest 30-minute peaks, occurring as separate events in a calendar year.
Capacity band	Classification allocated to an ICP for charging purposes.
Certificate of Compliance	A certificate issued in accordance with the Electricity (Safety) Regulations 2010 Regulation 65.
Connection	For the purposes of this standard, ‘connection’ is each point of connection where a supply of electricity may flow between the distribution network and the consumer’s installation as defined by the distributor.
Consumer	Any person who is a party to an agreement with a retailer for the supply of electricity by means of Unison’s distribution network.
Consumer’s installation	Any fittings owned or used by a consumer (except Unison’s equipment) that forms part of a system for conveying electricity from the point of supply (POS) to where the electricity may be consumed.
DDA	Default Distributor Agreement – published by the distributor and amended from time to time pursuant to the Code.
Demand	The rate electricity is being used expressed in kilowatts (kW).
DG	Distributed Generation – electricity generation connected and distributed within the distribution network.
Distributor	Unison as the operator and owner of the distribution networks.
EPR	Earth Potential Rise – a phenomenon occurring when large amounts of electricity enter the earth. It is typically caused when substations or high voltage towers fault, or when lightning strikes occur (fault current).
Ferro-resonance	An overvoltage phenomenon – a type of resonance occurring in electric circuits containing non-linear inductance and capacitance when the circuit is subject to rapid change in voltage or current.

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Definitions/Abbreviations, Continued

Grid	The National Grid is the network of high-voltage power lines between major power stations.
GXP	Grid Exit Point – any point of connection between Transpower’s transmission system and the distributor’s network.
ICP	Installation Control Point – a point of connection on the distributor’s network, which the distributor nominates as the point where a retailer is deemed to supply electricity to an end-consumer, and has the attributes set out in the Code.
Inductive coupling	The transfer of energy from one circuit to another by virtue of the mutual inductance between the circuits.
kV	Kilovolts – a unit of electromotive force, equal to 1000 volts.
kVA	Kilo-Volt Ampere – apparent power expressed in thousand volt-amps.
kVar	Kilo-volt amps reactive – a measure of how efficiently power flows or is used between the network and consumer technology. It measures the lag between the flow (current) and the pressure (voltage) of that flow along a consumer’s electrical circuit. Reactive power does not do work like active power (kilowatts), it instead produces an electromagnetic field. Installing a capacitor can generate the required magnetic field on-site reducing the total power (kilovolt-amperes) required to run a piece of equipment. 1 kVar = 1000 Volt-Amp Reactive
kW	Kilowatt – kW (1000 x watts) – a unit of measure of power or electricity. A kilowatt is the International System of Units designation for power equal to one thousand watts.
kWh	Kilowatt hour – the amount of electricity consumed in an hour. It is a derived unit of energy equal to 3.6 mega joules.
Load control equipment	The equipment (which may include, but is not limited to, ripple receivers and relays) which is from time-to-time installed in, over or upon a consumer’s premises to receive load management service signals.

Continued on next page

Definitions/Abbreviations, Continued

Load management service	Provides a signal to reduce or interrupt delivery to all or part of a consumer's premises, e.g. delivery to a water heater.
LV	Low Voltage – any voltage exceeding 50V a.c. or 120V ripple free d.c. but not exceeding 1000V a.c. or 1500V d.c. – usually 400/230V.
NCP	Network Connection Point – the point where ownership changes. This is usually at the property's boundary.
PCC	Point of Common Coupling – the first point where one consumer and another consumer are electrically connected in the distributor's network.
POS	Point of Supply – the boundary point between the electricity supply network and the customer's installation.
Power factor	The ratio of active power to apparent power (kW divided by kVA).
RAMP	Regulatory Asset Management Plan – asset management document prepared to meet the requirements of the Electricity Distribution Information Disclosure Determination 2012.
Retailer	An electricity retailer – the company that supplies electricity to consumers with installations connected to the distributor's network.
SAIDI	System Average Interruption Duration Index – the sum of all customer interruption durations ≥ 1 minute, divided by the total number of customers served (measured in minutes).
SAIFI	System Average Interruption Frequency Index – the total number of customer interruptions, ≥ 1 minute, divided by the total number of customers on the network (measured in interruptions per annum).
TOU	Time of Use – metering that measures the electricity consumption for a particular period (usually half-hourly) and compliant with Part 10 of the Electricity Industry Participation Code 2010.
Unison	Unison Networks Limited

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Definitions/Abbreviations, Continued

UoSA	Use of System Agreement – details the contractual basis for the relationship between distributors and retailers.
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2. Background

2.1. Purpose Unison is the owner of the electrical distribution system. It owns the wires and other equipment which transport the electrical energy from the grid to the consumer's Point of Supply (POS). To get (or remain) connected to Unison's network, a consumer must have an Agreement for Supply with an electricity retailer.

The retailers have a Use of System Agreement (UoSA) or Default Distributor Agreement (DDA) with Unison. This agreement sets out how Unison and the electricity retailer will work together to provide supply of electricity to the consumer. The UoSA and DDA are referenced in this document.

2.2. Invoicing the consumer In most cases, the consumer will not have a contractual agreement directly with Unison. The retailer will invoice the consumer for transmission and distribution charges.

In specific cases, Unison may have a direct contractual arrangement with a consumer. Unison will instead invoice the consumer directly for transmission and distribution charges. In this case, the consumer must still have an 'Agreement for Supply' with a retailer, and the requirements of this document will still apply.

2.3. What is covered in this document This document specifies:

- what Unison will provide
- what the design and installation requirements are for the consumer, and
- what information may be required from both parties.

2.4. Requesting a connection To request a connection to Unison's network, an application must be:

- completed, and
- submitted to Unison and a nominated retailer.

Applications can be made on Unison's website www.unison.co.nz, by contacting Unison or via the consumer's nominated retailer.

3. Supply Standard

3.1. Frequency and voltage

3.1.1. Overview

Unison's supply voltage is at 50Hz $\pm$ 1.5%. This frequency is managed by the National Grid Operator, Transpower and is entirely beyond Unison's control. Unison will accept no liability for frequency excursion outside the standard limits.

3.1.2. Supply Voltages

Unison's standard supply voltages are as follows:

- Three phase – 33kV (typically for >5,000kVA demand)
- Three phase – 11kV (typically for 1,000-10,000kVA demand), and
- Single/Three phase – 230/400V (typically for residential connections, small commercial and industrial consumers with less than 2,000kVA demand).

3.1.3. Non-Standard Supply Voltages

Non-standard supply voltages could be provided in negotiation with the consumer, if technically feasible (e.g. 3.3kV and 690V for specific industrial applications).

3.1.4. Voltage Regulation Standards

Unison must comply with the Electricity (Safety) Regulations and associated Electricity Codes of Practice. In general, Unison's standard for voltage regulations:

- is 230V $\pm$ 6% phase-to-earth or 400V $\pm$ 6% phase-to-phase (in case of three phase supplies) for standard low voltage connections when measured at the POS, and
- for connections at more than 250V, voltage regulation should be within $\pm$ 5% of the nominal supply voltage, e.g. 11kV $\pm$ 5%.

The above voltage regulations are measured at the POS and exclude momentary and transient fluctuations. Momentary and transient fluctuations are subject to AS/NZS 61000.

Unison aims to maintain steady state voltage unbalance to within $\pm$ 2% of nominal supply voltage.

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Supply Standard, Continued

3.2. Security Any consumer connection to Unison's network must be designed in accordance with:

- the planning criteria
- practices of Unison, and
- any relevant statutes and regulations.

Unison's current security of supply levels can be viewed in Unison's Regulatory Asset Management Plan (RAMP). This is available on Unison's website www.unison.co.nz or can be requested by contacting Unison directly.

Where specific security configurations are required, the consumer should discuss these directly with Unison to determine an appropriate solution.

3.3. Electricity supply availability Unison aims to maintain a reliable supply of electricity for all consumers and monitors this in a number of ways.

Unison measures the average duration and average number of supply interruptions on its network (SAIDI, SAIFI). It performs maintenance and augmentation activities to ensure results trend towards the targets outlined in Unison's RAMP.

The consumer is advised that Unison has obligations to Transpower to disconnect supply in emergency situations or to avoid an emergency situation. This includes:

- automatic disconnection through low frequency detectors as required under the Code, or
- emergency manual disconnection, as requested by Transpower.

From time-to-time, Unison is required to shut down network assets to perform maintenance and repairs. Unison aims to:

- use 'live-line' techniques to minimise such disruptions, where economic and practical, and
- co-ordinate shutdowns, to minimise disruption, where possible.

Planned shut-downs are notified in advance following the arrangements in the UoSA or DDA. Unison may provide the notification to the consumer's retailer and/or directly with the customer in advance. Notifications will align with the agreed arrangements with the specific retailer.

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Supply Standard, Continued

3.4. Capacity As part of the process of connection to Unison's network, the consumer is requested to specify their required maximum demand.

Unison will assess the availability of network capacity to accommodate the customer's proposed load. Should the network capacity be insufficient, Unison will assess the options available to facilitate the connection. This includes identifying network investment options to provide additional capacity. Unison may require the customer to fund, in part or full these investments, as a capital contribution. The capital contribution is determined by Unison's Capital Contributions Policy (FC0021).

For residential consumers, the standard band is a single-phase supply, fused at 63A. Alternative options can be found in Unison's Pricing Policy and Schedules (CM0001) or by contacting Unison directly.

Unison reserves the right to:

- review and determine the appropriate price category for an installation, and
 - reassess this as required in accordance with Unison's Pricing Policy and Schedules (CM0001).
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4. Design Standard

4.1. Network disturbances and waveform distortion

Distortion of the waveform on the network can be caused by certain types of equipment, and may result in:

- annoyance to other consumers, and
- incorrect operation or damage to equipment or fittings.

To limit these potential effects, the consumer's load must ensure:

- voltage fluctuations comply with limits set in the relevant Regulations and Electrical Code of Practice
- the harmonic content of any load complies with the limits specified in the New Zealand Code of Practice for Harmonic Levels (ECP36:1993) and any subsequent amendments
- motor starting complies with the ESANZ Engineers Institute, February 1982, Committee Report – Motor Starting Current for AC Motors, and
- voltage flicker complies with AS/NZS 61000.

Under special circumstances, and subject to assessment, Unison may approve alternative limits or levels.

Under fault and circuit switching conditions the rated frequency or voltage may fall or rise transiently. The fall or rise in voltage will be affected by the method of earthing of the neutral point of the network. This variation in voltage must be considered when equipment is selected for installation by the consumer.

Unison may require a consumer to undertake any necessary corrective measures, should their equipment not comply with the requirements above.

4.2. Network signalling

Unison operates signalling systems for load control and other control purposes at the following frequencies:

300Hz, 317Hz, 500Hz, 725Hz

Consumers must design and operate equipment connected to the network so it does not interfere with its operation. This will ensure a correct operation of the network signalling equipment. Unison may require a consumer to undertake any necessary corrective measures, should their equipment interfere with Unison's signalling systems or Unison's network.

The consumer must ensure that equipment installed on the consumer installation is adequately protected from these signals.

Continued on next page

Design Standard, Continued

4.3. Fittings at the Network Connection Point (NCP)	All fittings at the Network Connection Point (NCP) must meet the design principles in Unison's design and construction standards. Any connection to Unison's network will include a means of disconnection of the consumer installation readily accessible by Unison.
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4.4. Power factor	The power factor of a consumer's load, measured at the metering point, must not be less than 0.95 lagging. Unison may deem power factor correction necessary for the delivery of compliant voltages to:
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- the consumer concerned, or
- other consumers connected to its network.

Where power factor correction is necessary, Unison will require such correction to be installed by the consumer who has the non-compliant load.

Unison reserves the right to measure and conduct tests at any consumer's POS or Installation Control Point (ICP) to ascertain power factor.

Unison reserves the right to impose a charge for excess kVAr's drawn, if any consumers' installation supplied through any ICP show power factor excursions outside the limit specified above. In extreme cases, Unison may require disconnection of the installation from the network, until the problem is corrected. Details of the kVAr charge can be found in Unison's Pricing Policy and Schedules (CM0001) or by contacting Unison.

4.5. Motor starting	Unison undertakes to supply standard voltage (as defined in the Electricity Regulations) to the consumer's POS. This is up to the limit of the kVA demand rating assigned to the consumer's ICP.
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Unison is not responsible for below standard voltages incurred by:

- motor starting, or
- any other fluctuating load that momentarily exceeds the kVA rating assigned to the ICP concerned.

Consumers may impose on their ICP any motor starting currents that do not cause:

- the protective devices to operate, and/or
- voltage fluctuations to exceed the values outlined in the ESANZ Engineers Institute, February 1982, Committee Report – Motor Starting Current for AC Motors.

Unison will charge the consumer the cost to reset protective devices that have operated due to excessive motor starting currents. This charge will apply when it is shown to be the cause of the device operation.

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Design Standard, Continued

4.5. Motor starting (cont)

Unison reserves the right, if necessary, to increase the assigned capacity band, (and the tariff charged) of a consumer's ICP in order that motor starting may be accommodated.

Unison may be prepared to negotiate alternative solutions with retailers and consumers that could facilitate motor starting where such a problem arises.

To assist with the design of the consumer installation, Unison will provide:

- fault level information for the ICP during normal system operation, and
- protective device characteristics on request.

4.6. Earthing

Consumer installations must have their own earthing in accordance with Electricity (Safety) Regulations and AS/NZS 3000.

Consumers must take precautions to limit the occurrence and effects of circulating currents. This precaution relates to the neutral points connected with earth where there is more than one source of energy.

Unison accepts no responsibility for any problems caused by Earth Potential Rise (EPR) or inductive coupling arising from any fault beyond the POS.

4.7. Protection requirements

Unison will generally provide fuse or circuit breaker protection at each NCP. The protection will be rated according to the consumer's tariff.

Consumers must ensure their installation and circuit protection is compatible with Unison's protection systems. It must also be capable of withstanding the maximum prospective short circuit currents that may be encountered.

Unison strongly advises consumers who have large motors within their installation to provide voltage unbalance protection on these devices.

Unison will provide, on request, fault level information for the ICP during normal system operation to assist with the design of the consumer installation.

The consumer is advised that:

- Unison uses auto-reclosing devices on its network, and
- some protection arrangements on the network may cause disconnection of one phase only of a three-phase supply.

Unison will provide details of the protection devices upstream of the consumer on request. These situations should be provisioned in the design of the consumer network and associated protection arrangements.

Continued on next page

Design Standard, Continued

4.8. Direct connection to transformers

Where Unison and a consumer agree to make use of the overload protection capability of a consumer's incoming low voltage (LV) circuit breaker, the consumer agrees that access to alter agreed settings is sealed and tagged to prevent tampering. Any subsequent changes to the operation of the LV circuit breaker will be performed in conjunction and agreement with Unison and the consumer.

4.9. Harmonics

The harmonics produced by any consumer or consumer's installation must not exceed the levels prescribed in NZECP 36.

Unison reserves the right to:

- measure harmonics at the Point of Common Coupling (PCC) in the manner prescribed by NZECP 36, and
- follow the procedures in the UoSA negotiated between the retailer and Unison for situations of non-compliance with this document.

4.10. Voltage spikes and noise

Installations must not produce any measurable non-harmonic voltage spikes or electrical noise at the PCC.

Installations which comply with AS/NZS 61000 will be acceptable. When a consumer's installation creates disturbances, these can affect other consumers' quality of supply. In this case, the consumer and Unison must co-operate to find and remedy the problem in a way acceptable to both parties.

4.11. Voltage fluctuations

Sags and surges may be caused by faults on Unison's network, Transpower's network or by the consumer's installation.

Voltage fluctuations may also be caused by the actions of other network consumers or consumers. Such events are to be managed to the following criteria which are to be observed by both Unison and its consumers.

Voltage fluctuations at the PCC caused by consumer installations must be within the limits prescribed by AS/NZS 61000. Compliance with the relative voltage changes outlined in Table 1 will be accepted, unless Unison requires full compliance to this document.

Continued on next page

Design Standard, Continued

4.11 Voltage fluctuations (cont)

Frequency of Voltage Sags	At 400V PCC	At 11kV PCC
In excess of 10 per hour.	1%	0.5%
In excess of three per day, but not more than 10 per hour.	3%	0.8%
Not more than three per day, including not more than one between the hours of 5 pm and 11 pm on any day.	6%	1.5%
Emergency equipment started infrequently.	12%	2%

Table 1 – Schedule of Relative Voltage Change

Unison reserves the right to measure voltage fluctuations at or near the POS. Unison may be prepared to negotiate with consumers for variations to the above provided that no detrimental effect will be caused to:

- any other consumer connected to the network, or
- any plant owned by Unison.

Where Unison engineers agree a consumer's plant and its operation is causing voltage fluctuations at the PCC to exceed the limits given, the cost to remedy the situation must be borne by the consumer.

Unison may be prepared to negotiate with the consumer for changes to be made to Unison's system if that proves the most cost-effective way of ensuring compliance.

4.12. Inter- connection

Consumers with more than one point of connection must not parallel the supplies from these points of connection without Unison approval. This is necessary to:

- maintain network protection integrity, and
- avoid safety issues arising from back-feed onto Unison's network.

The consumer must ensure switching points within the consumer installation that can parallel points of connection are:

- locked, and
- under the control of responsible persons.

4.13. Load control

Should consumers, if available, choose a controllable hot water tariff, allowances must be made for the installations to facilitate load control. This is normally achieved via a load control relay installed at the consumer switchboard. Energy retailers will be responsible for the installation of the appropriate relays and other associated control devices.

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Design Standard, Continued

4.14. Ferro-resonance	Installations which, in the opinion of Unison may cause ferro-resonance: • must be fitted with three-phase switches, or • have other means to eliminate ferro-resonant voltages. Any extra costs incurred by Unison to eliminate ferro-resonance caused by a consumer's installation. The consumer or retailer whose installation requires this equipment to eliminate ferro-resonance caused by their installation are required to pay any extra costs incurred by Unison.
4.15. Super-imposed signals	Where a consumer installs mains-borne signalling equipment, it must comply with the appropriate industry standards. No consumer may use such equipment to impose signals on Unison's network without prior written agreement from Unison. Unison may refuse the installation of these types of equipment. Consumers must not inject signals into Unison's network that interfere with load control signalling initiated by Unison. The consumer must indemnify Unison for any loss or damage whatsoever, caused by the consumer using the network for such conveyance.
4.16. Assessed Maximum Demand (AMD)	Consumers should consider a diversity factor within their electrical installations so that the total AMD is not over estimated. An over estimated AMD may lead to higher costs than is necessary. Unison's equipment ratings are also affected by the AMD of an ICP. Any consumer load that is above the AMD rating for their ICP may cause: • reduced power quality, or • failure of the supply of electricity to that consumer. Unison accepts no responsibility for such failure, loss, any damage or loss incurred by the consumer on such occasions.
4.17. Distributed generation	Unison will allow consumers with distributed generation to be connected to its network in accordance with: • CM2001 Network Connection Standard (this document) • CM0003 Applications and Standards for Connection to a Distributed Generation of 10kW or Less in Total, and • associated guidelines and safety and technical standards, available on Unison's website www.unison.co.nz or by contacting Unison directly.

5. Operating Standards

5.1. Access to equipment	Consumer must not unreasonably withhold access to Unison to inspect, repair, install replace or test Unison equipment or fittings that are located on their site.
5.2. Service levels	Unison's service levels in terms of reliability, security and quality of supply are outlined in the UoSA between the energy retailers and Unison. Consumers with sensitive installations may require additional service quality and reliability, e.g. less outage, quicker restoration, less fluctuations, sags, surges and transients. Consumers with special needs are required to advise their energy retailers and Unison of their requirements. Unison may provide additional quality and service levels to individual consumers, if technically and commercially feasible.
5.3. Testing and monitoring	Unison reserves the right to test and/or monitor the network to ensure that consumers do not operate outside technical parameters specified in this or other relevant standards. Testing may arise as: • a result of complaints or investigations, or • part of Unison's routine processes for monitoring quality of supply.
5.4. Demand management	Unison is required by the Electricity Industry Participation Code 2010 to interrupt supply to consumers: • under emergency situations, or • to avoid a grid emergency. Where either party has a need for a coordinated means of demand management, the means of implementation must be agreed between the consumer and Unison.
5.5. Demand transfer	If a consumer has more than one supply point, information must be exchanged on the ability to transfer demand from/to alternative points of supply. Protocols to facilitate this transfer will be agreed between the consumer and Unison.

Continued on next page

Operating Standards, Continued

5.6. Vegetation management

Trees are a major cause of faults and consumer outages in the power system. Each tree owner is responsible under the Electricity (Hazards from Trees) Regulations 2003 to keep trees on their property away from power lines or another susceptible equipment owned and operated by Unison.

For safety reasons, trees that can encroach the power lines must not be cut by any person without written authorisation to do so by Unison. In these circumstances, Unison is to be advised, and will provide information for the work to be carried out safely.

Land owners are responsible for ensuring that when connecting to Unison's network, no interference or interruption is caused to Unison's network by vegetation at any time.

All new electrical equipment which forms part of the network connection must be installed so no interruption or interference to Unison's network can occur at the time or in the future.

Where a tree is encroaching on Unison's power lines and the tree owner fails to comply with a cut or trim notice issued under the Electricity (Hazards from Trees) Regulations 2003, then Unison may:

- carry out this work, and
- invoice the tree owner for the work done.

5.7. Safety

Safety is an essential element to be considered with any activity relating to electrical equipment or fittings. Unison has safety procedures in place to ensure compliance with the:

- Safety Rules and General Safety Handbooks for the Electricity Industry, and
- other relevant legislation, regulations and codes.

Only personnel authorised by Unison may access Unison owned fittings and apparatus.

Unison also reserves the right to disconnect a consumer installation, where it believes that installation is hazardous to persons or property, until it has been restored to a safe condition.

The distribution network should always be treated with respect. Contact with live conductors can cause severe shock or death. All electricity lines must be treated as energised at all times.

When identified or suspected that part of the distribution network could be a hazard, Unison must be contacted immediately on 0800 2 UNISON.

6. Information Requirements

6.1. Introduction

This section details the planning information which will, at Unison's request, be exchanged between Unison and the consumer.

6.2. Required information

Unison must provide all network parameters reasonably required for design and planning of the consumer installation. The consumer must provide Unison with all installation parameters necessary for them to comply with legislative, technical, safety, planning and administrative requirements.

When a person is required to supply information to another person under this document, they will be liable for the reasonable costs of supplying that information.

If a person requests information that is not a requirement under this Standard, they may be liable for the reasonable costs of supplying the information.

6.3. Requesting a connection

To request a connection to Unison's network, an application form will need to be completed and submitted to Unison and a nominated retailer. Application forms and further information is available:

- on Unison's website www.unison.co.nz, or
 - by contacting Unison directly or the nominated retailer.
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6.4. Types of equipment to be connected

Unison needs to assess the impact on the network and determine the necessary supply arrangements. Unison will require the consumer to specify details of the type of equipment to be connected to the consumer installation.

The details required are the:

- largest motor present and starting method
- largest starting current and duration
- percentage of consumer load on variable speed drives, and
- percentage of consumer load as motors.

Unison strongly recommends the consumer advises Unison and discusses any significant sensitive equipment and/or additional load to be (or likely to be) installed at the proposed consumer's installation. Unison welcomes the opportunity to work with the consumer to develop a solution that best fits their needs.

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Information Requirements, Continued

6.5. Capacitive and inductive effects

Unison requires that the consumer provide information on any:

- reactive compensation plant >100kVAr, and
- associated control systems to be connected.

Adequate detail is required to confirm that:

- the controlling equipment of the network is suitably rated, and
- the performance of the network will not be impaired.

Installed compensation plant must not interfere with the propagation of network signalling systems across Unison's network. In most cases this will require the installation to include blocking chokes as part of the design.

Appendix A – Summary of Document Changes

Date	Version No.	Changes to Document	Owner	Authoriser	Approver
19/01/2007	1.0	Amended with consultation feedback.	Commercial Manager	Network Development Manager	General Manager – Networks and Operations
18/08/2014	2.0	Full review and update into new template.	Commercial Manager	General Manager – Commercial	General Manager – Networks and Operations
27/03/2020	3.0	Full review with minor changes. Document to have a rewrite to incorporate Default Distributor Agreement (DDA) once established. • kVAR and RAMP definition updated. • Reference to DDA and UOSA include. • Reference to NCP included to reflect new terminology where possible. • Point 3.4 updated to include consumer contribution.	Energy Solutions Manager	General Manager – Commercial	General Manager – Networks and Operations