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.

The standards included in or referred to in this document are intended to support the provision of appropriate capacity and performance on Unison's network, and to ensure that it operates in a safe and efficient manner.

This document defines the electrical constraints imposed so that disturbances to other users on Unison's network are minimised, and the network continues to operate in a safe and efficient manner.

Use of System Agreement

The provisions of this document are enforceable through the 'Use of System Agreement' 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, or
- as 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:

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Revision

Revision, Consultation and Approval Processes shall be instigated by the Commercial Manager and shall be made available for public comment during the revision process, when the changes made are significant. Retailers shall be notified directly of proposed changes during the revision process.

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Key dates

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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

Standards

- AS/NZS 61000 Electromagnetic Compatibility
- AS/NZS 3000 Electrical Installations (known as the Australian/ New Zealand Wiring Rules)

Unison Policy

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

Unison Agreement

Use of System Agreement

Other References

ESANZ publications

Content

This document contains the following topics:

1. Definitions/Abbreviations

Active power	The product of voltage and current, and the cosine of the phase angle between them (measured in kW or MW).
Apparent power	The product of voltage and current (measured in kVA or MVA).
AMD	Stands for Assessed Maximum Demand. The average of the three highest 30 minute peaks, occurring as separate events in a calendar year.
AMP	Stands for Asset Management Plan. The AMP provides an overview of how Unison manages its electricity distribution asset and network.
Capacity band	Classification allocated to an ICP for charging purposes.
Certificate of Compliance	A certificate issued in accordance with Regulation 65 of the Electricity (Safety) Regulations 2010.
Connection	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. It has the same meaning as the Network Connection Point (NCP).
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 NCP to where the electricity may be consumed.
Demand	The rate of expending electrical energy expressed in kVA/MVA, kW/MW, kVAr/MVAr or apparent power, active power and reactive power respectively.
Distributor	Unison as the operator and owner of the distribution networks.

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Definitions/Abbreviations, Continued

Embedded generation or distributed generation	Electricity generation that is connected and distributed within the distributor's network.
GXP	Stands for Grid Exit Point. A point of connection between Transpower's transmission system and the distributor's network.
ICP	Stands for Installation Control Point. Point of connection on the distributor's network, which the distributor nominates as the point at which a retailer is deemed to supply electricity to an end-consumer, and has the attributes set out in the Rules.
kV	Kilovolts
kVA	Kilovolt amp
kVAr	Kilovolt amp reactive
kW	Kilowatt
kWh	Kilowatt hour
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 for the purpose of receiving load management service signals.

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Definitions/Abbreviations, Continued

Load management service	Providing a signal for the purpose of reducing or interrupting delivery to all or part of a consumer's premises, for example, delivery to a water heater.
LV	Stands for Low Voltage. Voltage up to 1,000 volts, generally 230 or 400 volts for supply to consumers.
NCP	Stands for Network Connection Point. The point at which the fittings of a consumer, or any other retailer's consumer connects to the distribution network.
PCC	Stands for Point of Common Coupling. The first point where one consumer and another consumer are electrically connected together in the distributor's network.
Power factor	The ratio of active power to apparent power calculated in accordance with the following formula: $P^2 / \sqrt{(P^2 + Q^2)}$ Where P = active power, Q = reactive power, both being the instantaneous values integrated over one and the same minimum time period used for billing purposes.
Reactive power	The product of voltage and current, and the sine of the phase angle between them (normally measured in kVAr or MVAr).
Retailer	The supplier of electricity to consumers with installations connected to the distribution network.
SAIDI	Stands for System Average Interruption Duration Index. The sum of all customer interruption durations ≥1minute, divided by the total number of customers served. SAIDI units are the total time (in minutes) of interruption per customer per year.

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Definitions/Abbreviations, Continued

SAIFI	Stands for System Average Interruption Frequency Index. The total number of customer interruptions, ≥1minute, divided by the total number of customers on the network. SAIFI units are the average number of interruptions per consumer per year.
TOU	Stands for Time of Use. Metering that measures the electricity consumption for a particular period (usually half-hourly) and complies with Part 10 of the Electricity Industry Participation Code 2010.
Unison	Unison Networks Limited

2. Overview of Standard

2.1 Purpose of the Use of System Agreement

Unison is the owner of the distribution system, including wires and other equipment which transports the electrical energy from the National Grid to network connection points, so consumers can access electricity. To get (or remain) connected to Unison's network, a consumer must have an agreement for supply with an electricity retailer.

The electricity retailers have a 'Use of System Agreement' with Unison, which sets out how Unison and the electricity retailer will work together to provide supply of electricity to the consumer. The Use of System Agreement refers to the Network Connection Standard (this document), and requires the electricity retailer to include the requirements outlined in the agreement with the consumer.

2.2 Invoicing the consumer

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

In specific cases, Unison may have a direct contractual arrangement with a consumer, and will invoice the consumer directly for transmission and distribution charges. In this case, the consumer must still have an agreement for supply with an electricity retailer, and the requirements of this standard will still apply.

2.3 What is covered in this standard

This document will specify:

- what Unison will provide
- what you (as a consumer) need to comply with when designing your installation, and
- what information may be required from both parties.

2.4 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 are available on Unison's website www.unison.co.nz or by contacting Unison or your nominated retailer.

3. Supply Standard

3.1 Frequency and voltage

3.1.1 Overview

Unison's supply voltage is at 50Hz ± 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 for >5,000kVA demand
- Three phase – 11kV for 1,000-5,000kVA demand, and
- Single/Three phase – 230/400V for residential connections, and small commercial and industrial consumers with less than 1,000kVA demand.

3.1.3 Non-Standard Supply Voltages

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

3.1.4 Voltage Regulation Standards

Unison has an obligation to comply with the statutory requirements given in the Electricity (Safety) Regulations and associated Electricity Codes of Practice. In general, Unison's standard for voltage regulations:

- is 230V ± 6% phase to earth or 400V ± 6% phase to phase (in case of three phase supplies) for standard low voltage connections, and

- for connections at more than 250V, voltage regulation should be within ± 5% of the nominal supply voltage, e.g. 11kV± 5%.

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

Unison endeavours to maintain steady state voltage unbalance to within ± 2% of nominal supply voltage.

3.2 Security

Any consumer connection to Unison's network shall be designed in accordance with the planning criteria and practices of Unison, any relevant statutes and regulations.

Unison's current security of supply levels can be viewed in Unison's Asset Management Plan (AMP). 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.

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Supply Standard, Continued

3.3 Electricity supply availability

Unison endeavours 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 AMP.

Unison also has additional service level targets in place with retailers, which may include a refund to the consumer, of a fee, where restoration periods are outside agreed targets. Details of these agreements form part of a contractual relationship between the retailer and Unison.

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 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 endeavours to minimise such disruptions by the use of 'live-line' techniques where economic and practical, and to co-ordinate shutdowns, to minimise disruption where possible. Planned shut-downs are notified to the consumer's retailer in advance to allow the event to be planned for.

3.4 Capacity

As part of the process of connection to Unison's network, the consumer is requested to specify their required maximum demand, by selecting one of Unison's standard capacity bands. Unison will endeavour to ensure its network has sufficient capacity to deliver this demand as and when the consumer requires.

For domestic consumers, the standard band is a single phase supply, fused at 63A. Alternative options can be found in Unison's Pricing schedule, available on Unison's website www.unison.co.nz or by contacting the company directly.

Unison reserves the right to review and decide the tariff appropriate for an installation and to reassess this as required.

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, incorrect operation or damage to equipment or fittings. To limit these potential effects, the consumer's load shall comply with the following:

- Voltage fluctuations must comply with limits set in the relevant Regulations and Electrical Code of Practice.
- The harmonic content of any load shall comply with the limits specified in the New Zealand Code of Practice, ECP36:1993 and any subsequent amendments.
- Motor starting shall comply with the Committee Report on Motor Starting Current for AC Motors published by ESANZ Engineers Institute, February 1982.
- Voltage flicker shall comply 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 shall be taken into account when selecting equipment for installation by the consumer.

Unison may require a consumer to provide 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

To ensure correct operation of the network signalling equipment, consumers shall design and operate equipment connected to the network such that it does not interfere with the operation of the network signalling system. Unison may require a consumer to provide any necessary corrective measures, should their equipment interfere with Unison's signalling systems or the Unison network.

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

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Design Standard, Continued

4.3 Fittings at the Network Connection Point (NCP)

All fittings at the point of connection must meet the design principles in Unison's design and construction standards. Any connection to the Unison network will include a means of disconnection of the consumer installation readily accessible by Unison.

4.4 Power factor

The power factor of a consumer's load, measured at the metering point, shall not be less than 0.95 lagging. If, in the opinion of Unison, power factor correction is necessary for the delivery of compliant voltages to either the consumer concerned or any other consumer connected to its network, then 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 NCP (or ICP) to ascertain power factor and/or reactive power usage.

Should any consumer's installation supplied through any ICP show power factor excursions outside the limit specified above, then Unison reserves the right to impose a charge for excess kVAr's drawn. In extreme cases Unison may require disconnection of the installation from the network, until such time as the problem is corrected. Details of the kVAr charge can be found in Unison's Pricing schedule, available Unison's website www.unison.co.nz or by contacting the company directly.

4.5 Motor starting

Unison undertakes to supply standard voltage (as defined in the Electricity Regulations) to the consumer's NCP up to the limit of the kVA demand rating assigned to the consumer's ICP.

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 NCP concerned.

Consumers may impose on their ICP any motor starting currents that do not cause the protective devices to operate, nor cause voltage fluctuations to exceed the values given in the ESANZ document.

The cost to Unison for resetting protective devices that have operated due to excessive motor starting currents will be charged to the consumer where this is shown to be the cause of the device operation.

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 with retailers and consumers alternative solutions that could facilitate motor starting where such a problem arises.

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Design Standard, Continued

4.5 Motor starting (cont)

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

Consumers shall take precautions to limit the occurrence and effects of circulating currents in respect 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 or Inductive Interference occasioned by any fault beyond the NCP.

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

Where the consumer has large motors within their installation, Unison strongly advises the consumer to provide voltage unbalance protection on these devices.

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

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, but these situations should be taken into account when designing the consumer network and associated protection arrangements.

4.8 Direct connection to transformers

Where Unison and the consumer agree to make use of the overload protection capability of a consumer's incoming 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 will be agreed to by both Unison and the consumer.

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Design Standard, Continued

4.9 Harmonics

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

Unison reserves the right to measure harmonics at the PCC in the manner prescribed by NZECP 36 and to follow the procedures in the Use of System Agreement negotiated between the retailer and Unison for situations of non-compliance to this Network Connection Standard.

4.10 Voltage spikes and noise

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

Installations complying with AS/NZS 61000, Electromagnetic Compatibility (EMC) will be acceptable. In the event of a consumer's installation creating disturbances that affect any other consumer's quality of supply, the consumer and Unison shall co-operate to find the cause and remedy the problem in a manner 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 users or consumers, and would typically be caused by starting large motors or by wide fluctuations of load. Such events are to be controlled and the following criteria are to be observed by both Unison and its consumers.

Voltage fluctuations at the PCC caused by consumer's installations shall be within the limits prescribed by AS/NZS 61000. The standard shall be used for voltage fluctuation purpose, but for convenience compliance with the following table will be accepted, unless, in specific cases, Unison requires full compliance to the above standard.

Frequency of Voltage Sags	At NCP	At 11kV bus
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 (i) Schedule of Relative Voltage Change

Unison reserves the right to measure voltage fluctuations at or near the NCP. 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 to any plant owned by Unison.

Where in the opinion of Unison's engineers, it is considered that a consumer's plant and its operation is causing voltage fluctuations at the PCC to exceed the limits given, then the cost of remedying the situation shall be borne by the consumer.

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Design Standard, Continued

4.11 Voltage fluctuations (cont)

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 shall not parallel the supplies from these points of connection without Unison approval. This is necessary to maintain network protection integrity and to avoid safety issues arising from back-feed onto Unison's network.

The consumer shall ensure switching points within the consumer installation that are able to parallel points of connection, are locked and under the control of responsible persons.

4.13 Load control

If available, should consumers choose a controllable hot water tariff then 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.

4.14 Ferro-resonance

Installations which, in the opinion of Unison, may cause ferro-resonance, shall be fitted with three-phase switches, or have other means of eliminating ferro-resonant voltages.

Any extra costs incurred by Unison for equipment in excess of its normal installation practice, but needed for eliminating ferro-resonance caused by a consumer's installation, shall be met by the consumer or retailer whose installation requires that equipment.

4.15 Super-imposed signals

Where a consumer installs mains borne signalling equipment, it shall comply with the appropriate industry standards. No consumer shall use such equipment to superimpose signals on Unison's network without prior written agreement from Unison, which may be withheld by Unison at its absolute discretion. Consumers shall not inject signals into Unison's network which creates interference with load control signalling initiated by Unison.

If any signals leak into the network, the consumer shall indemnify Unison from any loss or damage whatsoever, caused by the consumer using the network for such conveyance.

4.16 Distributed generation

Unison will allow consumers with distributed and/or embedded generation to be connected to its network in accordance with:

- this standard
- Unison's Distributed Generation policy (CM0003), and
- associated guidelines and safety and technical standards, available on Unison's website www.unison.co.nz or by contacting the company directly.

5. Operating Standards

5.1 Access to equipment

Where Unison wishes to inspect, repair, install replace or test Unison apparatus or fittings that are located on the consumer's site, the consumer shall not unreasonably withhold access.

5.2 Service levels

Unison's service levels in terms of reliability, security and quality of supply are formally described in the Use of System Agreement between the energy retailers and Unison.

Consumers with sensitive installations may require additional service quality and reliability (less outage, quicker restoration, less fluctuations, sags, surges, transients, etc). 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 are not operating outside technical parameters specified in this or other relevant standards. This testing may arise as a result of complaints, investigations or as 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 users 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 implementing this shall be agreed between the consumer and Unison.

5.5 Demand transfer

If a consumer has more than one supply point, information shall be exchanged on the ability to transfer demand from/to alternative points of supply. Protocols for facilitating this transfer will be agreed between the consumer and Unison.

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 other 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.

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Operating Standards, Continued

5.6 Vegetation management (cont)

It is the land owner's responsibility to ensure that in connecting to Unison's network, no interference or interruption shall be caused to Unison's network by vegetation now or in the future.

All new electrical equipment installed which forms part of the network connection shall be installed in such a way that no interruption or interference to Unison's network can occur now or in the future.

Where a tree is encroaching on Unison's power lines and the tree owner fails to cause the tree to be cut or trimmed 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 apparatus or fittings. Unison has safety procedures in place to ensure compliance with the Safety Rules & General Safety Handbooks for the Electricity Industry, 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 rectified to a safe condition.

The distribution network should be treated with respect at all times, as contact will live conductors can cause severe shock or death. Treat all electricity lines as live at all times.

If you see, or suspect that part of the distribution network could be a hazard, contact Unison 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 shall provide all network parameters reasonably required for design and planning of the consumer installation. Similarly the consumer shall provide to Unison all installation parameters necessary for Unison to comply with legislative, technical, safety, planning and administrative requirements.

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Information Requirements, Continued

6.2 Required information (cont)

Where a person is required to supply information to another person under this standard, the person supplying the information will bear the reasonable costs of supplying that information. If a person requests information in addition to that required under this standard, the person requesting the information may be required to bear 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 the company or your nominated retailer.

6.4 Assessed Maximum Demand (AMD)

Consumers should consider a diversity factor between their electrical installations so that the total assessed maximum demand is not over estimated. An over estimated AMD may lead to higher tariffs than is necessary.

Unison's plant ratings are also affected by the AMD of an ICP. Any consumer load that is above the AMD rating for their ICP may cause failure, or loss of power quality, 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.

6.5 Types of equipment to be connected

To allow Unison to assess the impact on the network and to determine the necessary supply arrangements, Unison requires the consumer to specify details of the type of equipment to be connected to the consumer installation:

- 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 and discusses any significant sensitive equipment to be (or likely to be) installed at the proposed consumers installation. Unison would welcome the opportunity to work with the consumer to develop a solution that best fits their needs.

6.6 Capacitive and inductive effects

Unison requires that the consumer provides information on any reactive compensation plant, >100kVAr, to be connected and associated control systems. Sufficient detail would be required to verify that the controlling equipment of the network is suitably rated, and to confirm that the performance of the network will not be impaired. Installed compensation plant shall 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	Creator	Authoriser	Approver
19/01/2007	1.0	Amended with consultation feedback.	Commercial Manager	Network Development Manager	GM Networks and Operations
18/08/2014	2.0	Full review and update into new template.	Commercial Manager	GM Commercial	GM Networks and Operations