

METERING GUIDE

PART1 – METERING GENERAL



Table of Contents

METERING GUIDE	1
<hr/>	
INTRODUCTION	3
<hr/>	
PURPOSE OF THIS GUIDE	3
1. METERING GENERAL	4
<hr/>	
1.1 ELECTRICITY SUPPLY - INDUSTRY PARTICIPANTS	4
1.1.1 GENERATORS	4
1.1.2 NETWORKS	4
1.1.3 RETAILERS	4
1.1.4 METERING EQUIPMENT PROVIDERS	4
1.1.5 APPROVED TEST HOUSES	4
1.2 CUSTOMER RESPONSIBILITY	4
1.3 NOTIFICATION REQUIREMENTS FOR NEW INSTALLATIONS AND ALTERATIONS	4
1.4 OWNERSHIP	4
1.5 DAMAGE AND INTERFERENCE	5
1.5.1 DAMAGE TO EQUIPMENT	5
1.5.2 INTERFERENCE	5
1.6 MAINTENANCE OF METERING INSTALLATIONS	5
1.7 INSTALLATION REQUIREMENTS FOR METERS AND CONTROL EQUIPMENT	5
1.7.1 ACCESS	5
1.7.2 UNSUITABLE MOUNTING LOCATIONS	5
1.7.3 LOCATION ON DOMESTIC PREMISES	6
1.7.4 LOCATION ON COMMERCIAL PREMISES	6
1.7.5 ELEVATED LOCATIONS	6
1.7.6 CLEARANCE AROUND METERING LOCATIONS	6
1.8 METER ENCLOSURES	6
1.8.1 RESIDENTIAL METER ENCLOSURES	6
1.8.2 BUSINESS METER ENCLOSURES	6
1.8.3 IDENTIFICATION OF PREMISES	7
1.9 TYPES OF METERING INSTALLATIONS	7
1.9.1 BUILDERS TEMPORARY SUPPLY (BTS)	7
A) GENERAL	7
B) APPLICATION OF BUILDERS TEMPORARY SUPPLIES	7
1.9.2 LOW VOLTAGE WHOLE CURRENT METERING	7
1.9.3 LOW VOLTAGE CURRENT TRANSFORMER METERING	7
A) GENERAL.	7
B) APPLICATION OF CURRENT TRANSFORMER METERING.	7
C) 30 MINUTE INTERVAL DATA METERING	7
D) APPLICATION OF HH 30 MINUTE INTERVAL DATA METERING	8
1.9.4 HIGH VOLTAGE METERING (11KV)	8
1.9.5 DISTRIBUTED GENERATION & IMPORT/EXPORT METERING	8
1.10 PERIPHERAL METERING DEVICES	8
1.10.1 CONTROL DEVICES (RIPPLE RELAYS & CONTRACTORS)	8
1.10.2 REMOTE METER READERS (RMR)	8
1.10.3 MODEMS AND ANTENNAE	9
1.10.4 COMMUNICATIONS HUBS	9
1.10.5 RADIO MESH DATA COLLECTORS	9

1.11 ALTERATIONS	9
1.11.1 UPGRADES	9
1.11.2 DOWNGRADES	9
1.11.3 RELOCATION	9
1.11.4 REMOVAL	9

Introduction

METRIX is an Electricity Authority (EA) Approved Electricity Metering Equipment Provider (MEP) supplying metering services to most retail electricity traders (Retailers). METRIX equipment is intended to be used for revenue collection and reconciliation purposes. Charges for the metering equipment are paid by the retail electricity trader (Retailer).

As a MEP, METRIX is responsible for ensuring and maintaining metering accuracy and certification. Metering devices may only be installed, altered and maintained by an EA Approved Test House. Metering enclosures and associated metering wiring is the property of the building owner.

Requests for connection to the electricity network should be directed to your nominated Electricity Retailer who will coordinate the metering & living requirements.

Specialist technical advice on metering problems is available through the METRIX Team (see Contact page on www.metrixinfo.co.nz for address and general contact information).

Purpose of this Guide

This guide consists of two separate parts aimed at different target audiences. Together the two parts provide information useful for planning, specifying, ordering, installing and maintaining METRIX metering equipment.

By following these guidelines, it is hoped that metering installations and maintenance are performed in a Safe, Consistent, and Compliant manner.

Part 1 – Metering General

Information for all parties involved in the planning and installation of metering equipment.

Part 2 - Installation

Reference information intended to be used by Metrix field staff and approved metering contractors (AMC's) maintaining and installing the metering equipment.

Notes:

The standards referenced in this guide should be taken into account during the planning and design stages of all residential, commercial and industrial metering installations.

This document was not written to cover all metering scenarios; however, METRIX has representatives who can discuss unusual or special needs with its customers.

Where new electrical installations, additions or alterations are contemplated, inquiry should be made in advance of construction or equipment purchase to assure that service will be available at the time required.

1. Metering General

1.1 Electricity Supply - Industry Participants

The New Zealand electricity supply industry is regulated by Electricity Authority (EA). The Electricity Industry Participation Code Part 10 specifies the requirements and obligations for metering installations and participants involved. Participants consist of five key players, namely:

1.1.1 Generators

Generators make the electricity. They may generate electricity from water, gas, geothermal activity, wind, coal, diesel, solar etc.

1.1.2 Networks

The network companies own the infrastructure that connects the generators to the consumers Installation Control Point (ICP). E.g. Power poles, power lines, transformers etc.

1.1.3 Retailers

The retailers purchase electricity from the generators and sell it to the consumers.

1.1.4 Metering Equipment Providers

The Metering Equipment Providers (MEP) supply, maintain and lease metering equipment to the retailer. The metering equipment is used to measure the amount of energy consumed at the Installation Control Point (ICP) so that the retailer can bill the consumer for the electricity they have used.

1.1.5 Approved Test Houses

The Approved Test Houses (ATH) carry out installation and certification of the metering equipment, ensuring that it is accurate, functional, and fit for purpose.

1.2 Customer Responsibility

The property owner or his agent shall ensure that each new electrical installation and every alteration is carried out in accordance with all relevant rules and regulations. Early discussion with an electrical contractor and retailer is advised for larger installations to establish building and installation requirements, and to give adequate lead time for the acquisition, installation and commissioning of specialized equipment.

Note: The property owner must provide the metering equipment enclosures (meter box) & the associated wiring.

The ATH, acting on behalf of the MEP, will connect commission & certify the metering installation.

1.3 Notification Requirements for New Installations and Alterations

Generally the request for new installations and alterations is coordinated by the electricity retailer. We advise contacting the retailer prior to approaching METRIX directly.

All metering work carried out by METRIX, requiring the supply of new metering related equipment, will require associated job numbers before any work can commence.

- Application For Supply Number (AFS)
- Installation Control Point Number (ICP)

These job numbers can only be obtained via the Electricity Retailer.

1.4 Ownership

The premise owner is responsible for the supply and installation of all service equipment. The revenue meter and any load control devices or metering transformers will be supplied by, and remain the property of METRIX (the MEP).

1.5 Damage and Interference

1.5.1 Damage to Equipment

Accidental damage or failure of METRIX's metering equipment should be immediately reported to METRIX (see Contact page on www.metrixinfo.co.nz for address and general contact information).

In the event of meters being destroyed or removed by unauthorised persons, or being damaged to the extent that an accurate reading cannot be obtained, METRIX shall seek to recover the cost of the damaged metering equipment.

1.5.2 Interference

Only persons who are authorised employees of METRIX or contractors authorised and appointed in a similar capacity shall make any connection to, or disconnection from, any conductor directly connected to the METRIX metering equipment. It is not permissible for any unauthorised person to interfere with a seal, or insert a conductor into any item of the metering equipment. The Electricity Act and retailers / lines company terms and conditions prescribe penalties for such interferences.

1.6 Maintenance of Metering Installations

METRIX is responsible for the routine maintenance of its metering installations and the replacement of any faulty meters and associated equipment. Property owners are responsible for the maintenance and upkeep of meter rooms, meter boxes and meter panels (including lids, doors and locking mechanisms).

Inspection, testing, or maintenance of metering installations may be carried out at any time by persons who are authorised employees or contractors of METRIX.

If a shutdown is required a prior notification will be advised.

1.7 Installation requirements for meters and control equipment

Metering & its associated wiring must comply with the Electrical (Safety) Regulations and AS/NZS3000 (The Wiring Rules).

1.7.1 Access

All equipment should be reasonably protected from damage and interference, and shall remain readily accessible to authorized METRIX persons during normal business hours.

1.7.2 Unsuitable Mounting Locations

In general, the following locations are considered unsuitable for the mounting of metering equipment:

- Stairways, ramps, narrow passageways or other confined spaces.
- Vehicle docks, driveways and factory passageways where the equipment or the person working on it would not be effectively protected.
- Positions in close proximity to or over or under machinery or open type switchgear.
- Locations where the atmosphere is liable to be affected by fumes, dampness or dust of a nature that may cause deterioration of equipment or unsafe working conditions.
- Hazardous locations as defined in the Wiring Rules.

- Where the normal ambient temperature exceeds 45°C.
- Where there is insufficient light.
- Where the metering equipment would be subject to strong magnetic fields.

1.7.3 Location on Domestic Premises

Metrix prefers the location of the metering equipment on domestic premises as follows:

- On any clear space on the front or on either side of the building within 1.5 metres of the front or front corner.
- The position should be such that the likeliness of enclosing the meter position or making it inaccessible as a result of any future building alterations or fencing are minimal.
- For new connections a separate external metering enclosure is required. Metrix do not normally allow combined internal meter switchboards

1.7.4 Location on Commercial Premises

It is preferable that in any public building or multiple customer installation the meters, fuses and links be located in an approved position in a common use area or near a public entrance to the building. The standard arrangement is to provide a meter or switch room in which all meters for the premises are located. Consideration may be given by METRIX to requests for metering positions in other areas where there are a number of separate customers and the meters may be grouped in convenient locations.

1.7.5 Elevated Locations

Any elevated floor, platform or stairway used to provide access to metering equipment should be substantial, permanent and fitted with approved safety railing.

1.7.6 Clearance around Metering Locations

Adequate space is required in front of the meter panel for METRIX authorized persons to read meters and to work safely. The space between any wall and obstruction in front of the panel or panel door should be not less than 1 metre.

In public buildings or multiple customer installations the metering equipment or enclosure should be accessible to METRIX authorized persons during normal business hours without having to obtain a key to the premises.

1.8 Meter Enclosures

1.8.1 Residential Meter Enclosures

- The metering enclosure should be in accordance with the NZ standard NZS6206:1980 'Domestic Electric Meter Boxes', and have minimum dimensions of 600 mm high x 400 mm wide x 190 mm deep in either plastic or metal, with equivalent IP56 rating.
- The panel must be able to open a full 90 degrees and have sufficient space above, below, and in front of the panel to allow unobstructed access.
- Any other type of metering enclosure may be considered on request.

1.8.2 Business Meter Enclosures

- For supplies where current transformers are not required, this enclosure must have minimum dimensions of 600mm x 600mm wide x 250mm deep in either plastic or metal, with equivalent IP56 rating. Alternative dimensions may be accepted provided a minimum area of 0.36m² is provided and no vertical or horizontal measurement is less than 500mm.
- New Builds: To allow maintenance & inspection work with minimal customer disruption an external meter box is required

- The panel must be able to open a full 90 degrees and have sufficient space above, below, and in front of the panel to allow unobstructed access.
- For supplies where current transformers are required, this enclosure must have minimum dimensions of 600mm high x 900mm wide x 250mm deep in either plastic or metal, with equivalent IP56 rating. Alternative dimensions may be accepted provided a minimum area of 0.54m² is provided and no vertical or horizontal measurement is less than 500mm.
- The meter box should be mounted in accordance with AS/NZS 3000. Height should be at not less than 1.2m from ground level. Where rails are used, they need to be of the adjustable type to allow for mounting any type of metering equipment.

1.8.3 Identification of Premises

In multi-metered installations service fuses and meter enclosures are to be labelled to identify customers. Labels shall be of a permanent type, clearly visible. The ICP number should be included.

1.9 Types of Metering Installations

1.9.1 Builders Temporary Supply (BTS)

Metrix provides meters suitable for use in Builders Temporary Supplies. With respect to electrical & metering compliance BTS are to be treated as any normal metering installation (with the exception of the housing and location).

a) General

A Builders Temporary Supply typically consists of Whole Current Meter installed in a weather proof meter enclosure. A BTS must comply with AS/NZS 3000.

b) Application of Builders Temporary Supplies

BTS metering installations are typically used during construction only.

1.9.2 Low Voltage Whole Current Metering

METRIX supplies both single and poly-phase meters with a typical capacity of 100 Amps General Whole current metering refers to a method of metering where the kilowatt hour meter is connected into the customer's load circuit, so that the whole of the load current passes through the meter's measurement elements.

Application of Whole Current Metering: Whole current metering is the most common method of metering for domestic and small commercial installations. Normally It is applicable to single-phase and poly-phase services requiring a supply capacity of up to 100 Amps per phase.

1.9.3 Low Voltage Current Transformer Metering

a) General.

Where an installation's maximum demand exceeds the permissible amount for whole current metering (100 Amps), the installation would most likely be metered with the aid of current transformers (CT metering). In this type of installation the CT reduces the load current to a value that can be read by a suitable meter. It is therefore necessary to apply a multiplication factor to the meter's reading to determine the total consumption for the site. This multiplication factor may be applied internally in the meter or externally by the retailers computerized billing systems.

b) Application of Current Transformer Metering.

CT metering is the most common method of metering for large commercial installations. It is typically applicable to poly-phase services over 100 Amps and up to 2000 Amps per phase. METRIX supplies CT Meters and a full selection of Current Transformers in both single & Multi-tap configurations.

c) 30 Minute Interval Data Metering

30 minute interval data metering is most commonly applied in medium to large commercial applications. (EIPC codes require interval data (HH) Metering for installations over 500 Amps.)

d) Application of HH 30 Minute Interval Data Metering

Interval data metering provides detailed consumption data, or, data at a higher resolution. The electricity retailer has a variety of price plans to offer interval data customers. Energy is measured and billed in ½ hour intervals. These meters will also include equipment that allows the meter to be remotely read via a communications system.

e) Application of Multiple Rate and Maximum Demand Metering

Multiple Rate and Maximum Demand metering most commonly applied in small to medium commercial applications. The meter is configured to match one of the retailer's specified tariffs. These tariffs offer price benefits for using electricity during off peak times.

1.9.4 High Voltage Metering (11kV)

METRIX can provide both the current and voltage transforms for high voltage metering. METRIX recommends engaging the services of a consulting engineer in the design of both the electrical and metering installation.

a) General

Where a customer takes supply at high voltage, the metering will be carried out using both current and voltage transformers (commonly referred to as HV metering).

b) Application of High Voltage Metering

High Voltage metering is the most common method of metering for very large commercial installations. Where HV metering is used, installation design drawings are necessary and will typically be designed by a consulting engineer and approved by a Class A Test House.

c) Half Hour Metering

All HV metering requires a meter configured for ½ hour (HH) metering (interval data metering).

1.9.5 Distributed Generation & Import/Export Metering

Import Export metering is required if the electricity consumer is also an electricity generator and electricity flow is possible in either direction (i.e. energy export to network as well as import). Meter panel wiring typically remains standard, but a suitably configured import/export meter is required.

Note: Sites with distributed generation require specific approval from the relevant network company before generation can be connected (refer to the network company or electricity trader)

METRIX can provide guidance on request.

1.10 Peripheral Metering Devices

1.10.1 Control Devices (Ripple Relays & Contractors)

For controlled tariffs METRIX will supply suitable control devices. To avoid overloading the network during peak demand times control devices are used to shed load by switching off appliances such as hot water cylinders. This load shedding is controlled by the network company. Typically load control is achieved either by pilot wire switching a contactor or via a ripple system (frequency sensing relay). This will depend on the network.

1.10.2 Remote Meter Readers (RMR)

A remote meter reader was an auxiliary device that provided an alternative location for the meter reader to view the recorded electrical energy consumption. They have been used for both single phase and three phase installations. Note the RMR is no longer available and has been superseded by meters with built in radio communications devices.

1.10.3 Modems and Antennae

Modems are now commonly fitted to smart meters to provide the remote communications capability.

All modems & RF devices used by METRIX are compliant with NZ regulations for communications equipment.

Consideration should be given to the location of metering panels with respect to suitability for RF communications. Underground basement metering locations can present significant problems for remote metering if the radio signal cannot penetrate.

Antennae

Various antenna types may be utilised to achieve the necessary connectivity to the metering devices. In some circumstances an external antenna may be required for the metering installation.

If a large high gain antenna is required the installation will be made in coordination with the building owner.

1.10.4 Communications Hubs

Where multiple metering devices are used in a single building METRIX may choose to utilise a communications hub. This device is similar to a small patch panel & allows multiple devices to connect through a single modem. The devices do not utilise any of the customer's electricity to operate. These devices are sealed as part of the metering installation & must not be tampered with.

1.10.5 Radio Mesh Data Collectors

This is a communications device only which is installed under contract with the building owner.

1.11 Alterations

1.11.1 Upgrades

Increasing the capacity or replacing the metering installation is referred to as an upgrade. Often the metering installation will need to be replaced or reconfigured to match the maximum demand. Maximum demand should be calculated in accordance with AS/NZS 3000 before contacting the Electricity Retailer with the upgrade request.

1.11.2 Downgrades

Decreasing the capacity of the metering installation is referred to as a downgrade. This is usually performed when the maximum demand has significantly decreased. Having an installation downgraded could save paying high network capacity charges and if excess metering equipment is removed there can also be a savings.

1.11.3 Relocation

When a metering installation requires relocating, the electrical contractor is to submit a Preliminary Notice to the Retailer detailing the work to be completed. A changeover appointment will then be coordinated between a METRIX authorized person and the Electrical Contractor.

1.11.4 Removal

When a metering installation is no longer required, the retailer is to be notified and they should arrange for the meter to be removed by a METRIX authorized person. All METRIX metering equipment that has been removed must be labelled and returned promptly to METRIX's

warehouse (see Contact page on www.metrixinfo.co.nz for address and general contact information).