



METERING GUIDE
PART2
INSTALLATION REQUIREMENTS

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Introduction

METRIX is an 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 solutions 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 which is useful for planning, specifying, ordering, installing and maintaining METRIX metering equipment.

While 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 facilities.
- 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.
- METRIX Contractors are expected to uphold METRIX expectations and standards on Safety, Installations, Enclosures, Quality, and Workmanship.
- Metering Enclosures must be fit-for-purpose, for example, sufficiently large to allow all variants of metering equipment.
- Easy access is afforded, and, in domestic situations, an external box is required for new connections.
- All Metering Installation Switchboard pre wiring should be of a high standard.
- Over and above meeting regulations good workmanship is expected.
- Regarding metering equipment selection, many factors influence the metering equipment selected for any particular application or installation, including coverage available for communications. Any queries related to devices to be installed should be directed to METRIX.

2. Installation

2.1 Safety

The installer shall hold an appropriate class of Electrical Registration and current Electrical Workers Practicing License.

The installer shall comply with all Occupational Health and Safety requirements. All new metering installations shall comply with the requirements of the current Electricity Regulations (current at the time of installation).

Replacement of Meters (and associated equipment) on existing installations should comply with current regulations as best that can be achieved with the pre-existing enclosures and wiring.

The installer shall observe all recommendations and Safety practices applicable to personnel and equipment, including but not limited to those detailed in this manual.

Recommendations and Safety practices detailed in this manual are aimed to address the prevention of personal injury and damage to equipment and property.

In no event shall the metering installation be left in a less safe state than that prior to work commencing.

2.2 Compliance

METRIX Test House is approved by the Electricity Authority (EA) to install and carry out maintenance and certification of Category 1, 2, and 3 metering installations.

All metering installations will be installed and certified in accordance with the current Electricity Industry Participation Code on the date of installation (specifically, EIPC Part 10 Metering). The Code can be found on the EA website at www.ea.govt.nz.

METRIX Test House has specific processes, procedures, and documentation, to ensure compliance with the Electricity Industry Participation Code.

The wiring of metering equipment must comply with all aspects of the New Zealand Electricity Regulations, Electricity Act, Codes of Practice, New Zealand standards, and any additional requirements specified by the Network Company that will supply power to the installation.

The Australian/New Zealand Standard AS/NZS 3000, also known as The Wiring Rules, applies to all electrical installations throughout New Zealand. Metering equipment is considered to be “switchgear” as defined in those rules and all standard provisions relating to switchboards and switch rooms shall apply to metering installations.

In addition to the above Standards, all metering technicians carrying out work under or as a contractor to METRIX Test House are expected to have a full understanding of The New Zealand Electricity Industry Participation Code Part 10 Metering Arrangements.

All metering installations carried out under METRIX Test House shall be properly inspected, tested, and documented, and accurate records shall be kept and sent to METRIX, including details of equipment installed and removed.

2.3 Quality

METRIX expects all metering installation jobs performed by or on behalf of METRIX Test House to be of good workmanship.

Accurate and concise documentation of the installation and the work completed is a fundamental requirement and expectation.

2.4 METRIX Design Reports

METRIX maintains standard Design Reports for Metering Installations on various Networks; these are available at METRIX Website...

<http://www.metrixinfo.co.nz/metering-guides/METRIX Design Reports/>

In preparation for an installation on a Network that has not yet approved the selected Design, METRIX must seek Design Report approval from the Network prior to commencing work, alternatively, the installer may be requested to follow the design prescribed by the network as appropriate for the Network requirements and the associated tariffs requested by the Retailer.

In all cases the METRIX Design Report should be referenced in the commissioning documentation. Any modification to the standard design should be noted in the Job Notes.

METRIX provides detailed technical guides to assist Authorised Metering Contractors (AMC's) to successfully carry out correct installation & operation of metering devices/equipment.

METRIX Design Reports are intended to be used as standard. The Design Report selected depends on the network, the Tariff and Register Content required (by the Retailer), and intended metering device to be used.

METRIX Test House should be contacted to determine the required Design Report for an installation in any of the following cases:

- If the required Design Report is not approved by the intended Installation Network or Retailer.
- If the required Design Report is not available in the METRIX Design Report Pack which is available from

<http://www.metrixinfo.co.nz/metering-guides/METRIX Design Reports/>

METRIX Test House will ascertain the required Design Report based on the Retailer's Tariff and Register Content requirements and will provide the necessary guidance in order to achieve the desired outcome.

2.5 Sealing of Metering Equipment

2.5.1 Sealing Requirements

Adequate sealing points shall be provided by the customer on all fuses, links, CT chambers, inspection doors or other equipment where sealing is a requirement.

Sealing of all metering equipment shall be carried out by a METRIX authorized person as soon as supply is made available to the customer and Meter Installation commissioning is completed.

Unauthorised interference with METRIX seals or metering equipment is not permitted under the New Zealand Electricity Industry Participation Code Part 10 Metering Arrangements. Any evidence of interference should be documented and communicated to METRIX.

2.5.2 Sealing Equipment

METRIX authorized personal are issued, on an individual basis, approved sealing tools with unique markings. It is imperative that METRIX seals be installed using only approved sealing tools and sealing wire issued by METRIX. The sealing wire should be kept as short as practicable.

2.5.3 Meter Case Seals

All meter cases shall be sealed with at least one high security seal. The seals shall be fitted by METRIX Test House technicians, or a METRIX approved Contractor, or, in the case of new meters, by the meter manufacturer. In either case the seal is to be embossed or stamped so as to identify the organization and individual who fitted the seal. The meter case seals shall not be broken by any person other than a METRIX authorized technician in the performance of their duties. If any meter case seal is found to be missing or broken, a temporary seal shall be fitted immediately and the circumstances reported to METRIX. (see Contact page on www.metrixinfo.co.nz for address and general contact information).

2.5.4 General Service Seals

Sealing of meter terminal covers, fuses, links, CT chambers, inspection doors or other equipment where sealing is a requirement shall be done using an approved and METRIX registered sealing tool. It is **NOT** acceptable to use pliers, cutters or any other non-approved tools to compress seals.

Security seals may only be removed by METRIX authorised persons in the performance of their duties. Security seals found to be broken or missing are to be reported to METRIX (see Contact page on www.metrixinfo.co.nz for address and general contact information).

2.6 Builders Temporary Supply (BTS)

Metrix provides meters suitable for use in Builders Temporary Supplies. These meters will need to be installed and the metering installation certified by a METRIX authorised person. Regulations & requirements for Builders Temporary Supplies are no different than those for a permanent connection. The only exception is that a meter may be reused in a BTS at another location provided less than 12 months has passed since the date of first installation of the meter.

2.7 Whole Current Metering

Whole Current Meters are available from METRIX on quotation of an Application For Supply (AFS) or Installation Control Point (ICP) number. This equipment is supplied and installed at the expense of METRIX and remains the property of METRIX.

2.7.1 General Requirements

a) Single Customer Installations

- For single customer installations requiring one or more phases, the customer shall provide the appropriate size standard metering panel and box.
- Where alterations and or additions to an existing installation entail additional metering and service equipment, and sufficient room is not afforded on the existing panel, a new standard box and panel shall be provided by the customer.

b) Multiple Installations using Meter Boxes

- Where the metering for multiple installations is installed on a single panel, sufficient space should be allowed for the metering equipment as per the METRIX minimum clearances document available at

www.metrixinfo.co.nz - Resources - Guides & Templates - Metering Component Dimensions

Each individual customer's metering position and associated wiring must be clearly identifiable by permanently marking of flat / apartment numbers

- In situations where additions and alterations to the existing metering installation are made, that cannot be contained in an approved layout, a new panel or meter box shall be provided by the customer.

c) Installations in Meter Rooms

- Where the metering for any number of customers is not contained in meter boxes, METRIX prefers that the customer provides a suitable Meter Room for the purpose.

- Meter rooms should be kept clean, tidy and provide unrestricted access to metering equipment.
- The room should also be of an adequate size and have adequate lighting installed.
- The room should be located in a position that affords ready access to METRIX employees.
- The access door need not have a lock, but if one is fitted, it is an expectation that access be provided to Metrix employees or AMCs upon request.
- The layout of equipment in meter rooms shall conform to the selected METRIX Design Report.

2.7.2 Wiring (Whole Current Metering)

a) Recommendations

- The mains cables should be of stranded copper conductor with a core-cross-section not less than 2.5mm^2 & not more than 25mm^2 (aluminium conductors are not acceptable for termination in the meter terminals).
- Minimum size for meter neutrals & control device wiring is 2.5mm^2
- Multi stranded flexible type wire must be consolidated in appropriate ferrules prior to termination at the meter.

b) Wiring and Layout of Equipment

- The typical wiring arrangements for Whole Current Metering are provided in the selected METRIX Design Report.

2.8 Low Voltage Current Transformer (CT) Metering

Current Transformers, Meters and Test Blocks are available from METRIX on quotation of an Application For Supply (AFS) number for the intended installation. This equipment is supplied and commissioned at the expense of METRIX and remains the property of METRIX.

2.8.1 General Requirements

- All wiring to the meter must be via a Test Block (supplied by METRIX).
- A separate CT and potential fuse chamber is required with the capability of being sealed. This is the only equipment allowed in the chamber.
- Where a CT chamber and meter panel are part of a main switchboard assembly but are not adjacent to each other, provision should be made for a dedicated steel enclosed cableway, duct, or conduit to contain the secondary wiring in order to maintain its integrity.
- All secondary meter cables should be:
 - (a) Labelled or colour coded (as per the standard Design Report)
 - (b) Be continuous (no joints are acceptable)
 - (c) Be no less than 2.5mm^2 in cross-sectional area for runs up to 10 metres, and no less than 4mm^2 for runs up to 20 metres. Note that where a requirement exists for runs in excess of 20 metres the matter shall be discussed with METRIX at the planning stage. If multi stranded conductor is used the conductors must be appropriately consolidated using appropriate ferrules or lugs.
 - (d) All CT cable connections to be lugged in an approved manner (automotive cable lugs are not acceptable)
- Metering equipment neutrals must be either in the main neutral lug or a separate lug on first sealable stud adjacent to the main neutral stud.

- Burden Rating: The standard rating of all new METRIX CTs is 5 VA, excessive length in the wiring run could exceed the rated burden & cause unacceptable measurement inaccuracy.

2.8.2 Installation of Current Transformers

a) General

- Where current transformers are fitted, a 100mm minimum free length of accessible insulated cable or bus shall be provided for the safe measurement of primary currents using clip-on type tong ammeters. Where the respective bar primaries or bus are used for this purpose the insulation should be at least 0.6/1.0 kV grade.
- The primary busbars passing through the current transformers are to be removable to allow future exchange of the current transformers.
- Mains cables within current transformer chambers or enclosures should be installed and connected in a manner that allows direct frontal access to the current transformers for testing and replacement.
- The current transformers should be mounted in a manner that allows for the easy changing of ratios on multi-tapped transformers.
- While work is being carried out on any Current Transformers or their associated meter(s), Current Transformers must have their output terminals shorted.

WARNING Failure to observe this requirement may lead to personal injury or loss of life.

b) Metering Potential Circuitry

- The potential wiring should originate on the load side of the current transformers and should be protected by fuses on each phase. The fuses should be mounted on a suitable mounting plate and as close as practicable to the origin of the potential.
- The fuse mounting point should be located in such a manner that when the fuse holders are removed, they are pulled directly outwards, away from the chamber. Sideways removal of fuse holders within the chamber is not permitted.
- All potential fuses are to be sealable HRC type and, if mounted on the bus bars, shall be 20A rating with a second set of 6A mounted adjacent to the Test Block.

c) Wiring and Layout of Equipment

- In CT metered installations, Current Transformers, Test Block, Fuses and all secondary wiring is to be installed and terminated by the customer's contractor.
- The colour code of the current and voltage circuitry wiring should comply with all aspects of this guide and any additional requirements that may be requested by METRIX.
- The typical wiring arrangement for Current Transformer Metering is provided in METRIX Design Report Pack.

d) Standard Metering Cubicles

All cubicles or enclosures should comply with the following basic requirements of this guide:

- CT enclosures should have sufficient sealing points positioned so that the removal of the enclosure's cover cannot be achieved without the removal of all seals.
- The metering panel should not be less than 500mm x 500mm and is to be easily removable.
- Access to any of the metering circuitry terminations should not be possible without the removal of a METRIX security seal.

- Where metering cubicles and boxes are exposed to weather, the enclosure should have a protection not inferior to IP53.
- The CT chamber should have provision to mount the current transformers in the manner described in Appendix A of this guide. Tapped holes or stud bolts should be used and the method of fixing should be such that the busbar passes through the CT's toroidal centre. There should be sufficient spacing between the CT's to allow for the removal of any one CT without having to remove adjacent CT's or equipment.
- The CT enclosure or chamber is only to be used for the housing and connection of metering equipment. The enclosure should not contain any other cable or switchboard apparatus that is not directly related to the metering installation.

e) Multiple Feeder Connections

Each individual feeder to a property, e.g. Two transformer feeders, are required to be separately metered, i.e. **summation CT's are no longer used or installed by METRIX.**

Appendices

Appendix A:

A1 METRIX Design Reports

A pack of METRIX Design Reports are available from the METRIX website...

www.metrixinfo.co.nz [Resources tab][Guides & Templates][METRIX Design Reports]

A2 Metering Equipment Panel Layout

A suite of METRIX recommended Panel Layouts are available from the METRIX website...

www.metrixinfo.co.nz - Resources - Guides & Templates - Domestic Metering Layouts

www.metrixinfo.co.nz - Resources - Guides & Templates - Business Metering Layouts

A3 Metering Equipment Templates

www.metrixinfo.co.nz - Resources - Guides & Templates - Metering Component Templates

A4 Installation Quick Sheets

Metrix Test House publishes guides to the correct commissioning of metering installations. These documents are available to Metrix Test House staff & Authorised Metering Contactors. Contact: testhouse@metrixinfo.co.nz

A5 Technical Guides

METRIX provides technical guides to approved Technicians to assist in the correct installation, operation of & fault finding of all smart metering equipment. These are provided on request from the Test House (see Contact page on www.metrixinfo.co.nz for address and general contact information).

Manufacturer's technical manuals may be released on special request only.

A6 Return of Equipment – General

Note: Specific project or contract requirements may vary or supersede this requirement.

METRIX expects any METRIX owned property equipment removed from a metering installation to be returned to METRIX Warehouse. Such equipment should be treated & transported with care with a view that it will be reused in a future installation.

Device Removal Labels: A special label is available to contractors authorised to remove METRIX equipment.

Its purpose is to ensure the appropriate handling of returned equipment by Metrix on receipt of the equipment at its warehouse facilities

All returned equipment is expected to have this label affixed detailing the reason for removal & equipment status

Sample label below:

Device Removal Label	METRIX <i>Post Pay project</i>
Please Tick:	<input type="checkbox"/> Demolition <input checked="" type="checkbox"/> Faulty <input type="checkbox"/> Replacement <input type="checkbox"/> Tampered <input type="checkbox"/> Displacement <input type="checkbox"/> Special Test
Date	<u>21/10/2009</u>
Contractor	<u>John White - Metrix</u>
Meter Owner	<u>Metrix</u>
Work Order No.	<u>573</u>
ICP	<u>035639847IUY00</u>
Customer	<u>I Carl</u>
Address	<u>33 Church St</u> <u>Onehanga</u>
Fault Description	<u>Faulty, Main LED red</u>