



# **Electricity Network Standards:**

## **EGP503 Smart Metering**

### **GUIDE**

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## I. Document Control

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## II. Document Revisions

Approved Versions	Date	Revision Notes
1.0	December 2022	
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## III. Document References

Document Number	Description	Location
ESA002	Electricity Network Connection Standard	Vector Standard

## IV. Glossary of Terms

Term	Description
CN	Controlled
Hz	Hertz
ILC	Integrated Load Control
IN	Inclusive
LCD	Liquid-Crystal Display
MEP	Metering Equipment Provider

## 1. Overview

### 1.1 Purpose

This document outlines metering requirements for new and replacement installations for low voltage customers (as defined in Vector's Network Connection Standard, ESA002). It is intended to be used by Metering Equipment Providers (MEPs) as input into their load control design documentation.

For metering installation and wiring please refer to Vector's Network Connection Standard (ESA002).

## 2. Metering Requirements

### 2.1 General

The purpose of metering equipment is to provide, including but not limited to:

- Revenue metering
- Load control functionality (to support load control requirements such as ripple receiver type functionality, timer/calendar control and remote control (via cellular or radio))

Metering installations generally fall into one of four high level groups:

1. Revenue metering with ILC (preferred controlled option)
2. Revenue metering with ILC and external load control
3. Revenue metering with external load control
4. Revenue metering without load control (not detailed within this guideline)

MEPs shall determine a suitable solution to meet the retailer and network requirements based on the specific requirements of each site. There are several factors that determine what the most practical solution shall be for any given site, including but not limited to:

- The Maximum Demand of the Electrical Installation
- The Rating of the main protective device (or other limiting factor)
- The site tariff requirements (register content codes)
- The quantity and type of loads (e.g. inclusive, uncontrolled, controlled)
- The number of controlled load circuits (i.e. number of load control switches required) – tariff based and/or potential coverage of pre-existing load control for customer benefit.

### 2.2 Specific

Load Relay Position:

- Relay position (Open/Closed) to be visible without the need to have the terminal cover removed, instead indicated on the LCD screen via dedicated relay symbols.
- Relay position at time of install is expected to be connected, however, the applied load control configuration may result in the load relay disconnecting based on defined Calendar Control settings (if enabled).

Loss of Supply Switching;

- This feature shall be enabled for meters with ILC.

### 2.3 Functionality of integrated load control

Function	Description	Requirements
<b>Ripple Control (current method for load control)</b>	The 'Ripple Control' functionality allows for the meter to interpret and respond to specific ripple protocols and channels.  Ripple protocol, frequency and signal voltage are to be programmable and master commands shall also be	Decabit 475Hz shall be supported.  For Peak control ripple channels, if the controlled supply remains OFF for more than 20 hours, it shall fall back to timer/calendar control (in the absence of any ON signals, or OFF signals to reset this failsafe timer).

	<p>allocated. A failsafe timer shall also be configured.</p> <p>Where there are multiple ripple channels allocated for a specific purpose, the solution shall randomise the assigned channel automatically (at time of programming).</p>	<p>The randomisation for ON ripple signals shall be set at 10 minutes.</p>
<p><b>Timer/Calendar Control</b> <b>(future method for load control)</b></p>	<p>The purpose of the Timer/Calendar Control function is to allow the meter to control the switching of the load control relay based on defined seasons (e.g. Summer/Winter) and state changes (connect/disconnect).</p> <p>State changes are specified times/windows to disconnect and connect the load control relay within each season.</p> <p>This function is managed internally by the meter, based on the meter configuration.</p>	<p>This shall be enabled on all meters where ILC is in use.</p> <p>Timer/Calendar always connected – random delay of 10 minutes to turn switch on.</p> <p>All timer/calendar control switching times are to be configured so that they are the same year-round (in local time, not standard time).</p> <p>Timer/Calendar control switching times shall be updated for meters locally or remotely.</p>
<p><b>Loss of Supply Switching (optional)</b></p>	<p>The Loss of Supply Switching function shall disconnect the load control relay upon the meter detecting a power supply outage and then apply a delay before reconnecting it following restoration of power supply.</p>	<p>This shall be enabled by default (where functionality is available).</p> <p>The reconnection of the load relay shall be randomised between 10 and 30 minutes following power restoration i.e. 10 minute fixed delay and 30 minute random delay.</p>
<p><b>Diagnostic Boost (optional)</b></p>	<p>The Diagnostic Boost function allows the field engineer (metering technician/installer) to manually switch the load control relay for installation checks and troubleshooting purposes. The relay can be connected or disconnected, with a configurable Diagnostic Timeout applying to the connect action and when it expires the meter shall revert the relay to the disconnected state or current state as defined by the Timer/Calendar Control.</p>	<p>This function shall be enabled by default (where functionality is available) and provide a 10-minute override period before the relay reverts to previous state or state defined by Timer/Calendar Control.</p> <p>Terminal cover removal is intended requirement to access this function, to prevent any unauthorised access to this function (seal on terminal cover will need to be broken, hence this function should only be used by authorised/trained personnel).</p>
<p><b>Customer Boost</b></p>	<p>The purpose of the Customer Boost function is to provide a mechanism that allows the consumer to use the buttons on the meter to connect the load control relay during a</p>	<p>This function is to be disabled.</p>

	<p>time that it would otherwise be disconnected.</p> <p>The consumer may use the Boost function if they needed the load to be on for a limited period of time (configurable) when it would otherwise normally be disconnected.</p> <p>For example, the hot water heating needed to be boosted to accommodate for the fact that there were extra people staying at the consumer premise meaning there was a higher usage of hot water.</p>	
<p><b>Individual Meter Switching</b></p>	<p>The Individual Meter Switching function covers the remote switching of the load control relay for an individual meter.</p> <p>This function is used for remote troubleshooting purposes to help with consumer complaints or assist field engineers with investigations and checks prior to, or during, site visits.</p> <p>The actions possible for the load control relay are connect and disconnect.</p>	<p>This function is to be disabled.</p>
<p><b>Demand Management via cellular or radio Communications</b></p>	<p>The Demand Management via cellular or radio communications function provides the capability to perform bulk load control relay actions for activities relating to demand management. It shall be used to achieve outcomes similar to a traditional ripple control solution. Load control requests should be made via groups of meters identified, which can be defined by Vector based on network hierarchy.</p>	<p>This function is to be enabled in the meter (for potential emergency or future use or trial situations) and assuming bulk control can only be carried out by authorised parties in co-ordination with Vector without risking network security.</p>

## Appendix A Network Tariff Codes

The below table provides a summary of the ripple channels/groups that exist in Vector's electricity network.

Note: The table does not include any Decabit 1050Hz ripple signal details as this system is currently inactive.

Purpose/Ripple Grouping		Register Content Code	Decabit (475Hz)			
<b>Load Control</b>	<b>P1 – Water Heating Peak Control</b> <ul style="list-style-type: none"> <li>Channels randomly allocated.</li> </ul>	CN19 IN19	100 00			
			100 01			
			100 02			
			100 03			
			100 04			
			100 05			
			100 06			
			100 08			
			100 09			
			100 10			
			100 14			
			103 15			
			103 16			
			103 17			
			103 18			
			103 19			
			103 20			
			103 21			
			103 22			
				<b>P4 - Water Heating Peak Control (Special Location)</b> <ul style="list-style-type: none"> <li>For Waiheke Island only.</li> <li>Channels randomly allocated.</li> <li>Controlled to no more than 5 hours off in any 24 hour period.</li> </ul>	CN19 IN19	100 11
						100 12
						100 13