

Distribution Code Part 3: Metering Requirements for Electrical Installations



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1. Introduction

This document provides information relating to the installation of metering at the boundary of connections to the Counties Energy network and applies to stakeholders such as electricity retailers, electricity users, developers, contractors, consultants and shareholders.

This code forms part of our Distribution Code, which comprises six parts, all of which are available from Counties Energy's website www.countiesenergy.co.nz, each covering a specific set of requirements

- Part 1: General Requirements
- Part 2: Network Connection Standard
- **Part 3: Metering Requirements for Electrical Installations (this document)**
- Part 4: Distributed Generation Requirements
- Part 5: Signaling and Technical Interference
- Part 6: Distribution Operation Code

Definitions of terms and abbreviations are found in section 14.1 of Part 1 of this code.

2. Distribution Code Requirements

Where appropriate, the metering system should provide the information listed below at each ownership boundary and critical point, using the most economical solution while allowing for different physical and technical conditions:

- a) All active energy input or output taken from, or delivered to, Counties Energy's distribution system by a user or customer.
- b) The active energy used solely to operate or maintain Counties Energy system need not be metered.
- c) Where bidirectional active energy flow occurs at a point of connection, meters shall be provided to separately measure input and output active energy.
- d) Where loads are sufficiently large, or are significant to Counties Energy's network, a meter shall be provided to separately record input and output active energy at each point, for each customer and each connected voltage level.
- e) Where appropriate, reactive energy output and reactive energy input shall also be available to allow separate recording of the input reactive energy and the output reactive energy at each point, for each user and customer and for each connected voltage level.

All metering required under the Distribution Code shall be of an appropriate accuracy class for its intended purpose. Reasonable steps must be taken to prevent information loss or unauthorised interference with the equipment. Adequate space shall be provided within a user's or customer's building for metering equipment, with reasonable access always permitted to the equipment owner. Responsibility for maintaining the metering equipment rests with the party that owns it.

The party responsible for the metering equipment shall be responsible for the maintenance of that equipment.

3. Safety

The metering equipment installer must hold a current practicing license and comply with all health and safety requirements regarding personnel and equipment as outlined in this document. Recommendations and practices detailed are aimed at preventing personal injury and damage to equipment and property.

All installations must comply with the requirements of the current Electricity Regulations.

Current transformers must have their output terminals shorted for each phase while work is being carried out on them or their associated meter(s).

4. General Technical Requirements

Electricians undertaking metering work must follow the general principles of the Metering Safety Good Practice Guide, issued by the Electricity Engineers' Association of New Zealand (EEA).

Meter boards must be located to provide unrestricted access for meter reading and maintenance. Where practicable, the location should also consider the owner's future development plans, including fencing and security.

Counties Energy recommends that a hot water pilot wire be installed between the meter box and the distribution board to allow customers to access discounted controlled-load tariffs if they choose to do so..

Meter boards must also be wired ready for the installation of metering and load control equipment, in accordance with the relevant drawings, using a minimum of 2.5 mm² stranded copper conductors, including neutrals.

For three phase meter installations, wiring may be colour coded as follows:

- Red for red phase
- White for white phase
- Blue for blue phase

Booking an inspection, metering and livening

Before inspection, metering and livening can be booked, Counties Energy must have received a signed Network Connection Form and any applicable capital contribution. This process will result in the issue of an ICP number.

All requests for inspection, metering and livening must be made through the customer's selected retailer. Counties Energy will not accept requests directly from customers or electricians and will act only on instruction from an authorised retailer.

Before booking an inspection, the installer must ensure that:

- All electrical work associated with the metering installation is complete and safe to liven.
- Where installed by an authorised contractor, the service main is complete to the point where livening can occur by insertion of the service main fuse(s).
- Where the contractor is not authorised to connect to the Counties Energy network, underground cables requiring termination may be completed by the inspector at additional cost.
- A correctly completed Certificate of Compliance (COC) for the installation wiring is available on site.
- Where applicable, a COC for the service main and a Record of Inspection for any distributed generation system are also available.

Livening will not occur until all required documentation has been sighted and approved by the inspector. It is the responsibility of the electrical contractor and/or customer to ensure all required COCs (all three copies) are available on site.

All bookings must be made through the customer's selected retailer.

Any cancellation of booked work should be notified to Counties Energy as soon as possible. Where an inspector attends a booked inspection that is incomplete and cannot be completed, additional charges will be billed to the customer unless otherwise agreed to be invoiced directly to the electrical contractor.

The following information is required when booking an inspection:

- 1) Name of customer (account holder).
- 2) The installation ICP number.
- 3) Address of installation.
- 4) Date inspection required.
- 5) Type of installation (builder's temporary supply, house, pump, shed etc.).

- 6) Number of phases.
- 7) Pole top or pillar connection required.
- 8) Special tariff rates, if known (import/export, etc.).
- 9) Helpful directions on finding the site, particularly if rural.
- 10) Location of the installation COC.
- 11) Location of the service main COC.
- 12) Electrician's name.
- 13) Electrician's contact number (preferably mobile number).
- 14) Any other helpful information e.g. special access requirements.

Inspection, metering and livening fees will be invoiced by Counties Energy to the account holder. Additional visit costs due to incomplete or non-compliant work or documentation will be charged to the customer unless invoiced directly to the electrical contractor by agreement.

5. General Meter / Relay Installation Requirements

5.1. Metering

Controlled Power Tariff

Counties Energy offers a lower-cost controlled power tariff designed primarily for hot water storage cylinders. Supply under this tariff may be controlled by Counties Energy or the associated retailer and may be interrupted for up to five hours per day (or as per the agreement in place with the Retailer), typically during peak demand periods.

Wiring and Load Requirements

All domestic installations must be wired to allow separate metering of controllable (water heating) loads.

A minimum 2.5 mm² conductor must be installed from the metering enclosure to the distribution board.

The maximum total load connected to the controlled supply must not exceed 31 amps (7 kW).

All controllable loads must be separately metered.

Equipment on Controlled Supply

Any equipment connected to the controlled supply must be suitable for controlled operation, clearly labelled as controlled, and wired so that remote reconnection does not create a safety risk, in accordance with electrical safety regulations.

Electric vehicle chargers may be connected to the controlled circuit, provided all requirements above are met.

Meter Box Location and Access

Counties Energy strongly prefers external meter boxes for new dwellings or buildings where whole-current (W/C) meters are required.

All meter boxes must be located in a readily accessible position.

Metering Facilities

Facilities for the mounting and wiring of Counties Energy meters and, where applicable, control equipment must comply with the following requirements:

- a) For a single-phase installation with or without controlled power metering, an unencumbered mounting plate, or mounting rails, with minimum dimensions of 430mm high, 360mm wide, 120mm deep (clearance from the mounting plate/rails to the inside of the closed door).
- b) For two phase installations with or without controlled power metering, an unencumbered mounting plate, or mounting rails, with minimum dimensions of 500mm high, 400mm wide, 120mm deep (clearance from the mounting plate/rails to the inside of the closed door).
- c) For three phase installations with or without controlled power metering, an unencumbered mounting plate, or mounting rails, with minimum dimensions of 500mm high, 400mm wide, 120mm deep (clearance from the mounting plate/rails to the inside of the closed door).
- d) For metering configurations other than those above, please contact Counties Energy for minimum device mounting requirements.

Meters must be positioned such that register readings are viewable to a meter reader without opening the meter panel door on external meter boxes.

5.2. Installation

- Meters shall be mounted so the register is clearly and easily readable through the meter box window.
- Load control devices must have contact ratings suitable for the maximum controlled load.

- All protection within meter boxes shall be close-current protection type.
- Cables may be installed through the top of the meter box, providing they do not restrict the installation of the meter(s) or load control devices.
- Looping from meter terminals is not permitted.
- Meter boxes shall be mounted so that the centre of the top viewing window will be 1.4 to 1.8 metres above the finished ground level.

6. Current Transformer (CT) Metering

- Current transformers (CTs) must be used where the maximum load is expected to exceed 100 amps.
- All proposed installations requiring CT's must be discussed with Counties Energy's engineering team at an early stage of the planning. CTs may take up to four weeks for delivery.
- The CT ratio to be installed, including the ratio for multi-ratio CTs, must be approved by Counties Energy Limited.
- All CT installations shall be fitted with a CT test block.
- CT's and test blocks shall be supplied by Counties Energy where the retailer requesting the livinging has nominated Counties Energy as the Metering Equipment Provider for the ICP.
- Provision must be made for a separate, sealable CT chamber incorporating a removable section of busbar or cable.
- One set of potential fuses, fitted with 10-amp cartridges, shall be mounted on the metering panel. These fuses These fuses must be spaced to allow individual sealing to prevent removal.
- Where busbars are installed, a second set of fuses fitted with 20-amp cartridges shall be mounted on the busbar within the sealable CT chamber. These fuses must be positioned so cartridges can be safely replaced without requiring a shutdown.
- All potential fuses shall be of the HRC, Q2 type.
- Meter boards must provide a minimum depth of 150 mm to accommodate the meter. Hinged meter boards must allow a minimum 90-degree opening with meters fitted.

7. Import / Export Metering for Distribution Generation

All distributed generation connecting to Counties Energy Network must be approved by Counties Energy.

Please refer to Counties Energy distributed generation documentation – “Distribution Code Part 4 - Distributed Generation Requirements”.

Import export metering is typically implemented via specific meter or meter programming. This metering must be requested through the retailer for the ICP as this corresponds to a tariff change.

Counties Energy typically will not undertake the electrical inspection of PV Solar energy systems, and this should be organised with an Electrical Inspector specialising in such systems.

Where photo voltaic (PV) distributed generation is included with a new build premises, a Record of Inspection must be provided for the PV with the COC for the building to Counties Energy’s Inspector.

7.1. Rural Area Connections

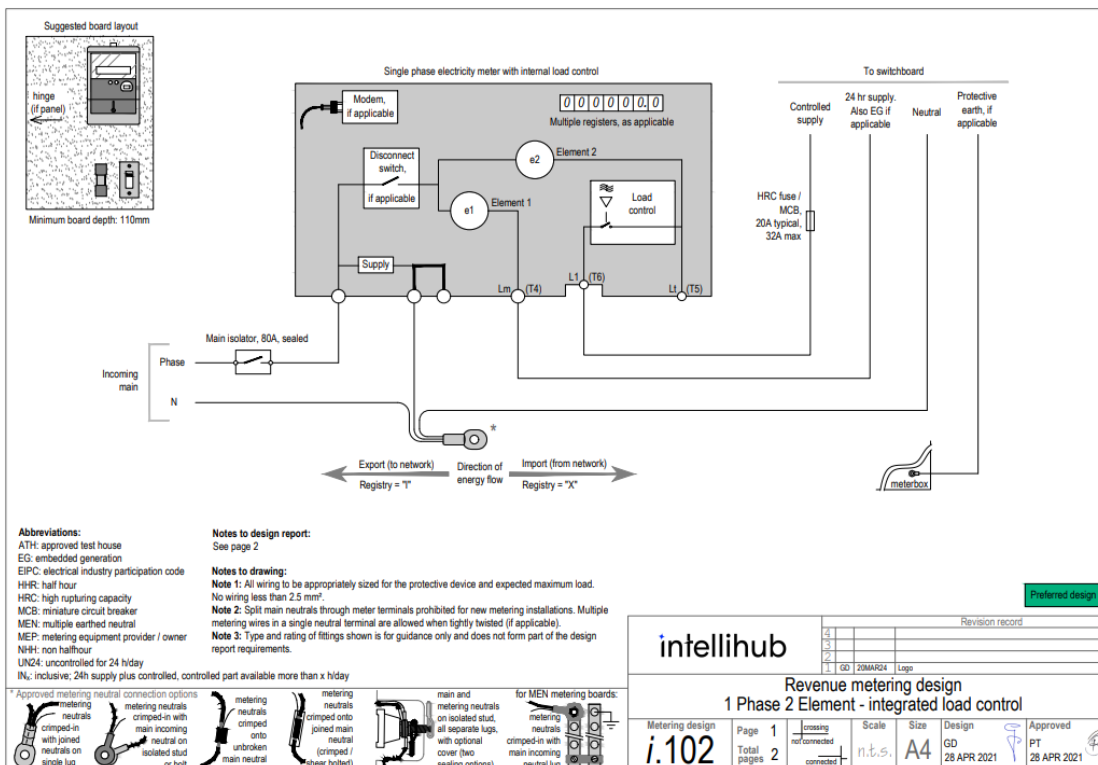
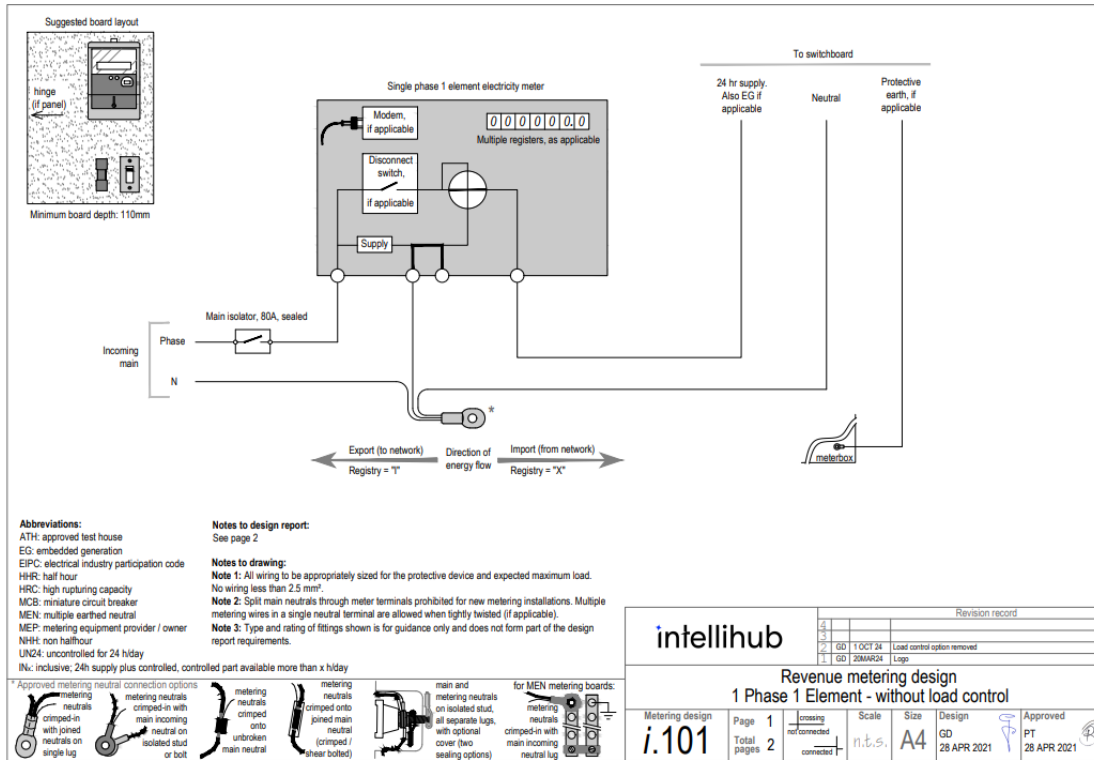
Counties Energy Network Connection Standard (Part 2 of the Distribution Code) specifies that:

“Supply to rural dwelling installations is recommended to be three phase and shall be a minimum of two phase and the connected load balanced across all connected phases at the Main Switchboard”.

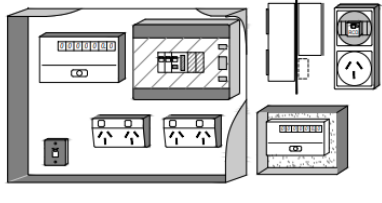
When a small-scale distributed generation system is installed in a rural area where a three phase or two-phase supply is provided, then the generation is required to inject equally into all phases to maintain a balanced load.

Appendix A – Wiring Diagrams List

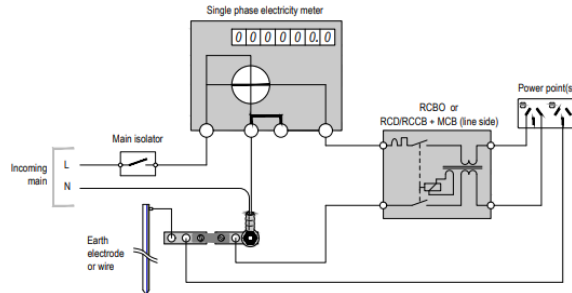
- i 101 1 phase 1 element - without load control**
- i 102 1 phase 2 element - integrated load control**
- i 109 1 phase 1 element builder's temp supply options**
- i 200 2 phase using two 1 phase meters - 2 element integrated load control**
- i 201 2 phase using 3 phase meter - optional integrated load control**
- i 204 2 phase using two single phase meters without load control**
- i 301 3 phase including - optional 1 phase integrated load control**
- i 302 3 phase uncontrolled plus 1 phase controlled - integrated load control**
- i 304 3 phase uncontrolled plus 3 phase controlled - integrated load control (with customer supplied 3 pole contactor)**
- i 306 3 phase builder's temporary supply**
- i 401 current transformer connected 5A 3 phase meter**
- i 701 design concept for multi-unit installation - using meters with integrated load control**



Ver 1.0



Setup suggestions



Single phase electricity meter

Notes to design report:	
Installation type / Service access interface	NHH with local read
Multiplier (compensation factor)	1
Max interrogation cycle (MIC)	365 days (local register read)
Owner	IntelliHub
MEP (designated metering equipment provider)	MTRX/HUB as applicable
Certification method	Selected component (EIPC Code 10, Schedule 10.7 clause 11)
Configuration: -- Meter registers	1: Total kWh import
Remote disconnect capability	No
Internal ripple control option	No
All NEW metering installations are to meet current applicable network standards	

Notes to drawing:
 Note 1: All wiring to be appropriately sized for the protective device and expected maximum load. No wiring less than 2.5 mm².
 Note 2: Split main neutrals through meter terminals prohibited for new metering installations. Multiple metering wires in a single neutral terminal are allowed when tightly twisted (if applicable).
 Note 3: Type of fittings shown is for guidance only.

Abbreviations:
 HHR: half hour / NHH: non half hour
 HRC: high rupturing capacity (fuse)
 MCB: miniature circuit breaker
 MEN: multiple earthed neutral
 MEP: metering equipment provider / owner
 UN24: uncontrolled "ban" for 24 h/day
 RCD: residual current device (generic name)
 RCBO: RCD with overcurrent protection
 RCCB: RCD without other protection

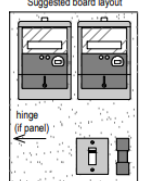
Revision record					
4					
3					
2	1 OCT 24	MEP change to both MTRX & HUB			
1	GD 20MAR24	Loop			

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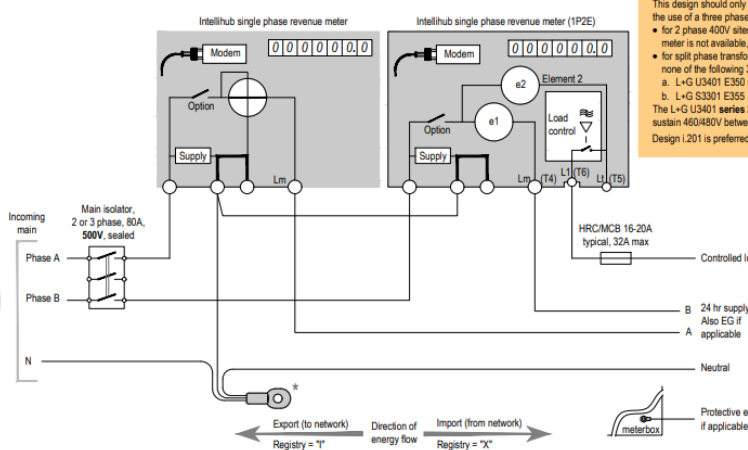
Revenue metering design drawing
 1 Phase 1 Element - Builders temp supply options

Metering design	Page 1	crossing not connected	Scale	Size	Design	Approved
i.109	Total pages 2	connected	n.t.s.	A4	GD 13 JUL 2021	PT 13 JUL 2021

Suggested board layout



Minimum board depth: 110mm



IntelliHub single phase revenue meter

IntelliHub single phase revenue meter (1P2E)

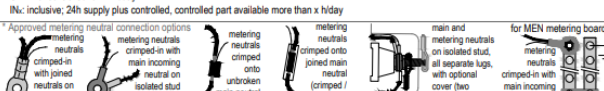
Alternative design:
 This design should only be used as an alternative to the use of a three phase meter:
 • for 2 phase 400V sites and a suitable 3 phase meter is not available, or
 • for split phase transformer sites (400/480V), where none of the following 3 phase meters are available:
 a. L-G U3401 E350 series 3 meter (white front)
 b. L-G S3301 E355
 The L-G U3401 series 2 meters (dark colour) cannot sustain 460/480V between phases, refer I.201.
 Design I.201 is preferred

Abbreviations:
 ATH: approved test house
 EG: embedded generation
 EIPC: electrical industry participation code
 HHR: half hour
 HRC: high rupturing capacity
 MCB: miniature circuit breaker
 MEN: multiple earthed neutral
 MEP: metering equipment provider / owner
 NHH: non halfhour
 UN24: uncontrolled for 24 h/day
 (Nk): inclusive; 24h supply plus controlled, controlled part available more than x h/day

Notes to design report:
 See page 2

Notes to drawing:
 Note 1: All wiring to be appropriately sized for the protective device and expected maximum load. No wiring less than 2.5 mm².
 Note 2: Split main neutrals through meter terminals prohibited for new metering installations. Multiple metering wires in a single neutral terminal are allowed when tightly twisted (if applicable).
 Note 3: Beware of dangerous voltages on floating meter - or relay - neutrals when live.
 Note 3: Type and rating of fittings shown is for guidance only and does not form part of the design report requirements.

Approved metering neutral connection options:



for MEN metering boards:
 main and metering neutrals on isolated stud, all separate lugs, with optional cover (two sealing options)
 metering neutrals crimped-in with main incoming neutral lug

Revision record					
4					
3	1 OCT 24	Phases clarified, E361 details added			
2	GD 20MAR24	Loop			
1	GD 19FEB2022	New L-G U3401 series 3 meter allows its use on split phase XFMR sites			

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Revenue metering design
 2 Phase using two 1 phase meters - 2 element integrated load control

Metering design	Page 1	crossing not connected	Scale	Size	Design	Approved
i.200	Total pages 2	connected	n.t.s.	A4	GD 28 APR 2021	PT 28 APR 2021

Ver 1.0

Suggested board layout

Minimum board depth: 110mm

Important note on use of 3 phase meters:
 Only the following 3 phase meters can be used on 460/480V:
 • L+G U3401 (E350) series 3 meter (white cover)
 • L+G S3301 (E355)
 The voltage rating of a series 2 L+G U3401 (E350 with dark colour) is insufficient for use on split phase transformer sites. Use two single phase meters where required (refer I.200 / I.204 / I.205).

IntelliHub three phase electricity meter

Internal load control only for L+G meters, with:
 - (green) specific to L+G S3301 E355 with isolated contact
 - (blue) specific to L+G U3401 E350 with contact connected to 3rd element

**** L+G U3401 (series 2 only)**
 Reason for C-phase lightning:
 Controlled load relay
 Metered C-phase load side terminal
 Controlled load terminal

***** Link to unused element is required:**
 - all EDM1 3ph meters
 Link to 3rd element is required:
 - L+G meters with connected controlled load
 A link may optionally be installed on all 3ph meters.

Abbreviations:
 EG: embedded generation
 EIPC: electrical industry participation code
 HHR / NHH: half hour / non half hour
 HRC: high rupturing capacity
 MCB: miniature circuit breaker
 MEN: multiple earthed neutral
 MEP: metering equipment provider / owner
 UN24: uncontrolled for 24 h/day
 INc: inclusive; 24h supply plus controlled, controlled part available more than x h/day

Notes to drawing:
Note 1: All wiring to be appropriately sized for the protective device and expected maximum load. No wiring less than 2.5 mm².
Note 2: Split main neutrals through meter terminals prohibited for new metering installations. Multiple metering wires in a single neutral terminal are allowed when tightly twisted (if applicable).
Note 3: Type and rating of fittings shown is for guidance only and does not form part of the design report requirements.

Notes to design report:
 See page 2

Approved metering neutral connection options

Revision record

4			
3	GD	1 OCT 24	Phases clarified, E355 details added
2	GD	20 MAR 24	Logos. Link to 3rd element.
1	GD	26 OCT 2022	Show internal relay, series 3 U3401 comment added

Revenue metering design
2 Phase using 3 phase meter - optional integrated load control

Metering design Page 1 of 2
 Total pages 2
 Scale n.t.s.
 Size A4
 Design GD 28 APR 2021
 Approved PT 28 APR 2021

Suggested board layout

Minimum board depth: 110mm

IntelliHub single phase revenue meter

Alternative design
 This design should only be used as an alternative to the use of a suitable three phase meter:
 • For split phase transformer sites (460/480V), where none of the following 3 phase meters are available:
 a. L+G U3401 E350 series 3 meter (white front)
 b. L+G S3301 E355
 Note that the L+G U3401 series 2 meters (dark colour) cannot sustain 460/480V between phases, refer I.201.
 Design I.201 is preferred.

Abbreviations:
 ATH: approved test house
 EG: embedded generation
 EIPC: electrical industry participation code
 HHR: half hour
 HRC: high rupturing capacity
 MCB: miniature circuit breaker
 MEN: multiple earthed neutral
 MEP: metering equipment provider / owner
 NHH: non half hour
 UN24: uncontrolled for 24 h/day
 INc: inclusive; 24h supply plus controlled, controlled part available more than x h/day

Notes to design report:
 See page 2

Notes to drawing:
Note 1: All wiring to be appropriately sized for the protective device and expected maximum load. No wiring less than 2.5 mm².
Note 2: Split main neutrals through meter terminals prohibited for new metering installations. Multiple metering wires in a single neutral terminal are allowed when tightly twisted (if applicable). Beware of dangerous voltages on floating meter - or relay - neutrals when live.
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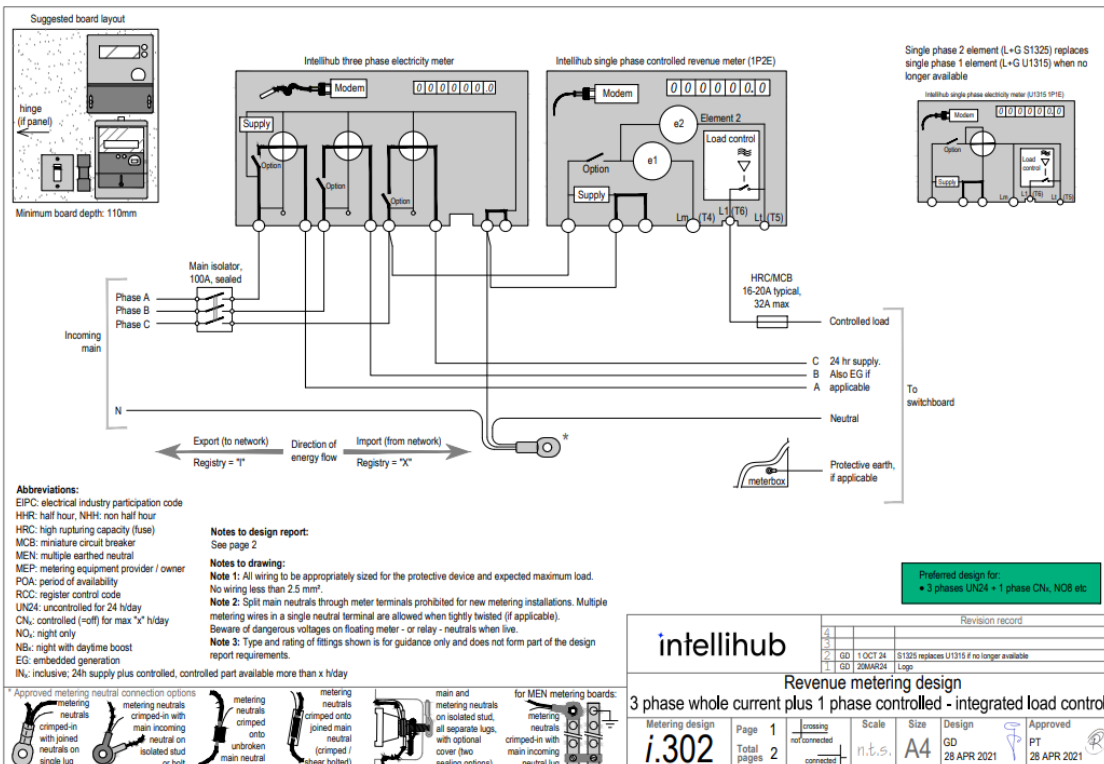
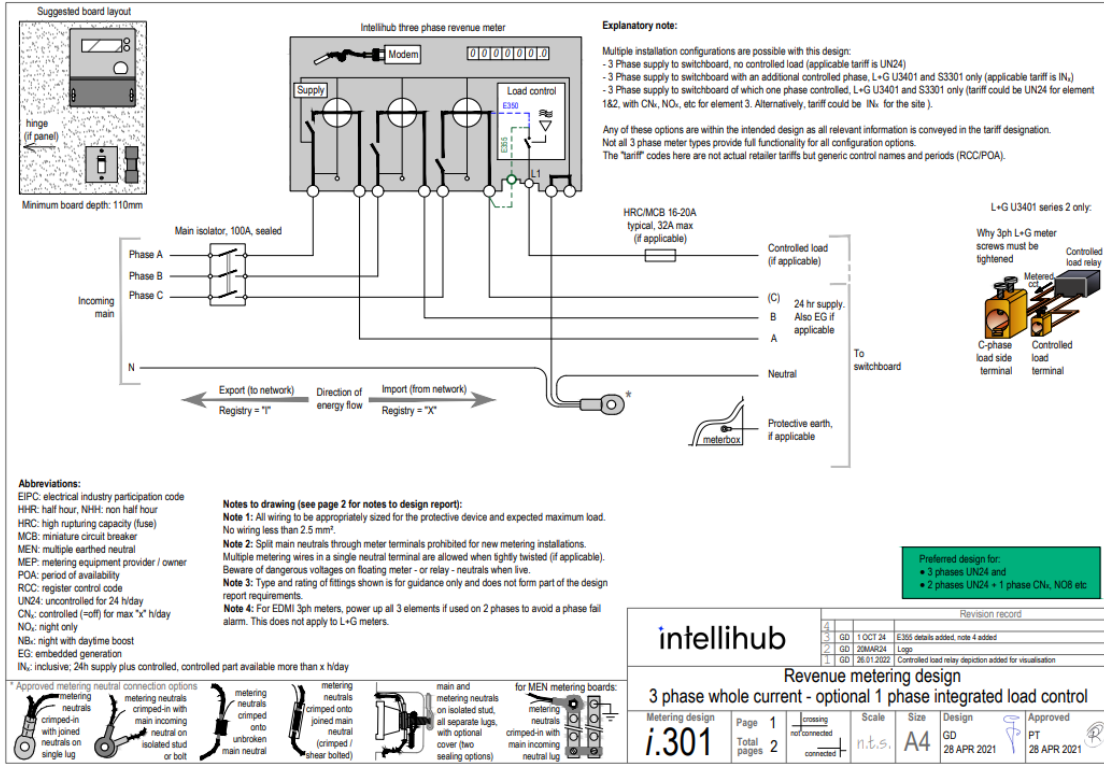
Approved metering neutral connection options

Revision record

4			
3	GD	1 OCT 24	Phases clarified, E355 details added, title change (see inclusive)
2	GD	20 MAR 24	Logos
1	GD	10 FEB 2023	New L+G U3401 series 3 meter allows its use on split phase XFRMR sites

Revenue metering design
2 Phase supply using two single phase meters - without load control

Metering design Page 1 of 2
 Total pages 2
 Scale n.t.s.
 Size A4
 Design GD 28 APR 2021
 Approved PT 28 APR 2021



Ver 1.0

