

CODE OF PRACTICE EIGHT

**CODE OF PRACTICE FOR THE METERING OF IMPORT
ACTIVE ENERGY VIA LOW VOLTAGE CIRCUITS FOR NON-
HALF HOURLY SETTLEMENT PURPOSES**

Issue 1

Version 2.0

DATE BETTA Effective Date

Code of Practice Eight

CODE OF PRACTICE FOR THE METERING OF IMPORT ACTIVE ENERGY VIA LOW VOLTAGE CIRCUITS FOR NON-HALF HOURLY SETTLEMENT PURPOSES

1. Reference is made to the Balancing and Settlement Code for the Electricity Industry in Great Britain and, in particular, to the definitions of "Code of Practice" in Annex X.1 thereof.
2. This is Code of Practice Eight Issue 1, Version 2.0
3. This Code of Practice shall apply to Metering Systems comprising Metering Equipment that is subject to the requirements of Section L of the Balancing and Settlement Code.
4. This Code of Practice is to be effective from BETTA Effective Date.
5. This Code of Practice has been approved by the Panel.

For and on behalf of the Panel.

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CODE OF PRACTICE FOR THE METERING OF IMPORT ACTIVE ENERGY VIA LOW VOLTAGE CIRCUITS FOR NON-HALF HOURLY SETTLEMENT PURPOSES

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FOREWORD

This Code of Practice defines the minimum requirements for directly connected and transformer operated Metering Equipment at the Defined Metering Point for the measurement of Import Active Energy via low voltage circuits for Non-Half Hourly Settlement purposes.

BSCCo shall retain copies of, inter alia, the Code of Practice together with copies of all documents referred to in them, in accordance with the provisions of the Balancing and Settlement Code (the Code).

Superseded

1. SCOPE

This Code of Practice states the practices that shall be employed and the facilities that shall be provided for the measurement and recording of the quantities required for Settlement purposes.

This Code of Practice specifically applies to directly connected and transformer operated Metering Equipment to be installed **FOR THE METERING OF IMPORT ACTIVE ENERGY VIA LOW VOLTAGE CIRCUITS FOR NON-HALF HOURLY SETTLEMENT PURPOSES.**

This Code of Practice only applies to "whole current" and transformer operated Metering Equipment for Import Active Energy measured in kWh. No provision is made for the measurement of Reactive or Apparent Energy or any Maximum Demand.

This Code of Practice defines the extent of Metering Equipment to be installed by a Meter Operator Agent in fulfilling its role in the provision of equipment and data for Non-Half Hourly Settlement purposes.

This Code of Practice derives force from the Balancing and Settlement Code, and in particular the metering provisions contained in Section L, to which reference should be made. It should also be read in conjunction with the relevant BSC Procedures.

This Code of Practice does not contain the calibration, testing and commissioning requirements for Metering Equipment used for Settlement purposes. These requirements are detailed in Code of Practice Four¹ - "Code of Practice for Calibration, Testing and Commissioning Requirements for Metering Equipment for Settlement Purposes".

Dispensations from the requirements of this Code of Practice may be sought in accordance with the Balancing and Settlement Code and BSC Procedure BSCP32.

In the event of an inconsistency between the provisions of this Code of Practice and the Balancing and Settlement Code, the provisions of the Balancing and Settlement Code shall prevail.

Meters manufactured prior to 1 April 2003 that have been tested and received type approval by the Authority (Ofgem or its predecessors) to a standard not less than Class 2 applicable at the time of type approval shall be deemed compliant with this Code of Practice.

¹ The current Issue 5 of Code of Practice Four may require minor amendments to accommodate Non-Half Hourly Metering Systems.

2. REFERENCES

The following documents are referred to in the text:-

| | |
|--|--|
| BS EN 61036 | ‘AC Static Watthour Meters for Active Energy (Classes 1 and 2)’ |
| BS EN 60521 | ‘Class 0.5, 1 and 2 Alternating Current Watt-Hour Meters.’ |
| BS 7856 | ‘Code of Practice for Design of Alternating Current Watt-Hour Meters for Active Energy (Classes 1 and 2)’ |
| BS 7951:2000 | ‘Electricity Meters. Alternating current single phase watt-hour Telemeters of accuracy class 1 or 2.’ |
| BS EN 60044-1:1999 | ‘Instrument Transformers – Part 1: Current Transformers’ |
| Balancing and Settlement Code BSC Procedures List | ‘Section X; Annex X-1 and Sections L and S’ ‘See BSC Section H 1.3.2 (a) – Code Subsidiary Documents’ |
| Code of Practice Four | ‘Code of Practice for Calibration, Testing and Commissioning Requirements for Metering Equipment for Settlement Purposes’ |
| Electricity Act 1989 | ‘Schedule 7, as amended by Schedule 1, to the Competition and Services (Utilities) Act 1992.’ |
| Statutory Instrument 2002 No. 2665 | ‘The Electricity Safety, Quality and Continuity Regulations 2002’ |
| Meter Operation Code of Practice Agreement ² (MOCOPA) | ‘Agreement between Meter Operators and Distribution Businesses governing arrangements for safety and technical competence’ |
| International Telecommunication Union - RTF.460 (ISBN92-61-05311-4) | ‘Standard Frequency and Time Signal Emission’ |
| Statutory Instrument 1998 No.1566 | ‘Electricity – The Meters (Certification) Regulations 1998.’ |

² The Meter Operation Code of Practice Agreement is a voluntary agreement between Distribution System Operators and Meter Operator Agents.

TPRD/L/3297/R88

‘Specification for Radio Teleswitches for tariff and load control’

Utilities Act 2000

‘Utilities Act 2000’

Superseded

3. DEFINITIONS AND INTERPRETATIONS

Save as otherwise expressly provided herein, words and expressions used in this Code of Practice shall have the meanings attributed to them in the Balancing and Settlement Code and are included for the purpose of clarification.

Note: * indicates definitions in the Balancing and Settlement Code.

Note: † indicates definitions which supplement or complement those in the Balancing and Settlement Code.

Note: ‡ indicates definitions specific to this Code of Practice

3.1 Active Energy *

Active Energy means the electrical energy produced, flowing or supplied by an electric circuit during a time interval, being the integral with respect to time of the instantaneous Active Power, measured in units of watt-hours or standard multiples thereof.

3.2 Active Power *

Active Power means the product of voltage and the in-phase component of alternating current measured in units of watts and standard multiples thereof, that is:-

1,000 Watts = 1 kW

1,000 kW = 1 MW

3.3 Actual Metering Point ‡

Actual Metering Point means the physical location at which electricity is metered.

3.4 Certified

Certified means a meter conforming with the Statutory Instrument, 1998 No.1566 “Electricity – The Meters (Certification) Regulations”.

3.5 Current Transformer

A transformer for use with electrical measuring instruments, electrical protection and/or control equipment, for the transformation of current and in which the current in the secondary winding, in normal conditions of use, is substantially proportional to the current in the primary winding and different from it by an angle which approaches zero for an appropriate direction of the connections.

3.6 De-Energised ‡

De-Energised means the temporary removal of the supply at a Defined Metering Point (e.g. the main circuit connections to the Public Distribution System Operator's network are still made) such that all or part of the Metering Equipment is considered to be temporarily "inactive" for the purposes of Settlement. e.g. unoccupied premises where the incoming switchgear has been opened or the cut-out fuse(s) removed.

3.7 Defined Metering Point ‡

Defined Metering Point means the physical location at which the overall accuracy requirements as stated in this Code of Practice are to be met. The Defined Metering Points are identified in section 8.

3.8 Distribution System *

- (i) any Public Distribution System; and
- (ii) any other distribution system in Great Britain for which the condition is satisfied that all entry/exit points are subject to registration in SMRS pursuant to the provisions of the MRA; where:
 - (1) 'distribution system' has the meaning given or to be given to that term in section 4(4) of the Act, following amendment of the Act by section 28 of the Utilities Act 2000;
 - (2) 'entry/exit point' means a point at which electricity may flow on to or off such distribution system other than from or to the Transmission System or another such system or a Public Distribution System.

3.9 electricity *

electricity means Active Energy and Reactive Energy.

3.10 Import ‡

Import means, for the purposes of this Code of Practice, an electricity flow away from the Transmission System. (i.e. At a Customer's premises, a power flow towards the Customer's installation.)

3.11 Isolating Switch

means a switch located between a Meter and customer's fuse box and providing a means of isolating the electricity supply to the customer's fuse box and which may be operated by the customer or their electrical contractor.

3.12 Meter *

Meter means a device for measuring Active Energy and/or Reactive Energy.

3.13 Metering Equipment ‡

Metering Equipment means Meters, Telemeters, Timeswitches, Radio Teleswitches, Isolating Switches, connector blocks, test terminal blocks, measurement transformers (voltage, current or combination units), metering protection equipment including alarms, circuitry, associated Communications Equipment and Outstation and wiring.

3.14 Meter Register ‡

Meter Register means a device, associated with a Meter, from which it is possible to obtain a reading of the amount of Active Energy that has been supplied by a circuit.

3.15 Radio Teleswitch

means a timing device for tariff and load control purposes, utilising a time base derived from, and maintained by, a radio signal in accordance with specification TPRD/L/3297/R88.

3.16 Registrant *

Registrant means in relation to a Metering System, the person for the time being registered in CMRS or (as the case may be) SMRS in respect of that Metering System pursuant to Section K of the Balancing and Settlement Code.

3.17 SVA Customer *

means a person to whom electrical power is provided, whether or not that person is the provider of that electrical power; and where that electrical power is measured by a SVA Metering System.

3.18 Telemeter

means a combined Meter and Radio Teleswitch.

3.19 Timeswitch

means a timing device for tariff and load control purposes, utilising a time base derived from either mains frequency or an internal crystal controlled clock.

3.20 UTC ‡

UTC means Co-ordinated Universal Time which bears the same meaning as in the document Standard Frequency and Time Signal Emission, International

Telecommunication Union - RTF.460(ISBN92-61-05311-4) (colloquially referred to as Rugby Time).

Superseded

4. MEASUREMENT CRITERIA – DIRECTLY CONNECTED (WHOLE CURRENT) METERS

4.1 Measured Quantities

4.1.1 Measured Quantities

For each separate circuit measurements of Import Active Energy in kWh are required for Settlement purposes.

Registers shall be provided in accordance with clause 6.3.1.

4.2 Accuracy Requirements

4.2.1 Type Test Requirements

Meters shall be type tested in accordance with and satisfy the requirements of BS EN 61036 or BS 7951:2000 or BS EN 60521 as appropriate.

4.2.2 Import Active Energy Accuracy Requirements

(i) Meter Accuracy

| CONDITION | LIMIT OF ERRORS AT STATED SYSTEM POWER FACTOR | |
|---------------------------------------|---|-----------------|
| | Power Factor | Limits of Error |
| Current | | |
| 100% I_{max} to 10% I_b inclusive | 1 | $\pm 2.0\%$ |

4.2.3 Initial verification (calibration) – Authority (Ofgem) Certification

See Certification Directions, clause 7(2).

4.2.4 In-service Accuracy limits

The overall accuracy of the energy measurements at, or referred to, the Defined Metering Point shall at all times be within the limits of error for in-service accuracy.

The overall in-service accuracy limits are +2.5% to –3.5% at any load at which the Metering Equipment is designed to operate.

5. MEASUREMENT CRITERIA – CURRENT TRANSFORMER OPERATED METERS

5.1 Measured Quantities

5.1.1 Measured Quantities

For each separate circuit measurements of Import Active Energy in kWh are required for Settlement purposes.

Registers shall be provided in accordance with clause 6.3.1.

5.2 Accuracy Requirements

5.2.1 Type Test Requirements

Meters shall be type tested in accordance with and satisfy the requirements of BS EN 61036 or BS 7951:2000 or BS EN 60521 as appropriate.

5.2.2 Import Active Energy Accuracy Requirements

(i) Meter Accuracy

| CONDITION | LIMIT OF ERRORS AT STATED SYSTEM POWER FACTOR | |
|--------------------------------------|---|-----------------|
| | Power Factor | Limits of Error |
| Current | | |
| 100% I_{max} to 5% I_n inclusive | 1 | $\pm 2.0\%$ |

5.2.3 Initial verification (calibration) – Authority (Ofgem) Certification

See Certification Directions, clause 7(2).

5.2.4 In-service Accuracy limits

The overall accuracy of the energy measurements at, or referred to, the Defined Metering Point shall at all times be within the limits of error for in-service accuracy.

The overall in-service accuracy limits are +2.5% to –3.5% at any load at which the Metering Equipment is designed to operate.

5.2.5 Voltage supply for Current Transformer operated Meters

A separately fused voltage supply shall be provided between the cut-out and the Current Transformer operated Meter. No burden other than Metering Equipment shall be connected to the fused side of the voltage supply. The neutral conductor of the voltage supply to the Meter shall not be fused.

5.2.6 Access to voltage supply

Access to the voltage supply fuse(s) shall only be possible by the breaking of a seal.

5.2.7 Current Transformers installed on existing circuits

Where circuits, other than those newly installed, are to be metered to this Code of Practice and where the installed Current Transformers do not comply with the Class accuracies specified in clause 6.2.1, then such Current Transformers may be used providing the following requirements and those in clause 5.2.4 are met and that where subsequently an alteration to the Metering Equipment is carried out, new Current Transformer(s) shall be provided to meet the accuracy requirements specified in clause 6.2.1 below.

5.2.8 Access to Current Transformers

Access to both the primary and secondary sides of Current Transformers shall only be possible by the breaking of a seal. Where 'open ring' Current Transformers are used, measures shall be taken to prevent unauthorised access to the central aperture, such that no additional conductors may be passed through the aperture without the breaking of a seal.

6. METERING EQUIPMENT CRITERIA

Metering Equipment shall be accommodated in a clean and dry environment.

For each circuit, other than one which is de-energised, the voltage supply to any Meters and Displays shall be connected such that it is normally energised to facilitate reading of the Meter Register(s).

6.1 Meters

The Meters may be either static or induction disc types.

For each circuit, Import Active Energy Meters shall be supplied which shall meet the requirements of BS 7856 and either BS EN 61036 Class 2 or BS EN 60521 Class 2 or BS 7951:2000.

Import Active Energy Meters provided for the metering of supplies to Customers shall be in accordance with Schedule 7 of the Electricity Act 1989.

Import Active Energy Meters shall be configured such that the number of measuring elements is equal to or one less than the number of primary system conductors. These include the neutral conductor, and/or the earth conductor where system configurations enable the flow of zero sequence energy. The Meter and any Current Transformers shall be of a rating appropriate to the installation.

6.2 Current Transformers

The term "Current Transformer" used in Section 5 does not preclude the use of other measuring techniques with a performance equal to that specified for such measurement transformers.

For each circuit where a Current Transformer is used, it shall meet the requirements set out below.

Where required, one set of Current Transformers to BS EN 60044-1:1999 with a minimum standard of accuracy to Class 0.5 shall be provided per circuit. Preferably the Current Transformers shall be dedicated for Settlement purposes, but the Current Transformers may be used for other purposes provided the overall accuracy requirements in clause 5.2.4 are met.

The total burden on each Current Transformer shall not exceed the rated burden of such Current Transformer.

6.3 Registers, Displays and Facilities

6.3.1 Meters and Telemeters

Rate registers shall be provided for either:

- (a) the total Import Active Energy measured by that Meter/Telemeter; or
- (b) each rate measured by a multi-rate Import Active Energy Meter/Telemeter. The sum of such multi-rate registers shall be equal³ to the total Import Active Energy measured by that Meter/Telemeter.

6.3.2 Displays

The Metering Equipment shall display the Import Active Energy in kWh for each register utilised on the Meter (not necessarily simultaneously).

6.3.3 Timeswitches

Timeswitches, where required, shall be installed and the time set to the time standard (GMT or BST) as required by the Supplier's tariff requirements.

6.3.4 Teleswitches

Teleswitches, where required, shall be installed and set to the appropriate Application/User/Group Code in accordance with the Supplier's tariff requirements.

6.3.5 Time keeping accuracy

Timeswitches, where required, shall be installed and set as close as reasonably practical to the time standard (GMT or BST) as required by the Supplier's tariff requirements. Timeswitches shall be maintained to an accuracy of ± 2 hours.

³ Allowance shall be made for fractions of kWh measured by each register, not being included in the total Import Active Energy calculation.

7. INSTALLATION OF METERS

7.1 BSC Accreditation requirements

A Supplier is required by the Balancing and Settlement Code only to use accredited agents for the purposes of providing meter operation services. Full details of the procedure are available in BSCP531 from the Balancing and Settlement Code Website “www.elexon.co.uk”.

7.2 Meter Operation Code of Practice Agreement (MOCOPA) requirements

MOCOPA covers the installation, operation and maintenance of Metering Equipment by Meter Operator Agents. It identifies the safety and technical requirements relevant to meter operation, and the interface between a Meter Operator Agent and a Distribution System Operator. It specifies the requirements for both the Metering Business and field staff as appropriate.

The principles within MOCOPA form the basis of good practice for meter installation, operation and maintenance at any site that is connected, either to a Distribution System or to any other network.

A party's compliance with MOCOPA is regulated and policed by the Registration Authority⁴.

7.3 Appropriate Seals

All SVA Customers Metering Equipment shall be sealed in accordance with Appendix 8 and 9 of the Meter Operation Code of Practice Agreement and any applicable BSCP.

⁴ The Registration Authority is defined within MOCOPA.

8. DEFINED METERING POINTS AND POINT OF SUPPLY

8.1 Single-rate Whole Current Meter – where the SVA Customer’s installation directly connects with the installed meter.

8.1.1 Distribution System Operator Responsibilities

The Distribution System Operator is responsible for the service cable and the cut-out.

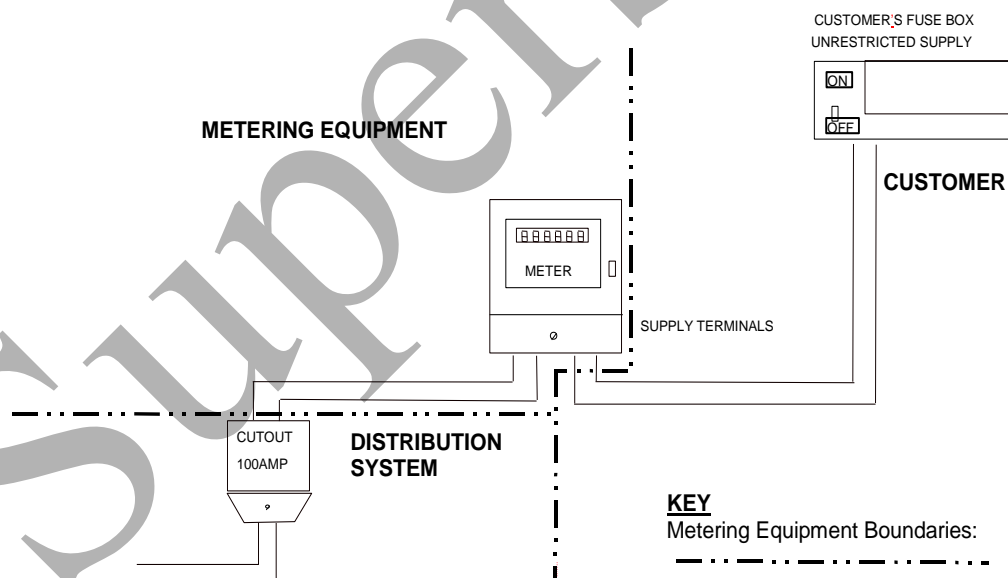
8.1.2 Meter Operator Agent Responsibilities

The Meter Operator Agent shall install the meter.

The conductors between the cut-out and the input terminals of the Meter shall be installed by, and be the responsibility of, the Meter Operator Agent.

The conductors between the Meter’s outgoing terminals and the consumer unit will be part of the SVA Customer’s installation but the responsibility of the Meter Operator Agent for connection.

Single-rate Whole Current Meter



Note:

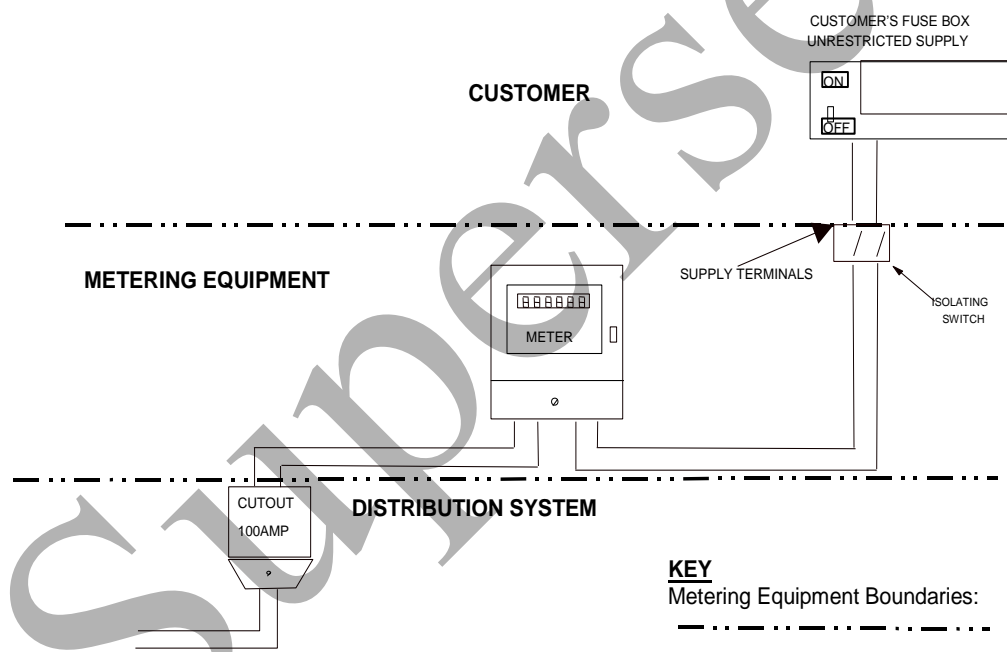
The diagrams in this section of the Code of Practice are for example only. These diagrams should not be taken as definitive wiring diagrams for any installation.

8.2 Single-rate or Multi-rate Whole Current Meter – where the SVA Customer’s installation does not directly connect with the installed meter(s).

8.2.1 Installations with an Isolating Switch

Where an installation has an additional meter, a timeswitch, teleswitch, or external isolating switch, then the Meter Operator Agent will install these items. Also, the interconnecting wiring between the items up to the last item of equipment, for example an isolating switch or meter before the ‘consumer unit’, would be installed and maintained by the Meter Operator Agent. However, any wiring between the final item of equipment and the ‘consumer unit’ would be part of the SVA Customer’s installation.

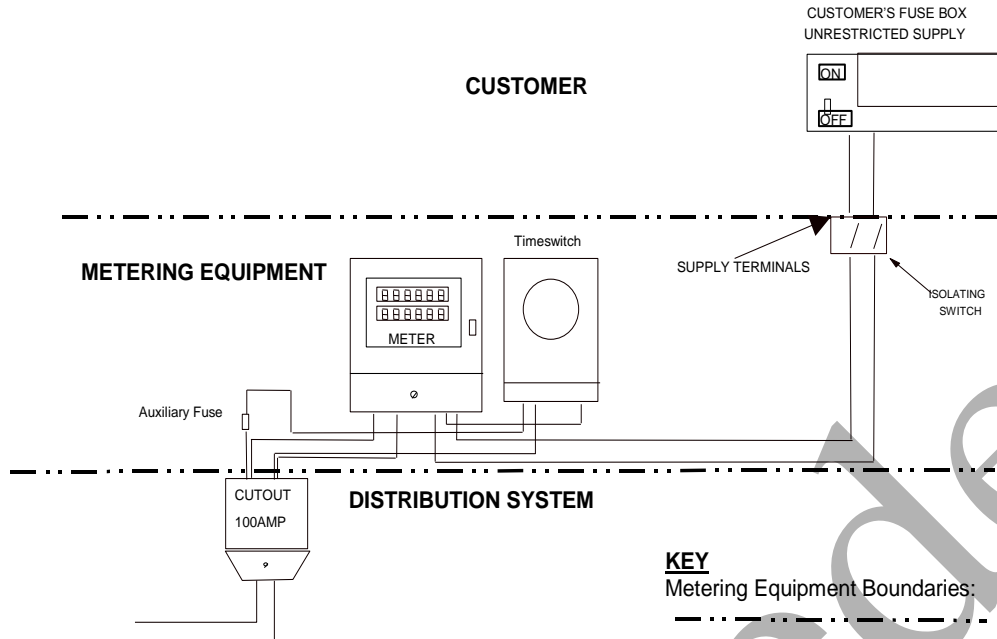
Single-rate Whole Current Meter with Isolating Switch



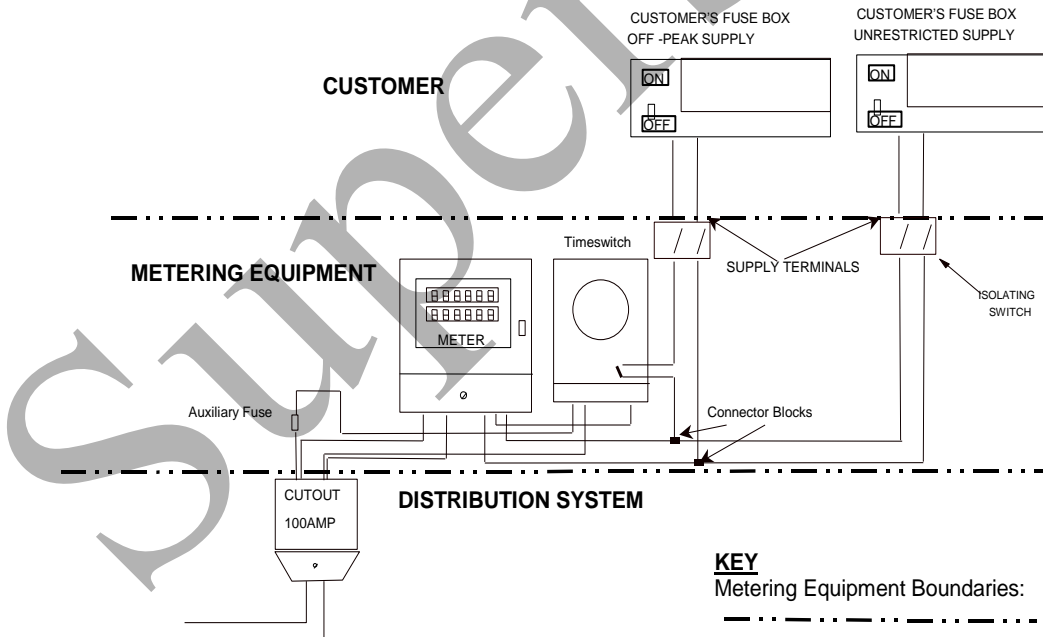
Note:

The diagrams in this section of the Code of Practice are for example only. These diagrams should not be taken as definitive wiring diagrams for any installation.

Multi-rate Whole Current Meter with Isolating Switch



Multi-rate Whole Current Meter with Isolating Switches and controlled Off-Peak Load



Note:

The diagrams in this section of the Code of Practice are for example only. These diagrams should not be taken as definitive wiring diagrams for any installation.

8.3 Other Requirements

8.3.1 Anti Fraud Devices

Where considered necessary by the Supplier, anti-fraud devices such as security blocks fitted between the cut-out and the meter, and plastic bubbles would be supplied and fitted by the Meter Operator Agent.

8.3.2 Outside Meter Cabinets

An outside meter cabinet will normally be considered the SVA Customer's property and their responsibility to replace in the event of it being damaged.

8.3.3 High Risers and Laterals

Where the metering is situated within a communal metering area the risers are normally privately owned.

Where the metering is situated in the individual flats, then the ownership of the risers will have been determined at the time of connection, in conjunction with the Distribution System Operator.

8.4 Current Transformer Operated Metering Equipment

8.4.1 Provision of Test and Isolation facilities

For the purposes of meter connection by the Meter Operator Agent, the Current Transformers, meter panel, associated multicore cable, test/isolating facilities and voltage fuses will be provided by the Distribution System Operator or a contractor nominated by the SVA Customer.

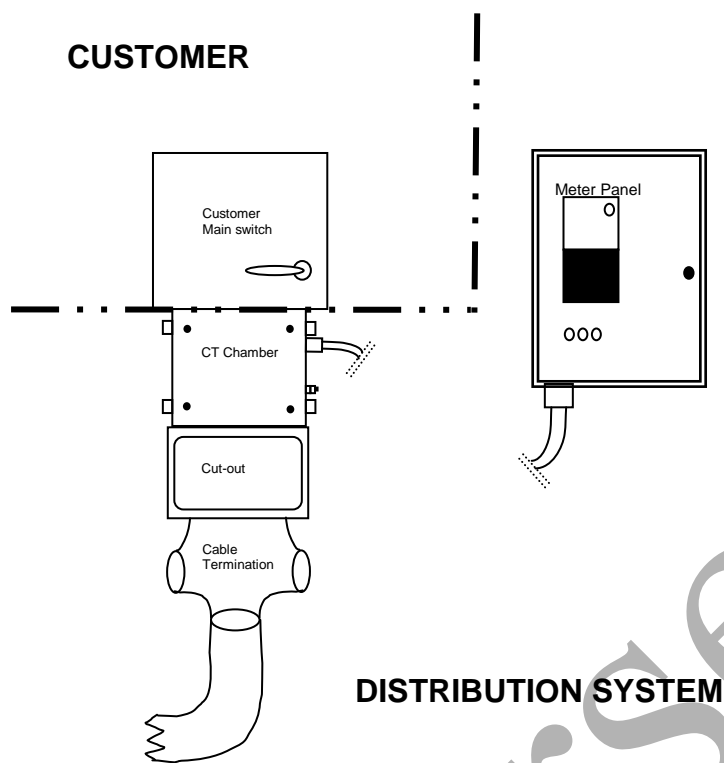
8.4.2 Interface between Meter Operator Agent and Distribution System Operator

In normal circumstances the Meter Operator Agent to Distribution System Operator interface point will be the outgoing connections from the test/isolating facilities and the metering panel voltage fuses.

8.4.3 SVA Customer cabling

The cabling from the Distributor System Operator's cut-out or main fuse, through Current Transformers and into a SVA Customer's main switch is the property of the SVA Customer. Where this cabling is provided by the SVA Customer or his contractor, then the cabling shall be to the Distribution System Operator's specification.

Current Transformer Operated Metering Equipment



Note 1:

The Meter is not normally provided by the Distribution Business.

Note 2:

Depending upon space availability at the Service Position, the meter may be mounted at the CT Chamber or remotely by means of a multicore cable and provision of a separate metering panel.

Note 3:

The CT chamber may be provided by the contractor to the Distribution System Operators specification.

9. PROVISION OF METERING EQUIPMENT

The table below is for guidance on the provision and responsibility of selected items in any particular installation.

The term Equipment Owner (EO) has been used to identify the party responsible for providing the item of Meter Equipment or associated / ancillary equipment.

Note:- Not all items in the following table will be present in all installations.

Table defining responsibilities for various items of Metering Equipment

| Item | Provider of equipment | Field work Responsibility |
|--|-------------------------|---------------------------|
| (A) <u>All installations</u> | | |
| Service cable | DSO | DSO |
| High Risers and Laterals | EO or landlord | DSO |
| Cut-out | DSO | DSO |
| Main fuses (cut-out fuses) | DSO | DSO or MOA* |
| Circuit Breaker (or equivalent) (for larger installations) | DSO | DSO or MOA* |
| Meter / Telemeter | EO | MOA |
| Timeswitch | EO | MOA |
| Teleswitch | EO | MOA |
| (B) <u>Whole current installations</u> | | |
| Cables: cut-out to meter | EO | MOA |
| Cables: from meter to SVA Customer owned switchgear | SVA Customer/contractor | MOA* to connect |
| Isolating switch | EO ⁵ | MOA |
| Connector blocks | EO | MOA |

⁵ Ownership may transfer from the Distribution System Operator to the SVA Customer.

| Item | Provider of equipment | Field work Responsibility |
|---|----------------------------|---------------------------|
| Cables: between meter and other EO supplied apparatus or between other items of EO supplied apparatus | EO | MOA |
| Revenue Protection equipment | Supplier/EO | MOA |
| Cables: between Revenue Protection equipment and other apparatus | Supplier/ EO | MOA |
| (C) <u>Current Transformer operated installations</u> | | |
| Current Transformers | DSO | DSO |
| Meter panel | DSO | DSO |
| Test terminal block | DSO | DSO |
| Potential fuses at source | DSO | DSO |
| Potential fuses or isolators on meter panel | DSO | DSO |
| Additional potential fuses for meters or other apparatus | EO | MOA |
| Multicore and all cabling between source and meter panel | DSO | DSO |
| Cables: beyond test terminal block and potential fuses | EO | MOA |
| Cables: cut-out (or Circuit Breaker) to SVA Customer's mainswitch | SVA Customer/contractor | MOA* to connect |

MOA* means MOA may operate this equipment under the terms of MOCOPA

Note: Use of the Table above in respect of ownership, provision, specification and ongoing maintenance of CT chambers, metering panels, isolating switches and rising mains should be confirmed with the relevant DSO. The Table illustrates the typical arrangements, but cannot be relied upon as being definitive in every circumstance.