GUIDE TO

SUPPLY AND METERING ARRANGEMENT

ON CUSTOMER'S

INTERNAL DISTRIBUTION SYSTEM

CLP POWER HONG KONG LIMITED

DATE REVISED: Oct 2024

Version 10 – 10/24

Guide to Supply and Metering Arrangement on Customer's Internal Distribution System

1. Acceptance of Customer's Schematic Wiring Diagram

This Guide shall be read in conjunction with the attached wiring diagram / drawing(s) returned herewith to the Developer / Customer. CLP Power Hong Kong Ltd. (CLP) accepts the diagram(s) / drawing(s) on condition that they comply with all requirements stated in the Guide.

The scope of acceptance is confined to the Developer / Customer's internal distribution system only. The interfacing arrangement between CLP's and Developer / Customer's supply systems shall be agreed separately with CLP Regions.

The summation metering system, if any, shall be agreed separately with CLP.

It is the responsibility of the REC/REW to ensure the electrical installation shall comply with CLP Supply Rules and requirements, as well as the latest Electricity Ordinance, and Code of Practice for the Electricity (Wiring) Regulations.

2. Ratings and Protection Facilities of Main Incoming Circuit Breaker (MICB)

Where the supply is to be taken directly from CLP transformer, the MICB shall be of draw-out type and rated at 40kA at low voltage.

Earth Fault Protection

Each MICB shall be provided with suitable protective device so that in the event of an earth fault between any phase and earth conductors, it shall disconnect the supply automatically within 5 seconds.

Over-current Protection

The over-current protection relays of each MICB shall be so selected and set that they will operate at a speed not slower than the "maximum time current characteristic curve of customer LV over-current protective relays" shown on the diagram on appendix 1.

The over-current relay having flexible operating characteristics and complying

with standards recognized by EMSD is recommended to be used at customer's MICBs. Flexible operating characteristics means the operating characteristics could be changed by adjusting the relay parameters without relay replacement.

Protection Current Transformer (CT) Requirements

The over-current and earth fault protection CT shall be of 15VA and class 10P20 and have the following CT Ratio.

Tx Rating in kVA:	2000	1500	1000	500
Protection CT Ratio:	3000/5A	2250/5A	1500/5A	750/5A

Output voltage of the protection CT shall be capable of operating the relays; its value > 16 x I_s (Z_{ct} + Z_{lead} + $Z_{o/c}$ + $Z_{e/f}$)

where I_s o/c relay current setting

Z_{ct} C.T. resistance

Z_{lead} total C.T. lead impedance

$Z_{o/c}$ o/c relay impedance at setting

$Z_{e/f}$ e/f relay impedance at setting

This is CT max. operating voltage ≥ (Rated VA / Rated Current) x A.L.F.

where A.L.F. Accuracy Limiting Factor of C.T.

e.g. A 2250/5A C.T. of 15 VA and class 10P20

i.e. Rated VA = 15; Rated Current = 5A; A.L.F. = 20

For electro-mechanical O/C & E/F relays connected to the common set of CT for a circuit breaker, the CT requirement is normally 15VA 10P20 subject to satisfactory inspection on site.

However, alternative CT arrangement for protective device which deviates from the above may also be considered. In this connection, Developer / Customer shall submit the design detail to CLP for agreement before installation.

3. Interconnection Facilities between Main Incoming Circuit Breakers (MICB)

Where the supply is designed to be taken from more than one transformer, a 4-pole circuit breaker of not less than 1600A shall be installed to provide interconnection facilities. To prevent CLP transformer from parallel operation and

supply backfeed, this 4-pole circuit breaker shall be electrically & mechanically interlocked with the adjacent two MICBs.

4. Multi-switchroom Premises

Where the MICBs for one building are installed in more than one switchroom, a permanent location board shall be provided to display the zones/area to be controlled by each MICB.

5. Ratings of Outgoing Control Gear in the Main Switchboard

The breaking capacity of all circuit breakers installed shall be capable of interrupting the prospective maximum fault current.

6. Size of Conductor for Rising Mains and Installation Methods

6.1 For cable rising mains of 800A or above, the number and size of cables to be used shall be no less than that given in the table on appendix 2.

6.2 No part of the rising mains installation is allowed to pass through any individual customer's unit.

6.3 Where busbar type rising mains are used, suitable facilities shall be provided to take up the expansion or contraction of the busbar system under normal service condition.

6.4 Unless specified otherwise on the drawings, all conductors are assumed to be copper.

7. Rising Mains Tee-Off Arrangements

7.1 Any building of more than four floors including the ground floor should be provided with 3-phase electrical rising mains with a 3-phase 4-wire tee-off at each floor unless otherwise agreed by this company.

7.2 All Tee-off connections from busbar rising mains shall be of flexible arrangement. Provision for at least one spare lateral tee-off unit is

recommended on each floor for future use for multi-risers (rising mains) installation of commercial / industrial buildings.

7.3 Where HRC fuses are used, they shall be fitted with insulated carriers to avoid exposure of any live parts. Where circuit breakers are used they shall be capable of interrupting the prospective maximum fault current.

7.4 A switch or linked circuit breaker shall be provided immediately before CLP metering equipment to control each customer's main for single-phase installation. The device shall be of double-pole type. For three-phase installation, it shall be of triple-pole and neutral type. Where the number of potential customers cannot be ascertained, a suitable busbar chamber with adequate pre-drilled holes to terminate all potential customer mains is required.

8. Connections of Landlord and Fire Services Installations

8.1 The supply for the Landlord's and Fire Services installations shall normally be fed through MICB. Only in the event of the MICB being tripped off can the Fire Services installation be arranged to be switched over to the incoming side of the MICB via an automatic changeover switch. *Maximum amount of loading to be switched over to the incoming side of the MICB is 25% of the rating of the MICB / protection C.T. (the less will be chosen) and the arrangement can only be applied to one MICB in each building.* Therefore fused-switch or circuit breaker that may bypass the MICB, shall be capable of disconnecting the supply within 5 seconds in the event of an earth fault in the Fire Services circuit. *If private generator (or alternative source) is installed by the landlord, the above arrangement is not allowed to be adopted.*

8.2 Where a private generator (or alternative source) is used to afford standby supply, the automatic changeover switch shall be of a 4-pole type and equipped with electrical and mechanical interlocking device to prevent parallel connecting with the supply source. The generator earth shall be connected to the Developer / Customer's main earthing terminal. Local switch should be installed after the changeover switch (refer to drawing no. CSB/99-009).

8.3 The control gear and distribution board for the Fire Services installation shall be painted in red and clearly labeled in English and Chinese.

9. Metering Arrangement

9.1 Adequate space shall be reserved in switch room / meter room (including cable duct & closet) for CLP metering equipment including meter, meter chamber, CT, CT chamber, modem, cable, marshalling box, antenna installation, meter board, etc. (refer to drawing nos. CSB/99-001, CSB/99-002, CSB/99-003, CSB/99-004, CSB/99-005, CSB/99-006 and CSB/99-007 for dimensional requirements and other details).

9.2 Meter position shall be located next to the service position and / or the rising mains tee-off position.

9.3 The switch room / meter room and the meter position shall be at a clean and safe position and readily accessible from a communal area at all times without the need to pass through any individual Customer's premises. The access shall not be less than 0.6m wide inside and at the entrance / exit of the room. The room shall be kept free of any obstruction and sufficient working space in front of the meter position shall be provided (refer to drawing no. CSB/99-003). Developer / Customer shall also ensure that the door-lock device of the meter room, as provided, complies with the requirements as shown in drawing no. CSB/99-008.

9.4 Adequate lighting shall be provided inside switch room / meter room */ meter chamber / meter enclosure or any location where installed meter.*

9.5 All through-floor holes and trenches shall be properly sealed or covered to prevent fall from height.

9.6 25mm diameter galvanised steel eye bolts should be installed on internal wall on both sides of all doors of the switch room / meter room at 1m above the floor for hanging a temporary caution notice.

9.7 The meter position shall be provided with adequate illumination to facilitate meter reading and installation work.

9.8 All meter boards and loops shall be provided and installed by Developer / Customer as agreed with CLP.

9.9 Meter boards, preferably made of environmental friendly materials such as varnished hardwood, shall be of 13mm minimum thickness and have clear indication of the position of meters arranged in sequence with the flat numbers. The flat numbering should be arranged in ascending order from left to right and top to bottom to ensure consistency.

9.10 Appropriate labels provided by CLP shall be fixed on Unmetered Riser (可安裝電錶的上升總線) by Developer / Customer at positions to be defined by CLP engineer on site.

9.11 For 3 phase low voltage installation with main switch of rating up to and including 100A, whole-current type meter shall be installed, while for 3 phase low voltage installation with main switch of rating exceeding 100A, CT operated meter shall be used.

9.12 Minimum size of meter leads for termination on whole-current meter shall be 4mm^2 stranded copper conductors and comply with the table shown in drawing no. CSB/99-003.

9.13 Meter leads terminated on meter terminals shall be circular stranded copper conductors. Sector-shaped conductors or flexible cables/cords are not allowed.

9.14 Bundle of multi-circuit cables running through the core of the same CT is not permitted. Drawing no. CSB/99-005 shall be referred to for the CT connection arrangement with dual main cables.

9.15 In order to prevent potential hazards arising from inadvertent contact of live parts inside the CT chamber, the relevant live parts inside the CT chamber shall be insulated by / screened with insulating materials, e.g. heat shrink tubing, transparent protective screens segregating the busbars or other equivalent means (refer to drawing nos. CSB/99-001, CSB/99-002 and CSB/99-005).

9.16 All CT operated meter installation shall be completed with removable 16A HRC voltage fuses / link (refer to drawing nos.: CSB/99-001, CSB/99-002 & CSB/99-004).

9.17 Free-standing floor-mounted metering cubicle exclusive for the installation of CLP metering equipment is acceptable provided that:-

i) the cubicle shall be installed immediately adjacent to the main switchboard;
ii) the maximum length of any metering CT circuit shall not exceed 4.5m for our standard meters of 5A secondary rating & 5VA CTs;
iii) the proposed design of the metering cubicle shall be approved by CLP before installation.

9.18 Meter leads between main switch and whole-current meter terminals shall not exceed 3m.

9.19 Personnel and vehicular access and temporary parking facility shall be provided to meter enclosure / rooms located on highways for operation and maintenance purpose.

9.20 Voltage measuring points for CT operated meters should be located at or near the corresponding current measuring points (refer to drawing no. CSB/99-004).

9.21 Metering point of an installation shall be arranged from unmetered position to avoid double metering. If shut down supply for purpose of necessary inspection and confirmation of no double metering at the time of inspection by CLP could not be arranged, Registered Electrical Worker (REW) on behalf of the Developer / Customer shall carry out necessary inspection and confirm by way of the prescribed form (Confirmation of no double metering form) that there is no other CLP meter installed at the existing and proposed circuit if that new circuit has not installed CLP meter. The written confirmation and accompany information mentioned in 9.22 shall be presented to the CLP inspector at the time of onsite inspection.

9.22 At the time of onsite inspection carried out by CLP Inspector, REW shall provide schematic diagram (existing and proposed), busbar arrangement drawing, photo(s) illustrated busbar arrangement of tapping from unmetered position and Confirmation of no double metering form (Appendix 3).

9.23 REW shall arrange shutdown of supply for purpose of the necessary inspection and confirmation of no double metering mentioned in 9.21 above upon request by the onsite CLP Inspector if it is deemed inadequate after review on information provided by REW.

9.24 Appropriate label provided by CLP shall be fixed on the unmetered circuit

of switchboard by developer / customer at the position to be defined by CLP Inspector on site.

9.25 Appropriate assistive lockable function for newly installed overcurrent protective devices shall be provided in accordance with Code of Practice for the Electricity (Wiring) Regulations.

9.26 For 132kV customer substation where metering equipment is installed in customer installation, dedicated Voltage Transformer (VT) or separate winding (for VT with multiple secondary outputs) solely for revenue metering and dedicated Current Transformer (CT) for revenue metering shall be provided. The installation including the VT and CT shall be in accordance with "Metering Equipment Specification and Installation Requirements for New 11kV Supply Network Arrangement of 132kV Developer Substation" (refer to Appendix 4). The design of the installation shall also be in accordance with "Code of Practice for 132kV Customer Substation Design".

10. Communication Facility

Developer / Customer shall provide and install at their own cost a dedicated telephone conduit with telephone socket near meter location at the switchboard (refer to drawing nos. CSB/99-001, CSB/99-002 & CSB/99-007).

For Bulk Tariff / Large Power Tariff application, Developer / Customer shall provide location for meter installation where the telecom signal of mobile operators engaged by CLP is strong. If telecom signal at meter location is not strong during application or afterwards, Developer / Customer shall provide and install a dedicated telephone line together with telephone socket to be terminated at position immediately adjacent to the meter in the switchboard / metering cubicle / on wall-mounted meter board at their own cost (refer to drawing nos. CSB/99-004, CSB/99-006 & CSB/99-007). The telephone line shall be suitably protected by conduit / trunking solely for metering purposes and connected to the analogue public switched telephone network (PSTN) junction box of telecommunication service providers.

To meet the needs of smart meter communication equipment in buildings, Developer / Customer is required to supply, install and maintain necessary

infrastructure provisions for the development to facilitate automatic meter reading and associated metering operations. Details of requirement, Developer / Customer shall refer to CLP Website and drawing no. CSB/99-010, Requirements of Power Supply Facilities for Smart Meter Communication Equipment in Building

11. Earthing Arrangement

In every Installation, Developer / Customer is required to provide his own earthing system by which the exposed conductive parts of the Installation are connected to earth in accordance with CLP Supply Rules and the Code of Practice for the Electricity (Wiring) Regulations.

Each rising mains installation shall be provided with an earthing conductor of not less than $70mm^2$ copper or $150mm^2$ aluminum to earth all units in the building through a suitable earthing terminal block at each floor.

Where the supply is taken directly from a transformer or via an underground cable having exposed conductive parts, a bonding conductor may be allowed between Developer / Customer's main earthing terminal and CLP transformer earth or metallic sheaths of service cable subject to the conditions set out in CLP Supply Rules and the Code of Practice for the Electricity (Wiring) Regulations.

12. Other Services

No water pipe, drainage system or flammable gas pipe is permitted within a switch room / meter room while gas pipe for fire protection could be exempted. Where it is designed to accommodate other communication equipment such as telephone, communal aerial broadcasting distribution system or security system, such equipment and the associated wiring shall be segregated from all electrical services.

13. Means to Prevent Ingress of Water

To prevent ingress of water, the switch room / meter room shall be suitably constructed and not be under an expansion joint. A kerb of not less than 100mm high shall be provided at the entrance of the room as shown on drawing No. CSB/99-008, except that the internal floor level of the room is higher than the external floor level.

14. Materials, Workmanship and Details of Installation Arrangements

14.1 No part of electrical installation of individual customer is allowed to pass through any other customer's unit.

14.2 Although the Guide does not specify the materials to be used, workmanship and details of installation arrangement shall comply with the Code of Practice for the Electricity (Wiring) Regulations, the Electricity Ordinance and CLP Supply Rules and be subject to CLP inspection before supply connection.

15. Interfacing Requirements for New Cable Colour Code

In accordance with the Code of Practice for the Electricity (Wiring) Regulations, the following interfacing requirements shall be fulfilled for phase identification purpose.

15.1 Label and coding identification marked in L1 & N, L2 & N or L3 & N shall be provided as interfacing requirements on the incoming and outgoing cables at the connections of CLP single-phase meter, whenever new cable colour code is adopted. Specification to L1, L2 or L3 shall be made instead of L, for phase identification purpose.

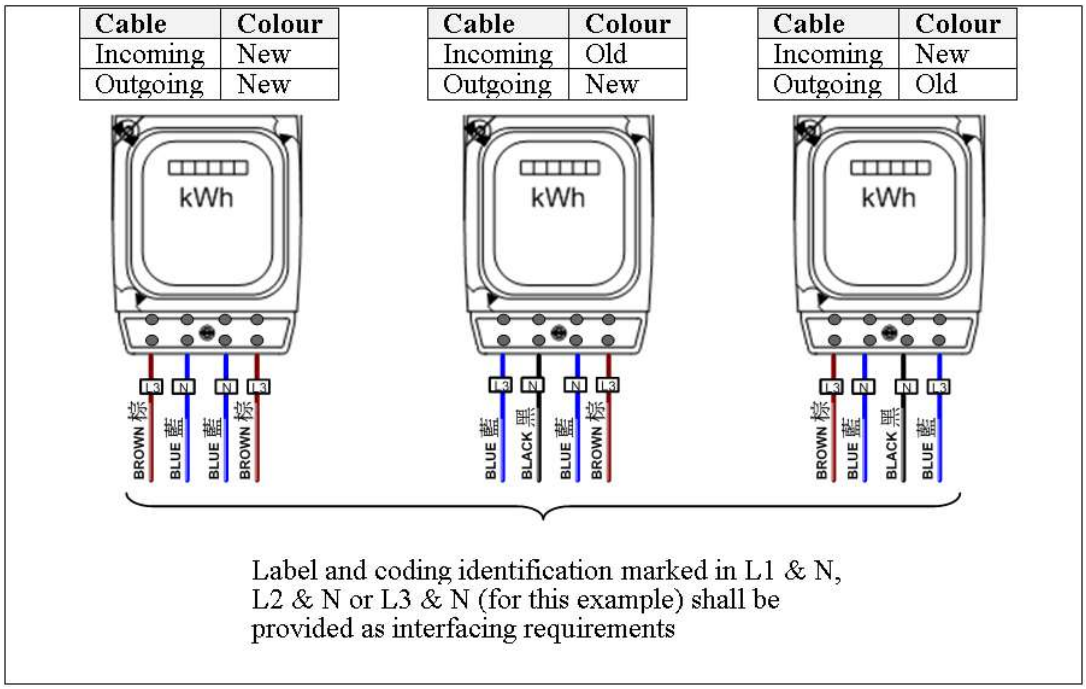


Figure 15.1 - Typical Arrangements of Label & Coding Identification for Single-phase Meters

15.2 Label and coding identification marked in L1, L2, L3 and N shall be provided as interfacing requirements on the incoming and outgoing cables

at the connections of CLP three-phase whole current meter, whenever mixed of new and old cable colour code are adopted.

15.3 Label and coding identification marked in L1, L2, L3 and N shall be provided on the customer side's equipment / cables at the supply point interface between customer and CLP under following situations:-

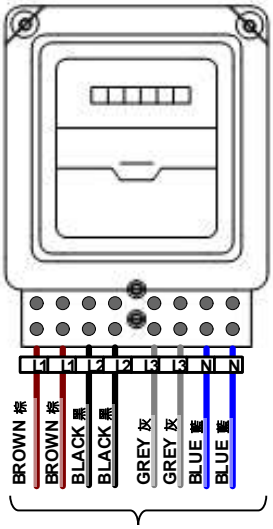
i) Modification, alteration or repair at the existing supply point interface between customer and CLP; or

ii) Establishment of new supply point interface between customer and CLP.

15.4 Label and coding identification shall be clearly legible and durable, and shall be in contrast to the colours of the insulations.

Remark: colour version is available on CLP Website, www.clponline.com

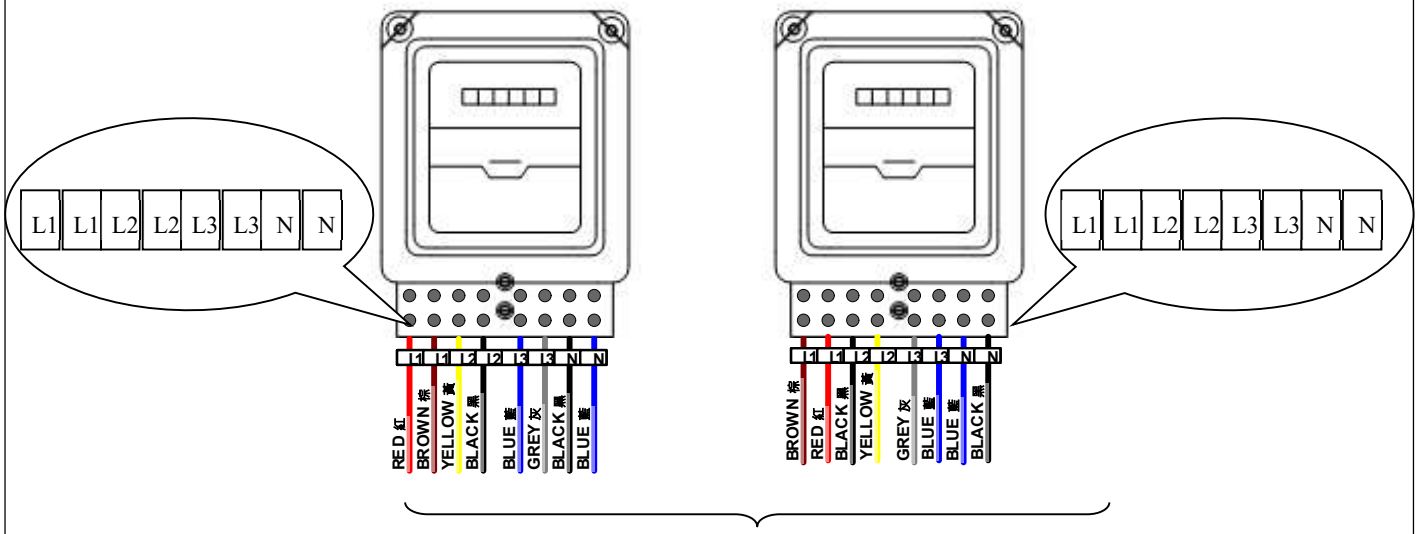
Cable	Colour
Incoming	New
Outgoing	New



Label and coding identification marked in L1, L2, L3 and N shall be provided as interfacing requirements

Cable	Colour
Incoming	Old
Outgoing	New

Cable	Colour
Incoming	New
Outgoing	Old



Label and coding identification marked in L1, L2, L3 and N shall be provided as interfacing requirements

Figure 15.2 Typical Arrangement of Label & Coding Identification for Three-phase Whole Current Meters.

16. Sample Flat & Typical Meter Room for Pre-inspection

16.1. Developer / Customer shall construct a sample flat for residential development together with typical meter room (completed with decoration panel for door if any) on the development site for CLP's agreement. To avoid unnecessary delay, Developer / Customer shall make appointment with CLP for pre-inspection at the earliest possible stage of the development.

16.2. The distribution board in the flat shall be installed in a readily accessible place which can be reached without use of tools (e.g. ladder) and removal of obstacle in the front of the distribution board.

17. Grid Connection of Renewable Energy Power System

No grid connection of private renewable energy power system is allowed unless otherwise pre-agreed by CLP. Application for grid connection of such system shall be submitted to CLP for assessment at the design stage.
For details of eligibility, procedures, required documents and technical guidelines, Developer / Customer shall refer to CLP Website,
https://www.clp.com.hk/en/help-support/feed-in-tariff

18. Meter Room Key

A dedicated master key exclusively for the meter enclosure / rooms (i.e. sharing with other utility rooms including lift machine room / lift well is not permitted) shall be kept under the custody of building management. The key shall be available for CLP staff to facilitate meter reading and maintenance work. A label "Meter Room Key" shall be secured onto the key.

19. Electric Vehicle Charging Facility at Building Developments

For the requirements of electrical installation with supplies to charging facilities for electric vehicles at car park of building developments, Developer / Customer shall refer to CLP Website,
https://www.clp.com.hk/en/business/low-carbon-solutions/emobility/power-supply-services

For supplement of metering arrangement of electric vehicle (EV) charging facilities for car parks of new building development, Developer / Customer shall

refer to CLP Website,
Standard Metering Arrangement for Electric Vehicle (EV) Charging Facilities

20. Fire Resisting Enclosure (FRE)

In accordance with the Fire Safety (Commercial Premises) Ordinance and the Fire Safety (Buildings) Ordinance, FRE is required to be installed to enclose CLP electricity meters and associated electrical equipment. To assist in designing the FRE, Customer / Consultant / Contractor should refer to the latest "Drawings of Typical Details for Improvement Works to Electrical Cable, Meter & etc. under the Fire Safety (Commercial Premises) Ordinance and the Fire Safety (Buildings) Ordinance" for reference.

Please note that FRE shall comply with the requirements under the Fire Safety (Commercial Premises) Ordinance, the Fire Safety (Buildings) Ordinance, the Buildings Ordinance, the Electricity Ordinance and other relevant Government regulations as well as our company's Supply Rules.

The latest "Drawings of Typical Details for Improvement Works to Electrical Cable, Meter & etc. under the Fire Safety (Commercial Premises) Ordinance and the Fire Safety (Buildings) Ordinance" can be obtained in CLP Website,
Typical Details for Improvement Works to Electrical Cable, Meters & etc. under the Fire Safety (Commercial Premises) Ordinance or Fire Safety (Buildings) Ordinance

21. Essential Supply Standby Meter (ESSM)

For ESSM installed inside a switchboard, the telecommunication accessories, including but not limited to the necessary conduits, socket outlet and sealable PVC box, shall be provided by Developer / Customer (refer to drawing no. CSB/99-007).

22. Submission of Schematic Wiring Diagram

For all electrical installations, installing in multi-customers premises or incorporating rising mains in accordance with the Supply Rules or having an estimated demand greater than or equal to low voltage 400A (except typical village house), Developer / Customer shall submit three copies of the proposed schematic wiring diagram to CLP for agreement.

For HV metering / summation metering application, one extra copy of the proposed schematic wiring diagram shall be submitted to CLP for comment.

For 132kV customer substation where metering equipment is installed in customer installation, dedicated Voltage Transformer (VT) or separate winding (for VT with multiple secondary outputs) solely for revenue metering and dedicated Current Transformer (CT) for revenue metering shall be provided.

23. Amendment Shown in Red

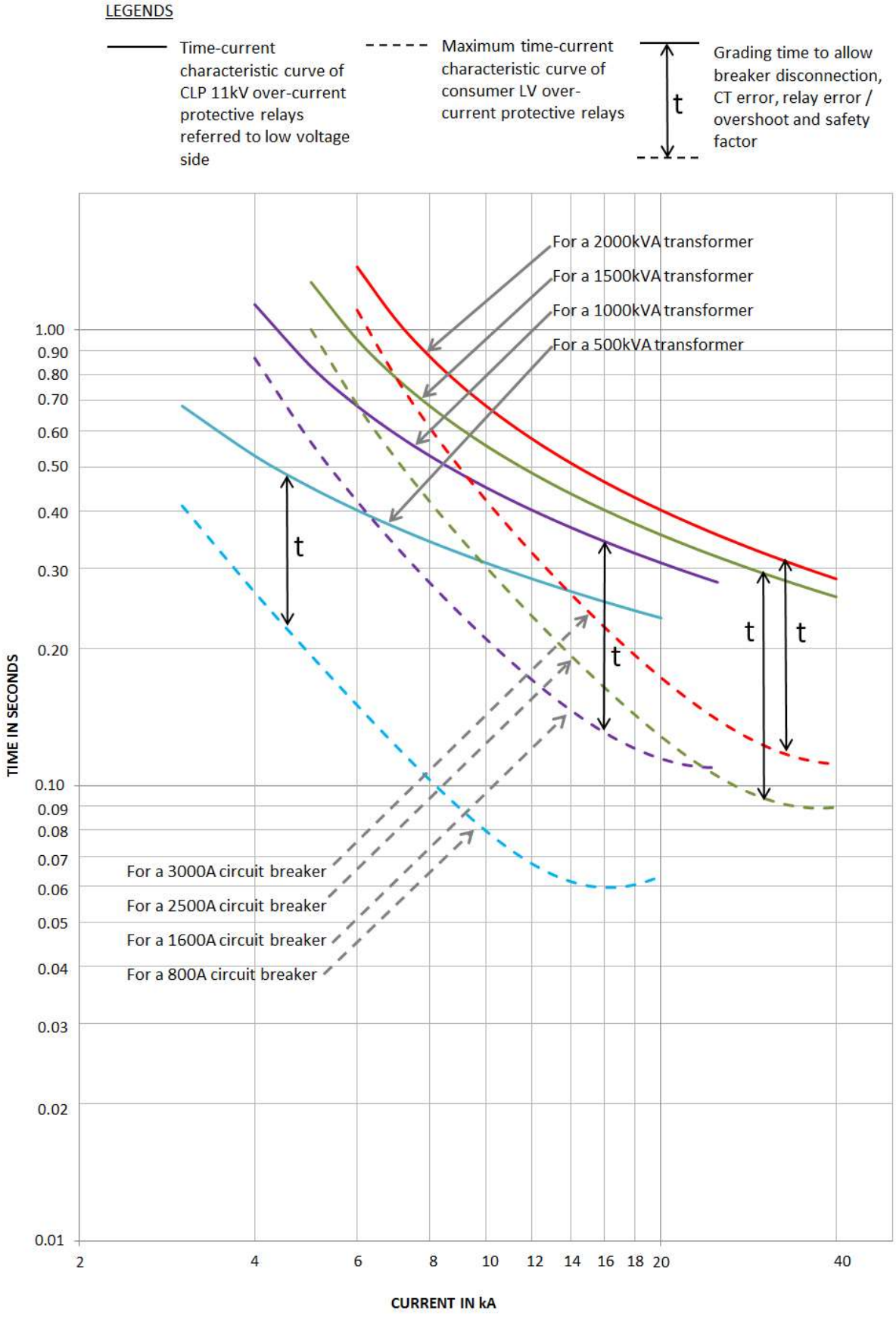
Apart from the foregoing, the completed installations shall comply fully with the drawings returned and accepted by CLP including any amendments shown in red.

24. Statutory Requirements

The Guide is intended to provide general technical references to enable a registered electrical worker in the design of electrical installation to comply with CLP requirements only. It is the responsibility of the registered electrical worker to ensure that the design complies in all respect with the latest Electricity Ordinance and other statutory requirements.

Appendix 1

Maximum Time-current Characteristic Curve for Over-current Protection Setting for LV Customer

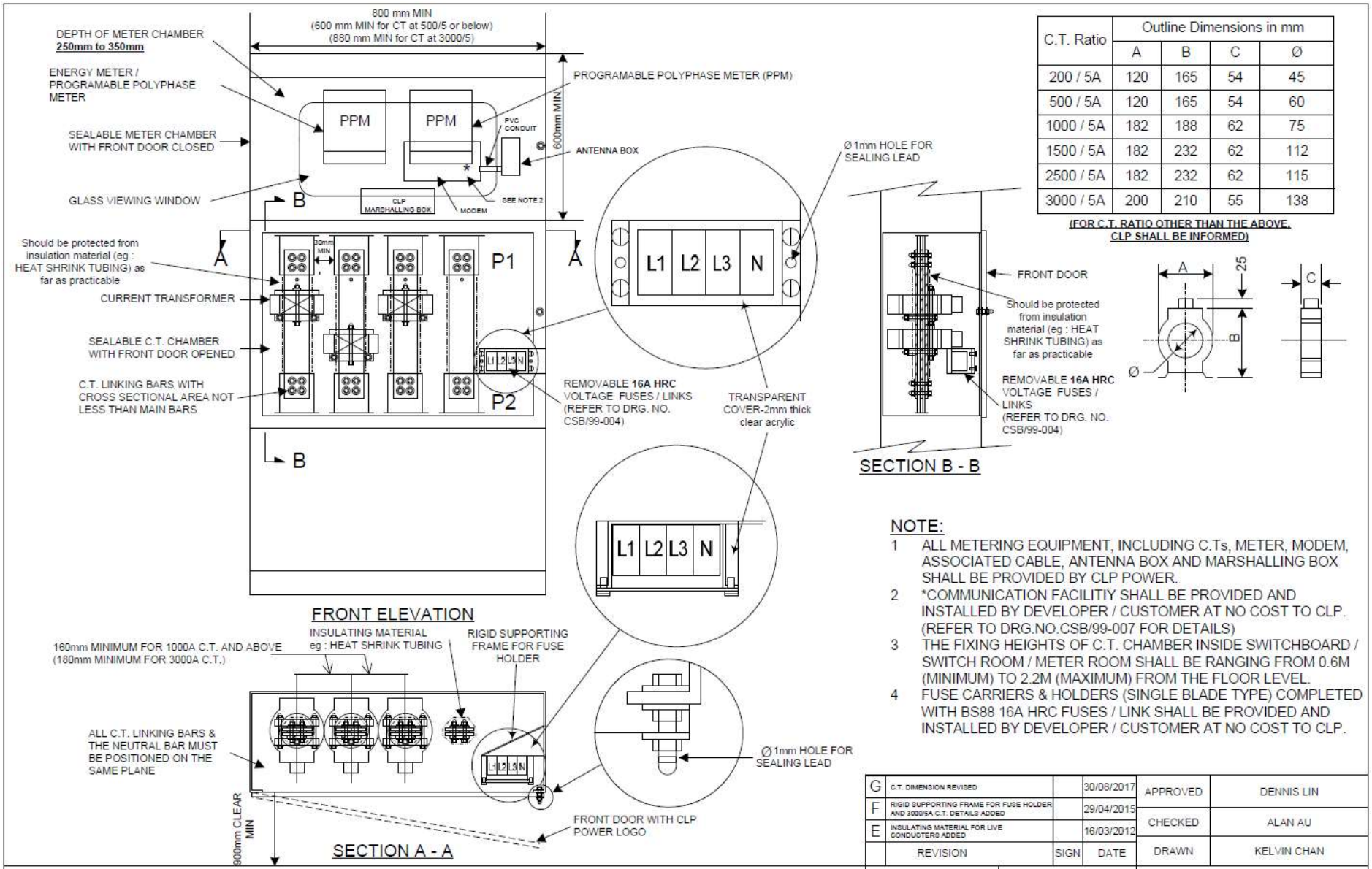


Appendix 2

Minimum Size of Single-core Cables for Rising Mains

Design Current of Cable Riser (A)		Number x Size of Cable (in mm^2) for each Phase Conductor						
		Enclosed			Clipped Direct			
		Bundled Together	Single-layer Touching	Trefoil Single or Multi-layer Spaced at a Clearance of 1 Cable Diameter	Bundled Together	Single-layer Touching	Trefoil Spaced at a Clearance of 1 Cable Diameter	Single or Multi-layer Spaced at a Clearance of 1 Cable Diameter
COPPER	800	2 x 500	2 x 500	2 x 400	1 x 630	1 x 630	1 x 630	1 x 500
	1200	2 x 1000 3 x 630	2 x 1000 3 x 500	2 x 800 3 x 400	2 x 630	2 x 500	2 x 500	1 x 1000 2 x 400
	1600	4 x 800	3 x 800 4 x 500	3 x 630	2 x 1000 3 x 630	2 x 1000 3 x 500	2 x 800 3 x 400	2 x 630
	2000		4 x 800	3 x 1000 4 x 630	4 x 1000 4 x 630	3 x 800 4 x 500	3 x 630	2 x 1000 3 x 630
	2500			4 x 1000	4 x 1000	4 x 630	4 x 630	3 x 800 4 x 630
ALUMINIUM	800	2 x 740	2 x 740	2 x 600	1 x 1200 2 x 480	1 x 1200 2 x 480	1 x 960	1 x 960
	1200	3 x 960	3 x 740	2 x 1200 3 x 600	2 x 960	2 x 740	2 x 740	2 x 600
	1600	4 x 1200	3 x 1200	3 x 960	3 x 960	3 x 740	2 x 1200 3 x 600	2 x 960 3 x 600
	2000		4 x 1200	4 x 960	4 x 960	3 x 1200 4 x 740	3 x 960	3 x 960
	2500					4 x 1200	4 x 960	3 x 1200 4 x 960

Note: The neutral conductor shall have a suitable current carrying capacity not less than that of the phase conductor.



C.T. Ratio	Outline Dimensions in mm			
	A	B	C	Ø
200 / 5A	120	165	54	45
500 / 5A	120	165	54	60
1000 / 5A	182	188	62	75
1500 / 5A	182	232	62	112
2500 / 5A	182	232	62	115
3000 / 5A	200	210	55	138

(FOR C.T. RATIO OTHER THAN THE ABOVE, CLP SHALL BE INFORMED)

NOTE:

1 ALL METERING EQUIPMENT, INCLUDING C.Ts, METER, MODEM, ASSOCIATED CABLE, ANTENNA BOX AND MARSHALLING BOX SHALL BE PROVIDED BY CLP POWER.

2 *COMMUNICATION FACILITIY SHALL BE PROVIDED AND INSTALLED BY DEVELOPER / CUSTOMER AT NO COST TO CLP. (REFER TO DRG.NO.CSB/99-007 FOR DETAILS)

3 THE FIXING HEIGHTS OF C.T. CHAMBER INSIDE SWITCHBOARD / SWITCH ROOM / METER ROOM SHALL BE RANGING FROM 0.6M (MINIMUM) TO 2.2M (MAXIMUM) FROM THE FLOOR LEVEL.

4 FUSE CARRIERS & HOLDERS (SINGLE BLADE TYPE) COMPLETED WITH BS88 16A HRC FUSES / LINK SHALL BE PROVIDED AND INSTALLED BY DEVELOPER / CUSTOMER AT NO COST TO CLP.

	REVISION	SIGN	DATE
G	C.T. DIMENSION REVISED		30/06/2017
F	RIGID SUPPORTING FRAME FOR FUSE HOLDER AND 3000/5A C.T. DETAILS ADDED		29/04/2015
E	INSULATING MATERIAL FOR LIVE CONDUCTERS ADDED		16/03/2012

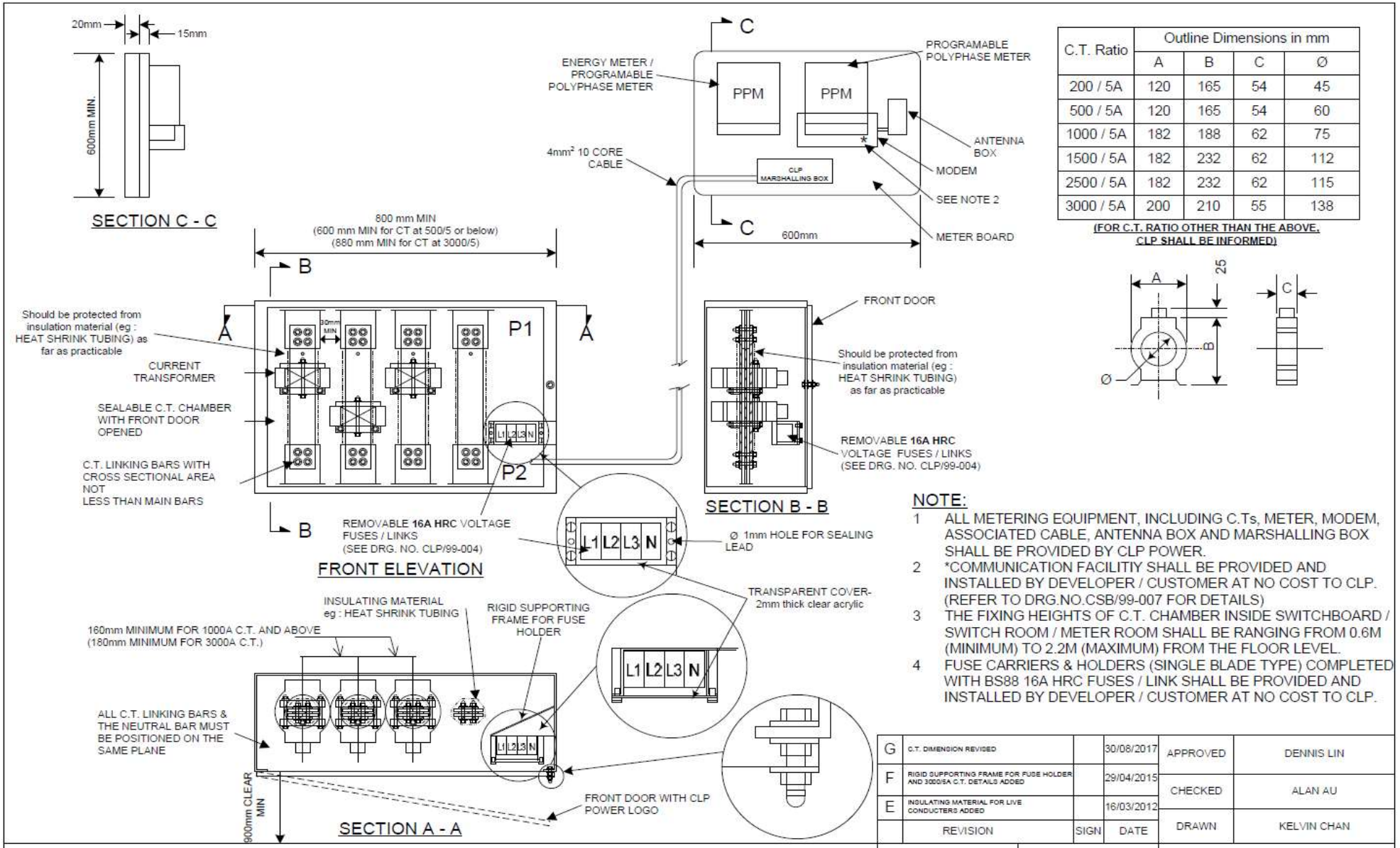
APPROVED	DENNIS LIN
CHECKED	ALAN AU
DRAWN	KELVIN CHAN

TYPICAL GROUND MOUNTED SWITCHBOARD WITH C.T. OPERATED METER INSTALLATION

SCALE: N.T.S. DATE : 30/08/2017

DRAWING No: CSB/99-001 Rev.G

CLP 中電



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E	INSULATING MATERIAL FOR LIVE CONDUCTERS ADDED		16/03/2012

APPROVED	DENNIS LIN
CHECKED	ALAN AU
DRAWN	KELVIN CHAN

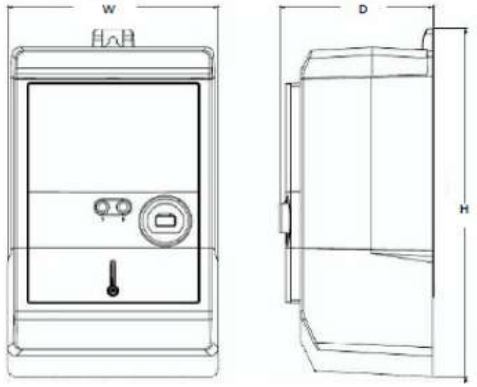
TYPICAL GROUND MOUNTED SWITCHBOARD WITH C.T. OPERATED METER ON WALL MOUNTED METER BOARD INSTALLATION

SCALE: N.T.S. DATE : 30/08/2017

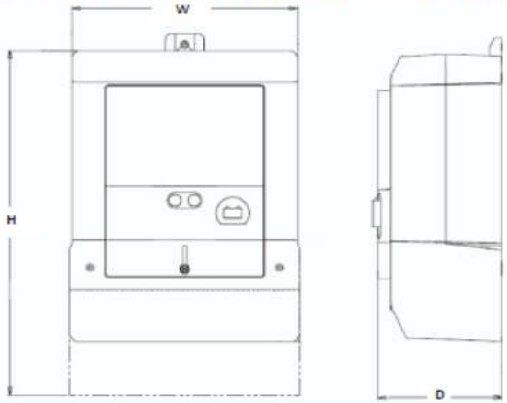
DRAWING No: CSB/99-002 Rev.G

CLP 中電

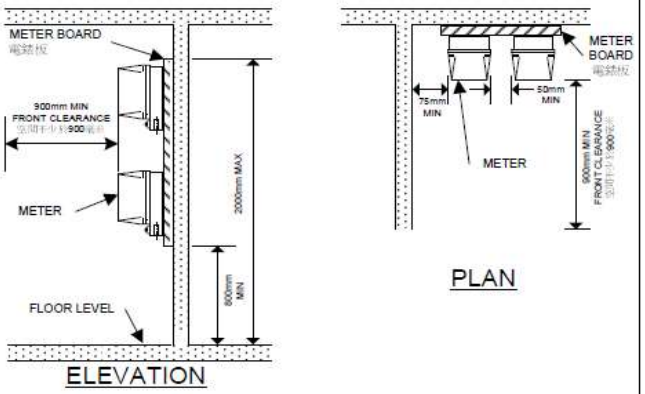
I) SINGLE - PHASE 20 - 80A kWh METER



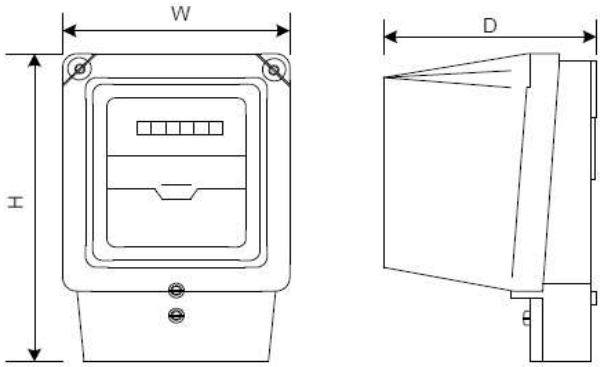
II) THREE PHASE 100A kWh WHOLE CURRENT METER



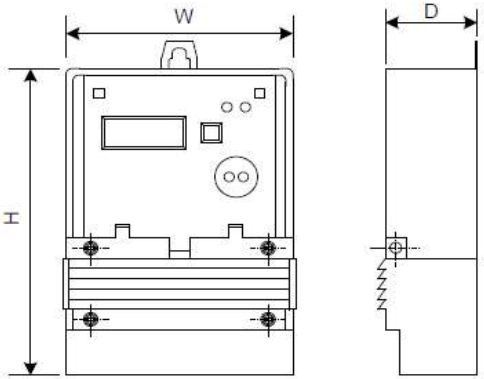
Requirement of Meter Position



III) THREE PHASE CT OPERATED METER



IV) PROGRAMABLE POLYPHASE METER (PPM)



CLP Supply	Main Switch Rating (Amp)	Meter Leads (sq. mm)
1 – Phase	≤ 60	25 max.
3 – Phase	≤ 100	35 max

Requirement of Meter Lead for
1-Phase & 3-Phase Whole Current Meter

OVERCURRENT AND EARTH FAULT PROTECTION CT SHALL BE OF 15VA AND CLASS 10P20 AND HAVE THE FOLLOWING CT RATIO

Tx RATING (kVA)	CT RATIO
2000	3000 / 5
1500	2250 / 5
1000	1500 / 5
500	750 / 5

Requirement of Protection CT

METER TYPE	OUTLINE DIMENSIONS		
	W	D	H
I	147	107	223
II	170	107	223
III	182	158	360
IV	200	80	330

Minimum Area of Meter Board for Design Guidance Purpose

	W	H
For Each Single Phase Meter	240	380
For Each Three Phase Whole Current Meter	310	540
For Each C.T. Operated Meter (Excluding The Space for C.T. Chamber)	600	540

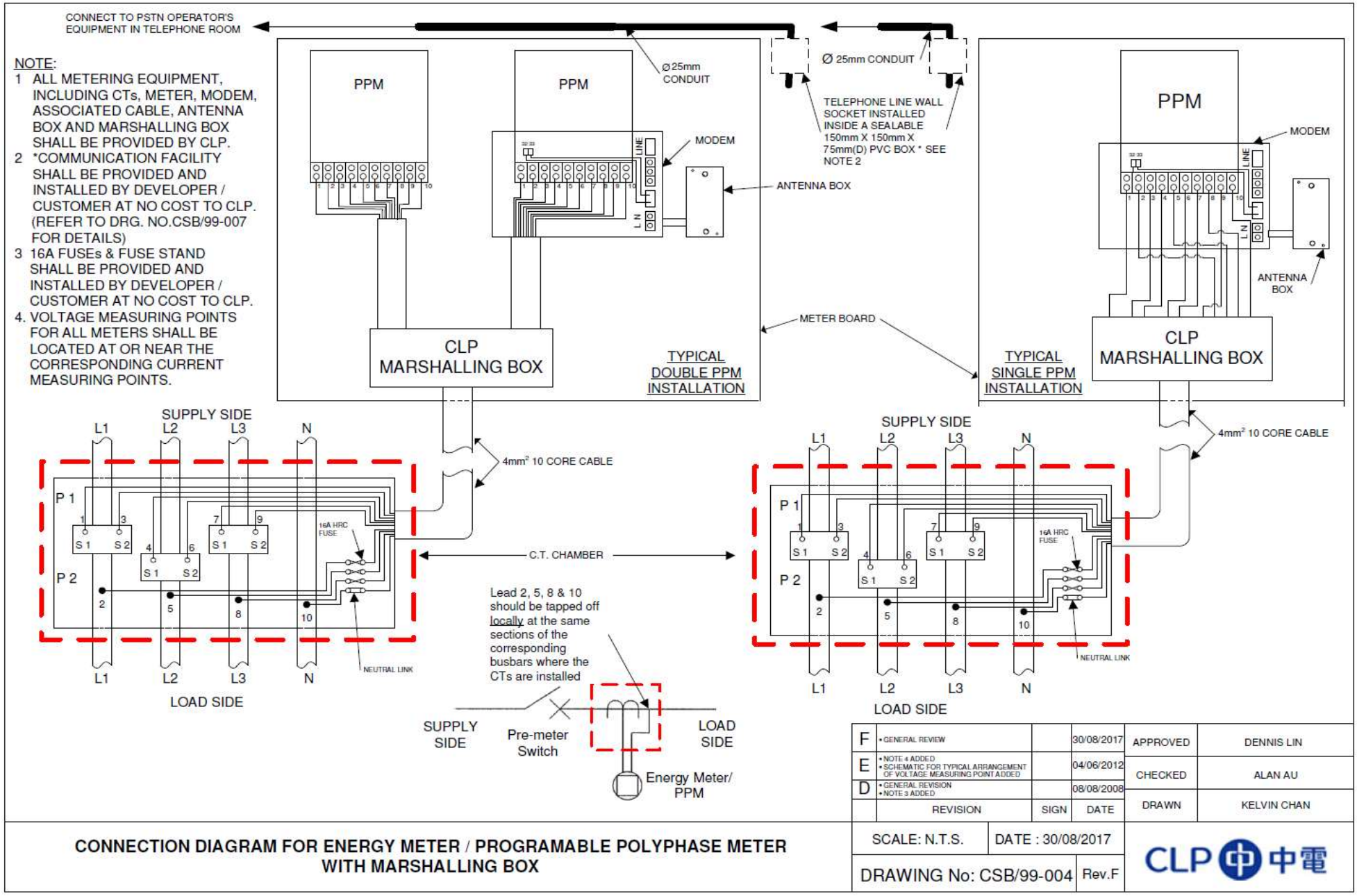
REV.	ITEMS REVISED	DATE	DRAWN	KELVIN CHAN
G	METER DIMENSION REVISED	30/08/2017		
F	3000/5A C.T. REQUIREMENTS ADDED	29/04/2015	APPROVED	DENNIS LIN
E	METER BOARD HEIGHTS REVISED	04/06/2012	CHECKED	ALAN AU

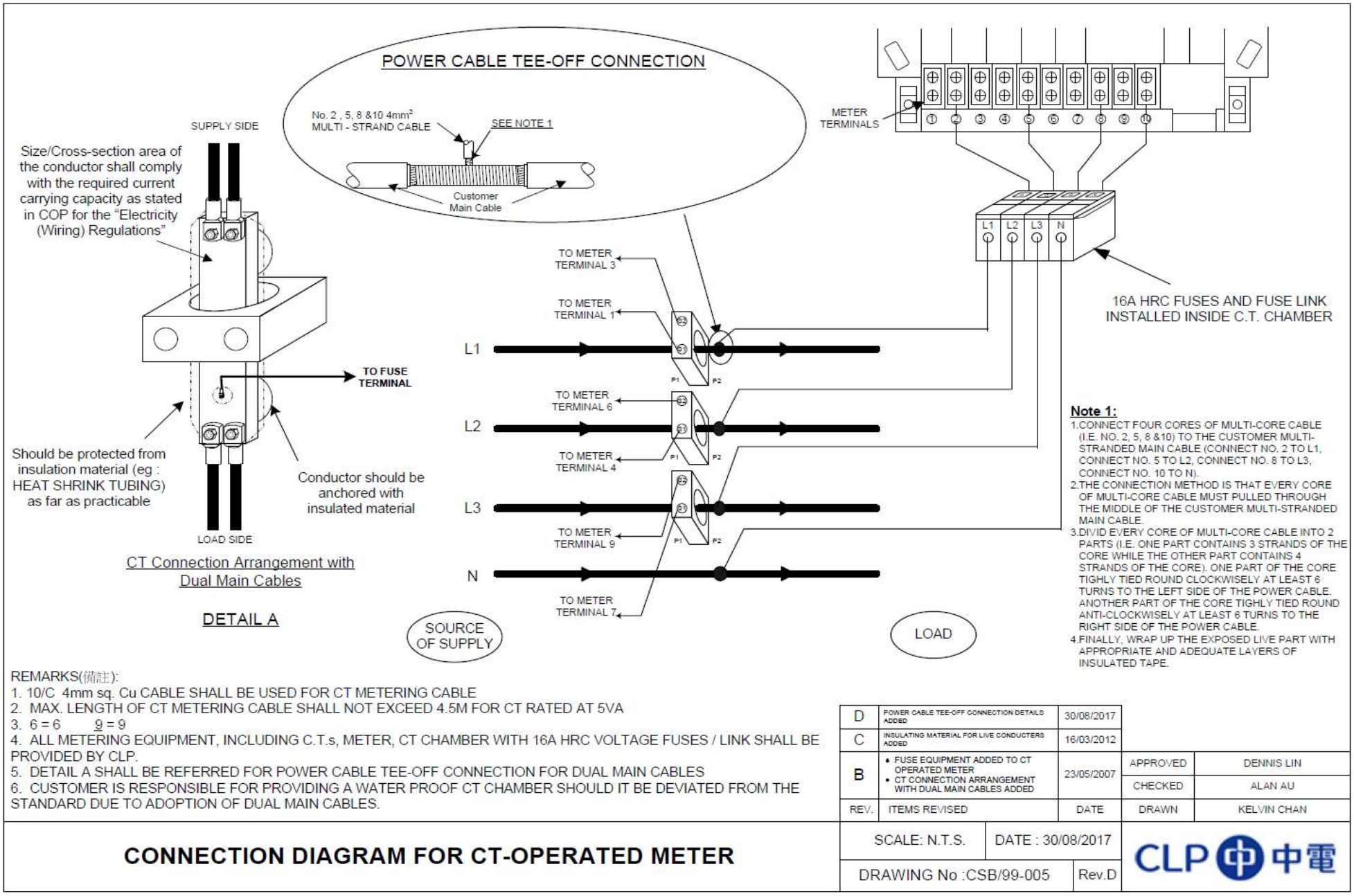
OUTLINE DIMENSIONS OF METER & REQUIREMENT FOR METERING ARRANGEMENT AND PROTECTION CT

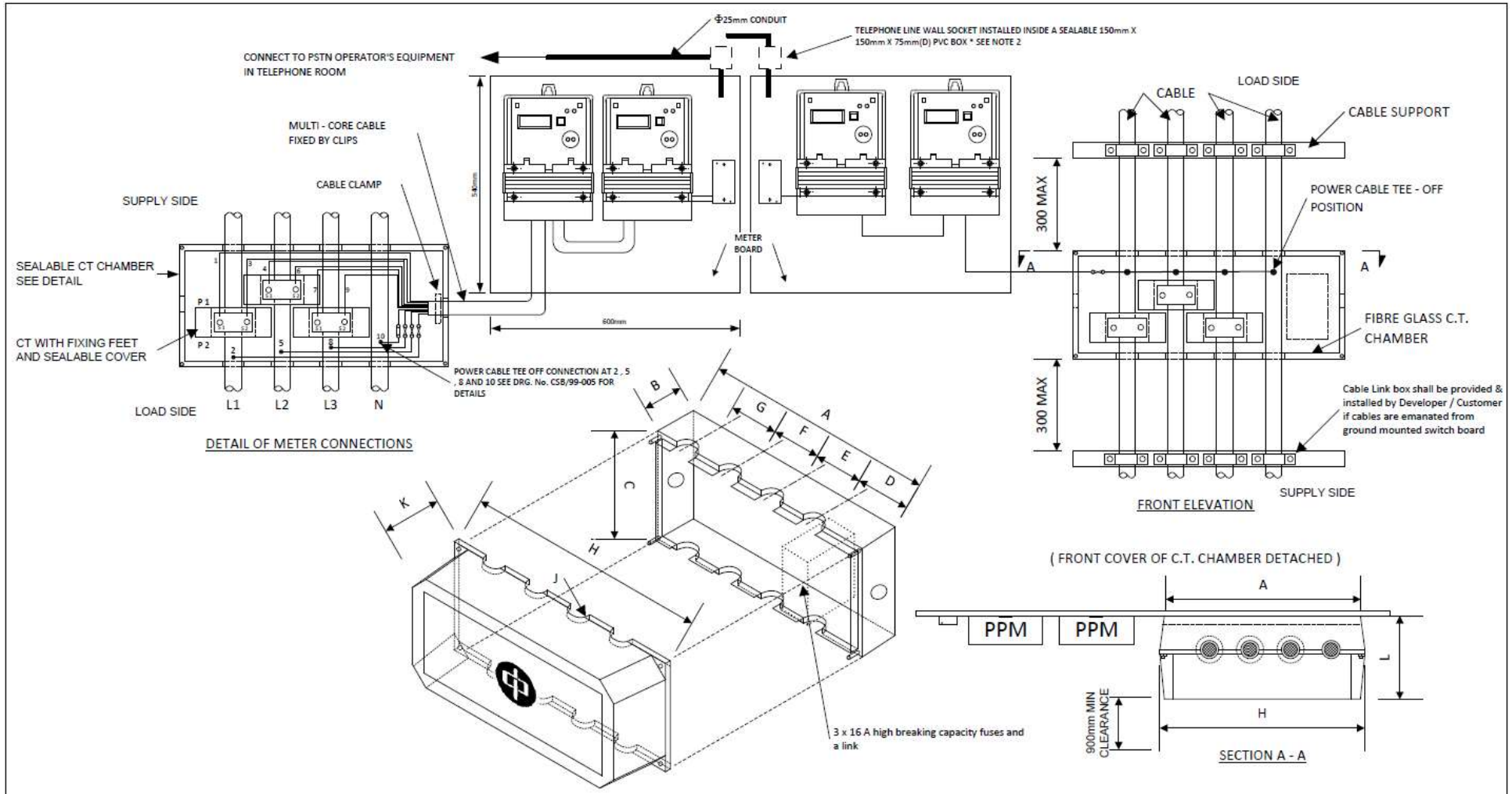
SCALE: N.T.S. | DATE : 30/08/2017

DRAWING No :CSB/99-003 | Rev.G

CLP 中電


CONNECT TO PSTN OPERATOR'S EQUIPMENT IN TELEPHONE ROOM
NOTE:
1 ALL METERING EQUIPMENT, INCLUDING CTs, METER, MODEM, ASSOCIATED CABLE, ANTENNA BOX AND MARSHALLING BOX SHALL BE PROVIDED BY CLP.
2 *COMMUNICATION FACILITY SHALL BE PROVIDED AND INSTALLED BY DEVELOPER / CUSTOMER AT NO COST TO CLP. (REFER TO DRG. NO.CSB/99-007 FOR DETAILS)
3 16A FUSEs & FUSE STAND SHALL BE PROVIDED AND INSTALLED BY DEVELOPER / CUSTOMER AT NO COST TO CLP.
4. VOLTAGE MEASURING POINTS FOR ALL METERS SHALL BE LOCATED AT OR NEAR THE CORRESPONDING CURRENT MEASURING POINTS.
PPM
PPM
Ø25mm CONDUIT
Ø 25mm CONDUIT
TELEPHONE LINE WALL SOCKET INSTALLED INSIDE A SEALABLE 150mm X 150mm X 75mm(D) PVC BOX * SEE NOTE 2
MODEM
ANTENNA BOX
METER BOARD
CLP MARSHALLING BOX
TYPICAL DOUBLE PPM INSTALLATION
PPM
MODEM
ANTENNA BOX
CLP MARSHALLING BOX
TYPICAL SINGLE PPM INSTALLATION
SUPPLY SIDE
L1 L2 L3 N
4mm² 10 CORE CABLE
P 1
P 2
S 1 S 2
16A HRC FUSE
C.T. CHAMBER
NEUTRAL LINK
LOAD SIDE
Lead 2, 5, 8 & 10 should be tapped off locally at the same sections of the corresponding busbars where the CTs are installed
SUPPLY SIDE
Pre-meter Switch
LOAD SIDE
Energy Meter/ PPM
F • GENERAL REVIEW 30/08/2017
E • NOTE 4 ADDED • SCHEMATIC FOR TYPICAL ARRANGEMENT OF VOLTAGE MEASURING POINT ADDED 04/06/2012
D • GENERAL REVISION • NOTE 3 ADDED 08/08/2008
REVISION SIGN DATE
APPROVED DENNIS LIN
CHECKED ALAN AU
DRAWN KELVIN CHAN
CONNECTION DIAGRAM FOR ENERGY METER / PROGRAMABLE POLYPHASE METER WITH MARSHALLING BOX
SCALE: N.T.S.
DATE : 30/08/2017
DRAWING No: CSB/99-004
Rev.F
CLP 中電


POWER CABLE TEE-OFF CONNECTION
No. 2 , 5, 8 &10 4mm² MULTI - STRAND CABLE
SEE NOTE 1
Customer Main Cable
METER TERMINALS
SUPPLY SIDE
Size/Cross-section area of the conductor shall comply with the required current carrying capacity as stated in COP for the "Electricity (Wiring) Regulations"
TO FUSE TERMINAL
Should be protected from insulation material (eg : HEAT SHRINK TUBING) as far as practicable
Conductor should be anchored with insulated material
LOAD SIDE
CT Connection Arrangement with Dual Main Cables
DETAIL A
TO METER TERMINAL 3
TO METER TERMINAL 1
TO METER TERMINAL 6
TO METER TERMINAL 4
TO METER TERMINAL 9
TO METER TERMINAL 7
L1
L2
L3
N
P1
P2
SOURCE OF SUPPLY
LOAD
16A HRC FUSES AND FUSE LINK INSTALLED INSIDE C.T. CHAMBER
Note 1:
1.CONNECT FOUR CORES OF MULTI-CORE CABLE (I.E. NO. 2, 5, 8 &10) TO THE CUSTOMER MULTI-STRANDED MAIN CABLE (CONNECT NO. 2 TO L1, CONNECT NO. 5 TO L2, CONNECT NO. 8 TO L3, CONNECT NO. 10 TO N).
2.THE CONNECTION METHOD IS THAT EVERY CORE OF MULTI-CORE CABLE MUST PULLED THROUGH THE MIDDLE OF THE CUSTOMER MULTI-STRANDED MAIN CABLE.
3.DIVID EVERY CORE OF MULTI-CORE CABLE INTO 2 PARTS (I.E. ONE PART CONTAINS 3 STRANDS OF THE CORE WHILE THE OTHER PART CONTAINS 4 STRANDS OF THE CORE). ONE PART OF THE CORE TIGHLY TIED ROUND CLOCKWISELY AT LEAST 6 TURNS TO THE LEFT SIDE OF THE POWER CABLE. ANOTHER PART OF THE CORE TIGHLY TIED ROUND ANTI-CLOCKWISELY AT LEAST 6 TURNS TO THE RIGHT SIDE OF THE POWER CABLE.
4.FINALLY, WRAP UP THE EXPOSED LIVE PART WITH APPROPRIATE AND ADEQUATE LAYERS OF INSULATED TAPE.
REMARKS(備註):
1. 10/C 4mm sq. Cu CABLE SHALL BE USED FOR CT METERING CABLE
2. MAX. LENGTH OF CT METERING CABLE SHALL NOT EXCEED 4.5M FOR CT RATED AT 5VA
3. 6 = 6 9 = 9
4. ALL METERING EQUIPMENT, INCLUDING C.T.s, METER, CT CHAMBER WITH 16A HRC VOLTAGE FUSES / LINK SHALL BE PROVIDED BY CLP.
5. DETAIL A SHALL BE REFERRED FOR POWER CABLE TEE-OFF CONNECTION FOR DUAL MAIN CABLES
6. CUSTOMER IS RESPONSIBLE FOR PROVIDING A WATER PROOF CT CHAMBER SHOULD IT BE DEVIATED FROM THE STANDARD DUE TO ADOPTION OF DUAL MAIN CABLES.
D POWER CABLE TEE-OFF CONNECTION DETAIL0 ADDED 30/08/2017
C INSULATING MATERIAL FOR LIVE CONDUCTERS ADDED 16/03/2012
B • FUSE EQUIPMENT ADDED TO CT OPERATED METER • CT CONNECTION ARRANGEMENT WITH DUAL MAIN CABLES ADDED 23/05/2007
REV. ITEMS REVISED DATE
APPROVED DENNIS LIN
CHECKED ALAN AU
DRAWN KELVIN CHAN
CONNECTION DIAGRAM FOR CT-OPERATED METER
SCALE: N.T.S.
DATE : 30/08/2017
DRAWING No :CSB/99-005
Rev.D
CLP 中電



NOTE
1. THE FIXING HEIGHTS OF C.T. CHAMBER INSIDE SWITCH ROOM / METER ROOM SHALL BE RANGING FROM 0.6M (MINIMUM) TO 2.2M (MAXIMUM) FROM THE FLOOR LEVEL
2. * COMMUNICATION FACILITY FOR CLP METERING SYSTEM SHALL BE PROVIDED AND INSTALLED BY DEVELOPER / CUSTOMER AT NO COST TO CLP PLEASE REFER TO DRAWING NO.CSB/99-007 FOR DETAILS
3. C.T. CHAMBER WITH BUILT-IN VOLTAGE FUSES/LINK SHALL BE PROVIDED BY CLP FOR TYPICAL WALL MOUNTED C.T. OPERATED METER INSTALLATION

C.T. Ratio	A	B	C	D	E	F	G	H	J	K	L
200/5A & 500/5A	580	87	200	215	90	90	90	590	R19	120	207
Above 500/5A	745	88	215	210	145	145	125	760	R28	150	238

ISOMETRIC VIEW OF FIBRE GLASS C.T. CHAMBER

REV.	ITEMS REVISED	DATE
D	• GENERAL REVIEW	30/08/2017
C	• CT CHAMBER INTERNAL DIMENSION "D" REVISED	14/07/2009
B	• CT CHAMBER DIMENSIONS REVISED • LABELING AND CODING IDENTIFICATION UPDATED • REVISED CONDUIT DIAMETER	23/05/2007

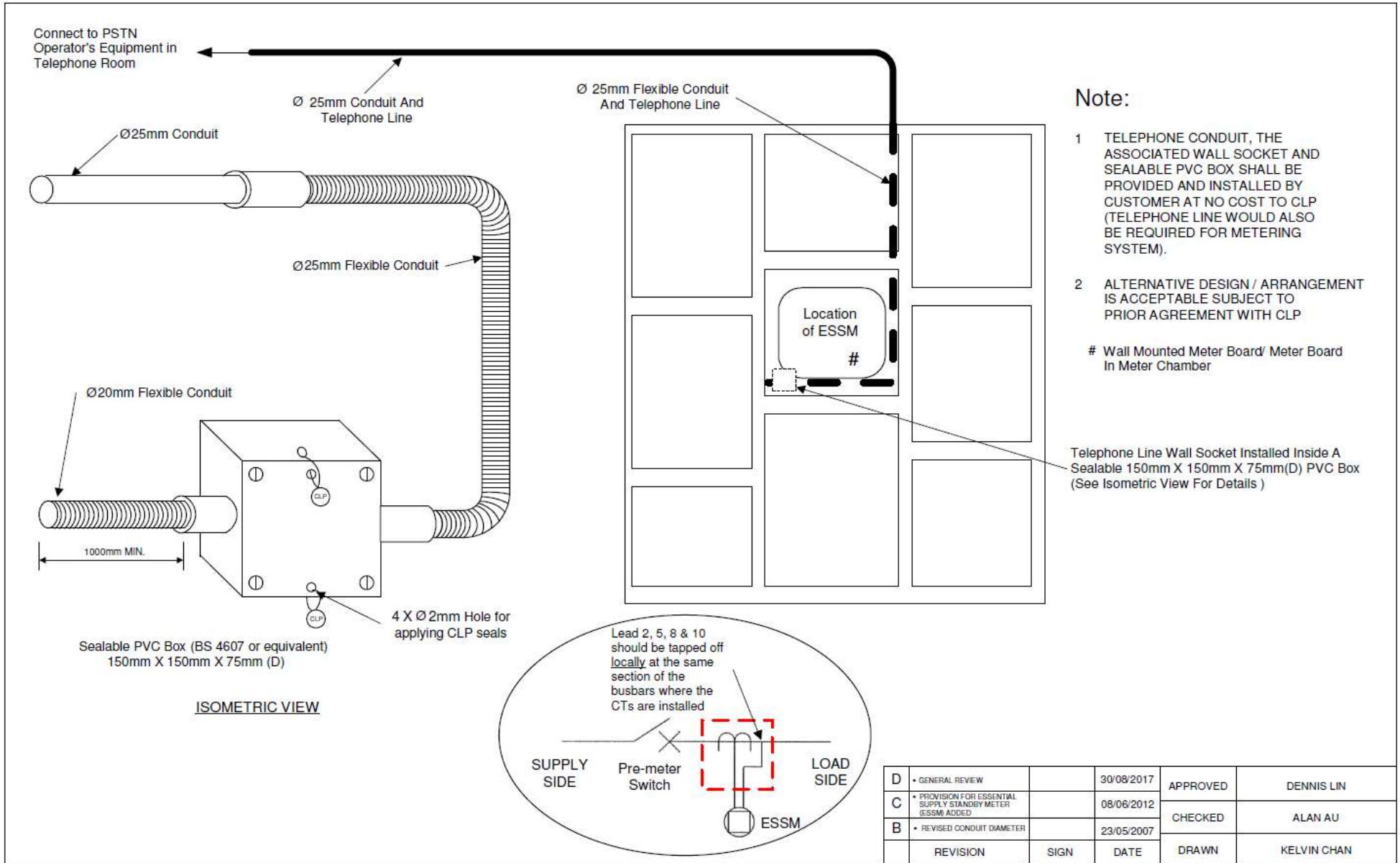
APPROVED	DENNIS LIN
CHECKED	ALAN AU
DRAWN	KELVIN CHAN

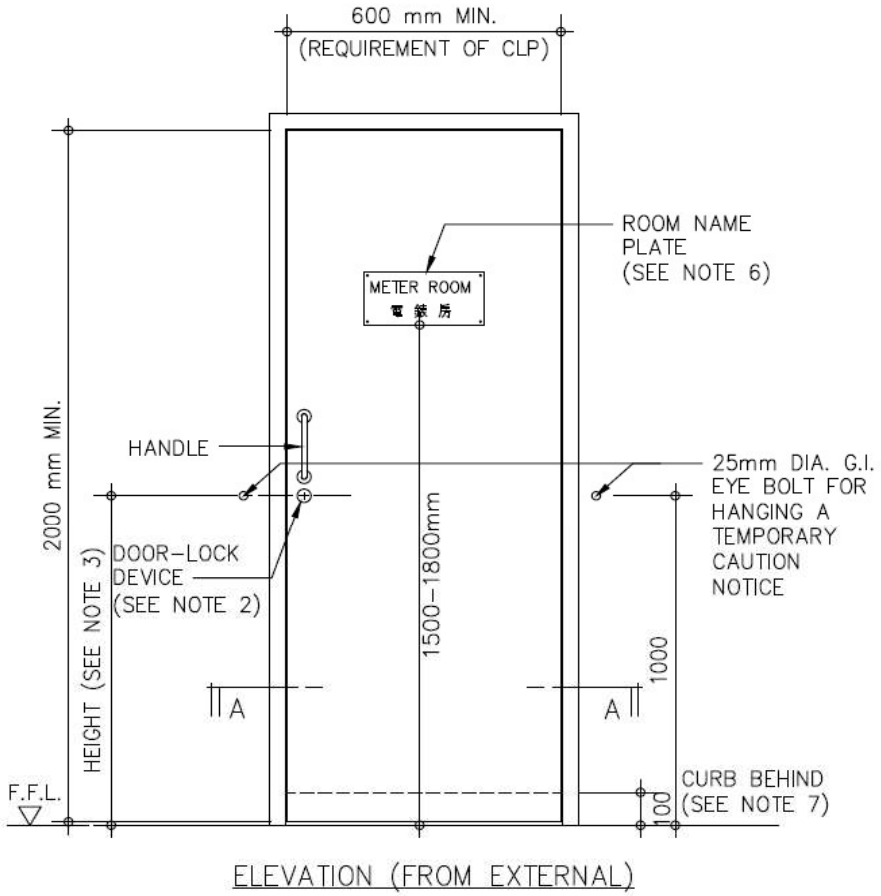
TYPICAL WALL MOUNTED C.T. OPERATED METER INSTALLATION

SCALE: N.T.S. DATE : 30/08/2017

DRAWING No :CSB/99-006 Rev.D

CLP 中電

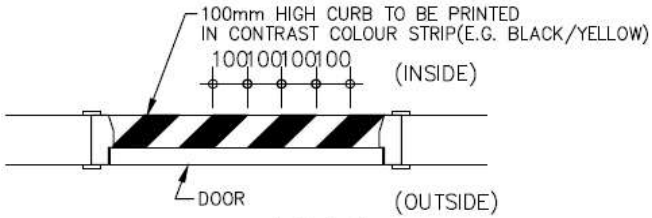

Connect to PSTN Operator's Equipment in Telephone Room
Ø 25mm Conduit And Telephone Line
Ø25mm Conduit
Ø25mm Flexible Conduit
Ø20mm Flexible Conduit
1000mm MIN.
4 X Ø 2mm Hole for applying CLP seals
Sealable PVC Box (BS 4607 or equivalent) 150mm X 150mm X 75mm (D)
ISOMETRIC VIEW
Ø 25mm Flexible Conduit And Telephone Line
Location of ESSM
#
Telephone Line Wall Socket Installed Inside A Sealable 150mm X 150mm X 75mm(D) PVC Box (See Isometric View For Details)
Note:
1 TELEPHONE CONDUIT, THE ASSOCIATED WALL SOCKET AND SEALABLE PVC BOX SHALL BE PROVIDED AND INSTALLED BY CUSTOMER AT NO COST TO CLP (TELEPHONE LINE WOULD ALSO BE REQUIRED FOR METERING SYSTEM).
2 ALTERNATIVE DESIGN / ARRANGEMENT IS ACCEPTABLE SUBJECT TO PRIOR AGREEMENT WITH CLP
Wall Mounted Meter Board/ Meter Board In Meter Chamber
Lead 2, 5, 8 & 10 should be tapped off locally at the same section of the busbars where the CTs are installed
SUPPLY SIDE
Pre-meter Switch
LOAD SIDE
ESSM
D • GENERAL REVIEW 30/08/2017
C • PROVISION FOR ESSENTIAL SUPPLY STANDBY METER (ESSM) ADDED 08/06/2012
B • REVISED CONDUIT DIAMETER 23/05/2007
REVISION SIGN DATE
APPROVED DENNIS LIN
CHECKED ALAN AU
DRAWN KELVIN CHAN
COMMUNICATION FACILITY FOR CLP METERING SYSTEM AND ESSENTIAL SUPPLY STANDBY METER (ESSM)
SCALE: N.T.S.
DATE: 30/08/2017
DRAWING No :CSB/99-007
Rev.D
CLP 中電



ELEVATION (FROM EXTERNAL)

NOTES:

1. METER ROOM MUST BE AT A CLEAN & SAFE POSITION AND READILY ACCESSIBLE FROM A COMMUNAL AREA AT ALL TIMES WITHOUT THE NEED TO PASS THROUGH ANY INDIVIDUAL CUSTOMER'S PREMISES FOR METER READING AND MAINTENANCE.
2. DOOR OF METER ROOM MUST BE OPENED BY COVENTIONAL KEY WITHOUT USING ANY SPECIAL TOOLS. (e.g. HEXAGON SCREWDRIVER)
3. THE DOOR-LOCK DEVICE OF METER ROOM OR THE ACCESS PANEL OF METER ENCLOSURE SHOULD BE INSTALLED AT HEIGHT OF NOT LESS THAN 1000mm & NOT MORE THAN 1500mm ABOVE FINISH FLOOR LEVEL.
4. THE DOOR-LOCK DEVICE OF FRONT DECORATION PANEL IF APPLICABLE SHOULD BE INSTALLED AT HEIGHT OF NOT LESS THAN 1000mm & NOT MORE THAN 1500mm ABOVE FINISH FLOOR LEVEL.
5. THE MINIMUM CLEAR WIDTH OF EXIT DOOR SHOULD BE 600mm.
6. THE NAME OF THE ROOM (BOTH CHINESE CHARACTER "電錶房" & ENGLISH LETTERING "METER ROOM") SHOULD NOT BE LESS THAN 30mm IN HEIGHT AND SHOULD EITHER BE PRINTED DIRECTLY ON THE DOOR OR ETCHED ON A STAINLESS STEEL NAMEPLATE PERMANENTLY FIXED ON THE DOOR AT A SUITABLE POSITION.
7. TO PREVENT INGRESS OF WATER, A MINIMUM 100mm HIGH CEMENT CONCRETE DOOR CURB IS RECOMMENDED TO BE BUILT WITHIN THE METER ROOM IMMEDIATELY BEHIND THE DOOR.
8. THE ACCESS SHALL NOT BE LESS THAN 600mm WIDE INSIDE AND AT THE ENTRANCE / EXIT OF THE ROOM.
9. DOOR STOPPER SHALL BE PROVIDED.



SECTION 'A'-'A'

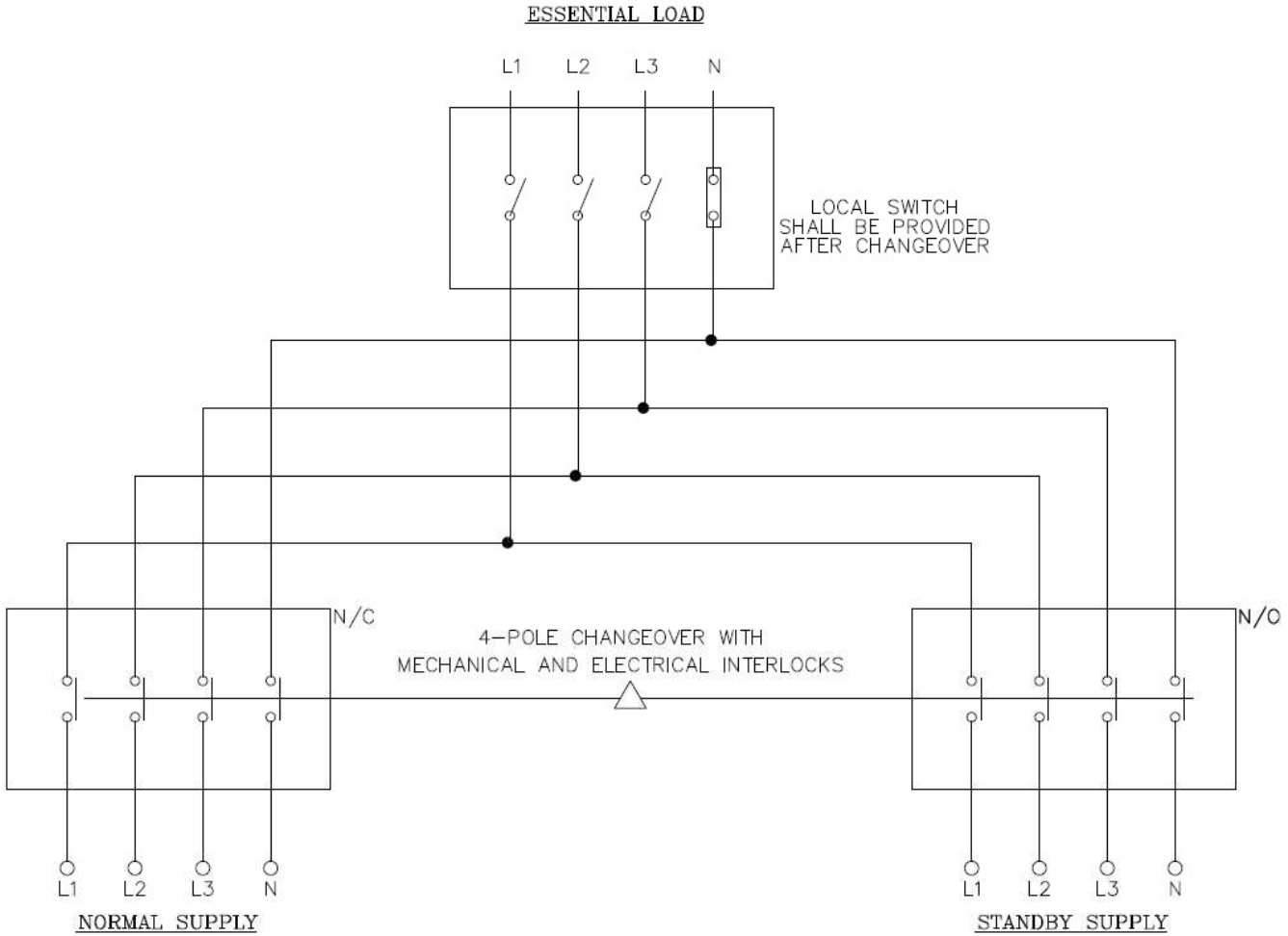
				APPROVED	DENNIS LIN
A	GENERAL REVIEW		30/08/2017	CHECKED	ALAN AU
	REVISION	SIGN	DATE	DRAWN	KELVIN CHAN

TYPICAL DETAILS OF METER ROOM DOOR

SCALE: N.T.S. DATE: 30/08/2017

DRAWING No: CSB/99-008 Rev. A

CLP 中電



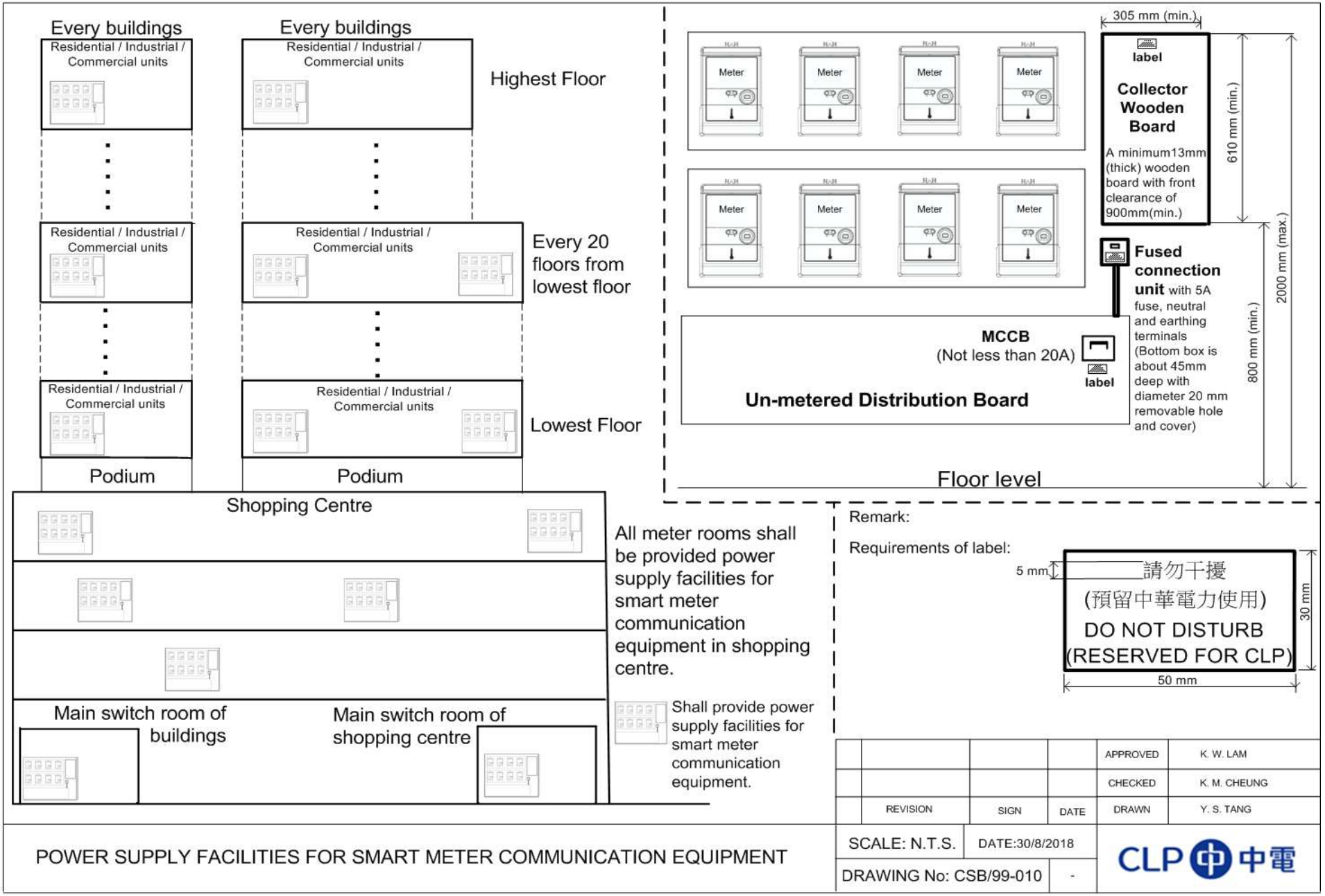
				APPROVED	DENNIS LIN
A	GENERAL REVIEW		30/08/2017	CHECKED	ALAN AU
	REVISION	SIGN	DATE	DRAWN	KELVIN CHAN

TYPICAL CHANGEOVER ARRANGEMENT FOR STANDBY SUPPLY

SCALE: N.T.S. DATE: 30/08/2017

DRAWING No: CSB/99–009 Rev. A

CLP 中電


Every buildings
Residential / Industrial / Commercial units
Every buildings
Residential / Industrial / Commercial units
Highest Floor
Residential / Industrial / Commercial units
Residential / Industrial / Commercial units
Every 20 floors from lowest floor
Residential / Industrial / Commercial units
Residential / Industrial / Commercial units
Lowest Floor
Podium
Podium
Shopping Centre
Main switch room of buildings
Main switch room of shopping centre
All meter rooms shall be provided power supply facilities for smart meter communication equipment in shopping centre.
Shall provide power supply facilities for smart meter communication equipment.
Meter
305 mm (min.)
label
Collector Wooden Board
A minimum13mm (thick) wooden board with front clearance of 900mm(min.)
610 mm (min.)
2000 mm (max.)
Fused connection unit with 5A fuse, neutral and earthing terminals (Bottom box is about 45mm deep with diameter 20 mm removable hole and cover)
MCCB
(Not less than 20A)
label
Un-metered Distribution Board
800 mm (min.)
Floor level
Remark:
Requirements of label:
5 mm
請勿干擾
(預留中華電力使用)
DO NOT DISTURB
(RESERVED FOR CLP)
30 mm
50 mm
APPROVED
K. W. LAM
CHECKED
K. M. CHEUNG
REVISION
SIGN
DATE
DRAWN
Y. S. TANG
POWER SUPPLY FACILITIES FOR SMART METER COMMUNICATION EQUIPMENT
SCALE: N.T.S.
DATE:30/8/2018
DRAWING No: CSB/99-010
-
CLP 中電

燃點生活力量 Energy for Life　　CLP 中 中電

無重複計量的證明
CONFIRMATION OF NO DOUBLE METERING

服務申請號碼 SERVICE ORDER NUMBER
供電地址 SUPPLY ADDRESS

致中華電力：

由於無法暫停電力以供 貴公司進行「無重複計量」的檢查，本人已安排註冊電業工程人員（註冊編號：_____）檢查供電予上址電力裝置的線路，並證明在現有或新電錶位前和後無接駁任何　貴公司的電錶。現附上有關線路示意圖及電巴圖安排以供參照。

To CLP Power,

Since shutdown supply cannot be arranged for CLP Power to check for no double metering, we have arranged registered electrical worker (Registration No. :_____) to check the circuit and confirm that there is no tariff meter of your Company installed before and after the present or proposed metering point. A copy of relevant schematic wiring diagram and busbar arrangement is attached for reference.

管理處／發展商名稱 NAME OF MANAGEMENT OFFICE / DEVELOPER
聯絡電話號碼 CONTACT TEL. NO.

_____ 管理處／發展商簽名／蓋章 MANAGEMENT OFFICE / DEVELOPER SIGNATURE / CHOP	_____ 日期 DATE

注意事項：
1. 請將填妥之證明書交給本公司。
2. 本公司現已制訂一套符合個人資料(私隱)條例的個人資料收集聲明。如欲了解該聲明，請參考此證明書背面。

Note：
1. Please forward this completed form to the Company.
2. The Company has a Personal Information Collection Statement, which complies with the Personal Data (Privacy) Ordinance and the statement can be referred from back side of this form if find out the statement.

Personal Information Collection Statement

CLP is committed to protecting your privacy. Set out below is information that explains our practices about the way your personal data ("the Data") is collected and used.

Purpose of Collection

CLP may use the personal data you provide in this form for supporting supply application and any directly related purposes. CLP may also use such personal data:

- To communicate with you;
- To handle and follow up service enquiries and complaints; and
- To investigate double meter incident

You are not required to provide the personal data requested in this form. However, the personal data you provide in this form will enable CLP to process your application. CLP may not be able to process your application unless you provide the personal data.

Transfer of Personal Data

CLP will disclose data when required to do so by law and may also disclose such data in response to requests from law enforcement agencies or regulatory authorities.

Access and Correction of Personal Data

You have a right to request access to, the correction and erasure of, your personal data in accordance with, where applicable, the provisions of the Personal Data (Privacy) Ordinance (Cap 486), and any other data protection law as applicable. Requests for access, correction and/or erasure of personal data, as well as withdrawal of consent, where applicable, should be by email and addressed to the Personal Data Officer of CLP at csd@clp.com.hk

Privacy Policy Statement

You can find out more about CLP's policies on privacy and personal data protection by accessing our privacy policy statement available on the CLP website at https://www.clp.com.hk/en/privacy-policy.
Unless specified otherwise, reference to "CLP" and the "CLP Group" shall mean CLP Holdings Limited, its subsidiaries and affiliates.

個人資料收集聲明

中電集團致力於保護你的私隱。以下所列示信息解釋我們的操作慣例和收集及使用閣下個人資料的方式。

收集個人資料的用途

中電集團使用閣下提供的個人資料主要用於支援供電申請及任何直接有關的用途上。
中電集團也可能使用閣下的個人資料 ：

- 與閣下溝通；
- 以處理及跟進客戶提出的服務諮詢及投訴；
- 調查有關重複計量事故。

中電集團並無規定閣下必須提供個人資料， 但閣下所提供的個人資料能夠使中電集團可處理閣下的供電申請。除非閣下向中電集團提供表格中的個人資料， 否則中電集團可能無法處理閣下的供電申請。

個人資料的轉移

如有法律規定， 中電集團會披露有關資料， 也會應執法機關或監管部門的要求披露上述資料。

查閱或更正你的個人資料的方法

根據《個人資料(私隱)條例》 (第 486 章) 及其他適用的個人資料保護法例， 你有權知道中電集團是否擁有你的個人資料， 亦可索取有關資料副本， 並更正和刪除中電保存的有關資料。 有關索閱，更正及/或刪除中電集團記錄內任何有關你的個人資料的要求， 以及撤回同意的要求(如適用) ， 可電郵至 csd@clp.com.hk 與中電集團的個人資料主任聯絡。

私隱政策聲明

你可以登入中電集團的網站 https://www.clp.com.hk/en/privacy-policy 查閱中電集團的私隱政策聲明， 以了解更多關於中電集團在私隱及個人資料保護方面的政策。

除非文義明確另有所指， 本文所提及的「中電」 及「中電集團」 是指中電控股有限公司，其附屬公司及關聯公司。

Appendix 4 - Metering Equipment Specification and Installation Requirements for New 11kV Supply Network Arrangement of 132kV Developer Substation

A. Metering Equipment Specification

1. Metering VT

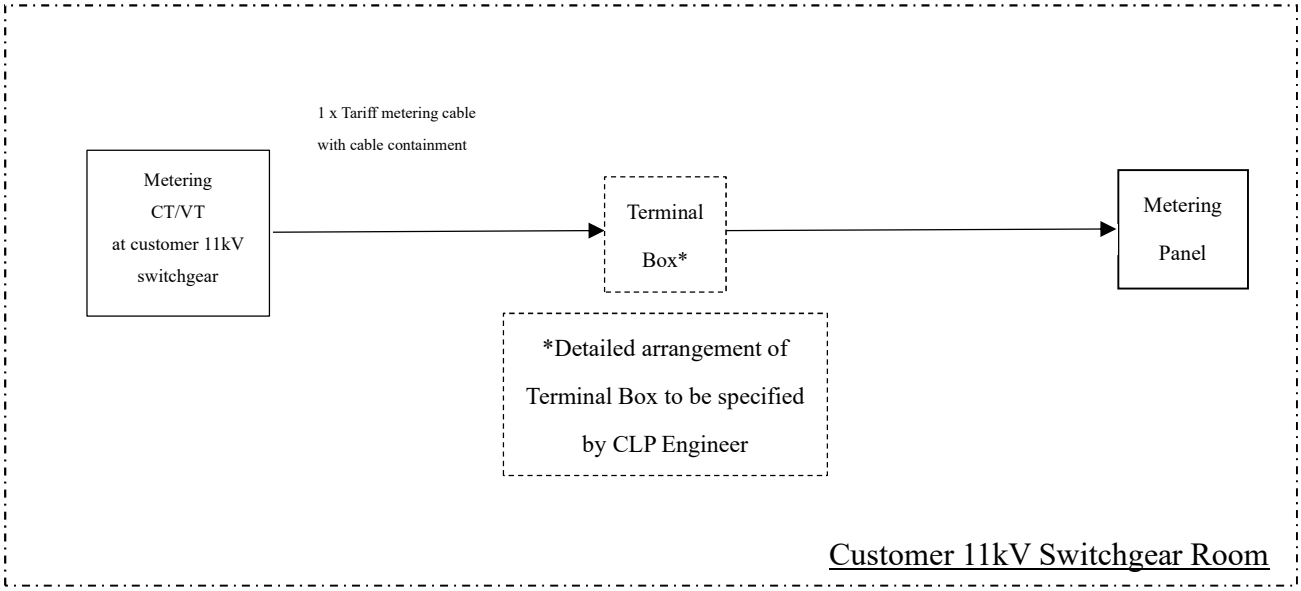
- Dedicated VT for revenue metering or separate winding (for VT with multiple secondary outputs) solely for revenue metering.
- Standard: IEC61869-3
- Burden: 75 VA /phase (reserved for metering purpose)
- Accuracy class: 0.5
- VT Secondary 110V
- VT Ratio: 11000/110
- Connection cable: 4 mm^2 10 core PVC/PVC copper
- Sealing facility: To be provided for fuse carriers, test terminal blocks, terminals, etc.
- Test report: To be submitted to CLP prior to installation of meters

2. Metering CT

- Dedicated CT for revenue metering
- Standard: IEC61869-2
- Burden: 15 VA
- Accuracy class: 0.5
- CT Secondary: 5A
- CT Ratio: To be advised by customer & agreed by CLP (e.g. 400/5A,800/5A, etc.)
- Connection cable: 4 mm^2 10 core PVC/PVC copper
- Sealing facility: To be provided for test terminal block, terminals, etc.
- Test report: To be submitted to CLP prior to installation of meters

3. Metering Cubicle

- Size: 850mm(w) x 650mm(d) x 1800mm(h) with front and rear swing doors
- Access clearance: 900 mm minimum (both front and rear)


1 x Tariff metering cable
with cable containment
Metering
CT/VT
at customer 11kV
switchgear
Terminal
Box*
Metering
Panel
*Detailed arrangement of
Terminal Box to be specified
by CLP Engineer
Customer 11kV Switchgear Room