K.K.I.P. POWER SDN BHD

Standard Guideline & Precautions to Electrical Consultants and Contractors
Design/Install & Commissioning of Electrical Utility Services to land lots in KKIP

Important Notes: This guideline applies in general to HV/LV supply with CT and/or CTVT metering. For LV three-phase supply to be equipped with whole-current direct metering and/or in the very rare case of single-phase supply, Item (9), (10), (11) and part of Item (12) with relevant to CT can be ignored.

Warning on Potential Hazards: All Consultants and Contractors are forewarned of the HV/LV underground or overhead network running along the front boundary of all the lots in KKIP, and all shall be reminded of Clause 37(12) of Electricity Supply Act (Amendment 2015) which stipulates that no person shall undertake any work or engage in any activity in the vicinity of any electrical installation or part thereof, and any person who contravenes this section shall be guilty of an offence and shall, on conviction, be liable to a fine or to imprisonment or to both. Please see Item (20) of this Guideline.

(1) **For domestic consumers** with the main incoming through overhead service line, the point of demarcation (or point of sell) will normally be at the low-voltage cut-out fuse which is normally installed next to the energy meter.

For domestic consumers with the main incoming through underground cable, the point of demarcation (or point of sell) will normally be at the low-voltage pole fuse which is attached at the low-voltage electrical pole situated at the front boundary of the premises.

(2) **For low voltage consumers**, other than domestic consumers, the point of demarcation (or point of sell) will normally be at the low-voltage distribution feeder pillar in the Distribution Substation, which is normally situated right at or nearby the front boundary of the land lots. Any downstream electrical installation after the feeder pillar shall be the responsibility of the consumer.

For consumers of total connected load above 625kVA, subject to the length of proposed incoming cable, the point of demarcation (or point of sell) may be directly at the low-voltage cable termination box of the outdoor transformer in the Distribution Substation (i.e. without going through feeder pillar). In this case, single-core cable (rather than 4-core cable) will be necessary to facilitate cable terminations.

(3) **For large power consumer** of total connected load above 1,000kVA, or of estimated maximum power demand well exceeding 500kW, High-Voltage supply may be considered. For high voltage consumers, the point of demarcation (or point of sell) will normally be at the outdoor switchgear (either circuit breaker or gears with or without fuse) in the Distribution Substation, which is normally situated right at the front boundary of land lots.

(4) The K.K.I.P. Power Sdn Bhd (KKIPPSB) will have no objection for the lot owner to engage his competent electrical contractor to supply and install the incoming HV or LV cables, in which case, the connection charge and/or consumer's share of capital contribution for connection of electricity supply will be just a token charge. Provided always that the said incoming cable does not encroach in to, particularly running within and in parallel to, any other public utility services reserve corridor.

(5) In the event that the lot owner is to engage his own competent electrical contractor to supply and install the proposed incoming cable, the design of the proposed incoming cable with details on type of cable, sizing and rated current carrying capacity, and proposed cable route etc. shall first be forwarded to KKIPPSB for comment. As a general rule, the proposed cable route shall ideally avoid paved area in order to facilitate fault locating and repair works in the event of cable fault. Should situation cannot be avoided, then proper cable ducting must be laid properly to facilitate cable repair/maintenance or replacement of faulty cable.

(6) From prudent utility practices, please consider the cascade outages of two incoming cables under parallel operation; as in the event of any fuse blown, it may result to overloading of the remaining healthy core.

(7) The KKIPPSB will provide the kWh and kVARh meters. All M&E design drawings must indicate properly the **proposed meter position** for approval or endorsement by KKIPPSB. The energy meters shall be installed at position reasonably accessible and will normally be at the outside wall of the factory/building premises.

(8) A **Meter Cubicle** to house the meter(s) and accessories shall be provided by the consumer. The metering cubicle shall be of stand-alone floor/wall mounted type, of weather proof design, well-ventilated with air vents meeting IP65, creature entry proof design and preferably installed in a position avoiding exposure to direct sunlight (Should the meter cubicle be installed at location subject to exposure to direct sunlight, additional sun shed of suitable design is required to effectively reduce solar radiation on the metering cubicle).

The cubicle shall also be equipped with sealable door-cover with transparent see-through window and c/w hardwood interior baseboard to facilitate installations of meter(s) and accessories securely. The metering cubicle shall have sufficient room to accommodate installation of: -

(a) One (1) Standard kWh Meter (approximately 30x18x15 cm)
(b) One (1) Standard kVARh Meter* (approximately 30x18x15 cm)
(c) One (1) Meter Test Terminal Block**
(d) Six (6) nos of 6A Voltage Fuse Links**

[Not applicable for single-phase supply]*
*[**In the case of three-phase supply to be equipped with whole-current direct metering and/or single-phase supply, Item (8)(c) and Item (8)(d) above shall be omitted and replaced by appropriate cutout fuse(s) and neutral connector.]*

The **preferred height of the kWh meter** (with reference to the bottom part of the meter where meter mains are terminated) shall be 1.8 m above the finishing ground level.

Cables/wirings (whether surface-mounted or flush-mounted) at the hardwood baseboard shall be of sufficient provisions in lengths to allow for smooth connection to the meter connection-terminal block normally located at the lower part of the meter and with a transparent terminal cover equipped with openings for proper cable/wire entries.

(9) **Metering CTs** shall best be housed in a separate sealable compartment within the Main Switch Board Panel. Metering CTs shall be of burden rated at 15VA and of accuracy Class 0.5 or better (Class 0.2 will be required for all Large Power Consumer under ID2 and/or CM2 tariff), of dual ratio for primary if necessary, with secondary current rating at 5Amp, and of appropriate inner diameter well fitted to suit the size and geometry construction of the switchboard bus-bar. A permanent labeling shall be obviously displayed right at the CT Compartment and easily seen before any attempted access to work on the CT Compartment. The label shall carry the following suggested wordings:

WARNING
KKIPPSB Metering CT Compartment
DO NOT DISTURB

(10) **The Metering CT Wiring** from the Metering CT Compartment to the Metering Cubicle must be in traceable solid G.I. conduit and shall not exceed 6 meter in length. In order to differentiate with other G.I. conduits which might be of same color code, a permanent label plate shall be obviously displayed on the Metering CT Wiring G.I. Conduit and easily seen

before any attempted access to work on the G.I. Conduit. The label shall carry the following suggested wordings:

WARNING
KKIPPSB Metering CT Wirings
DO NOT DISTURB

(11) A telephone line c/w socket shall be provided within the Metering Cubicle. The line can be a share line with any of the consumer's direct line WITHOUT going through PABX. The phone line will be used for tele-metering purpose and will be ONLY for dialing-in and in most cases, once in a month at odd hours e.g. midnight hours. *[Not applicable for whole-current direct metering]*

(12) As a matter of practicality and easier coordination of works, it is advisable to include in the **scope of work** of the nominated electrical contractor to provide the required Metering Cubicle, Metering CTs and all other relevant metering wirings and accessories as per mentioned in Item 8 to Item 11 above. *[For whole-current direct metering, please see Important Notes]*

To avoid possible miscommunication, it is recommended that the **shop drawing** of the **Main Switchboard** including the detail design of the Metering CT Compartment and Metering Cubicle be forwarded to KKIPPSB for confirmation preferably prior to fabrication. Metering CT manufacturer's factory test certificate for the metering CTs could be submitted at the later state prior to connection of supply.

(13) The KKIPPSB will in principle have no objection to the consumers' proposed Main Switch which normally rated at amperage higher than required in order to cater for future requirements, but it is recommended that the **protection relay** shall be set corresponding to the metering **CTs ratio** or dual ratio rating in stages.

(14) **For HV supply ONLY**: Metering VT shall be of accuracy Class 0.5 with secondary voltage at 110 Volts. Wiring requirements shall be same as CT wirings.

(15) Though the supply reliability in KKIP has been satisfactory according to the past years records, it is advisable that the M&E consultant shall study the necessity of standby generator to cater for essential services or special machineries and equipment if any. If there is a Standby Generating Set, there shall be proper "Changing Over Switch" to eradicate the possibility of power back feed from the Standby Generator to the KKIP Distribution System. Please also take note of the requirement to obtain permit for the Generating Set from relevant authority if applicable.

(16) It is advisable that the nominated licensed electrical contractor, once appointed, be immediately directed to forward all available further technical details to KKIPPSB in as soon as possible and to discuss with KKIPPSB to finalize the detail meter arrangement.

(17) In the course of **project progress**, preferably well before the planned commencement of work on connection of power cable to the premises, the consultant and/or the electrical contractor are expected to assist their client to finalize all the commercial aspects i.e. settlement of connection charges, signing of consumer agreement and payment of required security deposit.

(18) **Upon completion** of all wiring installations, please coordinate with the licensed electrical contractor to **furnish the following documentations**:
(i) As-Build Drawings of the incoming cable with detail route indicated.

(ii) Test Results of the Incoming Cable by qualified person.
(iii) Test Result of the Main Earthing by qualified person.
(iv) Main Switch Board (MSB) Test Certificates.
(v) Protection Relays (Overcurrent and Earth Fault) Test Certificate.
(vi) Metering CT manufacturer's factory test certificate
(vii) For HV Supply ONLY: Metering VT Manufacturer's factory test certificate.
(viii) Form G (Supervision & Completion Certificate) and Form H (Test Certificate) from the nominated licensed wiring contractor. The provision of these certificates is a requirement in according to Electricity Regulation 1994.

(19) For **safety** in according to Electricity Regulation 1994, prior to commissioning of power supply, please ensure that the followings are in place prior to connection of supply:

(i) As-Built Single Line Diagram must be displayed beside the MSB.
(ii) Proper Labeling of the MSB and Distribution Boards.
(iii) Safety poster on rescue from electrical accident.
(iv) A ground gradient control rubber mat must be provided at the MSB.
(v) LV cable markers along the incoming cable route.

(20) All consultants and contractors are also reminded of the followings **potential hazards**:

(A) **High Voltage/Low Voltage Underground Cable or Overhead Network** is running along the front boundary of all the lots in the park.

(B) All shall be reminded of Clause 37(12) of Electricity Supply Act (Amendment 2015) which stipulates that no person shall undertake any work or engage in any activity in the vicinity of any electrical installation or part thereof, and any person who contravenes this section shall be guilty of an offence and shall, on conviction, be liable to a fine or to imprisonment or to both.

(C) To prevent any damage on the high-tension Underground cable, we would emphasize that it is a must for your nominated contractor or sub-contractor to totally restrict the use of any machine powered excavation tools or equipment to carry out the excavation activities in vicinity of our Underground cable network. All **excavation** activities shall be limited to only manpower and with great precaution. The **protection bricks/PVC slabs** placed above the underground cable will help minimize the risk of accidental damage during excavation if it is done by manpower.

(D) KKIPPSB would reserve the rights to hold the lot owner/contractor responsible for any damage of the cable.

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KKIPPSB
Standard Guideline & Precautions For Design Install & Commissioning of Electricity Utility Services to land lots in KKIP
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