



PROVINCIAL ELECTRICITY AUTHORITY

POWER SYSTEM STANDARD DIVISION

INSTRUMENT TRANSFORMERS, OUTDOOR TYPE, FOR L.V. AND H.V. SYSTEM

Specification No. RMTR-021/2553

Approved date : 27/05/2553

Rev. No. : 1

Form No. 03-2

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Invitation to Bid No.: ๓.3กข๓๓.(๑๓.)e-bidding017/2562

C Material, equipment, and specifications for INSTRUMENT TRANSFORMERS, OUTDOOR TYPE, FOR L.V. AND H.V. SYSTEM

C1 General material and packing instructions

Additional to the general instructions, the following shall be observed:

1a Scope

These specifications cover instrument transformers, for L.V. and H.V. system up to 33 kV 50 Hz.

1b Standard

Instrument transformers shall be manufactured and tested in accordance with the latest edition of the following standard:

International Electrotechnical Commission (IEC)

IEC 60044-1 Instrument transformers – Part 1 : Current transformers

IEC 60044-2 Instrument transformers – Part 2 : Inductive voltage transformers

and all other relevant IEC standards, unless otherwise specified in these specifications.

PEA will remain to accept the type tests report which was carried out according to previous standard/edition for a period of three (3) years after the publishing of the latest standard/edition.

1c Principal requirement

1c.1 General

Instrument transformers shall be suitable for metering only; and the terminal cover of secondary side shall be sealable.

1c.2 Service conditions and installation

a) L.V. instrument transformers shall be designed and constructed for outdoor installation on poles with additional protection by metal cabinets (provided by PEA).

b) H.V. instrument transformers shall be designed and constructed for outdoor installation.

L.V. and H.V. instrument transformers shall withstand the following installation conditions:

Altitude : up to 1,000 m above sea level

Ambient air temperature : up to 40°C

Relative humidity : up to 94%

Climatic condition : tropical climate



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1c.3 Construction

H.V. instrument transformers shall be oil type or dry type. In case of dry type, the H.V. instrument transformer shall be either butyl molded, epoxy molded, or black polyurethane molded. All three molded types shall be single piece designed and suitable for withstanding rough handling during transportation and installation. In addition molded epoxy construction which is offered shall be constructed from cycloaliphatic epoxy resins only.

H.V. current transformers having double-bushing insulated design shall not be accepted.

1c.4 Primary terminals and primary connectors

The primary terminals of the H.V. current transformers shall be terminal pads or equipped with auxiliary terminal pads. The terminal pads shall be of high conductivity bronze and hot-tin dipped, or better, and drilled in accordance with NEMA Standards [14 mm (9/16") holes on 44.5 mm (1 3/4") centers.

The connectors of the H.V. current transformers shall be compression type of aluminium, and designed suitable for use with aluminium conductor (see C3 Schedule of detailed requirement) and the terminal pads. Each hole of the connectors shall be furnished with one (1) bolt, one (1) nut, two (2) flat washers and one (1) spring lock washer of stainless steel or better.

The primary terminals of the H.V. voltage transformers shall be furnished with solderless clamp type connectors for aluminium conductor diameter of 9.0 mm (size 50 mm²).

1c.5 Secondary terminals and secondary connectors

The secondary terminals of the H.V. instrument transformers shall be threaded stud type, M6, with 1/4 inch-20 UNC or equivalent, detail of the terminals shall be according to Figure 1 of Drawing No. SA4-015/48001 . Each terminal stud shall be furnished with one (1) connector, one (1) nut, two (2) flat washers, and one (1) spring lock washer.

The secondary bush&bolt type terminals as mentioned in Figure 2 of Drawing No. SA4-015/48001; each hole shall be furnished with one (1) connector, one (1) bolt of M6, two (2) flat washers, and one (1) spring lock washer; can be accepted.

The connectors of the H.V. instrument transformers shall be compression type of copper with tin plate, and designed suitable for use with the copper conductor diameter of 1.9 mm (size 2.5 mm²) and the secondary terminals.

The secondary terminals of L.V. current transformers shall be made of high conductivity bronze or brass, with tin or nickel plating, and designed suitable for use with the copper conductor diameter of 1.9 mm (size 2.5 mm²).



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1c.6 Secondary terminal boxes

The secondary terminal boxes of the H.V. instrument transformers shall be weatherproof type, mounted at the bottom level of the instrument transformers. The dimension of the terminal boxes shall not be less than 57.2 mm (2 1/4") wide and 114.3 mm (4 1/2") long, and the cover of the terminal boxes shall be held by four (4) noncorrosive thumbscrews which are drilled to accommodate the seal wire. The terminal boxes shall have two (2) openings with conduit fittings for 1-inch IPS conduit connection, and one (1) piece of 1-inch IPS galvanized steel plug shall be supplied.

1c.7 Terminal marking

Each terminal of H.V. and L.V. current transformers shall be marked legibly and durably, as follows:

Primary terminals : P1, P2

Secondary terminals : S1, S2 or S1, S2, S3

Each terminal of H.V. voltage transformers shall be marked legibly and durably, as follows:

Primary terminals : U, V

Secondary terminals : u, v

1c.8 Nameplate

The inscription on nameplate shall be English, according to Standard, and marked with two (2) additional marks as follows:

1. SUPPLIED BY PROVINCIAL ELECTRICITY AUTHORITY
2. PEA : (The number to be mark on the nameplate shall be given by PEA after the final of bid consideration.)



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1d Packing

Each L.V. instrument transformer shall be packed in a suitable package. The packages of the same item shall be seaworthy packed in wooden case(s).

Two (2) H.V. instrument transformers shall be seaworthy packed in an export crate or a wooden case.

The crate or wooden case shall be designed to be movable by a forklift in such a manner that the truck's forks can be inserted at any side of the bottom of the crate or wooden case.

Each crate or wooden case shall be strong enough for stacking over with at least another one.

If the crate or wooden case is made of rubber wood (Yang-para or Hevea brasiliensis), the wooden parts shall be treated with wood preservative.

The details of wood treatment shall be described.

Plastic foam shall not be accepted.

1e Tests and test reports

The instrument transformers shall be passed the manufacturer's standard routine tests, and also passed the routine tests in accordance with the latest IEC standards.

The following type tests in accordance with the latest IEC 60044-1 shall be made on only one (1) current transformer of identical units:

1. Short-time current test
2. Temperature-rise test
3. Lightning impulse test
4. Wet test for outdoor type transformer
5. Determination of errors

The type tests shall be conducted by the acknowledged independent testing laboratories.

The bidders have to submit the type test reports with the bid or within fifteen (15) calendar days of the bid closing date. The Item offered without submitting the type test reports shall be rejected.

The bidder may submit type test report of the same type and same rated voltage current transformers have higher current ratio for the proposed current transformers for PEA consideration. See ANNEX :
CONSIDERATION OF TYPE TEST REPORT OF CURRENT TRANSFORMERS



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The following type tests in accordance with the latest IEC 60044-2 shall be made on only one (1) voltage transformer of identical units:

1. Temperature-rise test
2. Short-circuit withstand capability test
3. Lightning impulse test
4. Wet test for outdoor type transformer
5. Determination of errors

The cost of all tests and reports shall be borne by the Contractor.



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C2 Material and packing data to be given by bidder

2a Specifications concerning the current transformer characteristics:

Type or Catalogue No.

Manufacturer's name and technical data of insulator

Standard

Rated voltage in kV

Rated primary current in A

Rated secondary current in A

Rated frequency in Hz

Polarity

Rated output in VA

Limits of current error and phase displacement in percent and minute

Accuracy class

Instrument security factor (FS)

One-minute power frequency withstand voltage in kV (r.m.s.)

Impulse withstand voltage in kV (peak)

Rated short-time thermal current (I_{th}), 1 s in kA

Rated dynamic current (I_{dyn}) in kA

Rated continuous thermal current in A

Class of insulation of windings in degree C

Maximum temperature rise of windings in K

Weight in kg/unit



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2b Specifications concerning the voltage transformer characteristics:

Type or Catalogue No.

Manufacturer's name and technical data of insulator

Standard

Rated voltage in kV

Rated primary voltage in V

Rated secondary voltage in V

Rated frequency in Hz

Polarity

Rated output in VA

Limits of voltage error and phase displacement in percent and minute

Accuracy class

One-minute power frequency withstand voltage in kV (r.m.s.)

Impulse withstand voltage in kV (peak)

Rated voltage factor

Class of insulation of windings in degree C

Maximum temperature rise of windings in K

Weight in kg/unit

2c Description of materials, surface treatment, and surface finishing of the component parts

2d Details and/or drawings, with dimensions in mm, of:

(1) Overall instrument transformer

(2) Terminal and terminal connectors

(3) Connection diagram

(4) Nameplate with inscription

(5) Etc.

2e List of routine tests



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2f Packing details

L.V. instrument transformer

Packing method (shown by drawing(s), and describe packing material)

Number of units in each package

Number of packages in each wooden case

Overall dimensions of each wooden case in cm

Volume of each wooden case in m³

Gross weight of each wooden case in kg

Net weight of each wooden case in kg

Type of storage facility required (indoor, outdoor)

H.V. instrument transformer

Packing method (shown by drawing(s), and describe packing material)

Number of units in each crate or wooden case

Overall dimensions of each crate or wooden case in cm

Volume of each crate or wooden case in m³

Gross weight of each crate or wooden case in kg

Net weight of each crate or wooden case in kg

Type of storage facility required (indoor, outdoor)

Note : Conditions for documentation and consideration

1. The Contractor has to supply the following documents in English, before shipment/delivery, for each ordered instrument transformer.

1.1 Reports of type test and routine test

1.2 Three (3) sets of instruction book for installation, operation, and maintenance

The above document shall be sent to the following address:

Meter Division

Provincial Electricity Authority

200 Ngam Wong Wan Road, Chatuchak

Bangkok Metropolis 10900

Thailand

2. Delivery time is also one of the important factors to be considered.

3. Partial shipment/delivery is allowed.



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ANNEX

CONSIDERATION OF TYPE TEST REPORT OF CURRENT TRANSFORMERS

The bidder may submit type test report of the same type and same rated voltage current transformers have higher current ratio for the proposed current transformers for PEA consideration, on condition that value of current density and ampere-turns of primary winding of the proposed current transformers shall not be more than the current transformer of the submitted test report.

In this case, the bidder shall submit the additional information of the proposed and tested current transformers as shown in Table 1 and the necessary information in order to show that the type test report can prove the performance of the proposed current transformers.

Table 1

Typical design data for current transformers

....phasekV Model.....

Item	Description	Design value for prototype in type test report	Design value for proposed current transformers
1.	Current ratio		
2.	Accuracy class		
3.	Rated ampere-turns		
4.	No. of turns on primary winding		
5.	No. of turns on primary winding		
6.	Primary ampere-turns at I_m, r.m.s.		
7.	Primary current at I_{dyn} , peak		
8.	Rated primary winding current density		
9.	Rated secondary winding current density		
10.	Primary winding size		
11.	Secondary winding size		

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Item	PEA Material No.	Quantity	Description
1	1060040031	set(s)	<p>Current transformer, single-phase, for outdoor installation, with:</p> <p>Rated voltage : 24 kV</p> <p>Rated primary current (I_n) and secondary current : 5/5 A</p> <p>Rated frequency : 50 Hz</p> <p>Polarity : subtractive</p> <p>Rated output : not less than 30 VA</p> <p>Accuracy class : 0.5 or better</p> <p>Instrument security factor (FS) : < 5</p> <p>One-minute power frequency withstand voltage on primary and secondary winding : not less than 50/3 kV (r.m.s.)</p> <p>Impulse withstand voltage : not less than 125 kV (peak)</p> <p>Rated short-time thermal current (I_{th}), 1 s : not less than $0.1 \times I_n$ kA</p> <p>Rated dynamic current (I_{dyn}) : not less than $2.5 \times I_{th}$ kA</p> <p>Insulation class of winding : class A (maximum temperature rise of 60 K), or better</p> <p>Minimum creepage distance of bushing, from live part to ground : not less than 600 mm</p> <p>Terminal pads : 2-hole</p> <p>Complete with primary connectors for aluminium conductor diameter of 9.0 mm (size 50 mm²), three (3) sets of secondary connectors for copper conductor diameter of 1.9 mm (size 2.5 mm²), ground terminals with solderless clamp type connector suitable for steel stranded conductor diameter of 9.0 mm (size 50 mm²), and mounting provision.</p> <p>The current transformer having total weight of no more than 55 kg is preferable.</p>

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Item	PEA Material No.	Quantity	Description
2.	1060040019	set(s)	Ditto as Item 1, but rated primary current (I_n) and secondary current 10/5 A.
3.	1060040020	set(s)	Ditto as Item 1, but rated primary current (I_n) and secondary current 20/5 A.
4.	1060040021	set(s)	Ditto as Item 1, but rated primary current (I_n) and secondary current 30/5 A.
5.	1060040022	set(s)	Ditto as Item 1, but rated primary current (I_n) and secondary current 50/5 A.
6.	1060040023	set(s)	Ditto as Item 1, but rated primary current (I_n) and secondary current 75/5 A.
7.	1060040024	set(s)	Ditto as Item 1, but rated primary current (I_n) and secondary current 100/5 A.
8.	1060040025	set(s)	Ditto as Item 1, but rated primary current (I_n) and secondary current 150/5 A.
9.	1060040032	set(s)	Ditto as Item 1, but rated primary current (I_n) and secondary current 50-100/5 A.
10.	1060040033	set(s)	Ditto as Item 1, but rated primary current (I_n) and secondary current 75-150/5 A.
11.	1060040026	set(s)	Ditto as Item 1, but rated primary current (I_n) and secondary current 200/5 A. Terminal pads : 4-hole Complete with primary connectors for aluminium conductor diameter of 17.6 mm (size 185 mm ²), three (3) sets of secondary connectors for copper conductor diameter of 1.9 mm (size 2.5 mm ²), ground terminals with solderless clamp type connector suitable for steel stranded conductor diameter of 9.0 mm (size 50 mm ²), and mounting provision.

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Item	PEA Material No.	Quantity	Description
12	1060040027	set(s)	<p>Ditto as Item 1, but:</p> <p>rated primary current (I_n) and secondary current . : 300/5 A</p> <p>Rated short-time thermal current (I_{th}), 1 s : not less than 25 kA</p> <p>Rated dynamic current (I_{dyn}) : not less than $2.5 \times I_{th}$ kA</p> <p>Terminal pads : 4-hole</p> <p>Complete with primary connectors for aluminium conductor diameter of 17.6 mm (sizes 185 mm²), three (3) sets of secondary connectors for copper conductor diameter of 1.9 mm (size 2.5 mm²), ground terminals with solderless clamp type connector suitable for steel stranded conductor diameter of 9.0 mm (sizes 50 mm²), and mounting provision.</p>
13	1060040028	set(s)	<p>Ditto as Item 1, but:</p> <p>rated primary current (I_n) and secondary current . : 400/5 A</p> <p>Rated short-time thermal current (I_{th}), 1 s : not less than 25 kA</p> <p>Rated dynamic current (I_{dyn}) : not less than $2.5 \times I_{th}$ kA</p> <p>Terminal pads : 4-hole</p> <p>Complete with primary connectors for aluminium conductor diameter of 17.6 mm (sizes 185 mm²), three (3) sets of secondary connectors for copper conductor diameter of 1.9 mm (size 2.5 mm²), ground terminals with solderless clamp type connector suitable for steel stranded conductor diameter of 9.0 mm (sizes 50 mm²), and mounting provision.</p>

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Item	PEA Material No.	Quantity	Description
14	1060040029	set(s)	<p>Ditto as Item 1, but:</p> <p>rated primary current (I_n) and secondary current . : 500/5 A</p> <p>Rated short-time thermal current (I_{th}), 1 s : not less than 25 kA</p> <p>Rated dynamic current (I_{dyn}) : not less than $2.5 \times I_{th}$ kA</p> <p>Terminal pads : 4-hole</p> <p>Complete with primary connectors for aluminium conductor diameter of 17.6 mm (sizes 185 mm²), three (3) sets of secondary connectors for copper conductor diameter of 1.9 mm (size 2.5 mm²), ground terminals with solderless clamp type connector suitable for steel stranded conductor diameter of 9.0 mm (sizes 50 mm²), and mounting provision.</p>
15	1060040030	set(s)	<p>Ditto as Item 1, but:</p> <p>rated primary current (I_n) and secondary current . : 600/5 A</p> <p>Rated short-time thermal current (I_{th}), 1 s : not less than 25 kA</p> <p>Rated dynamic current (I_{dyn}) : not less than $2.5 \times I_{th}$ kA</p> <p>Terminal pads : 4-hole</p> <p>Complete with primary connectors for aluminium conductor diameter of 17.6 mm (sizes 185 mm²), three (3) sets of secondary connectors for copper conductor diameter of 1.9 mm (size 2.5 mm²), ground terminals with solderless clamp type connector suitable for steel stranded conductor diameter of 9.0 mm (sizes 50 mm²), and mounting provision.</p>

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Item	PEA Material No.	Quantity	Description
16	1060040122	set(s)	<p>Current transformer, single-phase, for outdoor installation, with:</p> <p>Rated voltage : 36 kV</p> <p>Rated primary current (I_n) and secondary current : 5/5 A</p> <p>Rated frequency : 50 Hz</p> <p>Polarity : subtractive</p> <p>Rated output : not less than 30 VA</p> <p>Accuracy class : 0.5 or better</p> <p>Instrument security factor (FS) : < 5</p> <p>One-minute power frequency withstand voltage on primary and secondary winding : not less than 70/3 kV (r.m.s.)</p> <p>Impulse withstand voltage : not less than 170 kV (peak)</p> <p>Rated short-time thermal current (I_{th}), 1 s : not less than $0.1 \times I_n$ kA</p> <p>Rated dynamic current (I_{dyn}) : not less than $2.5 \times I_{th}$ kA</p> <p>Insulation class of winding : class A (maximum temperature rise of 60 K), or better</p> <p>Minimum creepage distance of bushing, from live part to ground : not less than 900 mm</p> <p>Terminal pads : 2-hole</p> <p>Complete with primary connectors for aluminium conductor diameter of 9.0 mm (size 50 mm²), three (3) sets of secondary connectors for copper conductor diameter of 1.9 mm (size 2.5 mm²), ground terminals with solderless clamp type connector suitable for steel stranded conductor diameter of 9.0 mm (size 50 mm²), and mounting provision.</p> <p>The current transformer having total weight of no more than 70 kg is preferable.</p>

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Item	PEA Material No.	Quantity	Description
17	1060040112	30 เครื่อง set(s)	Ditto as Item 16, but rated primary current (I_n) and secondary current 10/5 A.
18	1060040113	16 เครื่อง set(s)	Ditto as Item 16, but rated primary current (I_n) and secondary current 20/5 A.
19	1060040114	10 เครื่อง set(s)	Ditto as Item 16, but rated primary current (I_n) and secondary current 30/5 A.
20	1060040115	set(s)	Ditto as Item 16, but rated primary current (I_n) and secondary current 50/5 A.
21	1060040116	10 เครื่อง set(s)	Ditto as Item 16, but rated primary current (I_n) and secondary current 75/5 A.
22	1060040117	set(s)	Ditto as Item 16, but rated primary current (I_n) and secondary current 100/5 A.
23	1060040118	set(s)	Ditto as Item 16, but rated primary current (I_n) and secondary current 150/5 A.
24	1060040119	set(s)	Ditto as Item 16, but rated primary current (I_n) and secondary current 200/5 A. Terminal pads : 4-hole Complete with primary connectors for aluminium conductor diameter of 17.6 mm (size 185 mm ²), three (3) sets of secondary connectors for copper conductor diameter of 1.9 mm (size 2.5 mm ²), ground terminals with solderless clamp type connector suitable for steel stranded conductor diameter of 9.0 mm (size 50 mm ²), and mounting provision.

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Item	PEA Material No.	Quantity	Description
25	1060040120	set(s)	Ditto as Item 16, but: rated primary current (I_n) and secondary current : 300/5 A Rated short-time thermal current (I_{th}), 1 s : not less than 25 kA Rated dynamic current (I_{dyn}) : not less than $2.5 \times I_{th}$ kA Terminal pads : 4-hole Complete with primary connectors for aluminium conductor diameter of 17.6 mm (sizes 185 mm ²), three (3) sets of secondary connectors for copper conductor diameter of 1.9 mm (size 2.5 mm ²), ground terminals with solderless clamp type connector suitable for steel stranded conductor diameter of 9.0 mm (sizes 50 mm ²), and mounting provision.
26	1060040121	set(s)	Ditto as Item 16, but: rated primary current (I_n) and secondary current : 400/5 A Rated short-time thermal current (I_{th}), 1 s : not less than 25 kA Rated dynamic current (I_{dyn}) : not less than $2.5 \times I_{th}$ kA Terminal pads : 4-hole Complete with primary connectors for aluminium conductor diameter of 17.6 mm (sizes 185 mm ²), three (3) sets of secondary connectors for copper conductor diameter of 1.9 mm (size 2.5 mm ²), ground terminals with solderless clamp type connector suitable for steel stranded conductor diameter of 9.0 mm (sizes 50 mm ²), and mounting provision.

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Item	PEA Material No.	Quantity	Description
27	1060020007	set(s)	<p>Voltage transformer, single-phase, double-bushing insulated, for outdoor installation, with:</p> <p>Rated voltage : 24 kV</p> <p>Rated primary and secondary voltage : 22,000/110 V</p> <p>Rated frequency : 50 Hz</p> <p>Polarity : subtractive</p> <p>Rated output : not less than 50 VA</p> <p>Accuracy class : 0.5 or better</p> <p>Voltage factor : 1.2 continuous, 1.5 at 30 sec</p> <p>One-minute power frequency withstand voltage on primary and secondary winding : not less than 50/3 kV (r.m.s.)</p> <p>Impulse withstand voltage : not less than 125 kV (peak)</p> <p>Insulation class of winding : class A (maximum temperature rise of 60 K), or better</p> <p>Minimum creepage distance of bushing, from live part to ground : not less than 600 mm</p> <p>Complete with primary solderless clamp type connectors for aluminium conductor diameter of 9.0 mm (size 50 mm²), three (3) sets of secondary connectors for copper conductor diameter of 1.9 mm (size 2.5 mm²), ground terminals with solderless clamp type connector suitable for steel stranded conductor diameter of 9.0 mm (size 50 mm²), and mounting provision.</p> <p>The voltage transformer having total weight of no more than 55 kg is preferable.</p>

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C3 Schedule of detailed requirement

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Item	PEA Material No.	Quantity	Description
28	1060020105	52 ชุด(s) เครื่อง	<p>Voltage transformer, single-phase, double-bushing insulated, for outdoor installation, with:</p> <p>Rated voltage : 36 kV</p> <p>Rated primary and secondary voltage : 33,000/110 V</p> <p>Rated frequency : 50 Hz</p> <p>Polarity : subtractive</p> <p>Rated output : not less than 50 VA</p> <p>Accuracy class : 0.5 or better</p> <p>Voltage factor : 1.2 continuous, 1.5 at 30 sec</p> <p>One-minute power frequency withstand voltage on primary and secondary winding : not less than 70/3 kV (r.m.s.)</p> <p>Impulse withstand voltage : not less than 170 kV (peak)</p> <p>Insulation class of winding : class A (maximum temperature rise of 60 K), or better</p> <p>Minimum creepage distance of bushing, from live part to ground : not less than 900 mm</p> <p>Complete with primary solderless clamp type connectors for aluminium conductor diameter of 9.0 mm (size 50 mm²), three (3) sets of secondary connectors for copper conductor diameter of 1.9 mm (size 2.5 mm²), ground terminals with solderless clamp type connector suitable for steel stranded conductor diameter of 9.0 mm (sizes 50 mm²), and mounting provision.</p> <p>The voltage transformer having total weight of no more than 70 kg is preferable.</p>

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FOR L.V. AND H.V. SYSTEM****Page 10 of 11****C3 Schedule of detailed requirement****Invitation to Bid No.: ๓.๓๖๗๖.(๖๗.)e-bidding017/2562**

Item	PEA Material No.	Quantity	Description
29	1060030000	set(s)	<p>Current transformer, single-phase, window type, for round conductor of no less than 32 mm in diameter, and for outdoor installation, with:</p> <p>Rated voltage : 0.6 kV</p> <p>Rated primary current (I_n) and secondary current : 50/5 A</p> <p>Rated frequency : 50 Hz</p> <p>Rated output : not less than 5 VA</p> <p>Accuracy class : 0.5 or better</p> <p>Instrument security factor (FS) : < 5</p> <p>One-minute power frequency withstand voltage : 3 kV (r.m.s.)</p> <p>Rated short-time thermal current (I_{th}), 1 s : not less than $60 \times I_n$ A</p> <p>Insulation class of winding : class A (maximum temperature rise of 60 K), or better</p> <p>Complete with sealable secondary terminal cover and mounting provision.</p>

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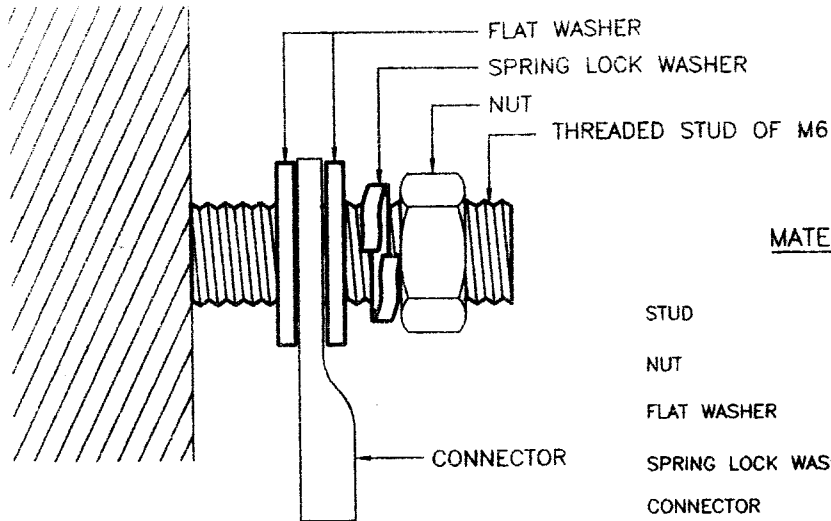
C3 Schedule of detailed requirement**Invitation to Bid No.:** ๓.3กบญ.(จษ.)e-bidding017/2562

Item	PEA Material No.	Quantity	Description
30	1060030001	set(s)	Ditto as Item 29, but rated primary current (I_n) and secondary current 100/5 A.
31	1060030100	set(s)	Ditto as Item 29, but rated primary current (I_n) and secondary current 150/5 A.
32	1060030002	set(s)	Ditto as Item 29, but rated primary current (I_n) and secondary current 200/5 A.
33	1060030003	set(s)	Ditto as Item 29, but rated primary current (I_n) and secondary current 250/5 A.
34	1060030004	set(s)	Ditto as Item 29, but round conductor of no less than 36 mm in diameter, rated primary current (I_n) and secondary current 300/5 A.
35	1060030005	set(s)	Ditto as Item 29, but round conductor of no less than 36 mm in diameter, rated primary current (I_n) and secondary current 400/5 A.

Note:

1. The bidders have to submit the sufficient references describing the previous experience of the suppliers (e.g. list of supply of equipment and/or materials having the same or similar design as proposed, field experience, the registration of TISI, the copies of license, and/or the inspection to supplier's factory by PEA's inspectors, etc.) to the satisfaction of PEA .
2. Enclosed ANNEX : CONSIDERATION OF TYPE TEST REPORT OF CURRENT TRANSFORMERS

PRELIMINARY



MATERIALS :

- STUD : BRASS
- NUT : BRASS WITH NICKEL PLATE
- FLAT WASHER : STAINLESS STEEL
- SPRING LOCK WASHER : STAINLESS STEEL
- CONNECTOR : COPPER WITH TIN PLATE

FIGURE 1 FOR THREADED STUD TYPE

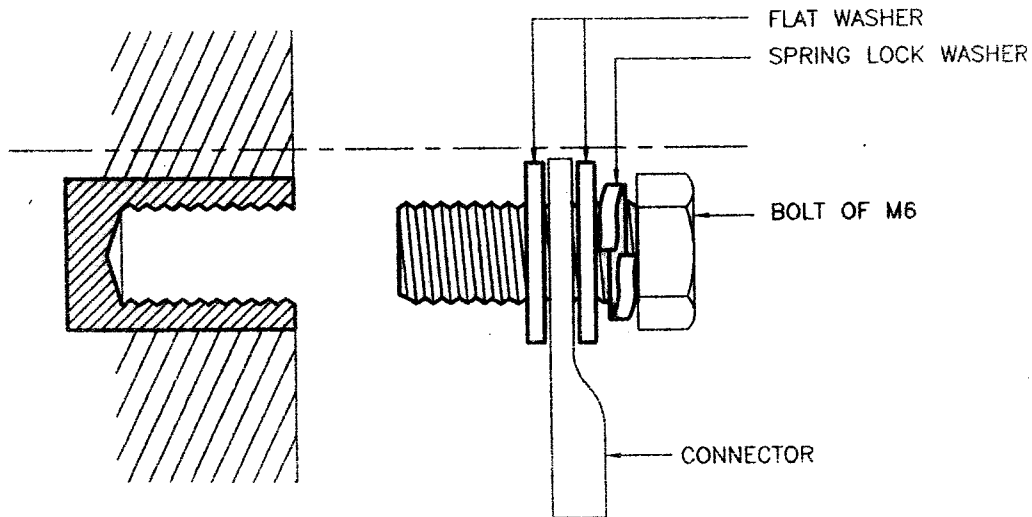


FIGURE 2 FOR BUSH & BOLT TYPE

MATERIALS :

- BUSH : BRASS
- BOLT : STAINLESS STEEL
- FLAT WASHER : STAINLESS STEEL
- SPRING LOCK WASHER : STAINLESS STEEL
- CONNECTOR : COPPER WITH TIN PLATE

กองมาตรฐานระบบไฟฟ้า ฝ่ายมาตรฐานและความปลอดภัย การไฟฟ้าส่วนภูมิภาค

มติเป็น วันที่ 12 ต.ค. 2548	รายละเอียดของหัวต่อสายแรงต่ำ สำหรับหม้อแปลงเครื่องมือวัด (ซีที. และ วีที. แรงสูง) DETAIL OF L.V. TERMINAL FOR INSTRUMENT TRANSFORMERS (CT AND VT)	แบบเลขที่ SA4-015/48001 แผ่นที่ 1 ของจำนวน 1 แผ่น
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พ.จ. 2

**PROVINCIAL ELECTRICITY AUTHORITY****POWER SYSTEM STANDARD DIVISION****Specification No. RMTR-021/2553 : INSTRUMENT TRANSFORMERS, OUTDOOR TYPE, FOR L.V. AND H.V. SYSTEM****Page 1 of 17****C4 Price schedule****Invitation to Bid No. ๓.3กบญ.(จษ.)e-bidding017/2562****Manufacturer :****Country of origin :****Trade-mark :**

Item	PEA Material No.	Catalogue No.	Description	Quantity	Unit Cost (See details & conditions attached)	Total Cost (See details & conditions attached)
1	1060040031		<p>Current transformer, single-phase, for outdoor installation, with:</p> <p>Rated voltage : 24 kV</p> <p>Rated primary and secondary current : 5/5 A</p> <p>Rated frequency : 50 Hz</p> <p>Rated short-time thermal current (I_{th}), 1 s : not less than $0.1 \times I_n$ kA</p> <p>Rated dynamic current (I_{dyn}) : not less than $2.5 \times I_{th}$ kA</p> <p>Terminal pads : 2-hole</p> <p>Complete with primary connectors for aluminium conductor diameter of 9.0 mm (size 50 mm²), three (3) sets of secondary connectors for copper conductor diameter of 1.9 mm (size 2.5 mm²), ground terminals with solderless clamp type connector suitable for steel stranded conductor diameter of 9.0 mm (size 50 mm²), and mounting provision.</p> <p>Minimum creepage distance of bushing, from live part to ground is mm.</p> <p>The total weight of one current transformer is kg.</p>	set(s)		

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Manufacturer :

Country of origin :

Trade-mark :

Item	PEA Material No.	Catalogue No.	Description	Quantity	Unit Cost (See details & conditions attached)	Total Cost (See details & conditions attached)
2	1060040019		Ditto as Item 1, but rated primary and secondary current 10/5 A. Minimum creepage distance of bushing, from live part to ground is mm. The total weight of one current transformer is kg.	set(s)		
3	1060040020		Ditto as Item 1, but rated primary and secondary current 20/5 A. Minimum creepage distance of bushing, from live part to ground is mm. The total weight of one current transformer is kg.	set(s)		
4	1060040021		Ditto as Item 1, but rated primary and secondary current 30/5 A. Minimum creepage distance of bushing, from live part to ground is mm. The total weight of one current transformer is kg.	set(s)		
5	1060040022		Ditto as Item 1, but rated primary and secondary current 50/5 A. Minimum creepage distance of bushing, from live part to ground is mm. The total weight of one current transformer is kg.	set(s)		

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Manufacturer :

Country of origin :

Trade-mark :

Item	PEA Material No.	Catalogue No.	Description	Quantity	Unit Cost (See details & conditions attached)	Total Cost (See details & conditions attached)
6	1060040023		Ditto as Item 1, but rated primary and secondary current 75/5 A. Minimum creepage distance of bushing, from live part to ground is mm. The total weight of one current transformer is kg.	set(s)		
7	1060040024		Ditto as Item 1, but rated primary and secondary current 100/5 A. Minimum creepage distance of bushing, from live part to ground is mm. The total weight of one current transformer is kg.	set(s)		
8	1060040025		Ditto as Item 1, but rated primary and secondary current 150/5 A. Minimum creepage distance of bushing, from live part to ground is mm. The total weight of one current transformer is kg.	set(s)		

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Manufacturer :

Country of origin :

Trade-mark :

Item	PEA Material No.	Catalogue No.	Description	Quantity	Unit Cost (See details & conditions attached)	Total Cost (See details & conditions attached)
9	1060040032		Ditto as Item 1, but rated primary and secondary current 50-100/5 A. Minimum creepage distance of bushing, from live part to ground is mm. The total weight of one current transformer is kg.	set(s)		
10	1060040033		Ditto as Item 1, but rated primary and secondary current 75-150/5 A. Minimum creepage distance of bushing, from live part to ground is mm. The total weight of one current transformer is kg.	set(s)		
11	1060040026		Ditto as Item 1, but rated primary and secondary current 200/5 A. Terminal pads : 4-hole Complete with primary connectors for aluminium conductor diameter of 17.6 mm (size 185 mm ²), three (3) sets of secondary connectors for copper conductor diameter of 1.9 mm (size 2.5 mm ²), ground terminals with solderless clamp type connector suitable for steel stranded conductor diameter of 9.0 mm (size 50 mm ²), and mounting provision.	set(s)		



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C4 Price schedule

Invitation to Bid No. ๓.3กบญ.(จช.)e-bidding017/2562

Manufacturer :

Country of origin :

Trade-mark :

Item	PEA Material No.	Catalogue No.	Description	Quantity	Unit Cost (See details & conditions attached)	Total Cost (See details & conditions attached)
12	1060040027		<p>Minimum creepage distance of bushing, from live part to ground is mm.</p> <p>The total weight of one current transformer is kg.</p> <p>Ditto as Item 1, but:</p> <p>Rated primary and secondary current : 300/5 A.</p> <p>Rated short-time thermal current (I_{th}), 1 s : not less than 25 kA</p> <p>Terminal pads : 4-hole</p> <p>Complete with primary connectors for aluminium conductor diameter of 17.6 mm (size 185 mm²), three (3) sets of secondary connectors for copper conductor diameter of 1.9 mm (size 2.5 mm²), ground terminals with solderless clamp type connector suitable for steel stranded conductor diameter of 9.0 mm (size 50 mm²), and mounting provision.</p> <p>Minimum creepage distance of bushing, from live part to ground is mm.</p> <p>The total weight of one current transformer is kg.</p>	set(s)		

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C4 Price schedule**Invitation to Bid No.** ๓.3กบข. (จข.) e-bidding017/2562**Manufacturer :****Country of origin :****Trade-mark :**

Item	PEA Material No.	Catalogue No.	Description	Quantity	Unit Cost (See details & conditions attached)	Total Cost (See details & conditions attached)
13	1060040028		Ditto as Item 1, but: Rated primary and secondary current : 400/5 A. Rated short-time thermal current (I_{th}), 1 s : not less than 25 kA Terminal pads : 4-hole Complete with primary connectors for aluminium conductor diameter of 17.6 mm (size 185 mm ²), three (3) sets of secondary connectors for copper conductor diameter of 1.9 mm (size 2.5 mm ²), ground terminals with solderless clamp type connector suitable for steel stranded conductor diameter of 9.0 mm (size 50 mm ²), and mounting provision. Minimum creepage distance of bushing, from live part to ground is mm. The total weight of one current transformer is kg.	set(s)		

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Item	PEA Material No.	Catalogue No.	Description	Quantity	Unit Cost (See details & conditions attached)	Total Cost (See details & conditions attached)
14	1060040029		Ditto as Item 1, but: Rated primary and secondary current : 500/5 A. Rated short-time thermal current (I_{th}), 1 s : not less than 25 kA Terminal pads : 4-hole Complete with primary connectors for aluminium conductor diameter of 17.6 mm (sizes 185 mm ²), three (3) sets of secondary connectors for copper conductor diameter of 1.9 mm (size 2.5 mm ²), ground terminals with solderless clamp type connector suitable for steel stranded conductor diameter of 9.0 mm (sizes 50 mm ²), and mounting provision. Minimum creepage distance of bushing, from live part to ground is mm. The total weight of one current transformer is kg.	set(s)		

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Item	PEA Material No.	Catalogue No.	Description	Quantity	Unit Cost (See details & conditions attached)	Total Cost (See details & conditions attached)
15	1060040030		Ditto as Item 1, but: Rated primary and secondary current : 600/5 A. Rated short-time thermal current (I_{th}), 1 s : not less than 25 kA Terminal pads : 4-hole Complete with primary connectors for aluminium conductor diameter of 17.6 mm (sizes 185 mm ²), three (3) sets of secondary connectors for copper conductor diameter of 1.9 mm (size 2.5 mm ²), ground terminals with solderless clamp type connector suitable for steel stranded conductor diameter of 9.0 mm (sizes 50 mm ²), and mounting provision. Minimum creepage distance of bushing, from live part to ground is mm. The total weight of one current transformer is kg.	set(s)		

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Manufacturer :

Country of origin :

Trade-mark :

Item	PEA Material No.	Catalogue No.	Description	Quantity	Unit Cost (See details & conditions attached)	Total Cost (See details & conditions attached)
16	1060040122		<p>Current transformer, single-phase, for outdoor installation, with:</p> <p>Rated voltage : 36 kV</p> <p>Rated primary and secondary current : 5/5 A.</p> <p>Rated frequency : 50 Hz</p> <p>Rated short-time thermal current (I_{th}), 1 s : not less than $0.1 \times I_n$ kA</p> <p>Rated dynamic current (I_{dyn}) : not less than $2.5 \times I_{th}$ kA</p> <p>Terminal pads : 2-hole</p> <p>Complete with primary connectors for aluminium conductor diameter of 9.0 mm (sizes 50 mm²), three (3) sets of secondary connectors for copper conductor diameter of 1.9 mm (size 2.5 mm²), ground terminals with solderless clamp type connector suitable for steel stranded conductor diameter of 9.0 mm (sizes 50 mm²), and mounting provision.</p> <p>Minimum creepage distance of bushing, from live part to ground is mm.</p> <p>The total weight of one current transformer is kg.</p>	set(s)		

**PROVINCIAL ELECTRICITY AUTHORITY****POWER SYSTEM STANDARD DIVISION****Specification No. RMTR-021/2553 : INSTRUMENT TRANSFORMERS, OUTDOOR TYPE, FOR L.V. AND H.V. SYSTEM****Page 10 of 17****C4 Price schedule****Invitation to Bid No.** ต.3กบญ.(จช.)e-bidding017/2562**Manufacturer :****Country of origin :****Trade-mark :**

Item	PEA Material No.	Catalogue No.	Description	Quantity	Unit Cost (See details & conditions attached)	Total Cost (See details & conditions attached)
17	1060040112		Ditto as Item 16, but rated primary and secondary current 10/5 A. Minimum creepage distance of bushing, from live part to ground is mm. The total weight of one current transformer is kg.	30 เครื่อง set(s)		
18	1060040113		Ditto as Item 16, but rated primary and secondary current 20/5 A. Minimum creepage distance of bushing, from live part to ground is mm. The total weight of one current transformer is kg.	16 เครื่อง set(s)		
19	1060040114		Ditto as Item 16, but rated primary and secondary current 30/5 A. Minimum creepage distance of bushing, from live part to ground is mm. The total weight of one current transformer is kg.	10 เครื่อง set(s)		
20	1060040115		Ditto as Item 16, but rated primary and secondary current 50/5 A. Minimum creepage distance of bushing, from live part to ground is mm. The total weight of one current transformer is kg.	set(s)		



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Manufacturer :

Country of origin :

Trade-mark :

Item	PEA Material No.	Catalogue No.	Description	Quantity	Unit Cost (See details & conditions attached)	Total Cost (See details & conditions attached)
21	1060040116		Ditto as Item 16, but rated primary and secondary current 75/5 A. Minimum creepage distance of bushing, from live part to ground is mm. The total weight of one current transformer is kg.	10 เครื่อง set(s)		
22	1060040117		Ditto as Item 16, but rated primary and secondary current 100/5 A. Minimum creepage distance of bushing, from live part to ground is mm. The total weight of one current transformer is kg.	set(s)		
23	1060040118		Ditto as Item 16, but rated primary and secondary current 150/5 A. Minimum creepage distance of bushing, from live part to ground is mm. The total weight of one current transformer is kg.	set(s)		



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Manufacturer :

Country of origin :

Trade-mark :

Item	PEA Material No.	Catalogue No.	Description	Quantity	Unit Cost (See details & conditions attached)	Total Cost (See details & conditions attached)
24	1060040119		Ditto as Item 16, but rated primary and secondary current 200/5 A. Terminal pads : 4-hole Complete with primary connectors for aluminium conductor diameter of 17.6 mm (sizes 185 mm ²), three (3) sets of secondary connectors for copper conductor diameter of 1.9 mm (size 2.5 mm ²), ground terminals with solderless clamp type connector suitable for steel stranded conductor diameter of 9.0 mm (sizes 50 mm ²), and mounting provision. Minimum creepage distance of bushing, from live part to ground is mm. The total weight of one current transformer is kg.	set(s)		

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Item	PEA Material No.	Catalogue No.	Description	Quantity	Unit Cost (See details & conditions attached)	Total Cost (See details & conditions attached)
25	1060040120		Ditto as Item 16, but: Rated primary and secondary current : 300/5 A. Rated dynamic current (I_{dyn}) : not less than 25 kA Terminal pads : 4-hole Complete with primary connectors for aluminium conductor diameter of 17.6 mm (size 185 mm ²), three (3) sets of secondary connectors for copper conductor diameter of 1.9 mm (size 2.5 mm ²), ground terminals with solderless clamp type connector suitable for steel stranded conductor diameter of 9.0 mm (size 50 mm ²), and mounting provision. Minimum creepage distance of bushing, from live part to ground is mm. The total weight of one current transformer is kg.	set(s)		

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Manufacturer :

Country of origin :

Trade-mark :

Item	PEA Material No.	Catalogue No.	Description	Quantity	Unit Cost (See details & conditions attached)	Total Cost (See details & conditions attached)
26	1060040121		Ditto as Item 16, but: Rated primary and secondary current : 400/5 A. Rated dynamic current (I_{dyn}) : not less than 25 kA Terminal pads : 4-hole Complete with primary connectors for aluminium conductor diameter of 17.6 mm (size 185 mm ²), three (3) sets of secondary connectors for copper conductor diameter of 1.9 mm (size 2.5 mm ²), ground terminals with solderless clamp type connector suitable for steel stranded conductor diameter of 9.0 mm (size 50 mm ²), and mounting provision. Minimum creepage distance of bushing, from live part to ground is mm. The total weight of one current transformer is kg.	set(s)		

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Item	PEA Material No.	Catalogue No.	Description	Quantity	Unit Cost (See details & conditions attached)	Total Cost (See details & conditions attached)
27	1060020007		<p>Voltage transformer, single-phase, double-bushing insulated, for outdoor installation, with:</p> <p>Rated voltage : 24 kV</p> <p>Rated primary and secondary voltage : 22,000/110 V</p> <p>Rated frequency : 50 Hz</p> <p>Complete with primary solderless clamp type connectors for aluminium conductor diameter of 9.0 mm (size 50 mm²), three (3) sets of secondary connectors for copper conductor diameter of 1.9 mm (size 2.5 mm²), ground terminals with solderless clamp type connector suitable for steel stranded conductor diameter of 9.0 mm (size 50 mm²), and mounting provision.</p> <p>Minimum creepage distance of bushing, from live part to ground is mm.</p> <p>The total weight of one voltage transformer is kg.</p>	set(s)		

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Manufacturer :

Country of origin :

Trade-mark :

Item	PEA Material No.	Catalogue No.	Description	Quantity	Unit Cost (See details & conditions attached)	Total Cost (See details & conditions attached)
28	1060020105		Ditto as Item 27, but: Rated voltage : 36 kV Rated primary and secondary voltage : 33,000/110 V Minimum creepage distance of bushing, from live part to ground is mm. The total weight of one voltage transformer is kg.	52 เครื่อง set(s)		
29	1060030000		Current transformer, single-phase, window type, outdoor installation, for 0.6 kV 50 Hz system, rated primary and secondary current 50/5 A, for round conductor of mm in diameter. Complete with sealable secondary terminal cover and mounting provision.	set(s)		
30	1060030001		Ditto as Item 29, but rated primary and secondary current 100/5 A, for round conductor of mm in diameter.	set(s)		

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Manufacturer :**Country of origin :****Trade-mark :**

Item	PEA Material No.	Catalogue No.	Description	Quantity	Unit Cost (See details & conditions attached)	Total Cost (See details & conditions attached)
31	1060030100		Ditto as Item 29, but rated primary and secondary current 150/5 A, for round conductor of mm in diameter.	set(s)		
32	1060030002		Ditto as Item 29, but rated primary and secondary current 200/5 A, for round conductor of mm in diameter.	set(s)		
33	1060030003		Ditto as Item 29, but rated primary and secondary current 250/5 A, for round conductor of mm in diameter.	set(s)		
34	1060030004		Ditto as Item 29, but rated primary and secondary current 300/5 A, for round conductor of mm in diameter.	set(s)		
35	1060030005		Ditto as Item 29, but rated primary and secondary current 400/5 A, for round conductor of mm in diameter. หมายเหตุ : กำหนดจุดจัดส่ง ณ แผนกคลังพัสดุ การไฟฟ้าส่วนภูมิภาคจังหวัดยะลา ส่งมอบภายใน 30 วันนับถัดจากวันที่ลงนามในสัญญาและภายในงวดสามารถทยอยจัดส่งได้	set(s)		