

Invitation to Bid No. : ศ.3กบญ.(จข.)e-bidding009/2562

Specification No. : R-652/2538

**C Material, equipment, and specifications for CONNECTORS AND ELECTRICAL CONTACT COMPOUND**

**C1 General material and packing instructions**

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

**1a Scope**

These specifications cover mechanical, compression and wedge type connectors to connect conductors, and electrical contact compound.

**1b Standard**

The connectors shall be manufactured and tested in accordance with the latest IEEE, ANSI, EEI-NEMA, ASTM, VDE Regulations and DIN, or equivalent; unless otherwise specified in these specifications.

The bodies of connectors shall be of aluminium-alloy according to manufacturer's standards, unless otherwise specified in these specifications.

**1c Principal requirement**

**1c.1 General**

The connectors shall be suitable for connecting stranded and/or solid conductors according to DIN, TIS, or equivalent; unless otherwise specified in these specifications.

**1c.2 Bolted type connector**

For the purpose of against self loosening, each bolt shall be furnished with at least of one (1) locknut. The bolts shall be designed for single-wrench installation. Each U-bolt is counted as two (2) bolts. The bolts shall be tightened to torque levels according to these shown in the table below or according to manufacturer's recommendation; the technical details of tightening torque levels shall be submitted on request.

All ferrous materials shall be hot-dip galvanized after manufacturing; except bolts, lockwashers, washers, and nuts up to M6 shall be electro galvanized; according to the relevant standards or having the thickness or zinc coating shown in the table below.

Sizes of Bolts, Lockwashers, Washers, and Nuts	Tightening Torque Level of Galvanized Steel Bolts kgf-m	Minimum Thickness of Zinc Coating mm.
M 6 (1/4")	-	0.010
M 8 (5/16")	2.0	0.040
M 10 (3/8")	2.7	0.040
M 12 (1/2")	5.5	0.040
M 14 (9/16")	6.5	0.040
M 16 (5/8")	7.5	0.040
M 20 (3/4")	11.0	0.045

### 1c.3 **Compression type connector**

Full tension sleeves and partial tension sleeves shall withstand at least 90% and 40%, respectively, of the minimum breaking strength of the conductors for which they are designed. Each sleeve shall be prefilled with electrical contact compound and closed both ends by plastic caps.

Conductor barrel of each terminal lug shall be prefilled with electrical contact compound and closed by a plastic cap.

Tap connectors shall be prefilled with electrical contact compound and packed in suitable packages, one (1) or two (2) pieces per package.

### 1c.4 **Compression deadend assembly set**

The aluminium body and aluminium jumper terminal shall accommodate aluminium conductor which is according to TIS; and the conductor barrel shall be prefilled with electrical contact compound and closed by a plastic cap.

**1c.5 Wedge type connector**

The wedge type connector shall consist of C-shaped member and wedge, and made of aluminium alloys which shall be described.

The wedge type connector shall pass the current cycle tests Class A (500 cycles) in accordance with the latest EEI-TDJ-162/NEMA C3, ANSI C 119.4 or equivalent.

Bidders who have never submitted the test reports of current cycle tests shall submit either prior to receipt of bids or within fifteen (15) days of the bid closing date, for saving bid consideration time, the Item without submitting the report shall be rejected.

**1c.6 Marking**

Each connector shall be marked, on the body, at least as follows :

- (1) Applicable conductor type and size.
- (2) Manufacturer's symbol.
- (3) Marks to press, for compression type only.
- (4) Words "FULL TENSION" and "PARTIAL TENSION", on full tension sleeves and partial tension sleeves, respectively.

Except for compression type tap connectors for main line size less than 10 mm<sup>2</sup> (not including size 10 mm<sup>2</sup>), if the applicable conductor type and size can not be marked on the bodies, the marks shall be marked on individual packages.

**1c.7 Sample**

Free samples shall be supplied on request. The samples will not be returned.

**1d Packing**

Each item shall be packed separately in suitable packages in sets or pieces of 1, 2, 100, 200, 250, or 300 .

Packages of same item may be packed together in suitable cases.

**C2 Material and packing data to be given by bidder**

- 2a For each item offered, the following details shall be submitted with the bid :
- Catalogue number.
  - Specifications of materials used for the component parts (body, bolts, nuts, screws, lockwashers, washers, etc.) .
  - Surface finishing of the component parts.
  - Nominal cross-sectional area in mm<sup>2</sup> of conductor for which the connector is designed.
  - Diameter in mm of conductor for which the connector is designed.
  - Material of conductors for which the connector can be used (Al, ACSR, Cu, etc.) .
  - Recommended tightening torques for bolts in kgf-m .
  - Weight in kg/100 sets or pieces.
- 2b It shall be advised whether the connectors should be protected by armour tape or preformed line guards, etc.
- 2c For each item offered, a drawing with dimensions in mm and marking details shall be submitted with the bid. For compression type connector, a drawing with the dimensions including inside and outside diameters and marking details shall be submitted.
- 2d Number of aluminium-alloy copper-alloy, and/or the chemical compositions of the bodies of connectors.

**2e Packing details**

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II

Packing method.

Number of sets or pieces in each package (maximum 300 sets or pieces in one package)

Principal dimensions of each package in cm .

Volume of each package in  $m^3$  .

Gross weight of each package in kg .

Net weight of each package in kg .

Number of packages.

If several packages are contained in one big case, further details are required :

Number of packages in each case.

Principal dimensions of each case in cm .

Volume of each case in  $m^3$  .

Gross weight of each case in kg .

Number of cases.

Table  
Packing Details for Connectors

PEA Material No.	Quantity Per Package	Packing Method
02300101, 02300102, 02310000	250	Sack
02300103	75	Sack
02310001	200	Sack
02310002	100	Sack
-	1,000	Sack



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### Addendum

This addendum is made to be a part of specifications it's attached.

1. Replace the packing detail only for the specific items in the specifications by the packing detail specified in **Table A1** below:

**Table A1: Packing Detail**

Item	Equipment	PEA's material No.	Packing method	Quantity per package/case	Number of packages/cases per pallet
<b>Connectors and cable accessories:</b>					
1	Hot line bail clamp (hot line stirrup clamp), for main aluminium conductor size 25 mm <sup>2</sup> to 50 mm <sup>2</sup>	1-02-033-0000	Sealed package	40	49
2	Hot line protected thread clamp for main aluminium conductor size 25 mm <sup>2</sup> to 50 mm <sup>2</sup>	1-02-033-0100	Sealed package	50	100
3	Hot line protected thread clamp for main aluminium conductor size 50 mm <sup>2</sup> to 120 mm <sup>2</sup>	1-02-033-0101	Sealed package	50	50
4	Compression splicing sleeve, full tension, for aluminium conductor size 50 mm <sup>2</sup>	1-02-040-0002	Suitable package	100	100
5	Compression splicing sleeve, full tension, for aluminium conductor size 95 mm <sup>2</sup>	1-02-040-0004	Suitable package	50	100
6	Compression splicing sleeve, full tension, for aluminium conductor size 185 mm <sup>2</sup>	1-02-040-0007	Suitable package	30	50
7	Compression splicing sleeve, full tension, for aluminium conductor size 400 mm <sup>2</sup>	1-02-040-0009	Suitable package	30	50
8	Compression splicing sleeve, partial tension, for aluminium conductor size 50 mm <sup>2</sup>	1-02-041-0002	Suitable package	100	100
9	Terminal connector (lug), compression type, for aluminium conductor size 185 mm <sup>2</sup>	1-02-041-0106	Suitable package	50	50
10	Pin terminal, for aluminium conductor size 50 mm <sup>2</sup>	1-02-042-0400	Suitable package	50	100
<b>Overhead line hardware:</b>					
11	Angle steel crossarm, size 150x100x12 mm, length 4,500 mm	1-00-012-0002	Bundle	10	-
12	Channel steel crossarm, size 100x50x5 mm, length 4,200 mm	1-01-000-0103	Bundle	20	-
13	Channel steel crossarm, size 100x50x5 mm, length 4,500 mm	1-01-000-0104	Bundle	20	-
14	Channel steel crossarm, size 150x75x6 mm, length 2,800 mm	1-01-000-0300	Bundle	20	-
15	Channel steel crossarm, size 150x75x6.5 mm, length 4,000 mm	1-01-000-0301	Bundle	20	-



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Item	Equipment	PEA's material No.	Packing method	Quantity per package/case	Number of packages/cases per pallet
16	Channel steel beam, size 150x75x6.5 mm, length 4,500 mm	1-01-000-0302	Bundle	20	-
17	Channel steel beam, size 150x75x6.5 mm, length 6,000 mm	1-01-000-0303	Bundle	20	-
18	Channel steel beam, size 150x75x6.5 mm, length 2,500 mm	1-01-000-0304	Bundle	20	-
19	Channel steel crossarm, size 150x75x9 mm, length 3,000 mm	1-00-012-0004	Bundle	20	-
20	Angle steel beam, size 65x65x6 mm, length 1,000 mm	1-01-001-0000	Bundle	100	-
21	Bolt, machine, M 16 x 170 mm	1-01-011-0201	Sack	100	56
22	Bolt, machine, M 16 x 300 mm	1-01-011-0204	Sack	80	56
23	Bolt, machine, M 16 x 350 mm	1-01-011-0205	Sack	80	56
24	Bolt, machine, M 16 x 450 mm	1-01-011-0207	Sack	40	56
25	Bolt, machine, M 16 x 500 mm	1-01-011-0208	Sack	40	50
26	Bolt, machine, M 16 x 600 mm	1-01-011-0209	Sack	40	50
27	Bolt, machine, hexagon head, M 16 x 75 mm	1-01-011-0400	Sack	200	56
28	Bolt, machine, hexagon head, M 16 x 550 mm	1-01-011-0401	Sack	40	50
29	Bolt, machine, hexagon head, M 16 x 600 mm	1-01-011-0402	Sack	40	50
30	Bolt, machine, hexagon head, M 16 x 650 mm	1-01-011-0403	Sack	30	50
31	Bolt, double arming, full thread, M 16 x 450 mm	1-01-012-0001	Sack	40	50
32	Bolt, double arming, full thread, M 16 x 500 mm	1-01-012-0002	Sack	40	50
33	Bolt, double arming, full thread, M 16 x 550 mm	1-01-012-0003	Sack	40	50
34	Bolt, double arming, full thread, M 16 x 600 mm	1-01-012-0004	Sack	40	50
35	Bolt, double arming, full thread, M 16 x 650 mm	1-01-012-0005	Sack	30	50
36	Bolt, double arming eye, M 16 x 450 mm	1-01-013-0001	Sack	40	56
37	Bolt, double arming eye, M 16 x 500 mm	1-01-013-0002	Sack	40	50
38	Bolt, double arming eye, M 16 x 650 mm	1-01-013-0005	Sack	30	50
39	Bolt, round eye, M 16 x 200 mm	1-01-014-0001	Sack	80	56
40	Bolt, round eye, M 16 x 250 mm	1-01-014-0002	Sack	80	56
41	Bolt, round eye, M 16 x 300 mm	1-01-014-0003	Sack	50	56
42	Bolt, oval eye, M 16 x 150 mm	1-01-015-0000	Sack	80	56
43	Bolt, oval eye, M 16 x 200 mm	1-01-015-0001	Sack	80	56
<b>Insulators and accessories:</b>					
44	Insulator, pin-post type, TIS 1251, Type 56/57-2	1-03-001-0101	Export package	2	30
45	Clevis-eye	1-03-014-0000	Suitable package	40	56
46	Ball-clevis, ANSI Type K	1-03-014-0001	Suitable package	30	56





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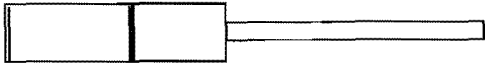
Item	Equipment	PEA's material No.	Packing method	Quantity per package/case	Number of packages/cases per pallet
47	Ball-hook, ANSI Type B	1-03-014-0002	Suitable package	40	56
48	Ball-clevis, ANSI Type B	1-03-014-0005	Suitable package	40	56
<b>Surge arresters:</b>					
49	LV surge arrester, 480 V, 5 kA	1-04-000-0300	Suitable package	100	5
<b>Meters:</b>					
50	Watt-hour meter, 15(45) A, 3-phase 4-wire	1-06-005-0107	Suitable corrugate-paper package	50	-
51	Watt-hour meter, 30(100) A, 3-phase 4-wire	1-06-005-0108	Suitable corrugate-paper package	50	-

2. Sacks used for packing equipment shall have enough durability and shall be made of hemp rope.
3. Bundle packing shall be using galvanized steel wires with diameter not less than 4 mm.
4. Pallets supplied to PEA shall have dimension not more than 1.1 m x 1.1 m (Width x Length) and the total height after containing the packages/cases shall be less than 1.5 m.

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C3 Schedule of detailed requirement

Item	PEA Material No.	Quantity	Description
1	1020420400	8,115 pcs	<p>Pin terminal, made of aluminium sleeve bonded to copper stud, for making termination of aluminium conductor according to TIS 85-2522 : size 50 mm<sup>2</sup> (dia. 9.06 mm) to copper alloy terminal clamp of equipment.</p> <p>The copper stud shall be tin-plated, if necessary</p> <p>The aluminium sleeve shall be pre-filled with electrical contact aid compound and capped.</p> <p>See figure below :</p> <p>The installation tool shall be ANDERSON VC-6 .</p> <div data-bbox="735 1178 1219 1240" style="text-align: center;"></div> <p><u>Note :</u></p> <ol style="list-style-type: none"><li>1. Enclosed Drawing No. SA4-015/37009</li><li>2. The bidder has to supply three (3) pieces of pin terminal as samples, within fifteen (15) days, counted from the Committee's request.</li></ol> <p>The samples will not be returned.</p>

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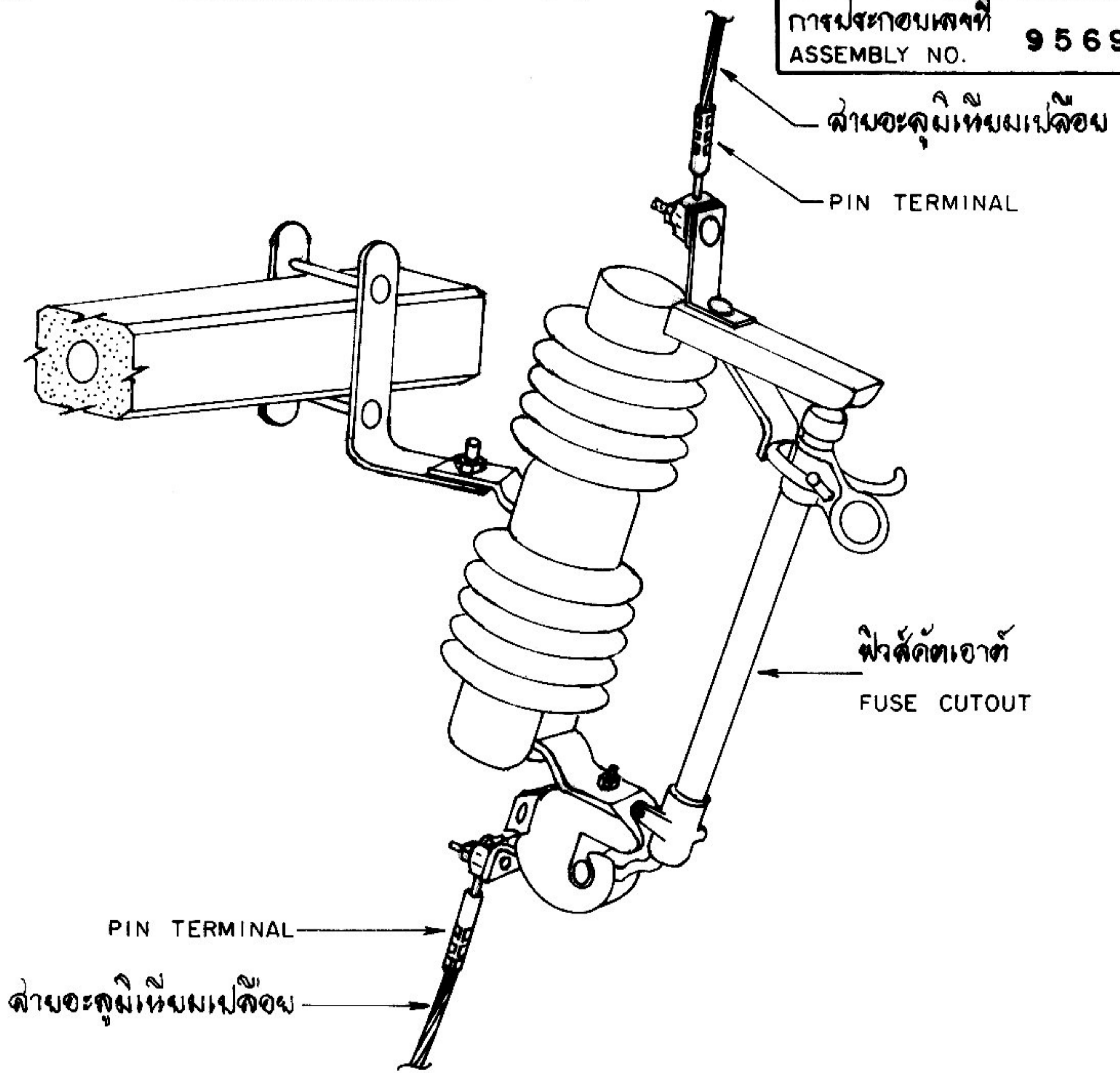
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C3 Schedule of detailed requirement

Item	PEA Material No	Quantity	Description
			<p>การไฟฟ้าส่วนภูมิภาคจะพิจารณาจัดซื้อ/จัดจ้างพัสดุที่ผลิตในประเทศไทย ทั้งนี้หากผู้เสนอราคาพัสดุที่ผลิตในประเทศไทย มีรายละเอียดคุณลักษณะเฉพาะไม่เป็นไปตามข้อกำหนดของการไฟฟ้าส่วนภูมิภาค หรือไม่มีผู้เสนอพัสดุที่ผลิตในประเทศไทย การไฟฟ้าส่วนภูมิภาคจะพิจารณาจัดซื้อ/จัดจ้างพัสดุที่ผลิตจากต่างประเทศต่อไป</p> <p>พัสดุที่ผลิตในประเทศไทย หมายความว่าถึง ผลิตภัณฑ์ที่ผลิตสำเร็จรูปแล้วโดยสถานที่ผลิตตั้งอยู่ในประเทศไทย</p>



การประกอบเลขที่ 9569  
ASSEMBLY NO.



การใช้ PIN TERMINAL

ใช้เพื่ออุปกรณ์สำหรับต่อสายตามสายอะลูมิเนียม ต่อเข้ากับอุปกรณ์ไฟฟ้า เช่น ฟิวส์คัทเอาต์, ซีที, จำนวนซึ่งแรงต่ำของหม้อแปลง 1 เฟส, ดิสคอนเนคติงสวิทช์ ที่มีขั้วต่อสายแบบ BOLT TYPE เพื่อป้องกันปัญหาจุดเข้าสายอุปกรณ์ไฟฟ้าอื่น และอาร์กขาดได้

ข้อแนะนำในการใช้งาน

1. เลือกขนาด PIN TERMINAL ให้เหมาะสมกับขนาดของสายที่ใช้ต่อเข้าอุปกรณ์ไฟฟ้า
2. ทำความสะอาดปลายสาย และขั้วต่อสายของอุปกรณ์ไฟฟ้าด้วยแปรงขนเหล็ก
3. สอดปลายสายเข้าปลายข้างหนึ่งของ PIN TERMINAL บีบตัวจนเคี้ยวของมีขั้วติด ไขดงอติด
4. สอดปลายด้านที่เป็นทองแดงขั้วตูดึงเข้าขั้วต่อสายของอุปกรณ์ไฟฟ้ากดให้แน่นพอประมาณ

กองวิศวกรรมการไฟฟ้าและเครื่องมือ ฝ่ายวิศวกรรม	<b>การไฟฟ้าส่วนภูมิภาค</b>	ใต้เลขแบบ..... ถูกหมดโดยนาย..... เดือนสิงหาคมที่ 18 พ.ศ. 37
ผู้เขียน..... ผู้ตรวจ..... วิศวกร..... หัวหน้าแผนก..... ผู้อำนวยการกอง..... ผู้อำนวยการฝ่าย.....	ผู้ตรวจ..... วันที่..... 4/4/37 การใช้ PIN TERMINAL สำหรับต่อสายเข้าอุปกรณ์ไฟฟ้า	แก้มแบบวันที่..... ผลิตเป็น..... ขนาดสาย.....
ของผู้ว่าการส่วนภูมิภาค .....	USE OF PIN TERMINAL FOR MAKING TERMINATIONS OF CONDUCTORS IN TERMINALS OF EQUIPMENT	แบบเลขที่ SA4-015/37009 แผ่นที่!...ของจำนวน!...แผ่น

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Specification No.: R-652/2538

Manufacturer :

Trade-mark :

Country of origin :

Bidder :

Bid No.:

Date :

**C4 Price schedule**

Item	PEA Material No.	Catalogue No.	Description	Quantity	Unit Cost (See details & conditions attached)	Total Cost (See details & conditions attached)
1	-		Pin terminal, for making termination of aluminium conductor size ..... mm <sup>2</sup> .  หมายเหตุ - กำหนดจุดจัดส่งที่ แผนกคลังพัสดุ การไฟฟ้าส่วนภูมิภาคจังหวัดยะลา - กำหนดส่งมอบงวดเดียวภายใน 90 วัน นับถัดจากวันที่ผู้ขายลงนามในสัญญา และภายในงวด สามารถทยอยจัดส่งได้	8,115 pcs		
	III					