

**1ST DRAFT OF TERM OF REFERENCE, ANNOUNCEMENT
AND DETAILS OF MEDIUM COST
FOR INVITATION TO BID NO. TS12-MJ2-05 and GBA3-MJ2-04
SUPPLY OF POWER CIRCUIT BREAKER AND DISCONNECTING SWITCH
TRANSMISSION SYSTEM EXPANSION PROJECT NO. 12
BULK POWER SUPPLY FOR THE GREATER BANGKOK AND VICINITY
AREA PHASE 3**

The Electricity Generating Authority of Thailand (EGAT) plans to call for proposals for the subject Bid. Any person who has the authorization from the company, firm, joint venture or consortium who supplies or manufactures the equipment required under the subject Bid is allowed to submit a comment against the first draft of the Term of Reference (TOR), the Announcement and the details of medium cost attached herewith.

How to Comment

Those who would like to comment shall submit an official letter signed by the authorized person together with the letter of authorization or the power of attorney, and addressed to “Chief, International Procurement Department – Transmission Segment, Procurement and Inventory Management Division”.

Comments shall be submitted via EGAT Procurement website or via email address: Email sunisa.y@egat.co.th with all related documents attached (e.g. the letter of authorization and the power of attorney).

Comments shall be received by EGAT on or before ***July 10, 2019***, Bangkok Standard Time, **otherwise the comments will not be taken into consideration:**

EGAT reserves the right to change or not to change the terms and conditions contained in the Term of Reference, the Announcement and the details of medium cost subject to its consideration and such decision shall be final.

Sunisa Yaemyoo

Mrs. Sunisa Yaemyoo
Head, International Buy Section – Transmission System Segment
July 5, 2019



INVITATION TO BID NO. TS12-MJ2-05 and GBA3-MJ2-04
SUPPLY OF POWER CIRCUIT BREAKER AND DISCONNECTING SWITCH
TRANSMISSION SYSTEM EXPANSION PROJECT NO. 12
BULK POWER SUPPLY FOR THE GREATER BANGKOK AND VICINITY AREA PHASE 3

The Electricity Generating Authority of Thailand (EGAT) is calling for the subject Invitation to Bid to be financed by EGAT's fund.

Place of Delivery : Bangkok Port / Ex-works

Medium Cost (including Value Added Tax and other expenses) :

Schedule A1 and B1	:	THB 16,600,000.-
Schedule A2 and B2	:	THB 11,700,000.-
Schedule A3 and B3	:	THB 32,100,000.-
Schedule A4	:	THB 1,430,000.-

Eligibility of Bidders

1. The Bidder shall be a juristic person who manufactures or provides such materials or services and shall not be named in the List of Work Abandoners published by the Office of Prime Minister and/or in the Debarment List and/or in the List of Work Abandoners declared by EGAT.
2. The Bidder shall not be a Jointly Interested Bidder with other Bidders as from the date of EGAT's issuance of the Invitation, or shall not be a person who undertakes any action as an "Obstruction of Fair Price Competition" for this Invitation.
3. The Bidder shall not either be EGAT's consultant or involve in EGAT's consultancy company under this Invitation to Bid, or shall not have EGAT's personnel involved in his business as shareholder having voting right that can control his business, director, manager, officer, employee, agent, or consultant except those who are officially ordered by EGAT to act or participate therein.
4. The Bidder shall not be the person who is privileged or protected not to be taken any legal proceedings under Thai Court; Provided that such Bidder's government declares that such special privilege is waived.
5. The Bidder who is a joint venture or consortium shall carry out all the work under such formation from the time of bidding until the fulfillment of the Contract.

Availability of Bidding Documents

Bidding Documents in CD-ROM will be available for examination of Bidder's Qualifications and purchase during 8:00 hrs. to 15:00 hrs., Bangkok Standard Time, as from _____ to _____ at USD 16.- or THB 500.- per copy, non-refundable, at the following address :

International Procurement Department – Transmission Segment
(Room No. 1202/2, 12th Floor, Building Tor. 101)
Procurement and Inventory Management Division
Electricity Generating Authority of Thailand
Bangkruai, Nonthaburi 11130, Thailand
Telephone no. 66 2436 0241
E-mail : procurement.tse@egat.co.th

For more details and downloading Registration Form for purchasing Bidding Documents on website :

<http://www4.egat.co.th/fprocurement/biddingeng/>

Payment can be made by a certified cheque or money order payable to EGAT or by a telegraphic transfer to EGAT's current account no. 109-6-01958-2 (swift code : KRTHTHBK), Krung Thai Bank Public Company Limited, Bangkruai Branch, Nonthaburi. All bank charges and fees incurred by the payment of bidding documents shall be under the buyer's responsibility.

Bidding Documents in CD-ROM will be either airmailed or airfreighted to the buyer at EGAT's expense upon receipt of the relevant remittance. In case the buyer requires the Bidding Documents to be sent by Express Mail Service (EMS), the charge will be at the buyer's expense.

Delivery of Bids

Bids shall be submitted at Room No. 1202/1, 12th Floor, Building Tor. 101 during 9:30 hrs. to 10:00 hrs., Bangkok Standard Time, _____ and will be opened publicly at 10:00 hrs.

ELECTRICITY GENERATING AUTHORITY OF THAILAND

(Date of Announcement)

(Mrs. Nilanate Osotpavapusit)

Chief, International Procurement Department –
Transmission Segment

DRAFT



ประกาศการไฟฟ้าฝ่ายผลิตแห่งประเทศไทย
เรื่อง ประกวดราคาซื้อ เลขที่ TS12-MJ2-05 and GBA3-MJ2-04

การไฟฟ้าฝ่ายผลิตแห่งประเทศไทย (กฟผ.) มีความประสงค์จะซื้อ Power Circuit Breaker and Disconnecting Switch ภายใต้โครงการขยายระบบส่งไฟฟ้าระยะที่ 12 โครงการขยายระบบไฟฟ้าในเขตกรุงเทพและปริมณฑล ระยะที่ 3 โดยใช้งบประมาณ กฟผ.

สถานที่ส่งมอบ : ท่าเรือกรุงเทพฯ / หน้าโรงงานผู้ผลิต

ราคากลาง(รวมภาษีมูลค่าเพิ่มและค่าใช้จ่ายอื่นๆ)

Schedule A1 and B1	:	THB 16,600,000.-
Schedule A2 and B2	:	THB 11,700,000.-
Schedule A3 and B3	:	THB 32,100,000.-
Schedule A4	:	THB 1,430,000.-

คุณสมบัติของผู้เสนอราคา

1. ต้องเป็นนิติบุคคลผู้ผลิตหรือเป็นผู้มีอาชีพขายพัสดุตามประกาศ และต้องไม่เป็นผู้ที่งานซึ่งสำนักนายกรัฐมนตรีได้แจ้งเวียนชื่อไว้ หรือต้องไม่เป็นผู้ที่ กฟผ. ห้ามติดต่อหรือห้ามเข้าเสนอราคา หรือต้องไม่เป็นผู้ที่ได้รับผลของการสั่งให้นิติบุคคลหรือบุคคลอื่นเป็นผู้ที่งานตามคำสั่ง กฟผ.
2. ต้องไม่เป็นผู้มีผลประโยชน์ร่วมกันกับผู้เสนอราคารายอื่น ณ วันประกาศประกวดราคาครั้งนี้เป็นต้นไป หรือต้องไม่เป็นผู้กระทำการอันเป็นการขัดขวางการแข่งขันราคาอย่างเป็นธรรมในการดำเนินการประกวดราคาครั้งนี้
3. ต้องไม่เป็นที่ปรึกษาของ กฟผ. หรือมีส่วนร่วมในบริษัทที่ปรึกษาของ กฟผ. ในงานนี้ หรือต้องไม่มีผู้ปฏิบัติงาน กฟผ. เข้าไปมีส่วนร่วมในกิจการของผู้เสนอราคา ไม่ว่าจะในฐานะผู้ถือหุ้นที่มีสิทธิควบคุมการจัดการ กรรมการ ผู้อำนวยการ ผู้จัดการ พนักงาน ลูกจ้าง ตัวแทนหรือที่ปรึกษา ยกเว้น ในกรณีที่ผู้ปฏิบัติงานได้รับคำสั่งอย่างเป็นทางการจาก กฟผ. ให้ไปปฏิบัติงานหรือเข้าร่วมในกิจการของผู้เสนอราคา
4. ต้องไม่เป็นผู้ได้รับเอกลิขสิทธิ์หรือความคุ้มครอง ซึ่งอาจปฏิเสธไม่ยอมขึ้นศาลไทย เว้นแต่รัฐบาลของผู้เสนอราคาได้มีคำสั่งให้ละสิทธิ์และความคุ้มครองเช่นนั้น
5. ผู้ประสงค์เข้าประกวดราคาในนามของกิจการร่วมค้าหรือกิจการค้าร่วม (Joint Venture or Consortium) จะต้องดำเนินการทุกขั้นตอนของการประกวดราคาในนามของกิจการร่วมค้าหรือกิจการค้าร่วม ตั้งแต่การเสนอราคาจนถึงสิ้นสุดข้อผูกพันกับ กฟผ.

การขายเอกสารประกวดราคา

ผู้สนใจติดต่อขอทราบรายละเอียด เพื่อตรวจสอบคุณสมบัติของผู้เสนอราคา และขอซื้อเอกสารประกวดราคา ในราคาชุดละ 500.- บาท ได้ที่ แผนกจัดซื้อต่างประเทศสายงานระบบส่ง (ห้อง 1202/2 ชั้น 12 อาคาร ท.101) กองจัดซื้อจัดจ้างต่างประเทศสายงานระบบส่ง ฝ่ายจัดซื้อจัดจ้างและบริหารพัสดุ การไฟฟ้าฝ่ายผลิตแห่งประเทศไทย เชียงสะพานพระราม 7 จังหวัดนนทบุรี ในวันทำการระหว่างเวลา 08:00 น. ถึง 15:00 น. ตั้งแต่วันที่ _____ ถึงวันที่ _____ หรือสอบถามทางโทรศัพท์ หมายเลข 0 2436 0241 หรืออีเมล procurement.tse@egat.co.th ทั้งนี้ สามารถ download แบบฟอร์มลงทะเบียนผู้ซื้อเอกสารประกวดราคาได้ที่เว็บไซต์ <http://www4.egat.co.th/fprocurement/biddingeng/>

การยื่นซองประกวดราคา

กำหนดยื่นซองประกวดราคา ในวันที่ _____ เวลา 9:30 น. ถึง 10:00 น. และเปิดซองประกวดราคาเวลา 10:00 น. ณ ห้อง 1202/1 ชั้น 12 อาคาร ท.101 การไฟฟ้าฝ่ายผลิตแห่งประเทศไทย เชียงสะพานพระราม 7 จังหวัดนนทบุรี

ประกาศ ณ วันที่

(นางนิลเนตร โอสมถาภูษิต)

หัวหน้ากองจัดซื้อจัดจ้างต่างประเทศสายงานระบบส่ง

**ตารางแสดงวงเงินงบประมาณที่ได้รับจัดสรรและราคากลาง(ราคาอ้างอิง)
ในการจัดซื้อจัดจ้างที่มีใช้งานก่อสร้าง**

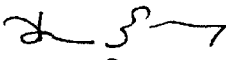
1. **ชื่อโครงการ** ประกวตราค่าเลขที่ TS12-MJ2-05 and GBA3-MJ2-04
งานจัดซื้อ Power Circuit Breaker and Disconnecting Switch
โครงการขยายระบบส่งไฟฟ้าระยะที่ 12
โครงการขยายระบบไฟฟ้าในเขตกรุงเทพและปริมณฑล ระยะที่ 3
/หน่วยงานเจ้าของโครงการ ฝ่ายแผนงานและโครงการระบบส่ง การไฟฟ้าฝ่ายผลิตแห่งประเทศไทย
2. **วงเงินงบประมาณที่ได้รับจัดสรร**
โครงการขยายระบบส่งไฟฟ้าระยะที่ 12 งบประมาณ 60,000 ล้านบาท
โครงการขยายระบบไฟฟ้าในเขตกรุงเทพและปริมณฑล ระยะที่ 3
งบประมาณ 12,100 ล้านบาท
3. **วันที่กำหนดราคากลาง** 20 มิถุนายน 2562 (วันที่ อวส. อนุมัติ)
ราคารวมภาษีมูลค่าเพิ่มและค่าใช้จ่ายอื่นๆ เป็นเงิน 61,830,000.00 บาท **ราคา/หน่วย** ตามเอกสารแนบ
4. **แหล่งที่มาของราคากลาง**
หลักเกณฑ์การกำหนดราคากลางการจัดซื้อและจัดจ้างงานก่อสร้างระบบส่งไฟฟ้าของสายงานระบบส่ง
5. **รายชื่อเจ้าหน้าที่ผู้กำหนดราคากลาง**
 - 5.1 นางสาวมธุรส ชมาฤกษ์ วศ.10 กวอ-ส.
 - 5.2 นายโสฬสศักดิ์ บุขวนากุล วศ.6 หอต-ส. กวอ-ส.

หมายเหตุ ค่าใช้จ่ายอื่นๆ ได้แก่ ค่าใช้จ่ายที่ กฟผ. ต้องจ่ายตามวิธีการพิจารณาเปรียบเทียบราคาที่กำหนดไว้ในเอกสารประกวดราคา เช่น อากรขาเข้า เป็นต้น

MEDIUM COST FOR BID NO. TS12-MJ2-05 and GBA3-MJ2-04

Group	Schedule	Medium cost (Rounded)
1	A1 and B1	16,600,000.00
2	A2 and B2	11,700,000.00
3	A3 and B3	32,100,000.00
4	A4	1,430,000.00
Total		61,830,000.00

ราคาดังกล่าวเป็นราคาที่รวม VAT, Import Duty, Customs Clearance เรียบร้อยแล้ว


20 มี.ย. 62

MEDIUM COST FOR BID NO. TS12-MJ2-05 and GBA3-MJ2-04
SUMMARY OF BID PRICE FOR SCHEDULE A1 AND B1
SUPPLY OF POWER CIRCUIT BREAKER AND DISCONNECTING SWITCH
TRANSMISSION SYSTEM EXPANSION PROJECT NO.12
BULK POWER SUPPLY FOR THE GREATER BANGKOK AND VICINITY AREA PHASE 3

No.	Description	Currency	Supply of Equipment	
			Foreign Supply	Foreign Currency
			CFR Thai Port	(excluding VAT)
			Amount	Amount
1	Schedule A1 : 230 kV Power Circuit Breaker	THB	12,306,019.00	128,790.00
2	Schedule B1 : 230 kV Power Circuit Breaker	THB	2,906,672.00	28,620.00
	BID PRICE	THB	15,212,691.00	157,410.00
	IMPORT DUTY	THB	49,517.96	
	CUSTOMS CLEARANCE	THB	91,276.17	
	VAT	THB	1,068,354.63	11,018.70
	SUMMARY OF BID PRICE	THB	16,421,839.76	168,428.70
	TOTAL MEDIUM COST	THB	16,590,268.46	
	TOTAL MEDIUM COST (ROUNDED)	THB	16,600,000.00	

[Signature]
20 Sep 62

MEDIUM COST FOR BID NO. TS12-MJ2-05 and GBA3-MJ2-04
Schedule A1 : 230 kV Power Circuit Breaker
SUPPLY OF POWER CIRCUIT BREAKER AND DISCONNECTING SWITCH
TRANSMISSION SYSTEM EXPANSION PROJECT NO.12

Item No.	Description	Qty.	Unit	Currency	Supply of Equipment				Supply of Equipment		Foreign Currency	Local Currency
					Foreign Supply				Local Supply			
					FOB Vessel	Cost of Transportation to Thai Port	CFR Thai Port		Ex-works Price (excluding VAT) Baht			
Unit Price	Unit Price	Unit Price	Amount	Unit Price	Amount	Amount	Amount					
A1-1	245 kV 4000 A 50 kA GCB 1&3 pole trip as per Ratings and Features RF CB8951(IEC)	6		THB	1,261,000.00		1,261,000.00	7,566,000.00			XXXXX	XXXXX
A1-2	Steel Supporting Structure for CB8951(IEC)* for item no. A1-1	6		THB	41,535.00		41,535.00	249,210.00			XXXXX	XXXXX
A1-3	Complete pole of Circuit Breaker for CB8951(IEC)	1		THB	249,000.00		249,000.00	249,000.00			XXXXX	XXXXX
A1-4	Closing Coil for CB8951(IEC)	1		THB	2,751.00		2,751.00	2,751.00			XXXXX	XXXXX
A1-5	Tripping Coil for CB8951(IEC)	1		THB	2,125.00		2,125.00	2,125.00			XXXXX	XXXXX
A1-6	Maintenance closing device for CB8951(IEC)	1		THB	7,726.00		7,726.00	7,726.00			XXXXX	XXXXX
A1-7	245 kV 4000 A 50 kA GCB 3 pole trip as per Ratings and Features RF CB8955(IEC)	3		THB	1,281,000.00		1,281,000.00	3,843,000.00			XXXXX	XXXXX
A1-8	Steel Supporting Structure for CB8955(IEC)* for item no. A1-7	3		THB	41,535.00		41,535.00	124,605.00			XXXXX	XXXXX
A1-9	Complete pole of Circuit Breaker for CB8955(IEC)	1		THB	249,000.00		249,000.00	249,000.00			XXXXX	XXXXX
A1-10	Closing Coil for CB8955(IEC)	1		THB	2,751.00		2,751.00	2,751.00			XXXXX	XXXXX
A1-11	Tripping Coil for CB8955(IEC)	1		THB	2,125.00		2,125.00	2,125.00			XXXXX	XXXXX
A1-12	Maintenance closing device for CB8955(IEC)	1		THB	7,726.00		7,726.00	7,726.00			XXXXX	XXXXX
A1-13	Cost of installation supervisor for item A1-1	12.00	Man day	THB	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	85,860.00	
A1-14	Cost of installation supervisor for item A1-7	6.00	Man day	THB	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	42,930.00	
	Equipments which shall be used together as a complete set referring to Article relevant to Liquidated Damages for Late Delivery of Equipment are item nos. A1-1 with A1-2 and A1-7 with A1-8.											
Total Price for Schedule A1				THB			12,306,019.00	Baht			128,790.00	Baht

*The design of supporting structures of circuit breaker shall be verified by circuit breaker manufacturer.

MEDIUM COST FOR BID NO. TS12-MJ2-05 and GBA3-MJ2-04
Service of Installation Supervisor (Schedule A1)
SUPPLY OF POWER CIRCUIT BREAKER AND DISCONNECTING SWITCH
TRANSMISSION SYSTEM EXPANSION PROJECT NO.12

Item No.	Description	Qty.	Unit	Currency	Foreign Currency		Local Currency (excluding VAT) Baht	
					Unit Price	Amount	Unit Price	Amount
A1-13	Cost of installation supervisor for item A1-1	12.00	Man day	THB	7,155.00	85,860.00		
A1-14	Cost of installation supervisor for item A1-7	6.00	Man day	THB	7,155.00	42,930.00		

Note:

1. The quoted total man-days for installation supervisor shall be the required number of days for complete installation, erection, field test and commissioning of all equipment as specified.
2. In addition to the quoted total man-days above, EGAT will also pay the following :
 - a. Travelling time from and to Supervisor's home office as well as travelling time from and to the installation site including ten (10) working days of operation, if any, which will be at the same rate as the cost quoted per man-day.
 - b. Airfares round trip economy class between the Supervisor 's home office and Bangkok by the most expeditious and direct route.
3. Local transportation from and to installation site will be provided by EGAT.
4. If the working man-days are less than the quoted total man-days, the payment shall be on the basis of actual man-days.
5. For man-days exceeding the quoted total amount, no payment shall be made by EGAT. Any such additional man-days approved by EGAT shall be paid on the quoted man-days rate.

MEDIUM COST FOR BID NO. TS12-MJ2-05 and GBA3-MJ2-04
Service of Installation Supervisor (Schedule B1)
SUPPLY OF POWER CIRCUIT BREAKER AND DISCONNECTING SWITCH
BULK POWER SUPPLY FOR THE GREATER BANGKOK AND VICINITY AREA PHASE 3

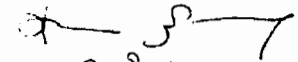
Item No.	Description	Qty.	Unit	Currency	Foreign Currency		Local Currency (excluding VAT) Baht	
					Unit Price	Amount	Unit Price	Amount
B1-7	Cost of installation supervisor for item B1-1	4.00	Man day	THB	7,155.00	28,620.00		

Note:

1. The quoted total man-days for installation supervisor shall be the required number of days for complete installation, erection, field test and commissioning of all equipment as specified.
2. In addition to the quoted total man-days above, EGAT will also pay the following :
 - a. Travelling time from and to Supervisor's home office as well as travelling time from and to the installation site including ten (10) working days of operation, if any, which will be at the same rate as the cost quoted per man-day.
 - b. Airfares round trip economy class between the Supervisor 's home office and Bangkok by the most expeditious and direct route.
3. Local transportation from and to installation site will be provided by EGAT.
4. If the working man-days are less than the quoted total man-days, the payment shall be on the basis of actual man-days.
5. For man-days exceeding the quoted total amount, no payment shall be made by EGAT. Any such additional man-days approved by EGAT shall be paid on the quoted man-days rate.

MEDIUM COST FOR BID NO. TS12-MJ2-05 and GBA3-MJ2-04
SUMMARY OF BID PRICE FOR SCHEDULE A2 AND B2
SUPPLY OF POWER CIRCUIT BREAKER AND DISCONNECTING SWITCH
TRANSMISSION SYSTEM EXPANSION PROJECT NO.12
BULK POWER SUPPLY FOR THE GREATER BANGKOK AND VICINITY AREA PHASE 3

No.	Description	Currency	Supply of Equipment	
			Foreign Supply	Foreign Currency
			CFR Thai Port Amount	(excluding VAT) Amount
1	Schedule A2 : 115 kV Power Circuit Breaker	THB	10,042,220.00	47,772.00
2	Schedule B2 : 115 kV Power Circuit Breaker	THB	721,324.00	2,654.00
		THB	10,763,544.00	50,426.00
	BID PRICE			
		THB	51,605.32	
	IMPORT DUTY			
		THB	64,581.27	
	CUSTOMS CLEARANCE			
		THB	757,060.45	3,529.82
	VAT			
		THB	11,636,791.04	53,955.82
	SUMMARY OF BID PRICE			
	TOTAL MEDIUM COST		11,690,746.86	
	TOTAL MEDIUM COST (ROUNDED)		11,700,000.00	


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MEDIUM COST FOR BID NO. TS12-MJ2-05 and GBA3-MJ2-04
Schedule A2 : 115 kV Power Circuit Breaker
SUPPLY OF POWER CIRCUIT BREAKER AND DISCONNECTING SWITCH
TRANSMISSION SYSTEM EXPANSION PROJECT NO.12

Item No.	Description	Qty.	Unit	Currency	Supply of Equipment				Supply of Equipment		Foreign Currency	Local Currency (excluding VAT) Baht		
					Foreign Supply				Local Supply				Amount	Amount
					FOB Vessel	Cost of Transportation to Thai Port	CFR Thai Port		Ex-works Price (excluding VAT) Baht					
							Unit Price	Unit Price	Unit Price	Amount				
A2-1	123 kV 3150 A 40 kA GCB as per Ratings and Features RF CB7846(IEC)	18		THB	522,000.00		522,000.00	9,396,000.00			XXXXX	XXXXX		
A2-2	Steel Supporting Structure for CB7846(IEC)* for item no. A2-1	18		THB	26,288.00		26,288.00	473,184.00			XXXXX	XXXXX		
A2-3	Complete pole of Circuit Breaker for CB7846(IEC)	1		THB	165,000.00		165,000.00	165,000.00			XXXXX	XXXXX		
A2-4	Closing Coil for CB7846(IEC)	1		THB	2,241.00		2,241.00	2,241.00			XXXXX	XXXXX		
A2-5	Tripping Coil for CB7846(IEC)	1		THB	2,241.00		2,241.00	2,241.00			XXXXX	XXXXX		
A2-6	Maintenance closing device for CB7846(IEC)	1		THB	3,554.00		3,554.00	3,554.00			XXXXX	XXXXX		
A2-7	Cost of installation supervisor for item A2-1	18.00	Man day	THB	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	47,772.00			
Total Price for Schedule A2								10,042,220.00		Baht	47,772.00	Baht		

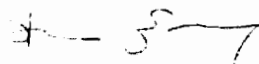
*The design of supporting structures of circuit breaker shall be verified by circuit breaker manufacturer.

MEDIUM COST FOR BID NO. TS12-MJ2-05 and GBA3-MJ2-04
Service of Installation Supervisor (Schedule A2)
SUPPLY OF POWER CIRCUIT BREAKER AND DISCONNECTING SWITCH
TRANSMISSION SYSTEM EXPANSION PROJECT NO.12

Item No.	Description	Qty.	Unit	Currency	Foreign Currency		Local Currency (excluding VAT) Baht	
					Unit Price	Amount	Unit Price	Amount
A2-7	Cost of installation supervisor for item A2-1	18.00	Man day	THB	2,654.00	47,772.00		

Note:

1. The quoted total man-days for installation supervisor shall be the required number of days for complete installation, erection, field test and commissioning of all equipment as specified.
2. In addition to the quoted total man-days above, EGAT will also pay the following :
 - a. Travelling time from and to Supervisor's home office as well as travelling time from and to the installation site including ten (10) working days of operation, if any, which will be at the same rate as the cost quoted per man-day.
 - b. Airfares round trip economy class between the Supervisor's home office and Bangkok by the most expeditious and direct route.
3. Local transportation from and to installation site will be provided by EGAT.
4. If the working man-days are less than the quoted total man-days, the payment shall be on the basis of actual man-days.
5. For man-days exceeding the quoted total amount, no payment shall be made by EGAT. Any such additional man-days approved by EGAT shall be paid on the quoted man-days rate.


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MEDIUM COST FOR BID NO. TS12-MJ2-05 and GBA3-MJ2-04

Schedule B2 : 115 kV Power Circuit Breaker

SUPPLY OF POWER CIRCUIT BREAKER AND DISCONNECTING SWITCH

BULK POWER SUPPLY FOR THE GREATER BANGKOK AND VICINITY AREA PHASE 3

Item No.	Description	Qty.	Unit	Currency	Supply of Equipment				Supply of Equipment		Foreign Currency	Local Currency (excluding VAT) Baht		
					Foreign Supply				Local Supply				Amount	Amount
					FOB Vessel	Cost of Transportation to Thai Port	CFR Thai Port		Ex-works Price (excluding VAT) Baht					
Unit Price	Unit Price	Unit Price	Amount	Unit Price	Amount	Amount	Amount							
B2-1	123 kV 3150 A 40 kA GCB as per Ratings and Features RF CB7846(IEC)	1		THB	522,000.00		522,000.00	522,000.00			XXXXX	XXXXX		
B2-2	Steel Supporting Structure for CB7846(IEC)* for item no. B2-1	1		THB	26,288.00		26,288.00	26,288.00			XXXXX	XXXXX		
B2-3	Complete pole of Circuit Breaker for CB7846(IEC)	1		THB	165,000.00		165,000.00	165,000.00			XXXXX	XXXXX		
B2-4	Closing Coil for CB7846(IEC)	1		THB	2,241.00		2,241.00	2,241.00			XXXXX	XXXXX		
B2-5	Tripping Coil for CB7846(IEC)	1		THB	2,241.00		2,241.00	2,241.00			XXXXX	XXXXX		
B2-6	Maintenance closing device for CB7846(IEC)	1		THB	3,554.00		3,554.00	3,554.00			XXXXX	XXXXX		
B2-7	Cost of installation supervisor for item B2-1	1.00	Man day	THB	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	2,654.00			
	Equipments which shall be used together as a complete set referring to Article relevant to Liquidated Damages for Late Delivery of Equipment are item nos. B2-1 with B2-2.													
Total Price for Schedule B2				THB	721,324.00				Baht		2,654.00	Baht		

*The design of supporting structures of circuit breaker shall be verified by circuit breaker manufacturer.

MEDIUM COST FOR BID NO. TS12-MJ2-05 and GBA3-MJ2-04
Service of Installation Supervisor (Schedule B2)
SUPPLY OF POWER CIRCUIT BREAKER AND DISCONNECTING SWITCH
BULK POWER SUPPLY FOR THE GREATER BANGKOK AND VICINITY AREA PHASE 3

Item No.	Description	Qty.	Unit	Currency	Foreign Currency		Local Currency (excluding VAT) Baht	
					Unit Price	Amount	Unit Price	Amount
B2-7	Cost of installation supervisor for item B2-1	1.00	Man day	THB	2,654.00	2,654.00		

Note:

1. The quoted total man-days for installation supervisor shall be the required number of days for complete installation, erection, field test and commissioning of all equipment as specified.
2. In addition to the quoted total man-days above, EGAT will also pay the following :
 - a. Travelling time from and to Supervisor's home office as well as travelling time from and to the installation site including ten (10) working days of operation, if any, which will be at the same rate as the cost quoted per man-day.
 - b. Airfares round trip economy class between the Supervisor 's home office and Bangkok by the most expeditious and direct route.
3. Local transportation from and to installation site will be provided by EGAT.
4. If the working man-days are less than the quoted total man-days, the payment shall be on the basis of actual man-days.
5. For man-days exceeding the quoted total amount, no payment shall be made by EGAT. Any such additional man-days approved by EGAT shall be paid on the quoted man-days rate.

**MEDIUM COST FOR BID NO. TS12-MJ2-05 and GBA3-MJ2-04
 SUMMARY OF BID PRICE FOR SCHEDULE A3 AND B3
 SUPPLY OF POWER CIRCUIT BREAKER AND DISCONNECTING SWITCH
 TRANSMISSION SYSTEM EXPANSION PROJECT NO.12
 BULK POWER SUPPLY FOR THE GREATER BANGKOK AND VICINITY AREA PHASE 3**

No.	Description	Currency	Supply of Equipment	
			Foreign Supply	Local Supply
			CFR Thai Port Amount	Ex-works Price (excluding VAT) Baht Amount
1	Schedule A3 : 230 kV and 115 kV Disconnecting Switch	THB	20,262,303.00	5,914,982.00
2	Schedule B3 : 230 kV and 115 kV Disconnecting Switch	THB	2,871,000.00	854,220.00
	BID PRICE	THB	23,133,303.00	6,769,202.00
	IMPORT DUTY	THB		
	CUSTOMS CLEARANCE	THB	138,799.82	
	VAT	THB	1,619,331.21	473,844.14
	SUMMARY OF BID PRICE	THB	24,891,434.03	7,243,046.14
	TOTAL MEDIUM COST		32,134,480.17	
	TOTAL MEDIUM COST (ROUNDED)		32,100,000.00	

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MEDIUM COST FOR BID NO. TS12-MJ2-05 and GBA3-MJ2-04
Schedule A3 : 230 kV and 115 kV Disconnecting Switch
SUPPLY OF POWER CIRCUIT BREAKER AND DISCONNECTING SWITCH
TRANSMISSION SYSTEM EXPANSION PROJECT NO.12

Item No.	Description	Qty.	Unit	Currency	Supply of Equipment				Supply of Equipment	
					Foreign Supply				Local Supply	
					FOB Vessel	Cost of Transportation to Thai Port	CFR Thai Port		Ex-works Price (excluding VAT) Baht	
					Unit Price	Unit Price	Unit Price	Amount	Unit Price	Amount
A3-1	245 kV 4000A air switch (high creepage) manually gang operated as per Ratings and Features RF DS89BH(IEC) (Phase spacing = 3.50 m.)	3		THB	403,000.00		403,000.00	1,209,000.00		
A3-2	245 kV 3150 A air switch with grounding blade manually gang operated as per Ratings and Features RF DS88B2(IEC) (Phase spacing = 3.50 m.)	4		THB	485,000.00		485,000.00	1,940,000.00		
A3-3	245 kV 3150 A air switch manually gang operated as per Ratings and Features RF DS88B1(IEC) (Phase spacing = 3.50 m.)	20		THB	403,000.00		403,000.00	8,060,000.00		
A3-4	123 kV 2000 A air switch manually gang operated as per Ratings and Features RF DS77B1(IEC) (Phase spacing = 2.25 m.)	31		THB	151,000.00		151,000.00	4,681,000.00		
A3-5	123 kV 2000 A air switch manually gang operated as per Ratings and Features RF DS77B1U(IEC) (Phase spacing = 2.25 m.) as per Dwg. BLG-S-4. See ST-TS-7-01 and ST-BB-7-01 for reference.	1		THB	587,010.00		587,010.00	587,010.00		
A3-6	123 kV 2000 A air switch with grounding blade manually gang operated as per Ratings and Features RF DS77B3(IEC) (Phase spacing = 2.25 m.)	3		THB	235,000.00		235,000.00	705,000.00		
A3-7	123 kV 3150 A air switch (high creepage) manually gang operated as per Ratings and Features RF DS78BH(IEC) (Phase spacing = 2.25 m.)	4		THB	151,000.00		151,000.00	604,000.00		

MEDIUM COST FOR BID NO. TS12-MJ2-05 and GBA3-MJ2-04

Schedule A3 : 230 kV and 115 kV Disconnecting Switch

SUPPLY OF POWER CIRCUIT BREAKER AND DISCONNECTING SWITCH

TRANSMISSION SYSTEM EXPANSION PROJECT NO.12

Item No.	Description	Qty.	Unit	Currency	Supply of Equipment				Supply of Equipment	
					Foreign Supply				Local Supply	
					FOB Vessel	Cost of Transportation to Thai Port	CFR Thai Port		Ex-works Price (excluding VAT) Baht	
					Unit Price	Unit Price	Unit Price	Amount	Unit Price	Amount
A3-8	123 kV 3150 A air switch (high creepage) with grounding blade manually gang operated as per Ratings and Features RF DS78BI(IEC) (Phase spacing = 2.25 m.)	3		THB	202,000.00		202,000.00	606,000.00		
A3-9	123 kV 2000 A air switch (high creepage) manually gang operated as per Ratings and Features RF DS77BH(IEC) (Phase spacing = 2.25 m.)	7		THB	151,000.00		151,000.00	1,057,000.00		
A3-10	123 kV 2000 A air switch (high creepage) with grounding blade manually gang operated as per Ratings and Features RF DS77BJ(IEC) (Phase spacing = 2.25 m.)	3		THB	235,000.00		235,000.00	705,000.00		
A3-11	115 kV 40 kA 3 pole air grounding switch as per Ratings and Features RF GS71A1(IEC) (Phase spacing = 2.25 m.)	1		THB	108,293.00		108,293.00	108,293.00		
A3-12	Steel Supporting Structure for DS89BH (IEC) (for Item no. A3-1) as per EGAT's Dwg. No. ST-DS-4-01 and SD-AB-0-01 , H = 6.00 m	3							115,474.00	346,422.00
A3-13	Steel Supporting Structure for DS88B2 (IEC) (for Item no. A3-2) as per EGAT's Dwg. No. ST-DS-4-01 and SD-AB-0-01 , H = 6.00 m	4							115,474.00	461,896.00
A3-14	Steel Supporting Structure for DS88B1 (IEC) (for Item no. A3-3) as per EGAT's Dwg. No. ST-DS-4-01 and SD-AB-0-01 , H = 6.00 m	20							115,474.00	2,309,480.00

MEDIUM COST FOR BID NO. TS12-MJ2-05 and GBA3-MJ2-04

Schedule A3 : 230 kV and 115 kV Disconnecting Switch

SUPPLY OF POWER CIRCUIT BREAKER AND DISCONNECTING SWITCH

TRANSMISSION SYSTEM EXPANSION PROJECT NO.12

Item No.	Description	Qty.	Unit	Currency	Supply of Equipment				Supply of Equipment	
					Foreign Supply				Local Supply	
					FOB Vessel	Cost of Transportation to Thai Port	CFR Thai Port		Ex-works Price (excluding VAT) Baht	
					Unit Price	Unit Price	Unit Price	Amount	Unit Price	Amount
A3-15	Steel Supporting Structure for DS77B1 (IEC) (for Item no. A3-4) as per EGAT's Dwg. No. ST-DS-4-01 and SD-AB-0-01 , H = 5.30 m	31						53,792.00	1,667,552.00	
A3-16	Steel Supporting Structure for DS77B3 (IEC) (for Item no. A3-6) as per EGAT's Dwg. No. ST-DS-4-01 and SD-AB-0-01 , H = 5.30 m	3						53,792.00	161,376.00	
A3-17	Steel Supporting Structure for DS78BH (IEC) (for Item no. A3-7) as per EGAT's Dwg. No. ST-DS-4-01 and SD-AB-0-01 , H = 5.30 m	4						53,792.00	215,168.00	
A3-18	Steel Supporting Structure for DS78BI (IEC) (for Item no. A3-8) as per EGAT's Dwg. No. ST-DS-4-01 and SD-AB-0-01 , H = 5.30 m	3						53,792.00	161,376.00	
A3-19	Steel Supporting Structure for DS77BH (IEC) (for Item no. A3-9) as per EGAT's Dwg. No. ST-DS-4-01 and SD-AB-0-01 , H = 5.30 m	7						53,792.00	376,544.00	
A3-20	Steel Supporting Structure for DS77BJ (IEC) (for Item no. A3-10) as per EGAT's Dwg. No. ST-DS-4-01 and SD-AB-0-01 , H = 5.30 m	3						53,792.00	161,376.00	

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MEDIUM COST FOR BID NO. TS12-MJ2-05 and GBA3-MJ2-04
Schedule A3 : 230 kV and 115 kV Disconnecting Switch
SUPPLY OF POWER CIRCUIT BREAKER AND DISCONNECTING SWITCH
TRANSMISSION SYSTEM EXPANSION PROJECT NO.12

Item No.	Description	Qty.	Unit	Currency	Supply of Equipment				Supply of Equipment	
					Foreign Supply				Local Supply	
					FOB Vessel	Cost of Transportation to Thai Port	CFR Thai Port		Ex-works Price (excluding VAT) Baht	
					Unit Price	Unit Price	Unit Price	Amount	Unit Price	Amount
A3-21	Steel Supporting Structure for GS71A1 (IEC) (for Item no. A3-11) as per EGAT's Dwg. No. ST-GS-4-01 and SD-AB-0-01 , H = 5.30 m Equipments which shall be used together as a complete set referring to Article relevant to Liquidated Damages for Late Delivery of Equipment are item nos. A3-1 with A3-12, A3-2 with A3-13, A3-3 with A3-14, A3-4 with A3-15, A3-6 with A3-16, A3-7 with A3-17, A3-8 with A3-18, A3-9 with A3-19, A3-10 with A3-20, A3-11 with A3-21	1							53,792.00	53,792.00
Total Price for Schedule A3				THB	20,262,303.00			Baht	5,914,982.00	

MEDIUM COST FOR BID NO. TS12-MJ2-05 and GBA3-MJ2-04

Schedule B3 : 230 kV and 115 kV Disconnecting Switch

SUPPLY OF POWER CIRCUIT BREAKER AND DISCONNECTING SWITCH

BULK POWER SUPPLY FOR THE GREATER BANGKOK AND VICINITY AREA PHASE 3

Item No.	Description	Qty.	Unit	Currency	Supply of Equipment				Supply of Equipment	
					Foreign Supply				Local Supply	
					FOB Vessel	Cost of Transportation to Thai Port	CFR Thai Port		Ex-works Price (excluding VAT) Baht	
					Unit Price	Unit Price	Unit Price	Amount	Unit Price	Amount
B3-1	245 kV 3150 A air switch (high creepage) manually gang operated as per Ratings and Features RF DS88BH(IEC) (Phase spacing = 3.50 m.)	6		THB	403,000.00		403,000.00	2,418,000.00		
B3-2	123 kV 2000 A air switch (high creepage) manually gang operated as per Ratings and Features RF DS77BH(IEC) (Phase spacing = 2.25 m.)	1		THB	151,000.00		151,000.00	151,000.00		
B3-3	123 kV 2000 A air switch (high creepage) manually gang operated as per Ratings and Features RF DS77BH(IEC) (Phase spacing = 2.25 m.)	2		THB	151,000.00		151,000.00	302,000.00		
B3-4	Steel Supporting Structure for DS88BH (IEC) (for Item no. B3-1) as per EGAT's Dwg. No. ST-DS-4-01 and SD-AB-0-01 , H = 6.00 m	6							115,474.00	692,844.00
B3-5	Steel Supporting Structure for DS77BH (IEC) (for Item no. B3-2) as per EGAT's Dwg. No. ST-DS-4-01 and SD-AB-0-01 , H = 5.30 m	1							53,792.00	53,792.00

MEDIUM COST FOR BID NO. TS12-MJ2-05 and GBA3-MJ2-04**Schedule B3 : 230 kV and 115 kV Disconnecting Switch****SUPPLY OF POWER CIRCUIT BREAKER AND DISCONNECTING SWITCH****BULK POWER SUPPLY FOR THE GREATER BANGKOK AND VICINITY AREA PHASE 3**

Item No.	Description	Qty.	Unit	Currency	Supply of Equipment				Supply of Equipment	
					Foreign Supply				Local Supply	
					FOB Vessel	Cost of Transportation to Thai Port	CFR Thai Port		Ex-works Price (excluding VAT) Baht	
					Unit Price	Unit Price	Unit Price	Amount	Unit Price	Amount
B3-6	Steel Supporting Structure for DS77BH (IEC) (for Item no. B3-3) as per EGAT's Dwg. No. ST-DS-4-01 and SD-AB-0-01 , H = 7.30 m Equipments which shall be used together as a complete set referring to Article relevant to Liquidated Damages for Late Delivery of Equipment are item nos. B3-1 with B3-4, B3-2 with B3-5, B3-3 with B3-6	2							53,792.00	107,584.00
Total Price for Schedule B3				THB			2,871,000.00	Baht		854,220.00

MEDIUM COST FOR BID NO. TS12-MJ2-05 and GBA3-MJ2-04
SUMMARY OF BID PRICE FOR SCHEDULE A4
SUPPLY OF POWER CIRCUIT BREAKER AND DISCONNECTING SWITCH
TRANSMISSION SYSTEM EXPANSION PROJECT NO.12
BULK POWER SUPPLY FOR THE GREATER BANGKOK AND VICINITY AREA PHASE 3

No.	Description	Currency	Supply of Equipment	
			Foreign Supply	CFR Thai Port
			Amount	
I	Schedule A4 : 33 kV and below Disconnecting Switch	THB	1,244,744.00	
	BID PRICE	THB	1,244,744.00	
	IMPORT DUTY	THB	87,218.15	
	CUSTOMS CLEARANCE	THB	7,468.46	
	VAT	THB	93,237.35	
	SUMMARY OF BID PRICE	THB	1,432,667.96	
	TOTAL MEDIUM COST		1,432,667.96	
	TOTAL MEDIUM COST (ROUNDED)		1,430,000.00	

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MEDIUM COST FOR BID NO. TS12-MJ2-05 and GBA3-MJ2-04
Schedule A4 : 33 kV and below Disconnecting Switch
SUPPLY OF POWER CIRCUIT BREAKER AND DISCONNECTING SWITCH
TRANSMISSION SYSTEM EXPANSION PROJECT NO.12

Item No.	Description	Qty.	Unit	Currency	Supply of Equipment				Supply of Equipment	
					Foreign Supply				Local Supply	
					FOB Vessel	Cost of Transportation to Thai Port	CFR Thai Port		Ex-works Price (excluding VAT) Baht	
					Unit Price	Unit Price	Unit Price	Amount	Unit Price	Amount
A4-1	38 kV 1600 A 20 kA air switch vertical break manually gang operated as per Ratings and Features RF DS36D1(IEC) (Phase spacing = 1.00 m, H = 5.50 m form base plate to top terminal)	1		THB	159,000.00		159,000.00	159,000.00		
A4-2	27 kV 1600 A 20 kA air switch vertical break manually gang operated as per Ratings and Features RF DS26D3(IEC) (Phase spacing = 1.00 m, H = 7.50 m form base plate to top terminal)	1		THB	143,000.00		143,000.00	143,000.00		
A4-3	27 kV 1600 A 20 kA air switch 1 pole vertical break hook operated as per Ratings and Features RF DS26E3(IEC) (Phase spacing = 1.00 m)	33		THB	28,568.00		28,568.00	942,744.00		
Total Price for Schedule A4				THB			1,244,744.00	Baht		

Contract No.

**Invitation to Bid No. TS12-MJ2-05
and GBA3-MJ2-04**

ELECTRICITY GENERATING AUTHORITY OF THAILAND



BIDDING DOCUMENTS

**SUPPLY OF POWER CIRCUIT BREAKER AND
DISCONNECTING SWITCH**

**TRANSMISSION SYSTEM EXPANSION PROJECT NO.12
BULK POWER SUPPLY FOR THE GREATER BANGKOK AND
VICINITY AREA PHASE 3**

EGAT'S FUND

BIDDER : _____

(2019)

TC-SUPPLY-01 (Rev.1)
(Jul.18)

INVITATION TO BID NO. TS12-MJ2-05 and GBA3-MJ2-04

**SUPPLY OF POWER CIRCUIT BREAKER AND
DISCONNECTING SWITCH**

**TRANSMISSION SYSTEM EXPANSION PROJECT NO.12
BULK POWER SUPPLY FOR THE GREATER BANGKOK AND
VICINITY AREA PHASE 3**

EGAT'S FUND

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TC-SUPPLY-01 (Rev.1)
(Jul.18)

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CONFIRMATION FORM

(INDIVIDUAL COMPANY / JOINT VENTURE)

INVITATION TO BID NO. TS12-MJ2-05 and GBA3-MJ2-04

**SUPPLY OF POWER CIRCUIT BREAKER AND
DISCONNECTING SWITCH**

**TRANSMISSION SYSTEM EXPANSION PROJECT NO.12
BULK POWER SUPPLY FOR THE GREATER BANGKOK AND
VICINITY AREA PHASE 3**

By signing in the space provided below, we confirm that:-

- According to “Eligibility of Bidders” and in addition to the Documentary List attached to the bidding documents, we are not a Jointly Interested Bidder with the other bidders as from the date of EGAT’s issuance of the subject Invitation and are not a person who undertakes any actions as an “Obstruction of Fair Price Competition”.
- According to Article B-8 Information to be Submitted with Bid, we confirm
 - Registration with the Revenue Department as a value added tax registrant in Thailand as per certificate of value added tax registration (พ.ร.บ.20) attached.
 - Non-Registration as a value added tax registrant in Thailand, but will register later.
 - Non-Registration as a value added tax registrant in Thailand and will not register.

Confirmed :

.....

By :

Title :

Date :

CONFIRMATION FORM

(CONSORTIUM)

INVITATION TO BID NO. TS12-MJ2-05 and GBA3-MJ2-04

**SUPPLY OF POWER CIRCUIT BREAKER AND
DISCONNECTING SWITCH**

**TRANSMISSION SYSTEM EXPANSION PROJECT NO.12
BULK POWER SUPPLY FOR THE GREATER BANGKOK AND
VICINITY AREA PHASE 3**

Member No. ... of the consortium:

By signing in the space provided below, we confirm that:-

- According to “Eligibility of Bidders” and in addition to the Documentary List attached to the bidding documents, we are not a Jointly Interested Bidder with the other bidders as from the date of EGAT’s issuance of the subject Invitation and are not a person who undertakes any actions as an “Obstruction of Fair Price Competition”.
- According to Article B-8 Information to be Submitted with Bid, we confirm
 - Registration with the Revenue Department as a value added tax registrant in Thailand as per certificate of value added tax registration (ทพ.20) attached.
 - Non-Registration as a value added tax registrant in Thailand, but will register later.
 - Non-Registration as a value added tax registrant in Thailand and will not register.

Confirmed :

.....

By :

Title :

Date :

DISCOUNT FORM

INVITATION TO BID NO. TS12-MJ2-05 and GBA3-MJ2-04

**SUPPLY OF POWER CIRCUIT BREAKER AND
DISCONNECTING SWITCH**

**TRANSMISSION SYSTEM EXPANSION PROJECT NO.12
BULK POWER SUPPLY FOR THE GREATER BANGKOK AND
VICINITY AREA PHASE 3**

Bidder : _____

By signing in the space provided below, we confirm that:-

- we offer no discount.
- we offer discount(s) as follows:

Details of discount	Currency	Amount	VAT
			<input type="checkbox"/> included <input type="checkbox"/> excluded
			<input type="checkbox"/> included <input type="checkbox"/> excluded
			<input type="checkbox"/> included <input type="checkbox"/> excluded
			<input type="checkbox"/> included <input type="checkbox"/> excluded

Remarks :

- The above discount(s) shall not be subject to any conditions. Discount with conditions shall not be considered.
- This Discount Form, together with Bidder's Summary of Bid Price, will be publicly presented on a screen to all Bidders in the bid opening room at the time of bid opening.

Confirmed by authorized person(s):

.....

By :

Title :

Date :

Additional Regulation

This Regulation shall apply to the Enquiry, Bid for Supply, Lease, Hire of Work, or Hire of Consultant by Way of Selection.

1. Attachments

1.1 Definitions

1.1.1 Jointly Interested Bidder

1.1.2 Obstruction of Fair Price Competition

1.2 Documentary List

2. Bidder's Qualifications

2.1 The Bidder shall professionally be in the business of providing materials or services or leasing or consultancy services, as the case may be, and shall not be named in the list of work abandoners published by the Office of the Prime Minister, and/or in the debarment list and/or the list of work abandoners declared by EGAT according to Article 5 of this Regulation.

2.2 The Bidder shall not be a Jointly Interested Bidder with other bidders as from the date of EGAT's issuance of the Invitation for Bid/Enquiry or the Invitation Letter/ Terms of Reference for the consultancy services, as the case may be, or shall not be a person who undertakes any action as an "Obstruction of Fair Price Competition" described in Article 1.1 - Definitions.

2.3 The Bidder shall not have EGAT's personnel involve in his business *as shareholder having voting right that can control his business, director, manager, officer, employee, agent or consultant* except for the ones who are officially ordered by EGAT to act or participate therein.

3. Information to be Submitted with Bid

The Bidder shall submit with his bid the documents according to Article 1.2 - Documentary List, including but not limited to, the following documents :-

3.1 Where the Bidder is a juristic person :

(a) ordinary partnership or limited partnership

a certified copy of affidavit of incorporation, name list of managing partners, list of persons entrusted with controlling power (if any), as well as a certified copy of registration for value added tax (if any).

(b) limited company or public limited company

a certified copy of affidavit of incorporation, memorandum of association, name list of managing directors, list of persons entrusted with controlling power (if any) and name list of major shareholders, as well as a certified copy of registration for value added tax (if any).

Such certified copy of affidavit of incorporation with the validity of not more than six (6) months from the date of certification to the opening date of Bid/Enquiry or the date of Invitation Letter/Terms of Reference in case of consultancy services, as the case may be, shall certify at least the following information :

- (i) Type of a juristic person : an ordinary partnership, a limited partnership, a limited company, a public limited company,
- (ii) Name according to (i),
- (iii) Number and names of managing partners or managing directors,
- (iv) Number and names of managing partners or managing directors authorized to act on behalf of the company,
- (v) Amount of shareholders' equity or registered capital,
- (vi) Authority of managing partner in case of partnership,
- (vii) Location of head office,
- (viii) Registration purposes,
- (ix) Scope of work indicated in business permit license of a foreign juristic person who registers in Thailand,
- (x) Other documents e.g. changes or additions to the above documents, branches (if any).

3.2 Where the Bidder is a natural person or a group of persons other than a juristic person :

a certified copy of :

- identity card
- partnership agreement or contract (if any)
- partners' identity cards
- registration required by Ministry of Commerce of Thailand
- registration for value added tax (if any)

3.3 Where the Bidder is a joint venture / consortium :

a certified copy of :

- association agreement
- identity card or passport (if non Thai national)
(The participant in the joint venture or consortium is not a juristic person.)
- all documents specified in *Item 3.1* of Additional Regulation
(The participant in the joint venture or consortium is a juristic person.)

3.4 Other documentary evidence as required per *Item 3, 6 or 8* of Documentary List (if any).

4. Preliminary Examination

4.1 EGAT shall examine the qualification of all bidders to determine whether any bidder is a Jointly Interested Bidder as from the date of EGAT's issuance of the Invitation for Bid/Enquiry or the Invitation Letter/Terms of Reference for the consultancy services, as the case may be, and/or undertakes any action as an "Obstruction of Fair Price Competition" before or during the bid opening. If there is evidence showing that any bidder is a Jointly Interested Bidder or undertakes any action as an "Obstruction of Fair Price Competition", EGAT shall delete his name from the list of bidders and inform such bidder by written notice hereof.

4.2 The Bidder whose name is deleted according to Article 4.1, may, within *fifteen (15)* calendar days from the date of receipt of EGAT's written notice, appeal to EGAT, explaining reasons together with relevant documents for EGAT's reconsideration.

In case EGAT agrees with the objection of the appellant but considers that the cancellation of enquiry/bidding will be beneficial to EGAT, EGAT may, at its sole discretion, cancel such bid. In the event that the Bidder who undertakes any action as an "Obstruction of Fair Price Competition" does not appeal or, after his appeal, EGAT does not agree with his objection, such Bidder shall be regarded as a work abandoner.

EGAT's decision shall be notified to the appellant in writing and such decision shall be final and conclusive.

5. Reservation of the Right for Proposal and Others

In case any juristic person is regarded as a work abandoner by EGAT and such abandonment is caused by the manager, the managing partner, the managing director, the executive or the person authorized to manage the business of that juristic person, EGAT shall also include his name as a work abandoner.

In case any juristic person is regarded as a work abandoner by EGAT, such decision shall also be applied to other juristic persons of the same business where its manager, managing partner, managing director, executive, or person authorized to manage the business is the same person who is the manager, managing partner, managing director, executive, or person authorized to manage the business of the juristic person who is regarded as a work abandoner by EGAT as aforesaid.

In case any natural person is regarded as a work abandoner by EGAT, such decision shall also be applied to other juristic persons who submit the proposal and have such natural person as the manager, managing partner, managing director, executive or person authorized to manage the business of such juristic persons

1.1 Definitions

These definitions shall apply to the Enquiry, Bid for Supply, Lease, Hire or Work, or Hire of Consultant by Way of Selection.

1.1.1 **“Jointly Interested Bidder”** means a natural person or juristic person who submits bid to EGAT for the supply of goods, lease, hire of work, or hire of consultant by way of selection, as the case may be, and who has an interest, either directly or indirectly, in the business of another natural person or juristic person whose bid is also submitted to EGAT in this bidding.

The interest, either direct or indirect, in another natural person or juristic person as aforesaid includes the relationship in the following manners :

- (1) Management relationship, whereby the manager, the managing partner, the managing director, the executive or the person authorized to manage the business of a natural person or a juristic person has the power, or is able to exercise the power, in managing the business of the other one or more natural persons or juristic persons whose bids are also submitted to EGAT in this bidding.
- (2) Capital relationship, whereby a partner in an ordinary partnership or a partner with unlimited liability in a limited partnership or a major shareholder in a limited company or a public limited company is a partner in the other one or more ordinary partnerships or limited partnerships, or is a major shareholder in the other one or more limited companies or public limited companies whose bids are also submitted to EGAT in this bidding.
- (3) Cross relationship between (1) and (2), whereby the manager, managing partner, managing director, executive or person authorized to manage the business of a natural person or juristic person is a partner in the other one or more ordinary partnerships or limited partnerships, or is major shareholder in the other one or more limited companies or public limited companies whose bids are also submitted to EGAT in this bidding, or *vice versa*.

“Major shareholder” means a shareholder who holds more than twenty five (25) percent of stake in such an enterprise or at another percentage determined by the Governor as he deems expedient for some types or sizes of enterprises.

Holding of position, being a partner or shareholding as aforesaid by the spouse or minor of the person in (1), (2) or (3) shall be deemed the holding of position, being a partner or shareholding by such person.

If any bidder uses the name of another person as the manager, managing partner, managing director, executive, partner or shareholder, but in which case he himself in fact exercises the power in management or he himself is the real partner or shareholder of the partnership or limited company or public limited company, as the case may be, and the related partnership or limited company or public limited company whose bid is also submitted to EGAT in this bidding, that bidder shall be deemed to have a relationship under (1), (2) or (3), as the case may be.

1.1.2 **“Obstruction of Fair Price Competition”** means any act committed by a bidder or bidders causing hindrance or obstruction or impeding the opportunity for fair price competition in the tendering of bid to EGAT, whether done by collusion, or by granting, requesting, or agreeing to grant, demand, accept or agreeing to accept money or property or other benefit or by committing an act of violence or by threatening to commit an act of violence or presenting a false document or doing any act in bad faith, with the objective of acquiring benefit among the other bidders or in order to give benefit to any specific bidder so that such person will be entitled to enter into a contract with EGAT or in order to avoid fair price competition, or in order to take advantage of EGAT which not being usual business practices.

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1.2 Documentary List

This documentary list shall apply to the Enquiry, Bid for Supply, Lease, Hire of Work, or Hire of Consultant by Way of Selection.

	No. of page(s)	For EGAT only	
<u>Thai National Bidder</u>			
[] 1. Where the Bidder is a natural person or a group of persons other than a juristic person			
() (a) Natural Person		Yes	No
- Certified copy of identity card		<input type="checkbox"/>	<input type="checkbox"/>
() (b) Group of persons			
- Certified copy of partnership agreement or contract (if any)		<input type="checkbox"/>	<input type="checkbox"/>
- Certified copy of identity card(s) of partners or related documents according to <i>Item 2 (a) and (b)</i> of each participant of the group		<input type="checkbox"/>	<input type="checkbox"/>
[] 2. Where the Bidder is a juristic person			
() (a) Ordinary partnership or limited partnership			
- Certified copy of affidavit of incorporation		<input type="checkbox"/>	<input type="checkbox"/>
- Name list of managing partners and list of persons entrusted with controlling power (if any) (Please fill in the form on page 10.)		<input type="checkbox"/>	<input type="checkbox"/>
() (b) Limited company or public limited company			
- Certified copy of affidavit of incorporation		<input type="checkbox"/>	<input type="checkbox"/>
- Memorandum of Association		<input type="checkbox"/>	<input type="checkbox"/>
- Name list of managing directors and list of persons entrusted with controlling power (if any) (Please fill in the form on page 10.)		<input type="checkbox"/>	<input type="checkbox"/>
- Name list of major shareholders (Please fill in the form on page 11.)		<input type="checkbox"/>	<input type="checkbox"/>
[] 3. Other documents (if any)			
() Certified copy of any other registration required by Ministry of Commerce of Thailand		<input type="checkbox"/>	<input type="checkbox"/>
() Certified copy of registration for value added tax		<input type="checkbox"/>	<input type="checkbox"/>
()		<input type="checkbox"/>	<input type="checkbox"/>
()		<input type="checkbox"/>	<input type="checkbox"/>
()		<input type="checkbox"/>	<input type="checkbox"/>

h

Non-Thai National Bidder

		No. of page(s)	For EGAT only	
			Yes	No
[]	4. Where the Bidder is a natural person or a group of persons other than a juristic person			
()	(a) Natural Person			
	- Certified copy of passport	<input type="checkbox"/>	<input type="checkbox"/>
()	(b) Group of persons			
	- Certified copy of partnership agreement or contract (if any)	<input type="checkbox"/>	<input type="checkbox"/>
	- Certified copy of passport of partners or related documents according to <i>Item 5</i> of each participant of the group	<input type="checkbox"/>	<input type="checkbox"/>
[]	5. Where the Bidder is a juristic person			
	- Certified copy of affidavit of incorporation	<input type="checkbox"/>	<input type="checkbox"/>
	- Name list of managing partners, directors, etc., as the case may be, and list of persons entrusted with controlling power (if any)	<input type="checkbox"/>	<input type="checkbox"/>
	- Memorandum of Association (if any) (Please fill in the form on page 10.)	<input type="checkbox"/>	<input type="checkbox"/>
	- Name list of major shareholders (if any) (Please fill in the form on page 11.)	<input type="checkbox"/>	<input type="checkbox"/>
[]	6. Other documents (if any)			
()	<input type="checkbox"/>	<input type="checkbox"/>
()	<input type="checkbox"/>	<input type="checkbox"/>
()	<input type="checkbox"/>	<input type="checkbox"/>
()		
()		

Thai and Non-Thai National Bidder

	No. of page(s)	For EGAT only	
		Yes	No
[] 7. Where the Bidder is a joint venture / consortium			
- Certified copy of association agreement	<input type="checkbox"/>	<input type="checkbox"/>
() (a) If participant of a joint venture / consortium is not a juristic person			
(i) Thai national			
- Certified copy of identity card	<input type="checkbox"/>	<input type="checkbox"/>
(ii) Non-Thai national			
- Certified copy of passport	<input type="checkbox"/>	<input type="checkbox"/>
() (b) If participant of a joint venture / consortium is a Thai-national juristic person			
() (i) Ordinary partnership or limited partnership			
- Certified copy of affidavit of incorporation	<input checked="" type="checkbox"/>	<input type="checkbox"/>
- Name list of managing partners, and list of persons entrusted with controlling power (if any) (Please fill in the form on page 10.)	<input type="checkbox"/>	<input type="checkbox"/>
() (ii) Limited company or public limited company			
- Certified copy of affidavit of incorporation	<input type="checkbox"/>	<input type="checkbox"/>
- Memorandum of Association	<input type="checkbox"/>	<input type="checkbox"/>
- Name list of managing directors, and list of persons entrusted with controlling power (if any) (Please fill in the form on page 10.)	<input type="checkbox"/>	<input type="checkbox"/>
- Name list of major shareholders (Please fill in the form on page 11.)	<input type="checkbox"/>	<input type="checkbox"/>

	No. of page(s)	For EGAT only	
		Yes	No
() (c) If participant of a joint venture / consortium is a Non-Thai national juristic person			
- Certified copy of affidavit of incorporation	<input type="checkbox"/>	<input type="checkbox"/>
- Name list of managing partners, directors, etc., as the case may be, and list of persons entrusted with controlling power (if any) (Please fill in the form on page 10.)	<input type="checkbox"/>	<input type="checkbox"/>
- Memorandum of Association (if any)	<input type="checkbox"/>	<input type="checkbox"/>
- Name list of major shareholders (if any) (Please fill in the form on page 11.)	<input type="checkbox"/>	<input type="checkbox"/>
[] 8. Other documents (if any)			
() Certified copy of any other registration required by Ministry of Commerce of Thailand	<input type="checkbox"/>	<input type="checkbox"/>
() Certified copy of registration for value added tax in Thailand	<input type="checkbox"/>	<input type="checkbox"/>
()	<input type="checkbox"/>	<input type="checkbox"/>
()	<input type="checkbox"/>	<input type="checkbox"/>
()	<input type="checkbox"/>	<input type="checkbox"/>

We hereby confirm that all documents detailed above are true and correct.

Signed _____
(Name of Bidder)

stamp company seal (if any)

**List of Names of Manager / Managing Partner / Managing Director / Executive /
Person Who Is Authorized to Manage the Business
(Relationship in Management)
Bidder shall fill in and submit this form with his bid**

Enquiry / Bid No : Enquiry / Bid Opening Date :
Name of Company / Partnership / Juristic Person :

No.	Name – Surname	Position	Name – Surname of Spouse	Name – Surname of Minor

We hereby confirm that all documents submitted are true and correct.

Signed _____
(Name of Bidder)

Stamp company seal (if any)

Remarks

1. The unused wordings shall be struck out.
2. Duplicate this page as necessary.

List of Partner in Ordinary Partnership / Partner with Unlimited Liability in Limited Partnership /
Major Shareholder in Limited Company or Public Limited Company
(Relationship in Capital)

Bidder shall fill in and submit this form with his bid

Enquiry / Bid No. : Enquiry / Bid Opening Date :

Name of Company / Partnership / Juristic Person :

Registreed Capital : (currency) Number of Share : Price per Share : (currency)

No.	Name - Surname	Position	Number of Share (%) or Amount of Shareholder's Equity	Name – Surname of Spouse	Number of Share (%) or Amount of Shareholder's Equity	Name – Surname of Minor	Number of Share (%) or Amount of Shareholder's Equity

We hereby confirm that all documents submitted are true and correct.

Signed _____

(Name of Bidder)

Stamp company seal (if any)

Remarks

1. The unused wordings shall be struck out.
2. "Major Shareholder" means a shareholder who holds more than twenty-five (25) per cent of stake in an enterprise. The shareholding of spouse or minor of a person shall be regarded as being the shareholding of such person. In case of no major shareholder, please specify "No major shareholder" in the tabulation above.
3. Duplicate this page as necessary.
4. The Bidder shall submit List of Names of Manager/ Managing Partner/ Managing Director/ Executive/ Person Who Is Authorized to Manage the Business (Relationship in Management)/ and List of Partner in Ordinary Partnership/ Partner with Unlimited Liability in Limited Partnership/ Major Shareholder in Limited Company or Public Limited Company (Relationship in Capital) of the Bidder as per page 10-11 of this Additional Regulation.

In case that any Major Shareholder(s) of the Bidder is (are) juristic person(s), and such juristic person(s) has (have) Major Shareholder(s) who is (are) juristic person(s), the Bidder shall submit the list of the Major Shareholder(s)/ the Names of Manager/ Managing Partner/ Managing Director/ Executive/ Person Who Is Authorized to Manage the Business/ Partner/ Partner with Unlimited Liability/ of such juristic person(s) as per page 10-11 of this Additional Regulation. The requirement of submission of list of the Major Shareholder(s)/ the Names of Manager/ Managing Partner/ Managing Director/ Executive/ Person Who Is Authorized to Manage the Business/ Partner/ Partner with Unlimited Liability/ of such juristic person(s) shall apply to 2 tiers of Major Shareholder(s) who is(are) juristic person(s).

Important Information
for
Invitation to Bid No. TS12-MJ2-05 and GBA3-MJ2-04

The purpose of this section is to inform the Bidders to **carefully study** the details of the revised terms and conditions in the bidding documents. The following provisions have been **recently revised** as stated hereunder:

Article F-8. Payment:

If the Contractor requires the payment of foreign currency portion to be paid directly to the suppliers, he has to inform EGAT **which portion of the Contract Price, as stipulated in the term of payment of the Contract**, to be paid accordingly.

In case the local Contractor requires foreign currency or currencies to be paid directly to him, payment of such foreign currency or currencies will be made to the local Contractor in Thai Baht by using the **selling exchange rate** published by the Bank of Thailand on the **payment date** (previously stated as buying exchange rate on the bid opening date).

The number of days which payment for the first portion of foreign supply will be made after delivery, previously specified as 45 days, has been **deleted**.

Article F-9. Liquidated Damages for Late Delivery of Equipment:

The limit of liquidated damages, previously specified that does not exceed 10%, has been **deleted**.

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DATA SHEET

DATA SHEET

for

Invitation to Bid No. TS12-MJ2-05 and GBA3-MJ2-04

This section consists of provisions that are specific to each procurement and supplement the information or requirements included in bidding documents.

Article B-3. Bid Security

Schedule Nos. A1 and B1

The amount of bid security shall be USD 26,590.- or THB 830,000.-.

Schedule Nos. A2 and B2

The amount of bid security shall be USD 18,740.- or THB 585,000.-.

Schedule Nos. A3 and B3

The amount of bid security shall be USD 51,410.- or THB 1,605,000.-.

Schedule A4

The amount of bid security shall be USD 2,300.- or THB 71,500.-.

Article B-4. Validity of Bids

The validity of the bid shall be for one hundred and twenty (120) Days from the date specified for opening of bid.

Article B-8. Information to be Submitted with Bid:

Item m. is not applicable

Article B-12. Evaluation and Comparison of Bids:

The evaluation of bid prices shall be on :

- combination of Schedules A1 and B1
- combination of Schedules A2 and B2
- combination of Schedules A3 and B3
- schedule basis for Schedule A4

Article E-29. Failure to Meet Requirements and F-10. Maintenance Guarantee

Maintenance Guarantee Period

- For all Equipment except Shunt Reactor, 200 MVA 230 kV and above Power Transformer and 500 kV System Voltage Equipment

The Contractor shall guarantee the proper functioning of Equipment for a period of one (1) Year except the following Equipment the guarantee period of which shall be as follows :

<u>Equipment</u>	<u>Period of Guarantee (Year)</u>
- Fault Recording System	2
- Control and Protection System	2

- For Shunt Reactor, 200 MVA 230 kV and above Power Transformer and 500 kV System Voltage Equipment

The Contractor shall guarantee the proper functioning of Equipment for a period of five (5) Years.

Defective Equipment to be replaced with the whole new set

For GIS, Power Transformer, Power Circuit Breaker, Shunt Reactor, in case EGAT, at its sole discretion, requires the Contractor to replace any defected Equipment, the Contractor shall replace the Equipment with the whole new set as specified in Failure to Meet Requirements in section E and Maintenance Guarantee in section F.

Article F-9. Liquidated Damages for Late Delivery of Equipment

The Liquidated Damages shall be at the rate of one-tenth of one (0.10) per cent of the price of each complete item of Equipment not timely delivered for each Day of delay. This sum is payable regardless of the actual loss and/or damages incurred.

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SECTION A
INVITATION TO BID

INVITATION TO BID NO. TS12-MJ2-05 and GBA3-MJ2-04

**SUPPLY OF POWER CIRCUIT BREAKER AND
DISCONNECTING SWITCH**

TRANSMISSION SYSTEM EXPANSION PROJECT NO.12

**BULK POWER SUPPLY FOR THE GREATER BANGKOK AND
VICINITY AREA PHASE 3**

A-1. Invitation

The Electricity Generating Authority of Thailand (EGAT) hereby invites sealed bids for furnishing and delivering of Power Circuit Breaker and Disconnecting Switch under Transmission System Expansion Project No. 12 and Bulk Power Supply for The Greater Bangkok and Vicinity Area Phase 3 hereinafter called Equipment in accordance with the terms, conditions and Specifications described in these Bidding Documents.

A-2. Eligibility of Bidders: General Requirements

All Bidders shall meet the following requirements; failure to so comply shall constitute sufficient ground for rejection.

- a. The Bidder shall be a partnership, firm or company, either alone or in joint venture or in consortium.
- b. The Bidder shall be a purchaser of the bidding documents from EGAT. For a joint venture or consortium, only one (1) member of the joint venture or consortium is required to purchase the bidding documents.

In the case where the Bidder is not the purchaser of the bidding documents, the purchaser shall notify EGAT of the name of the Bidder in writing *prior to the bid opening*.

- c. The Bidder shall be well-established and maintain a permanent place of business. For a joint venture or consortium, all members of the joint venture or consortium are required to meet this qualification.

- d. The Bidder shall not be named in the List of Work Abandoners published by the Office of the Prime Minister and/or in the Debarment List and/or in the List of Work Abandoners declared by EGAT.
- e. For the Bidder who changes name before submitting the bid, his experience records in previous name shall be considered as the experience records of the Bidder.
- f. The Bidder shall not be a Jointly Interested Bidder with other Bidders as from the date of EGAT's issuance of this invitation to bid, or shall not be a person who undertakes any action as an "Obstruction of Fair Price Competition" as defined in Additional Regulation for this invitation.
- g. The Bidder shall not either be EGAT's consultant or involve in EGAT's consultancy company under this invitation, or have EGAT's personnel involved in his business as shareholder having voting right that can control his business, director, manager, officer, employee, agent or consultant except the ones who are officially ordered by EGAT to act or participate therein.
- h. The Bidder shall not be the person who is privileged or protected not to be taken any legal proceeding under Thai court; provided that such Bidder's government declares that such special privilege is waived.
- i. In case of a joint venture or consortium, the Bidder shall carry out all the provision of the Equipment and all Work under such formation from the time of bidding until the fulfillment of the Contract and the parties to the joint venture or the consortium shall accept joint and several liability for performing all obligations under the bid and the Contract.
- j. The Bidder shall not propose to supply the Equipment from the country under the state of war whether declared or not.
- k. The Bidder shall have adequate fund to meet financial obligations incidental to this Contract.
- l. The Bidder shall submit documentary evidence established in accordance with Article B-8. Information to be Submitted with Bid to demonstrate the Bidder's sufficient eligibility to bid and qualification to perform the Contract.

A-3. Eligibility of Bidders: Technical Requirements

I. All Bidders shall meet the following requirements; failure to so comply shall constitute sufficient ground for rejection.

- a. The Bidder shall manufacture or supply the Equipment or Work as required under this invitation to bid.
- b. If the Bidder is a new company formed by acquisition of or merger with other companies or business units before submitting the Bid, the experience records of any of such previous companies or business units that meet the requirements set forth herein are acceptable as the experience records of the Bidder.
- c. The Bidder shall have no just or proper claims pending against the Bidder with respect to breach in the performance of contract on other similar works awarded by EGAT. If the Bidder is a new company formed by acquisition of or merger with other companies or business units, the pending claim of any of such previous companies or business units shall be considered pending claim of the Bidder.
- d. The Bidder shall have sufficient capacity to carry out the Work.
- e. The bidder shall propose the Equipment manufactured by the qualified manufacturers who shall fulfill the following requirements :

1. Being well-established and maintaining a permanent place of business.
2. The manufacturer shall have the experience records that meet the requirements set forth herein.

Reference records of either parent or affiliated companies shall not be considered as the records of such manufacturer.

3. If the Manufacturer is a new company formed by acquisition of or merger with other companies or business units, and any of such previous companies or business units has the experience records that meet the requirements set forth herein, such experience records are acceptable as the experience records of the new company, provided that each item of the equipment to be supplied under this bid shall be manufactured from the same source of supply as indicated in each of such relevant supply records as described in Item e.5 below. Otherwise, it shall not be acceptable and shall be sufficient grounds for rejection.

For the avoidance of doubt, it is not allowed to combine the experience records of the previous companies or business units in order to meet the experience requirements.

4. Regularly manufacturing of Equipment of the type and ratings proposed.

5. Having one of the following qualifications for the required Equipment as follows:

5.1 Proposing the Equipment of the type and ratings which have ever been accepted by EGAT.

OR

5.2 For 230 kV Power Circuit Breaker

Having a supply record of Equipment of the type proposed at nominal system voltage of 220 kV or above, 3000 A or above, 50 kA or above, with successful operation/use of at least three (3) consecutive years in an overseas country (not his own country) and at least three (3) three phase sets.

However, the Equipment of the type and ratings proposed shall have a supply record of successful operation/use of at least three (3) consecutive years in overseas country (not his own country) and at least one (1) three phase set.

In case that the supply record of Equipment of the type and ratings proposed fulfilled the requirement, the manufacturer may propose a newly developed or modified type of such Equipment with successful operation/use for at least one (1) year in overseas country (not his own country) and at least three (3) three phase sets. The detailed information of the development or modification shall be submitted with his proposal. EGAT, however, reserves the right and will make its own judgment whether or not to consider or accept the proposed developed or modified type.

For 115 kV Power Circuit Breaker

Having a supply record of Equipment of the type proposed at nominal system voltage of 110 kV or above, 2000 A or above, 40 kA or above, with successful operation/use of at least three (3) consecutive years in an overseas country (not his own country) and at least three (3) three phase sets.

However, the Equipment of the type and ratings proposed shall have a supply record of successful operation/use of at least three (3) consecutive years in overseas country (not his own country) and at least one (1) three phase set.

In case that the supply record of Equipment of the type and ratings proposed fulfilled the requirement, the manufacturer may propose a newly developed or modified type of such Equipment with successful operation/use for at least one (1) year in overseas country (not his own country) and at least three (3) three phase sets. The detailed information of the development or modification shall be submitted with his proposal. EGAT, however, reserves the right and will make its own judgment whether or not to consider or accept the proposed developed or modified type.

For 69 kV and below Power Circuit Breaker

Having a supply record of Equipment of the type and ratings proposed with successful operation/use of at least three (3) consecutive years in an overseas country (not his own country) and at least three (3) three phase sets. The ratings and features of Equipment shall be the same or similar rating as EGAT specifies.

In case that the supply record of Equipment of the type and ratings proposed fulfilled the requirement, the manufacturer may propose a newly developed or modified type of such Equipment with successful operation/use of at least one (1) year in overseas country (not his own country) and at least three (3) three phase sets. The detailed information of the development or modification shall be submitted with his proposal. EGAT, however, reserves the right and will make its own judgment whether or not to consider or accept the proposed developed or modified type.

Supply records of the higher rating Equipment shall not be accepted if the Bidder does not propose such higher rating Equipment in his bid.

For 230 kV and below Disconnecting Switch

Having a supply record of Equipment of the type and ratings proposed with successful operation/use for at least three (3) consecutive years in an overseas country (not his own country) and at least three (3) three phase sets. The ratings and features of Equipment shall be the same or similar rating as EGAT specifies.

In case that the supply record of Equipment of the type and ratings proposed fulfilled the requirement, the manufacturer may propose a newly developed or modified type of such Equipment with successful operation/use for at least one (1) year in overseas country (not his own country) and at least three (3) three phase sets. The detailed information of the development or modification shall be submitted with his proposal. EGAT, however, reserves the right and will make its own judgment whether or not to consider or accept the proposed developed or modified type.

Supply records of the higher rating Equipment shall not be accepted if the Bidder does not propose such higher rating Equipment in his bid.

6. Having a past design test record of the Equipment as proposed, if specified in EGAT's specification. Such past design test record shall conform to the test specified in EGAT's specification.
7. Proposing the manufacturer who has no just or proper claims pending against Equipment on other similar works.

In case the manufacturer is a new company formed by acquisition or merger with other companies or business units, the pending claim of any of such previous companies or business units shall be considered pending claim of the manufacturer.

II. All Bidders should preferably meet the following requirements; failure to so comply may constitute sufficient ground for rejection.

- a. Proposing the steel supporting structure of Disconnecting Switch manufactured by local manufacturers.

A-4. Joint Venture or Consortium

In the event that the successful Bidder is a joint venture or a consortium formed of two or more companies, EGAT requires that the parties to the joint venture or the consortium accept joint and several liability for all obligations under the Contract.

A-5. Preparation and Delivery of Bids

Bids shall be prepared in accordance with the Instructions to Bidders contained in the Bidding Documents in one (1) original and three (3) hard copies in English, on the bid forms included for this purpose and shall be accompanied with a bid security as required under the Article pertaining to Bid Security in Section B. Instructions to Bidders. The bid security will be placed in a separate sealed envelope.

The envelope of the bids will be marked in capital letters in the lower left-hand corner as follows :

INVITATION TO BID NO. TS12-MJ2-05 and GBA3-MJ2-04

**SUPPLY OF POWER CIRCUIT BREAKER AND
DISCONNECTING SWITCH**

**TRANSMISSION SYSTEM EXPANSION PROJECT NO.12
BULK POWER SUPPLY FOR THE GREATER BANGKOK AND
VICINITY AREA PHASE 3**

and shall be addressed and delivered to :

***International Procurement Department - Transmission Segment
Procurement and Inventory Management Division***
Electricity Generating Authority of Thailand
Bangkruai, Nonthaburi 11130
Thailand

on or before 10:00 a.m., Bangkok Standard Time,*see Tentative Schedule*.....

If the envelope(s) is not sealed, marked and addressed as required above, EGAT will assume no responsibility for the bid misplacement or premature opening.

Bids will be opened publicly at Room No. 1202/1, 12th floor, Building TOR 101 and at the time specified above.

Bids received after the time stipulated herein shall be rejected and returned unopened.

A-6. Availability of Bidding Documents

The Bidding Documents in CD-ROM are available for examination and can be obtained from EGAT at the hereunder address upon payment to EGAT, non-refundable, in the amount of USD 16.- or Baht 500.-. These prices include the value added tax.

International Procurement Department - Transmission Segment
Procurement and Inventory Management Division
Electricity Generating Authority of Thailand
Bangkruai, Nonthaburi 11130
Thailand

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**SECTION B
INSTRUCTIONS TO BIDDERS**

INSTRUCTIONS TO BIDDERS

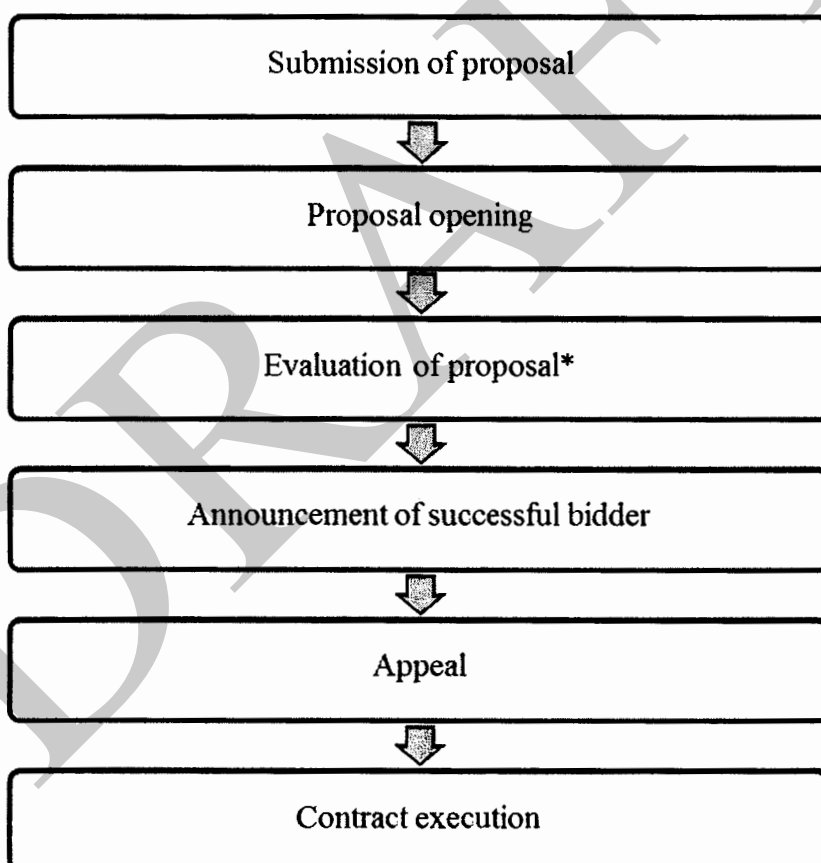
Overview of the Procurement Process

In compliance with the Office of the Prime Minister's Regulations of e-Government Procurement B.E.2549, bid prices and the Contract Price shall include value added tax (VAT) imposed under the law of Thailand. The medium cost announced by EGAT is inclusive of VAT and other relevant expenses.

The amounts of performance security, maintenance security, and liquidated damages shall also be based on the Contract Price which is inclusive of VAT (if any).

For evaluation and comparison of Bids, the bid price shall be evaluated according to the conditions specified in the bidding document.

The procurement process is summarized in the following diagram.



*Remarks

1. The Bidder shall be deemed to have carefully examined all of the terms, conditions and Specifications of the Bidding Documents.
2. EGAT will take into consideration the conformity of the bid to the requirements of the Bidding Documents as well as the suitability for the purpose intended.
3. EGAT will not be bound to accept the bid with the lowest indicated cost. EGAT reserves the right to accept the bid which in its judgement is the lowest evaluated bid.

B-1. Preparation of Bids

- a. Bids shall be prepared in English, in one (1) original and three (3) hard copies, clearly marked each "Original" and "Copy", and submitted at the place and time specified for receipt of bids.

In the event of any discrepancy between the Original and the Copy, the Original shall govern.

For price quotation, Bidder must fill bid prices in an excel file of Price Schedules contained in the Bidding Documents and submit one (1) original and three (3) hard copies together with the excel file to EGAT at the same time of bid submission.

Pursuant to the Office of the Prime Minister's Regulations of e-Government Procurement B.E.2549, VAT at the prevailing rate shall be filled automatically in the Summary of Bid Price of the price schedule in the Excel file subject to Article B-2. Bid Prices.

However, in case Bidder is a consortium formed of two or more companies, Bidder must also submit one (1) original hard copy including an excel file of price schedules of the Work performed by each member of the consortium in addition to hard copies and excel file of the total bid price as specified above.

If any discrepancy between the bid prices of the Work performed by each member of the consortium and the bid prices of the Bidder occurs, the bid prices of the Bidder shall govern and the bid prices of the Work performed by each member of the consortium shall be adjusted accordingly.

In the event of discrepancy between the original hard copy and the Excel file submitted, the original hard copy shall govern.

- b. Bidder shall not submit more than two (2) proposals and the proposal(s) to be submitted shall conform to the specifications. In case of any deviation from the specifications, Bidder shall follow the provisions under Article B-9. Deviations from Specifications.
- c. The "Original" and "Copy" shall be prepared on the bid forms included and made a part of the Bidding Documents, which shall be submitted with all applicable blanks in the bid forms properly filled in, and shall be manually signed in ink by a person or persons duly authorized. The letter of authorization shall be indicated by written power-of-attorney accompanying the bid.

All pages of the bid, except for unamended printed literature, shall be initialled by the person or persons signing the bid.

- d. The bid shall contain no interlineations, erasures or overwriting except as necessary to correct errors made by the Bidder, in which case such corrections shall be initialled by the person or persons signing the bid.
- e. Modification by letter or facsimile of bids already submitted will be considered if received prior to the time fixed for the receipt of bids. Confirmation by letter of any modification by facsimile should be sent to EGAT evidencing by post mark not later than the deadline for submission of Bids.
- f. No Bidder will be permitted to alter his bid after the bids have been opened, but clarifications not changing the substance of the bid therein may be accepted.
- g. Bidder may quote for any schedule or all schedules as called for, but shall quote for all items of the schedule(s) proposed. Consideration will be made as stipulated in Article B-12. Evaluation and Comparison of Bids.
- h. Any price discount to be offered shall be clearly stated in the Discount Form accompanied with the Bid to be submitted on the bid opening date specified herein.

B-2. Bid Prices

Currency

Bid prices as shown in Article C-1. Price Schedule shall be firm, not subject to adjustment and payable in the currencies as follows :

- a. The bid price shall be quoted in Thai baht, US dollar, euro, Japanese yen, renminbi (Chinese yuan), or in the Bidder's or Manufacturer's home currency only if his currency trading is prevailed at the time of bidding in any international market other than in Bidder's or Manufacturer's home country.

If the currencies quoted by the Bidder do not conform to the requirement set forth herein, EGAT reserves the right to convert the bid price to US dollars by using the exchange rate on the Reuters screen which is announced at 10.00 a.m. (Bangkok Time) on the bid opening date. Such converted bid price in US dollars shall be treated as the Bidder's proposed bid price. In such case the Contract Price for such portion under the Contract shall be made in US dollars.

Subject to paragraph a. above, in case the Bidder expects to incur a portion of its expenditures in the performance of the Contract in more than one currency and wishes to be paid accordingly, the bid price shall be expressed in different currencies and the respective amount in each currency together making up the total price.

- b. Local expenditures shall be quoted in Thai Baht.
- c. Payments will be made in the currency or currencies in which the bid prices have been stated.

Source of Supply and Service

- a. Prices for Equipment manufactured in Thailand shall be firm ex-works prices and quoted in Thai Baht. Any import duty and taxes (value added tax included) assessed by the Government of Thailand at the port of entry on imported raw materials or components shall be paid by the Contractor and included in these ex-works prices.
- b. Prices for Equipment manufactured outside Thailand (imported Equipment) shall be firm, stated both on FOB Port of Shipment/Vessel and CFR Thai Port basis, and quoted in foreign currencies specified above. Any import duty, excise tax (if any) and value added tax to be assessed by the Government of Thailand at the port of entry shall not be included in the quoted bid prices.
- c. Prices for services including cost of installation supervisor (if any) shall be firm.
- d. All expenses incurred for the Work specified in Article F-1. Scope of Work shall be included in the quoted Bid Prices.

Price Schedule

The Bidder shall enter a unit price, an amount, or a lump sum price, as required, for every item listed in the price schedule. If the unit price as entered does not conform to the amount entered for the same item, the unit price shall govern. If the sum of the amount entered for individual items does not conform to the total amount entered for these amounts under total bid prices, then the sum of the amount entered for the individual items shall govern.

Where quantity and total price only are required, the unit price shall be taken as the stated total price divided by the quantity specified.

Except for foreign supply, VAT at the prevailing rate shall be filled automatically in the Summary of Bid Price of the price schedule in the Excel file. However, the Contract Price shall include VAT only for the portion of Work which is subject to VAT.

B-3. Bid Security

The original of the bid submitted shall be accompanied with a bid security in the form of a cash deposit or a certified cheque issued by a local bank, *or a cashier cheque issued by a*

local bank, or a bank guarantee or a letter of guarantee issued only by a local bank or an acceptable financial institution in Thailand, or by a foreign bank counter-guaranteed by a local bank as primary obligor. *In case of a cash deposit, only Thai baht can be made.*

The bid security shall be in a form as per specimen attached or in any other form with essential content in accordance with the specimen, and made payable to EGAT in the amount as specified in Data Sheet. Any bid not being accompanied with bid security shall be rejected. The bid security shall remain in force up to and including ninety (90) Days after the expiry date of the bid validity.

The bid security shall be forfeited in favor of EGAT if :

- a. The Bidder withdraws his bid after the bid is opened; or
- b. The successful Bidder fails for any reason to execute the Contract or to furnish a performance security.

The Bidder may, upon EGAT's request to extend the bid security when it has expired, refuse to do so without forfeiting the bid security. A Bidder granting the request will be neither required nor permitted to modify his bids.

The bid security of unsuccessful Bidder(s) will be returned as decided by EGAT or within thirty (30) Days following EGAT's acceptance of the successful Bidder.

The bid security of the successful Bidder will be returned upon execution of the Contract and after the performance security furnished has been accepted by EGAT.

B-4. Validity of Bids

The validity of the bid shall be as specified in Data Sheet.

In the event EGAT requires the validity period to be extended, EGAT may in writing or by facsimile so notify the Bidders at least fourteen (14) Days prior to the expiry date of the validity period, in which event any Bidder not agreeing to such request for extension may withdraw his bid by so advising EGAT in writing or by facsimile prior to the expiry date of the original validity period. If the advice of withdrawal shall not have been received by EGAT prior to the said date, the extension shall be deemed to have been accepted by the Bidder, and the Bidder shall be required to extend the effective period of the bid security accordingly.

B-5. Delivery of Bids

Where bids are submitted by mail, the hour and date of receipt of the bid will be taken as that certified by EGAT. For all bids delivered directly, a receipt will be furnished to the Bidder indicating the place, hour, and date of delivery. Late bids will be returned unopened.

B-6. Withdrawal of Bids

Bids may be withdrawn only on written requests which are received by EGAT prior to the time fixed for the receipt of the bids. Negligence on the part of the Bidder in preparing his bid confers no right for the withdrawal of the bid after it has been opened. Whenever a bid has been withdrawn, it will be returned unopened to the Bidder.

B-7. Interpretation of Bidding Documents before Bid Opening

If a prospective Bidder is in doubt about the true meaning of any part of the Bidding Documents, the Bidder may submit to EGAT a written request for a reply or an interpretation; provided that sufficient time is allowed for a reply to reach the prospective Bidder prior to the date specified for bid opening. An interpretation will be given in the form of a Supplemental Notice furnished to all prospective Bidders. Receipt of all Supplemental Notices shall be acknowledged by each prospective Bidder on the Proposal. Oral interpretation of the Bidding Documents will not be binding.

B-8. Information to be Submitted with Bid

Each Bidder shall submit with his bid the following documents, data and information in English language in addition to any other information called for elsewhere in the Bidding Documents in order to enable EGAT to fully evaluate the Proposal of the Bidder :

- a. Name of manufacturer and country of origin and type or model of Equipment he proposes to furnish.
- b. Data, drawings, catalogue and descriptive materials which will show equipment arrangement, general dimensions, principles of operation, extent of factory assembly, and the materials from which parts are made.
- c. Sufficient references describing the technical experience of the manufacturers, including lists of the Equipment supplied and installed overseas. If possible, certificates issued by the user and/or consulting engineers supporting the said work and record of commercial operation in good condition should also be submitted.

- d. Copies of Auditor's certified balance sheet of the Bidder for the past three (3) consecutive years.
- e. In case the local manufactured Equipment is proposed, the sufficient documentary evidence, if any, showing that the manufacturers have been acknowledged for producing standard product by the Thai Industrial Standard Institute (TISI), Ministry of Industry, or registered with TISI, or ISO 9000 certified by the National Accreditation Council of Thailand (NAC) or obtained the privilege from the Board of Investment or accepted by EGAT for manufacture of such Equipment, is required to be submitted with the Bid.
- f. Sufficient evidence documents clearly demonstrating that a firm/company who changes its name, merges with, or acquires other company/companies, or forms a new company by merging its business unit with those of other companies, and the experience records of the new company clearly demonstrating that it has sufficient evidence of running the business as before.
- g. A statement of proposed minor deviations from the Specifications along with complete specifications and all necessary descriptive literature for any proposed alternative Equipment or procedure, as required under Article B-9. Deviations from Specifications.
- h. Where Proposal Data Forms are provided, the Bidder shall enter all information as directed.
- i. Where the Specifications provide for submission of a sample or samples, the Bidder shall submit same together with his bid.
- j. Joint Venture/Consortium Agreement with a statement that each member of a joint venture/consortium will be jointly and severally responsible and liable for the complete execution of the work (in case the Bidder is a joint venture or consortium).
- k. Confirmation Form of not being a Jointly Interested Bidder with other Bidders and not being a person who undertakes any actions as an Obstruction of Fair Price Competition, and Registration/Non-registration with the Revenue Department as a VAT registrant.

If the Bidder has registered as a VAT registrant, he shall submit EGAT an evidence of VAT registration. On the contrary, if the Bidder is not registered as a VAT registrant, he shall inform EGAT whether he will register as a VAT registrant or not.

In case the Bidder is a consortium, each member of the consortium shall fill in the Confirmation Form provided for consortium Bidders.

- l. Filled-in Documentary List and documents required according to Additional Regulation.

- m. A statement indicating that the parent manufacturer shall certify and be responsible for the design, production process and quality control. This information is required only for the Equipment specified in Data Sheet.

Should the Bidder fail to submit any of the document described above and neglect to submit the same to EGAT within the time as specified by EGAT, such failure shall be sufficient reason for rejection of his bid.

Verbal statements made by the Bidder at any time regarding quality, quantity, or arrangement of Equipment will not be considered.

If alternative Equipment is indicated in the bid, it shall be understood that EGAT will have the option of selecting any one of the alternates so indicated and such selection shall not be a cause for extra compensation or extension of time.

In case the Bidder proposes alternative Equipment, with the condition to supply any one of the alternates so indicated at his option, such bid will be considered conditional and may be considered sufficient reasons for rejection.

B-9. Deviations from Specifications

Unless otherwise provided in the Specifications, the quality of Equipment and workmanship shall comply in all respects with the Standards required under the bidding documents.

If the Bidder proposes any minor deviations from the specifications, he shall submit a statement of each proposed deviation referenced to the particular Article of these specifications, details on the design drawings or article, paragraph and section of referenced standards or specifications. Full details of all minor deviations together with confirmation shall be submitted with the bid in a form provided in Section C. The Bidder shall submit, with his bid, copies of the standards or specifications proposed for his deviations. In case there is no statement in the form provided in Section C in the Bidder's proposal on the proposed deviations, the bid shall be regarded by EGAT as conforming in all respects to the terms and conditions and Specifications as stated in the bidding documents at no additional cost to the bid price.

Notwithstanding the foregoing, it is at EGAT's sole discretion in determining whether any of such proposed deviations is acceptable and in determining whether it is minor or major deviation.

B-10. Rejection of Bids

EGAT reserves the right not to accept the lowest evaluated bid.

Bids shall be strictly based on the Specifications and terms and conditions in the Bidding Documents. Should any bid fail to comply with the terms and conditions stipulated in these Bidding Documents, especially those under Article pertaining to payment or be incomplete, conditional or obscure, or contain additions not called for, or irregularities of any kind, it will be liable to rejection.

EGAT also reserves the right to reject any or all bids submitted without giving reason or to reject the bid from any Bidder who fails to satisfy EGAT that the bid complies with the terms and conditions stipulated in these bidding documents without any non-compliance which is deemed substantial and advantageous over other Bidders.

B-11. Delivery Time

Delivery time required is indicated for each respective Price Schedule in the Proposal section of the Bidding Documents, and shall be carefully observed. However, no preference will be given in the bid evaluation for earlier delivery than the stipulated delivery period.

All bids specifying delivery time later than those indicated may be rejected.

B-12. Evaluation and Comparison of Bids

Bid prices pursuant to Article B-2. Bid Prices will be evaluated as follows :

1. The evaluation of bid prices shall be specified in Data Sheet.
2. Bid prices will be converted into Thai Baht at the selling exchange rates, published by the Bank of Thailand, www.bot.or.th between Baht and other currencies on the bid opening date.
3. The rate of import duty prevailed on the bid opening date will be used for the purpose of bid evaluation of CFR Thai Port Price.
4. The prices to be used for evaluation and comparison purpose shall be as follows :
 1. Ex-works price including VAT for the final sale direct to EGAT for locally manufactured Equipment
 2. CFR Thai Port of Equipment to be imported plus the calculated insurance premium of 0.0898% of [CFR price+10% (CFR price)], import duty, excise tax

(if any), value added tax to be assessed by the Thai Government at the port of entry for imported Equipment , and 0.6 % of CFR price for customs clearance

The rate of import duty to be used for price comparison shall be as follows:

- a) For Equipment consisting of separate components which are intended to contribute together as a functional unit and imported under partial import entry - using a normal single tariff rate published in the Customs Tariff Decree for such Equipment
- b) For other Equipment and spare parts
 - i) In case any imported Equipment and spare part is proposed from one (1) country of origin for the same item:
 - Country of Origin Under Free Trade Agreement (FTA) – using lower comparing rate between the FTA rate and the normal rate published in the Customs Tariff Decree;
 - Country of Origin Under Non FTA – using a normal rate published in the Customs Tariff Decree.
 - ii) In case any imported Equipment and spare part is proposed from different countries of origin for the same item, a normal rate published in the Customs Tariff Decree for such Equipment and spare part will be used for price comparison.
3. Cost of local transportation including VAT, if any
4. Cost of installation supervisor including VAT, if any
5. Guaranteed losses of Equipment, if any, at the rate as stipulated in the Proposal Data.

Price for optional items, if any, will not be taken into consideration; however, Bidders shall also quote the prices thereof as required.

B-13. Acceptance of Bids

EGAT will not be bound to accept the bid with the lowest indicated cost. EGAT reserves the right to accept the bid which in its judgement is the lowest evaluated bid. In making its selection, EGAT will take into consideration the conformity of the bid to the requirements of the Bidding Documents and Specifications, guaranteed delivery time, the suitability for the purpose intended and whenever applicable, compensating factors will

be applied to deviation or departures from Specifications. EGAT will also take into consideration whether the Bidder's experience, organization, facilities and financial resources will assure the successful carrying out of the Work under the Contract within the time specified.

B-14. Appeal

Disqualified or unsuccessful Bidders who see that their disqualification or failure are due to EGAT's non-compliance with EGAT's procurement regulations may appeal to EGAT within fifteen (15) Days from the date of receipt or announcement, whichever comes first, of EGAT's final evaluation result. An appeal shall be made in writing and clearly state the cause of appeal and argument with referred facts or regulations and related documents. Appealing does not constitute a ground for suspending the ongoing procurement process unless EGAT's Governor agrees otherwise.

The Contract or Purchase Order shall not be executed until the period of appeal has ended and there is no appeal. In the event there is an appeal during such period, the Contract or Purchase Order shall not be executed unless EGAT's Governor concurs.

Decision of EGAT's Governor is final and conclusive.

B-15. Award of Contract

The Contract will be awarded as soon as practicable after opening of the bids, to the Bidder with the lowest evaluated bid. EGAT reserves the right to award the Contract on the basis of standards and specifications as proposed by the Bidder, if in the opinion of EGAT, they are considered acceptable.

At the time of execution of the Contract, the successful Bidder shall furnish the performance security in accordance with the conditions of Contract in the specimen of performance security provided in the bidding documents.

Failure to comply with the condition as expressed in the specimen of performance security will lead to withdrawal of award and cancellation of Contract, and in this respect EGAT reserves the right to award the Contract to the Bidder with the next lowest evaluated substantially responsive bid and the Bidder who defaults shall have his bid security forfeited in favor of EGAT.

After EGAT notifies the successful Bidder that his bid has been accepted, EGAT will send the Bidder the Contract Documents incorporating all agreements between the parties not later than ninety (90) Days after receipt of notice of award of Contract.

Promptly but not later than fifteen (15) Days after receipt of the Contract, the successful Bidder shall sign and date the Contract and return it to EGAT.

B-16. Bidder's Responsibility

The Bidder shall be deemed to have carefully examined all of the terms, conditions and Specifications of this Invitation to Bid, and also to have fully informed himself as to all conditions, local or otherwise, affecting the carrying out of the Work of the Contract, and to have formulated an estimate of the facilities available and needed.

The Bidder shall also be liable to any rules and regulations as well as Acts enforced in the Kingdom of Thailand. Failure to do so will be at the Bidder's risk.

B-17. Supplemental Notices

Supplemental Notices to the Bidding Documents may be issued prior to the date of opening of bids to clarify the Bidding Documents or to reflect modifications in the design or Contract terms. Each supplemental notice issued will be distributed to each person or organization to whom the Bidding Documents have been issued. The recipient shall acknowledge receipt of each supplemental notice by signing and returning in a reasonable time the receipt form distributed with the supplemental notice. All supplemental notices issued shall become a part of the Contract Documents.

B-18. Cost of Bidding

Bidders will not be reimbursed for any expenses they may incur in preparing and submitting their bids.

B-19. Cancellation of Bid

EGAT reserves the right not to accept any quantity or item or schedule or package, or to cancel the bid without purchasing any item. Bidders shall not be entitled to claim EGAT for any losses and/or damages in this connection. EGAT also reserves the right to cancel the bid

should there be any reasonable grounds that bidder is not in good faith in submitting *bid* such as submitting false documents.

In case of bid cancellation, EGAT will not be responsible for any losses and/or damages and will not refund payment of Bidding Documents.

DRAFT

SPECIMEN OF BID SECURITY

Whereas.....(hereinafter called "the Bidder") has submitted his bid dated.....for.....(hereinafter called "the Bid") under Invitation to Bid No.....KNOW ALL MEN by these presents that WE.....of.....having our registered office at.....(hereinafter called "the Guarantor") are bound unto Electricity Generating Authority of Thailand (hereinafter called "EGAT") in the sum of..... (in words :) for which payment well and truly to be made to EGAT, the Guarantor binds itself, its successors and assigns by these presents. Sealed with the Common Seal of the said Bank this.....(date).....day of.....(month).....,(year).....

THE CONDITIONS of this obligation are :

1. If the Bidder withdraws his bid during the period of bid validity specified in the Bidding Documents; or
2. If the Bidder, having been notified of the acceptance of his bid by EGAT during the period of bid validity;
 - (a) fails or refuses to execute the Contract, if required; or
 - (b) fails or refuses to furnish the Performance Security, in accordance with the Instructions to Bidders;

We, the Guarantor, unconditionally undertake to pay to EGAT as the primary obligor, up to the above amount upon receipt of its first written demand, without EGAT having to substantiate its demand.

This guarantee will remain in force up to and including ninety (90) Days after the expiry date of the bid validity.

(Signature of the Bank)

DRAFT

**SECTION C
PROPOSAL**

INVITATION TO BID NO. TS12-MJ2-05 and GBA3-MJ2-04

PROPOSAL

FOR

SUPPLY OF POWER CIRCUIT BREAKER AND
DISCONNECTING SWITCH

TRANSMISSION SYSTEM EXPANSION PROJECT NO.12
BULK POWER SUPPLY FOR THE GREATER BANGKOK AND
VICINITY AREA PHASE 3

C-1. Price Schedule

The undersigned Bidder, having carefully examined the Bidding Documents, hereby offers and proposes to perform the services and to furnish the Equipment on the basis of FOB Port of Shipment/Vessel or CFR Thai Port as specified in the Delivery Schedule and Distribution List for foreign supply or Ex-works delivery for local supply, in accordance with all provisions and conditions as described herein, all for the prices stated in the Schedule(s) attached.

Note : 1. Article C-1. Price Schedule

For imported Equipment, EGAT reserves the right to award the Contract on either FOB Port of Shipment/Vessel or CFR Thai Port basis.

2. Article E-12. Performance Security

The performance security required under Article E-12. Performance Security shall be ten (10) per cent of the Contract Price. Cost for furnishing the performance security shall be spread over the items proposed.

C-2. Penalty for Equipment Not Meeting Guaranteed Characteristics

The losses of Equipment shall be evaluated with the same rate as stipulated in the Proposal Data.

If the Equipment proposed fails to meet the guaranteed characteristics or the price of the measured losses is higher than the price of the guaranteed losses, the Contract price of Equipment shall be reduced by the different amount of the comparison between the price of the measured losses and the price of the guaranteed losses.

C-3. Guaranteed Delivery Time

Delivery Time of Equipment is required as indicated in the Delivery Schedule and Distribution List attached. The undersigned Bidder guarantees to make and to complete the delivery of Equipment proposed as required by EGAT.

Whenever the Equipment in any item are sub-itemized, the Contractor shall endeavor not to make partial shipment/delivery by sub-items.

In case of failure on the part of the Contractor to comply with the provision of the above paragraph, it is hereby understood that the Equipment in such particular items shall be deemed undelivered unless and until each all sub-items have been shipped/delivered.

C-4. Drawing and Document Submission Schedule

Drawing and Document Submission Schedule is required as indicated in Article F-11. Drawings and Documents to be Furnished by Contractor. The undersigned Bidder guarantees to submit all drawings and documents as required by EGAT.

C-5. Estimate of Deliveries

The estimated number of individual shipment/delivery, shipping point or points, estimated delivery date and estimated shipping weights and volumes for each individual shipping will be as follows :

<u>Number of Shipments</u>	<u>Item No.</u>	<u>Shipping Point</u>	<u>Estimated Delivery Date from Shipping Point</u>	<u>Total Weight kg.</u>	<u>Total Volume Cu.m.</u>
-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----

C-6. Bid Security

Bid security in the amount of _____,
(in words)
_____ has been deposited with EGAT.
(number)

C-7. Supplemental Notices

The undersigned Bidder certifies that the following Supplemental Notices have been received for the Contract Documents :

Proposal Submission Date _____ Day of _____ A.D. _____

Firm's Name _____

By _____

Title _____

Firm's Address _____

Witness

DRAFT

PART 1: PRICE PROPOSAL

PART 1 : PRICE PROPOSAL
PRICE QUOTATION INSTRUCTIONS

This part of the Bidding Document comprises :

1. Summary of Bid Prices
2. Price Schedules

Cost of Supply of Equipment comprises Foreign Portion and Local Portion. For Foreign Portion, Bidder is allowed to quote price in only four (4) different currencies. For Local Portion, default currency is Baht (THB).

Bidder shall fill in the price schedules in the soft file recorded and given in the CD, item by item. Then, the total prices for each schedule and Summary of Bid Prices will be automatically calculated.

Filling-in the data shall be in accordance with the following instructions :

1. Bidder shall fill in all data required in blue cells of the price schedules - Currency and Unit Price.
2. For local portion, the default is THB.
3. For foreign portion, Bidder shall fill a currency code in a column "Currency".

Remarks: Price Schedules are created in Microsoft Office Excel 2007.

INVITATION TO BID NO. TS12-MJ2-05 and GBA3-MJ2-04
SUMMARY OF BID PRICE FOR SCHEDULE A1 AND B1
SUPPLY OF POWER CIRCUIT BREAKER AND DISCONNECTING SWITCH
TRANSMISSION SYSTEM EXPANSION PROJECT NO.12
BULK POWER SUPPLY FOR THE GREATER BANGKOK AND VICINITY AREA PHASE 3

No.	Description	Currency	Supply of Equipment		Foreign Currency (excluding VAT) Amount	Local Currency (excluding VAT) Baht Amount
			Foreign Supply	Local Supply		
			CFR Thai Port	Ex-works Price (excluding VAT) Baht		
			Amount	Amount		
1	Schedule A1 : 230 kV Power Circuit Breaker					
2	Schedule B1 : 230 kV Power Circuit Breaker					
BID PRICE						Baht
VAT						Baht
SUMMARY OF BID PRICE						Baht

INVITATION TO BID NO. TS12-MJ2-05 and GBA3-MJ2-04
SUMMARY OF BID PRICE FOR SCHEDULE A2 AND B2
SUPPLY OF POWER CIRCUIT BREAKER AND DISCONNECTING SWITCH
TRANSMISSION SYSTEM EXPANSION PROJECT NO.12
BULK POWER SUPPLY FOR THE GREATER BANGKOK AND VICINITY AREA PHASE 3

No.	Description	Currency	Supply of Equipment		Foreign Currency (excluding VAT) Amount	Local Currency (excluding VAT) Baht Amount
			Foreign Supply	Local Supply		
			CFR Thai Port	Ex-works Price (excluding VAT) Baht		
			Amount	Amount		
1	Schedule A2 : 115 kV Power Circuit Breaker					
2	Schedule B2 : 115 kV Power Circuit Breaker					
BID PRICE						Baht
VAT						Baht
SUMMARY OF BID PRICE						Baht

INVITATION TO BID NO. TS12-MJ2-05 and GBA3-MJ2-04
SUMMARY OF BID PRICE FOR SCHEDULE A3 AND B3
SUPPLY OF POWER CIRCUIT BREAKER AND DISCONNECTING SWITCH
TRANSMISSION SYSTEM EXPANSION PROJECT NO.12
BULK POWER SUPPLY FOR THE GREATER BANGKOK AND VICINITY AREA PHASE 3

No.	Description	Currency	Supply of Equipment	
			Foreign Supply	Local Supply
			CFR Thai Port	Ex-works Price (excluding VAT) Baht
			Amount	Amount
1	Schedule A3 : 230 kV and 115 kV Disconnecting Switch			
2	Schedule B3 : 230 kV and 115 kV Disconnecting Switch			
BID PRICE				Baht
VAT				Baht
SUMMARY OF BID PRICE				Baht

INVITATION TO BID NO. TS12-MJ2-05 and GBA3-MJ2-04
SUMMARY OF BID PRICE FOR SCHEDULE A4
SUPPLY OF POWER CIRCUIT BREAKER AND DISCONNECTING SWITCH
TRANSMISSION SYSTEM EXPANSION PROJECT NO.12
BULK POWER SUPPLY FOR THE GREATER BANGKOK AND VICINITY AREA PHASE 3

No.	Description	Currency	Supply of Equipment	
			Foreign Supply	Local Supply
			CFR Thai Port	Ex-works Price (excluding VAT) Baht
			Amount	Amount
1	Schedule A4 : 33 kV and below Disconnecting Switch			
	BID PRICE			Baht
	VAT			Baht
	SUMMARY OF BID PRICE			Baht

INVITATION TO BID NO. TS12-MJ2-05 and GBA3-MJ2-04
Schedule A1 : 230 kV Power Circuit Breaker
SUPPLY OF POWER CIRCUIT BREAKER AND DISCONNECTING SWITCH
TRANSMISSION SYSTEM EXPANSION PROJECT NO.12

Item No.	Description	Qty.	Unit	Currency	Supply of Equipment				Supply of Equipment		Foreign Currency	Local Currency (excluding VAT) Baht		
					Foreign Supply				Local Supply				Amount	Amount
					FOB Vessel	Cost of Transportation to Thai Port	CFR Thai Port		Ex-works Price (excluding VAT) Baht					
					Unit Price	Unit Price	Unit Price	Amount	Unit Price	Amount				
A1-1	245 kV 4000 A 50 kA GCB 1&3 pole trip as per Ratings and Features RF CB8951(IEC)	6								XXXXX	XXXXX			
A1-2	Steel Supporting Structure for CB8951(IEC)* for item no. A1-1	6								XXXXX	XXXXX			
A1-3	Complete pole of Circuit Breaker for CB8951(IEC)	1								XXXXX	XXXXX			
A1-4	Closing Coil for CB8951(IEC)	1								XXXXX	XXXXX			
A1-5	Tripping Coil for CB8951(IEC)	1								XXXXX	XXXXX			
A1-6	Maintenance closing device for CB8951(IEC)	1								XXXXX	XXXXX			
A1-7	245 kV 4000 A 50 kA GCB 3 pole trip as per Ratings and Features RF CB8955(IEC)	3								XXXXX	XXXXX			
A1-8	Steel Supporting Structure for CB8955(IEC)* for item no. A1-7	3								XXXXX	XXXXX			
A1-9	Complete pole of Circuit Breaker for CB8955(IEC)	1								XXXXX	XXXXX			
A1-10	Closing Coil for CB8955(IEC)	1								XXXXX	XXXXX			
A1-11	Tripping Coil for CB8955(IEC)	1								XXXXX	XXXXX			
A1-12	Maintenance closing device for CB8955(IEC)	1								XXXXX	XXXXX			
A1-13	Cost of installation supervisor for item A1-1		Man day		XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX				
A1-14	Cost of installation supervisor for item A1-7		Man day		XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX				
	Equipments which shall be used together as a complete set referring to Article relevant to Liquidated Damages for Late Delivery of Equipment are item nos. A1-1 with A1-2 and A1-7 with A1-8.													
Total Price for Schedule A1									Baht			Baht		

*The design of supporting structures of circuit breaker shall be verified by circuit breaker manufacturer.

INVITATION TO BID NO. TS12-MJ2-05 and GBA3-MJ2-04
Service of Installation Supervisor (Schedule A1)
SUPPLY OF POWER CIRCUIT BREAKER AND DISCONNECTING SWITCH
TRANSMISSION SYSTEM EXPANSION PROJECT NO.12

Item No.	Description	Qty.	Unit	Currency	Foreign Currency		Local Currency (excluding VAT) Baht	
					Unit Price	Amount	Unit Price	Amount
A1-13	Cost of installation supervisor for item A1-1		Man day					
A1-14	Cost of installation supervisor for item A1-7		Man day					

Note:

1. The quoted total man-days for installation supervisor shall be the required number of days for complete installation, erection, field test and commissioning of all equipment as specified.
2. In addition to the quoted total man-days above, EGAT will also pay the following :
 - a. Travelling time from and to Supervisor's home office as well as travelling time from and to the installation site including ten (10) working days of operation, if any, which will be at the same rate as the cost quoted per man-day.
 - b. Airfares round trip economy class between the Supervisor 's home office and Bangkok by the most expeditious and direct route.
3. Local transportation from and to installation site will be provided by EGAT.
4. If the working man-days are less than the quoted total man-days, the payment shall be on the basis of actual man-days.
5. For man-days exceeding the quoted total amount, no payment shall be made by EGAT. Any such additional man-days approved by EGAT shall be paid on the quoted man-days rate.

INVITATION TO BID NO. TS12-MJ2-05 and GBA3-MJ2-04
Schedule A2 : 115 kV Power Circuit Breaker
SUPPLY OF POWER CIRCUIT BREAKER AND DISCONNECTING SWITCH
TRANSMISSION SYSTEM EXPANSION PROJECT NO.12

Item No.	Description	Qty.	Unit	Currency	Supply of Equipment				Supply of Equipment		Foreign Currency	Local Currency (excluding VAT) Baht		
					Foreign Supply				Local Supply				Amount	Amount
					FOB Vessel	Cost of Transportation to Thai Port	CFR Thai Port		Ex-works Price (excluding VAT) Baht					
					Unit Price	Unit Price	Unit Price	Amount	Unit Price	Amount				
A2-1	123 kV 3150 A 40 kA GCB as per Ratings and Features RF CB7846(IEC)	18								XXXXX	XXXXX			
A2-2	Steel Supporting Structure for CB7846(IEC)* for item no. A2-1	18								XXXXX	XXXXX			
A2-3	Complete pole of Circuit Breaker for CB7846(IEC)	1								XXXXX	XXXXX			
A2-4	Closing Coil for CB7846(IEC)	1								XXXXX	XXXXX			
A2-5	Tripping Coil for CB7846(IEC)	1								XXXXX	XXXXX			
A2-6	Maintenance closing device for CB7846(IEC)	1								XXXXX	XXXXX			
A2-7	Cost of installation supervisor for item A2-1		Man day		XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX				
	Equipments which shall be used together as a complete set referring to Article relevant to Liquidated Damages for Late Delivery of Equipment are item nos. A2-1 with A2-2.													
Total Price for Schedule A2									Baht			Baht		

*The design of supporting structures of circuit breaker shall be verified by circuit breaker manufacturer.

INVITATION TO BID NO. TS12-MJ2-05 and GBA3-MJ2-04
Service of Installation Supervisor (Schedule A2)
SUPPLY OF POWER CIRCUIT BREAKER AND DISCONNECTING SWITCH
TRANSMISSION SYSTEM EXPANSION PROJECT NO.12

Item No.	Description	Qty.	Unit	Currency	Foreign Currency		Local Currency (excluding VAT) Baht	
					Unit Price	Amount	Unit Price	Amount
A2-7	Cost of installation supervisor for item A2-1		Man day					

Note:

1. The quoted total man-days for installation supervisor shall be the required number of days for complete installation, erection, field test and commissioning of all equipment as specified.
2. In addition to the quoted total man-days above, EGAT will also pay the following :
 - a. Travelling time from and to Supervisor's home office as well as travelling time from and to the installation site including ten (10) working days of operation, if any, which will be at the same rate as the cost quoted per man-day.
 - b. Airfares round trip economy class between the Supervisor 's home office and Bangkok by the most expeditious and direct route.
3. Local transportation from and to installation site will be provided by EGAT.
4. If the working man-days are less than the quoted total man-days, the payment shall be on the basis of actual man-days.
5. For man-days exceeding the quoted total amount, no payment shall be made by EGAT. Any such additional man-days approved by EGAT shall be paid on the quoted man-days rate.

INVITATION TO BID NO. TS12-MJ2-05 and GBA3-MJ2-04
Schedule A3 : 230 kV and 115 kV Disconnecting Switch
SUPPLY OF POWER CIRCUIT BREAKER AND DISCONNECTING SWITCH
TRANSMISSION SYSTEM EXPANSION PROJECT NO.12

Item No.	Description	Qty.	Unit	Currency	Supply of Equipment				Supply of Equipment	
					Foreign Supply				Local Supply	
					FOB Vessel	Cost of Transportation to Thai Port	CFR Thai Port		Ex-works Price (excluding VAT) Baht	
Unit Price	Unit Price	Unit Price	Amount	Unit Price	Amount					
A3-1	245 kV 4000A air switch (high creepage) manually gang operated as per Ratings and Features RF DS89BH(IEC) (Phase spacing = 3.50 m.)	3								
A3-2	245 kV 3150 A air switch with grounding blade manually gang operated as per Ratings and Features RF DS88B2(IEC) (Phase spacing = 3.50 m.)	4								
A3-3	245 kV 3150 A air switch manually gang operated as per Ratings and Features RF DS88B1(IEC) (Phase spacing = 3.50 m.)	20								
A3-4	123 kV 2000 A air switch manually gang operated as per Ratings and Features RF DS77B1(IEC) (Phase spacing = 2.25 m.)	31								
A3-5	123 kV 2000 A air switch manually gang operated as per Ratings and Features RF DS77B1U(IEC) (Phase spacing = 2.25 m.) as per Dwg. BLG-S-4. See ST-TS-7-01 and ST-BB-7-01 for reference.	1								
A3-6	123 kV 2000 A air switch with grounding blade manually gang operated as per Ratings and Features RF DS77B3(IEC) (Phase spacing = 2.25 m.)	3								
A3-7	123 kV 3150 A air switch (high creepage) manually gang operated as per Ratings and Features RF DS78BH(IEC) (Phase spacing = 2.25 m.)	4								

INVITATION TO BID NO. TS12-MJ2-05 and GBA3-MJ2-04
Schedule A3 : 230 kV and 115 kV Disconnecting Switch
SUPPLY OF POWER CIRCUIT BREAKER AND DISCONNECTING SWITCH
TRANSMISSION SYSTEM EXPANSION PROJECT NO.12

Item No.	Description	Qty.	Unit	Currency	Supply of Equipment				Supply of Equipment	
					Foreign Supply				Local Supply	
					FOB Vessel	Cost of Transportation to Thai Port	CFR Thai Port		Ex-works Price (excluding VAT) Baht	
					Unit Price	Unit Price	Unit Price	Amount	Unit Price	Amount
A3-8	123 kV 3150 A air switch (high creepage) with grounding blade manually gang operated as per Ratings and Features RF DS78BI(IEC) (Phase spacing = 2.25 m.)	3								
A3-9	123 kV 2000 A air switch (high creepage) manually gang operated as per Ratings and Features RF DS77BH(IEC) (Phase spacing = 2.25 m.)	7								
A3-10	123 kV 2000 A air switch (high creepage) with grounding blade manually gang operated as per Ratings and Features RF DS77BJ(IEC) (Phase spacing = 2.25 m.)	3								
A3-11	115 kV 40 kA 3 pole air grounding switch as per Ratings and Features RF GS71A1(IEC) (Phase spacing = 2.25 m.)	1								
A3-12	Steel Supporting Structure for DS89BH (IEC) (for Item no. A3-1) as per EGAT's Dwg. No. ST-DS-4-01 and SD-AB-0-01 , H = 6.00 m	3								
A3-13	Steel Supporting Structure for DS88B2 (IEC) (for Item no. A3-2) as per EGAT's Dwg. No. ST-DS-4-01 and SD-AB-0-01 , H = 6.00 m	4								
A3-14	Steel Supporting Structure for DS88B1 (IEC) (for Item no. A3-3) as per EGAT's Dwg. No. ST-DS-4-01 and SD-AB-0-01 , H = 6.00 m	20								

INVITATION TO BID NO. TS12-MJ2-05 and GBA3-MJ2-04
Schedule A3 : 230 kV and 115 kV Disconnecting Switch
SUPPLY OF POWER CIRCUIT BREAKER AND DISCONNECTING SWITCH
TRANSMISSION SYSTEM EXPANSION PROJECT NO.12

Item No.	Description	Qty.	Unit	Currency	Supply of Equipment				Supply of Equipment	
					Foreign Supply				Local Supply	
					FOB Vessel	Cost of Transportation to Thai Port	CFR Thai Port		Ex-works Price (excluding VAT) Baht	
Unit Price	Unit Price	Unit Price	Amount	Unit Price	Amount					
A3-15	Steel Supporting Structure for DS77B1 (IEC) (for Item no. A3-4) as per EGAT's Dwg. No. ST-DS-4-01 and SD-AB-0-01 , H = 5.30 m	31								
A3-16	Steel Supporting Structure for DS77B3 (IEC) (for Item no. A3-6) as per EGAT's Dwg. No. ST-DS-4-01 and SD-AB-0-01 , H = 5.30 m	3								
A3-17	Steel Supporting Structure for DS78BH (IEC) (for Item no. A3-7) as per EGAT's Dwg. No. ST-DS-4-01 and SD-AB-0-01 , H = 5.30 m	4								
A3-18	Steel Supporting Structure for DS78BI (IEC) (for Item no. A3-8) as per EGAT's Dwg. No. ST-DS-4-01 and SD-AB-0-01 , H = 5.30 m	3								
A3-19	Steel Supporting Structure for DS77BH (IEC) (for Item no. A3-9) as per EGAT's Dwg. No. ST-DS-4-01 and SD-AB-0-01 , H = 5.30 m	7								
A3-20	Steel Supporting Structure for DS77BJ (IEC) (for Item no. A3-10) as per EGAT's Dwg. No. ST-DS-4-01 and SD-AB-0-01 , H = 5.30 m	3								

INVITATION TO BID NO. TS12-MJ2-05 and GBA3-MJ2-04
Schedule A3 : 230 kV and 115 kV Disconnecting Switch
SUPPLY OF POWER CIRCUIT BREAKER AND DISCONNECTING SWITCH
TRANSMISSION SYSTEM EXPANSION PROJECT NO.12

Item No.	Description	Qty.	Unit	Currency	Supply of Equipment				Supply of Equipment	
					Foreign Supply				Local Supply	
					FOB Vessel	Cost of Transportation to Thai Port	CFR Thai Port		Ex-works Price (excluding VAT) Baht	
					Unit Price	Unit Price	Unit Price	Amount	Unit Price	Amount
A3-21	Steel Supporting Structure for GS71A1 (IEC) (for Item no. A3-11) as per EGAT's Dwg. No. ST-GS-4-01 and SD-AB-0-01 , H = 5.30 m	1								
	Equipments which shall be used together as a complete set referring to Article relevant to Liquidated Damages for Late Delivery of Equipment are item nos. A3-1 with A3-12, A3-2 with A3-13, A3-3 with A3-14, A3-4 with A3-15, A3-6 with A3-16, A3-7 with A3-17, A3-8 with A3-18, A3-9 with A3-19, A3-10 with A3-20, A3-11 with A3-21									
Total Price for Schedule A3										Baht

INVITATION TO BID NO. TS12-MJ2-05 and GBA3-MJ2-04
Schedule A4 : 33 kV and below Disconnecting Switch
SUPPLY OF POWER CIRCUIT BREAKER AND DISCONNECTING SWITCH
TRANSMISSION SYSTEM EXPANSION PROJECT NO.12

Item No.	Description	Qty.	Unit	Currency	Supply of Equipment				Supply of Equipment	
					Foreign Supply				Local Supply	
					FOB Vessel	Cost of Transportation to Thai Port	CFR Thai Port		Ex-works Price (excluding VAT) Baht	
					Unit Price	Unit Price	Unit Price	Amount	Unit Price	Amount
A4-1	38 kV 1600 A 20 kA air switch vertical break manually gang operated as per Ratings and Features RF DS36D1(IEC) (Phase spacing = 1.00 m, H = 5.50 m form base plate to top terminal)	1								
A4-2	27 kV 1600 A 20 kA air switch vertical break manually gang operated as per Ratings and Features RF DS26D3(IEC) (Phase spacing = 1.00 m, H = 7.50 m form base plate to top terminal)	1								
A4-3	27 kV 1600 A 20 kA air switch 1 pole vertical break hook operated as per Ratings and Features RF DS26E3(IEC) (Phase spacing = 1.00 m)	33								
Total Price for Schedule A4										Baht

INVITATION TO BID NO. TS12-MJ2-05 and GBA3-MJ2-04
Schedule B1 : 230 kV Power Circuit Breaker
SUPPLY OF POWER CIRCUIT BREAKER AND DISCONNECTING SWITCH
BULK POWER SUPPLY FOR THE GREATER BANGKOK AND VICINITY AREA PHASE 3

Item No.	Description	Qty.	Unit	Currency	Supply of Equipment				Supply of Equipment		Foreign Currency	Local Currency (excluding VAT) Baht
					Foreign Supply				Local Supply			
					FOB Vessel	Cost of Transportation to Thai Port	CFR Thai Port		Ex-works Price (excluding VAT) Baht			
					Unit Price	Unit Price	Unit Price	Amount	Unit Price	Amount		
B1-1	245 kV 4000 A 50 kA GCB 3 pole trip as per Ratings and Features RF CB8955(IEC)	2								XXXXXX	XXXXXX	
B1-2	Steel Supporting Structure for CB8955(IEC)* for item no. B1-1	2								XXXXXX	XXXXXX	
B1-3	Complete pole of Circuit Breaker for CB8955(IEC)	1								XXXXXX	XXXXXX	
B1-4	Closing Coil for CB8955(IEC)	1								XXXXXX	XXXXXX	
B1-5	Tripping Coil for CB8955(IEC)	1								XXXXXX	XXXXXX	
B1-6	Maintenance closing device for CB8955(IEC)	1								XXXXXX	XXXXXX	
B1-7	Cost of installation supervisor for item B1-1		Man day		XXXXXX	XXXXXX	XXXXXX	XXXXXX	XXXXXX	XXXXXX	XXXXXX	
	Equipments which shall be used together as a complete set referring to Article relevant to Liquidated Damages for Late Delivery of Equipment are item nos. B1-1 with B1-2											
Total Price for Schedule B1									Baht			Baht

*The design of supporting structures of circuit breaker shall be verified by circuit breaker manufacturer.

INVITATION TO BID NO. TS12-MJ2-05 and GBA3-MJ2-04
Service of Installation Supervisor (Schedule B1)
SUPPLY OF POWER CIRCUIT BREAKER AND DISCONNECTING SWITCH
BULK POWER SUPPLY FOR THE GREATER BANGKOK AND VICINITY AREA PHASE 3

Item No.	Description	Qty.	Unit	Currency	Foreign Currency		Local Currency (excluding VAT) Baht	
					Unit Price	Amount	Unit Price	Amount
B1-7	Cost of installation supervisor for item B1-1		Man day					

Note:

1. The quoted total man-days for installation supervisor shall be the required number of days for complete installation, erection, field test and commissioning of all equipment as specified.
2. In addition to the quoted total man-days above, EGAT will also pay the following :
 - a. Travelling time from and to Supervisor's home office as well as travelling time from and to the installation site including ten (10) working days of operation, if any, which will be at the same rate as the cost quoted per man-day.
 - b. Airfares round trip economy class between the Supervisor 's home office and Bangkok by the most expeditious and direct route.
3. Local transportation from and to installation site will be provided by EGAT.
4. If the working man-days are less than the quoted total man-days, the payment shall be on the basis of actual man-days.
5. For man-days exceeding the quoted total amount, no payment shall be made by EGAT. Any such additional man-days approved by EGAT shall be paid on the quoted man-days rate.

INVITATION TO BID NO. TS12-MJ2-05 and GBA3-MJ2-04

Schedule B2 : 115 kV Power Circuit Breaker

SUPPLY OF POWER CIRCUIT BREAKER AND DISCONNECTING SWITCH

BULK POWER SUPPLY FOR THE GREATER BANGKOK AND VICINITY AREA PHASE 3

Item No.	Description	Qty.	Unit	Currency	Supply of Equipment				Supply of Equipment		Foreign Currency	Local Currency		
					Foreign Supply				Local Supply				Amount	Amount
					FOB Vessel	Cost of Transportation to Thai Port	CFR Thai Port		Ex-works Price (excluding VAT) Baht					
					Unit Price	Unit Price	Unit Price	Amount	Unit Price	Amount				
B2-1	123 kV 3150 A 40 kA GCB as per Ratings and Features RF CB7846(IEC)	1								XXXXX	XXXXX			
B2-2	Steel Supporting Structure for CB7846(IEC)* for item no. B2-1	1								XXXXX	XXXXX			
B2-3	Complete pole of Circuit Breaker for CB7846(IEC)	1								XXXXX	XXXXX			
B2-4	Closing Coil for CB7846(IEC)	1								XXXXX	XXXXX			
B2-5	Tripping Coil for CB7846(IEC)	1								XXXXX	XXXXX			
B2-6	Maintenance closing device for CB7846(IEC)	1								XXXXX	XXXXX			
B2-7	Cost of installation supervisor for item B2-1		Man day		XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX				
	Equipments which shall be used together as a complete set referring to Article relevant to Liquidated Damages for Late Delivery of Equipment are item nos. B2-1 with B2-2.													
Total Price for Schedule B2									Baht			Baht		

*The design of supporting structures of circuit breaker shall be verified by circuit breaker manufacturer.

INVITATION TO BID NO. TS12-MJ2-05 and GBA3-MJ2-04
Service of Installation Supervisor (Schedule B2)
SUPPLY OF POWER CIRCUIT BREAKER AND DISCONNECTING SWITCH
BULK POWER SUPPLY FOR THE GREATER BANGKOK AND VICINITY AREA PHASE 3

Item No.	Description	Qty.	Unit	Currency	Foreign Currency		Local Currency (excluding VAT) Baht	
					Unit Price	Amount	Unit Price	Amount
B2-7	Cost of installation supervisor for item B2-1		Man day					

Note:

1. The quoted total man-days for installation supervisor shall be the required number of days for complete installation, erection, field test and commissioning of all equipment as specified.
2. In addition to the quoted total man-days above, EGAT will also pay the following :
 - a. Travelling time from and to Supervisor's home office as well as travelling time from and to the installation site including ten (10) working days of operation, if any, which will be at the same rate as the cost quoted per man-day.
 - b. Airfares round trip economy class between the Supervisor 's home office and Bangkok by the most expeditious and direct route.
3. Local transportation from and to installation site will be provided by EGAT.
4. If the working man-days are less than the quoted total man-days, the payment shall be on the basis of actual man-days.
5. For man-days exceeding the quoted total amount, no payment shall be made by EGAT. Any such additional man-days approved by EGAT shall be paid on the quoted man-days rate.

INVITATION TO BID NO. TS12-MJ2-05 and GBA3-MJ2-04

Schedule B3 : 230 kV and 115 kV Disconnecting Switch

SUPPLY OF POWER CIRCUIT BREAKER AND DISCONNECTING SWITCH

BULK POWER SUPPLY FOR THE GREATER BANGKOK AND VICINITY AREA PHASE 3

Item No.	Description	Qty.	Unit	Currency	Supply of Equipment				Supply of Equipment	
					Foreign Supply				Local Supply	
					FOB Vessel	Cost of Transportation to Thai Port	CFR Thai Port		Ex-works Price (excluding VAT) Baht	
					Unit Price	Unit Price	Unit Price	Amount	Unit Price	Amount
B3-1	245 kV 3150 A air switch (high creepage) manually gang operated as per Ratings and Features RF DS88BH(IEC) (Phase spacing = 3.50 m.)	6								
B3-2	123 kV 2000 A air switch (high creepage) manually gang operated as per Ratings and Features RF DS77BH(IEC) (Phase spacing = 2.25 m.)	1								
B3-3	123 kV 2000 A air switch (high creepage) manually gang operated as per Ratings and Features RF DS77BH(IEC) (Phase spacing = 2.25 m.)	2								
B3-4	Steel Supporting Structure for DS88BH (IEC) (for Item no. B3-1) as per EGAT's Dwg. No. ST-DS-4-01 and SD-AB-0-01 , H = 6.00 m	6								
B3-5	Steel Supporting Structure for DS77BH (IEC) (for Item no. B3-2) as per EGAT's Dwg. No. ST-DS-4-01 and SD-AB-0-01 , H = 5.30 m	1								

INVITATION TO BID NO. TS12-MJ2-05 and GBA3-MJ2-04
Schedule B3 : 230 kV and 115 kV Disconnecting Switch
SUPPLY OF POWER CIRCUIT BREAKER AND DISCONNECTING SWITCH
BULK POWER SUPPLY FOR THE GREATER BANGKOK AND VICINITY AREA PHASE 3

Item No.	Description	Qty.	Unit	Currency	Supply of Equipment				Supply of Equipment	
					Foreign Supply				Local Supply	
					FOB Vessel	Cost of Transportation to Thai Port	CFR Thai Port		Ex-works Price (excluding VAT) Baht	
					Unit Price	Unit Price	Unit Price	Amount	Unit Price	Amount
B3-6	Steel Supporting Structure for DS77BH (IEC) (for Item no. B3-3) as per EGAT's Dwg. No. ST-DS-4-01 and SD-AB-0-01 , H = 7.30 m	2								
	Equipments which shall be used together as a complete set referring to Article relevant to Liquidated Damages for Late Delivery of Equipment are item nos. B3-1 with B3-4, B3-2 with B3-5, B3-3 with B3-6									
Total Price for Schedule B3								Baht		

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PART 2: PROPOSAL DATA

POWER CIRCUIT BREAKER

PROPOSAL DATA

PROCUREMENT REFERENCE _____
SCHEDULE NO. _____
ITEM NO. _____

BIDDER _____

- a. Make and country of origin
 - Circuit breaker
 - Make _____
 - Country of origin _____
 - Steel supporting structure
 - Make _____
 - Country of origin _____
- b. Type
 - Interrupting medium (SF6, Vacuum, etc) _____
 - Tripping
 - [] Three poles _____
 - [] Single pole & Three poles _____
- c. Number of interrupter per pole _____
- d. Model no _____
- e. Applied standards _____
- f. Rated voltage _____ kV
- g. First pole to clear factor _____
- h. Power frequency withstand voltage (rms)
 - Across open switching device _____ kV
 - Phase-to-earth _____ kV
- i. Lightning impulse withstand voltage, Peak
 - Across open switching device _____ kV
 - Phase-to-earth _____ kV
- j. Switching Impulse Withstand, Peak
 - Between phases _____ kV
 - Phase-to-earth and across open switching device _____ kV
- k. Frequency _____ Hz
- l. Current rating
 - Rated continuous _____ A
 - Rated short circuit current at max kV _____ kA
 - Limited overload capacity _____ A
- m. Interrupting rating
 - Max symmetrical interrupting current _____ kA
 - 1 s short time current _____ kA
 - Max opening and interrupting time at rated control voltage
 - Opening time _____ ms
 - Interrupting time _____ ms
 - Current at max interrupting time _____ kA
 - Interrupting time of resistive current _____ ms
 - Mechanism stroke _____ mm
 - Interrupter stroke _____ mm
 - Opening velocity (contact part) _____ m/s

POWER CIRCUIT BREAKER

PROPOSAL DATA

PROCUREMENT REFERENCE _____

BIDDER _____

SCHEDULE NO. _____

ITEM NO. _____

n.	Asymmetrical interrupting rating			
	- Max asymmetrical interrupting current	_____	_____	kA
o.	Closing rating			
	- Closing and latching current at max kV	_____	_____	kA
	- Making capacity-peak at max kV	_____	_____	kA
	- Closing time at rated operations	_____	_____	ms
	- Closing velocity (contact touch)	_____	_____	m/s
p.	Capacitive current			
	- Rated capacitance current switching			
	- Line charging breaking current	_____	_____	A
	- Cable charging breaking current	_____	_____	A
	- Current (Back to back)	_____	_____	A
	- Inrush current (Back to back)	_____	_____	kA
	- Frequency of inrush current	_____	_____	Hz
	- Corresponding to a max line length of	_____	_____	km
	- Rated transient overvoltage factor			
	- Restrike free	[] Class C1 [] Class C2		
q.	Temperature rise of contacts at nominal current			°C
		Closing	Tripping	
r.	Mechanism type (Spring, Hydraulic, etc)	_____	_____	
s.	Control voltage rating			
	- Nominal voltage	_____	_____	Vdc
	- Operating voltage range (min/max)	____/____	____/____	Vdc
t.	Current at nominal control voltage	_____	_____	A
u.	Command duration	_____	_____	ms
v.	Reclosing duty cycle	_____	_____	
w.	Number of operations between servicing	_____	_____	
x.	Rated reclosing time	_____	_____	ms
y.	Heater in control cabinet			
	- Continuous operated heater			
	- Rating	_____	Vac _____	W
	- Thermostat controlled heater			
	- Rating	_____	Vac _____	W
	- Temperature setting range	_____	°C to _____	°C

POWER CIRCUIT BREAKER

PROPOSAL DATA

PROCUREMENT REFERENCE _____
SCHEDULE NO. _____
ITEM NO. _____

BIDDER _____

- z. Spring charged mechanism
 - Model no _____
 - Motor rating _____
 - Nominal voltage _____ Vdc
 - Operating voltage range (Min/Max) _____ / _____ Vdc
 - Power rating _____ kW
 - Max charging time at nominal voltage _____ s
- aa. Porcelain insulator

	Chamber	Support	
- Make	_____	_____	
- Country of origin	_____	_____	
- Type	_____	_____	
- Creepage distance	_____	_____	mm
- ab. Height of breaker from lower energizing part to base plate _____ mm
- ac. Net weight of breaker _____ kg
- ad. Insulating SF6 gas required per breaker _____ kg
- ae. Insulating SF6 gas furnished (115% of actual required) _____ kg
- af. Rated gas pressure at 20 °C (gauge) _____ kg/cm²
- ag. Minimum gas pressure at 20 °C (gauge) _____ kg/cm²
- ah. Overpressure relief device
 - Equipped Yes No
 - Operating pressure _____ kg/cm²
- ai. Each breaker completely assembled and test at the factory Yes No
- aj. Time required for field installation of each breaker _____ Days
- ak. Surge absorber capacitor (Supplied for 33 kV and below SF6 GCB if required)
 - Manufacturer _____
 - Country _____
 - Type/Model _____
 - Rated voltage _____ kV
 - BIL _____ kV
 - Capacitance _____ μF

AIR SWITCHES

PROPOSAL DATA

PROCUREMENT REFERENCE _____

BIDDER _____

SCHEDULE NO. _____

ITEM NO. _____

- a. **Manufacturer and Country of Origin**
 - Air Switch _____
 - Manufacturer _____
 - Country of origin _____
 - Steel supporting structure _____
 - Manufacturer _____
 - Country of origin _____
- b. **Type /Model /Cat. No.** _____
- c. **Applied Standards** _____
- d. **Rated Voltage** _____ kV
- e. **Power Frequency Withstand, rms**
 - Across isolating distance _____ kV
 - Phase-to-earth _____ kV
- f. **Lightning Impulse Withstand, Peak**
 - Across isolating distance _____ kV
 - Phase-to-earth _____ kV
- g. **Switching Impulse Withstand, Peak**
 - Across isolating distance _____ kV
 - Between phases _____ kV
 - Phase-to-earth _____ kV
- h. **Current Rating**
 - **Main Blades**
 - Rated normal current _____ A
 - Rated short time withstand current (1 s) _____ kA
 - Rated peak withstand current _____ kA
 - **Grounding Blades**
 - Rated short time withstand current _____ kA
 - Rated peak withstand current _____ kA
- i. **Type and Material of Live Parts**
 - **Main Blades**
 - Type (Tubular, Bar, etc) _____
 - Material _____
 - **Grounding Blades**
 - Type (Tubular, Bar, etc) _____
 - Material _____
- j. **Contact Material**
 - Exposed Contacts _____
 - Fixed contacts _____
 - Moving Contacts _____
 - Other Current Carrying Contacts _____
- k. **Have the Main Blades a Twist Motion in Both Opening and Closing Cycles** Yes No
- l. **Have the Ground Blades a Double Motion in Both Opening and Closing Cycles** Yes No

AIR SWITCHES

PROPOSAL DATA

PROCUREMENT REFERENCE _____
SCHEDULE NO. _____
ITEM NO. _____

BIDDER _____

- m. Temperature Rise under Rated Voltage, Current and Frequency of
 - Contact _____ °C
 - Current Carrying Part _____ °C
 - Other Metallic Part _____ °C
 - Insulating Part _____ °C
- n. Mounting Position _____
- o. Phase Spacing _____ m
- p. Clearance, Live Parts and Earth _____ m
- q. Operating Mechanism
 - Type (Manual, Motor, etc) _____
 - Operating Motion (Reciprocate, Torsion, etc) _____
 - Manual Operating Force _____ kg-m
 - Operation Pressure _____ kg/cm²
 - Motor Type / Rating _____ / _____ kW
 - Operating Voltage Range of Motor Min= _____ Vdc, Max= _____ Vdc
 - Method of Interlocking
 - Self Mechanical Interlocking between Main Blade and Its Grounding Blade Yes No
 - Interlocking between Grounding Switch and Other Corresponding Switch by Key Yes No
 - Key Kirk Other
 - Auxiliary Switches
 - Number of Aux. Switches _____
 - Type of Contacts Interchangeable Fixed Type
 - Current Rating _____ A
- r. Insulator
 - Manufacturer / country of origin _____ / _____
 - **Post Insulator Designation** _____
 - Lightning Impulse Withstand, peak (IEC) _____ kV
 - Switching Impulse Withstand, peak (IEC) _____ kV
 - **Power Frequency Withstand, Wet** _____ kV
 - Creepage Distance (IEC) _____ mm
 - Mechanical Strength
 - Cantilever (IEC) _____ kg
 - Torsional (IEC) _____ kg-m
 - Mounting Bolt Circle (IEC) _____ cm
 - Color _____
- s. Weight per Phase _____ kg
- t. Transformer Magnetizing Interruption Capability _____ A

Manufacturer's successful operation supply record in overseas country for Power Circuit Breaker

Manufacturer / Country : _____ / _____

Customer / Country	Substation	Quantity	Equipment Rating			Applied System Rating			Type / Model No.	Type of Mechanism	Date of Operation
			Voltage (kV)	Current (A)	Short Circuit Current (kA)	Voltage (kV)	Current (A)	Short Circuit Current (kA)			

The above information is to prove that manufacturer has experience conforming to that required by Article relevant to Eligibility of Bidders.

Manufacturer's successful operation supply record in overseas country for Disconnecting Switch

Manufacturer / Country : _____ / _____

Customer / Country	Substation	Quantity	Equipment Rating			Applied System Rating			Type / Model No.	Type of Mechanism	Date of Operation
			Voltage (kV)	Current (A)	Short Time Withstand Current (kA)	Voltage (kV)	Current (A)	Short Time Withstand Current (kA)			

The above information is to prove that manufacturer has experience conforming to that required by Article relevant to Eligibility of Bidders.

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PART 3: DELIVERY SCHEDULE AND DISTRIBUTION LIST

Invitation to Bid No. TS12-MJ2-05 and GBA3-MJ2-04

Delivery Schedule and Distribution List

Transmission System Expansion Project No.12

Schedule A1 : 230 kV Power Circuit Breaker

Item No.	Description	Qty	Job no.	Substation	Delivery Required by EGAT (within months after receipt of Award of Contract)
					CFR Thai Port / Ex-works / DDP EGAT's Store
A1-1	245 kV 4000 A 50 kA GCB 1&3 pole trip RF CB8951(IEC)	6	TS12-16-RSV	RSV	10
A1-2	Steel Supporting Structure for CB8951(IEC)	6	TS12-16-RSV	RSV	10
A1-3	Complete pole of Circuit Breaker for CB8951(IEC)	1	TS12-16-RSV	RSV	10
A1-4	Closing Coil for CB8951(IEC)	1	TS12-16-RSV	RSV	10
A1-5	Tripping Coil for CB8951(IEC)	1	TS12-16-RSV	RSV	10
A1-6	Maintenance closing device for CB8951(IEC)	1	TS12-16-RSV	RSV	10
A1-7	245 kV 4000 A 50 kA GCB 3 pole trip RF CB8955(IEC)	3	TS12-16-S105	LS	10
A1-8	Steel Supporting Structure for CB8955(IEC)	3	TS12-16-S105	LS	10
A1-9	Complete pole of Circuit Breaker for CB8955(IEC)	1	TS12-16-S105	LS	10
A1-10	Closing Coil for CB8955(IEC)	1	TS12-16-S105	LS	10
A1-11	Tripping Coil for CB8955(IEC)	1	TS12-16-S105	LS	10
A1-12	Maintenance closing device for CB8955(IEC)	1	TS12-16-S105	LS	10

Thai Port = BKK Port

Invitation to Bid No. TS12-MJ2-05 and GBA3-MJ2-04

**Delivery Schedule and Distribution List
Transmission System Expansion Project No.12
Schedule A2 : 115 kV Power Circuit Breaker**

Item No.	Description	Qty	Job no.	Substation	Delivery Required by EGAT (within months after receipt of Award of Contract)
					CFR Thai Port / Ex-works / DDP EGAT's Store
A2-1	123 kV 3150 A 40 kA GCB CB7846(IEC)	1	TS12-13-S16	PK2	10
		3	TS12-13-S15	PK3	10
		2	TS12-16-S09	SDO	10
		1	TS12-16-S11	RPB	10
		3	TS12-16-S27	BKN	10
		1	TS12-16-S28	NW	10
		1	TS12-16-S35	CBD	10
		2	TS12-16-S150	MM2	10
		2	TS12-04-S02	KS	10
		2	TS12-14-S39	LS	10
A2-2	Steel Supporting Structure for CB7846(IEC)	1	TS12-13-S16	PK2	10
		3	TS12-13-S15	PK3	10
		2	TS12-16-S09	SDO	10
		1	TS12-16-S11	RPB	10
		3	TS12-16-S27	BKN	10
		1	TS12-16-S28	NW	10
		1	TS12-16-S35	CBD	10
		2	TS12-16-S150	MM2	10
		2	TS12-04-S02	KS	10
		2	TS12-14-S39	LS	10
A2-3	Complete pole of Circuit Breaker for CB7846(IEC)	1	TS12-13-S16	PK2	10
A2-4	Closing Coil for CB7846(IEC)	1	TS12-13-S16	PK2	10

Dist_list_TS12-MJ2-05 and GBA3-MJ2-04 (TS12)

Invitation to Bid No. TS12-MJ2-05 and GBA3-MJ2-04
Delivery Schedule and Distribution List
Transmission System Expansion Project No.12
Schedule A2 : 115 kV Power Circuit Breaker

Item No.	Description	Qty	Job no.	Substation	Delivery Required by EGAT (within months after receipt of Award of Contract)
					CFR Thai Port / Ex-works / DDP EGAT's Store
A2-5	Tripping Coil for CB7846(IEC)	1	TS12-13-S16	PK2	10
A2-6	Maintenance closing device for CB7846(IEC)	1	TS12-13-S16	PK2	10

Thai Port = BKK Port

Invitation to Bid No. TS12-MJ2-05 and GBA3-MJ2-04
Delivery Schedule and Distribution List
Transmission System Expansion Project No.12
Schedule A3 : 230 kV and 115 kV Disconnecting Switch

Item No.	Description	Qty	Job no.	Substation	Delivery Required by EGAT (within months after receipt of Award of Contract)
					CFR Thai Port / Ex-works / DDP EGAT's Store
A3-1	245 kV 4000A air switch (high creepage) manually gang operated DS89BH(IEC)	3	TS12-16-S105	LS	10
A3-2	245 kV 3150 A air switch with grounding blade manually gang operated DS88B2(IEC)	4	TS12-10-S01	BGS	10
A3-3	245 kV 3150 A air switch manually gang operated DS88B1(IEC)	20	TS12-10-S01	BGS	10
A3-4	123 kV 2000 A air switch manually gang operated DS77B1(IEC)	8	TS12-16-S09	SDO	10
		3	TS12-16-S11	RPB	10
		8	TS12-16-S27	BKN	10
		1	TS12-16-S31	TS	10
		4	TS12-16-S35	CBD	10
		4	TS12-04-S02	KS	10
		3	TS12-14-S39	LS	10
A3-5	123 kV 2000 A air switch manually gang operated DS77B1U(IEC)	1	TS12-16-S124	BLG	10
A3-6	123 kV 2000 A air switch with grounding blade manually gang operated DS77B3(IEC)	1	TS12-16-S27	BKN	10
		2	TS12-04-S02	KS	10
A3-7	123 kV 3150 A air switch (high creepage) manually gang operated DS78BH(IEC)	4	TS12-13-S15	PK3	10

Invitation to Bid No. TS12-MJ2-05 and GBA3-MJ2-04
Delivery Schedule and Distribution List
Transmission System Expansion Project No.12
Schedule A3 : 230 kV and 115 kV Disconnecting Switch

Item No.	Description	Qty	Job no.	Substation	Delivery Required by EGAT (within months after receipt of Award of Contract)
					CFR Thai Port / Ex-works / DDP EGAT's Store
A3-8	123 kV 3150 A air switch (high creepage) with grounding blade manually gang operated DS78BI(IEC)	2	TS12-13-S15	PK3	10
		1	TS12-10-S01	BGS	10
A3-9	123 kV 2000 A air switch (high creepage) manually gang operated DS77BH(IEC)	2	TS12-13-S16	PK2	10
		4	TS12-16-S150	MM2	10
		1	TS12-16-S140	SH1	10
A3-10	123 kV 2000 A air switch (high creepage) with grounding blade manually gang operated DS77BJ(IEC)	1	TS12-13-S16	PK2	10
		2	TS12-16-S150	MM2	10
A3-11	115 kV 40 kA 3 pole air grounding switch GS71A1(IEC)	1	TS12-16-S124	BLG	10
A3-12	Steel Supporting Structure for DS89BH (IEC) (for Item no. A3-1)	3	TS12-16-S105	LS	10
A3-13	Steel Supporting Structure for DS88B2 (IEC) (for Item no. A3-2)	4	TS12-10-S01	BGS	10
A3-14	Steel Supporting Structure for DS88B1 (IEC) (for Item no. A3-3)	20	TS12-10-S01	BGS	10
A3-15	Steel Supporting Structure for DS77B1 (IEC) (for Item no. A3-4)	8	TS12-16-S09	SDO	10
		3	TS12-16-S11	RPB	10
		8	TS12-16-S27	BKN	10
		1	TS12-16-S31	TS	10

Dist_list_TS12-MJ2-05 and GBA3-MJ2-04 (TS12)

Invitation to Bid No. TS12-MJ2-05 and GBA3-MJ2-04
Delivery Schedule and Distribution List
Transmission System Expansion Project No.12
Schedule A3 : 230 kV and 115 kV Disconnecting Switch

Item No.	Description	Qty	Job no.	Substation	Delivery Required by EGAT (within months after receipt of Award of Contract)
					CFR Thai Port / Ex-works / DDP EGAT's Store
		4	TS12-16-S35	CBD	10
		4	TS12-04-S02	KS	10
		3	TS12-14-S39	LS	10
A3-16	Steel Supporting Structure for DS77B3 (IEC) (for Item no. A3-6)	1	TS12-16-S27	BKN	10
		2	TS12-04-S02	KS	10
A3-17	Steel Supporting Structure for DS78BH (IEC) (for Item no. A3-7)	4	TS12-13-S15	PK3	10
A3-18	Steel Supporting Structure for DS78BI (IEC) (for Item no. A3-8)	2	TS12-13-S15	PK3	10
		1	TS12-10-S01	BGS	10
A3-19	Steel Supporting Structure for DS77BH (IEC) (for Item no. A3-9)	2	TS12-13-S16	PK2	10
		4	TS12-16-S150	MM2	10
		1	TS12-16-S140	SH1	10
A3-20	Steel Supporting Structure for DS77BJ (IEC) (for Item no. A3-10)	1	TS12-13-S16	PK2	10
		2	TS12-16-S150	MM2	10
A3-21	Steel Supporting Structure for GS71A1 (IEC) (for Item no. A3-12)	1	TS12-16-S124	BLG	10

Thai Port = BKK Port

Invitation to Bid No. TS12-MJ2-05 and GBA3-MJ2-04
Delivery Schedule and Distribution List
Transmission System Expansion Project No.12
Schedule A4 : 33 kV and below Disconnecting Switch

Item No.	Description	Qty	Job no.	Substation	Delivery Required by EGAT (within months after receipt of Award of Contract)
					CFR Thai Port / Ex-works / DDP EGAT's Store
A4-1	38 kV 1600 A 20 kA air switch vertical break manually gang operated DS36D1(IEC)	1	TS12-16-S11	RPB	10
A4-2	27 kV 1600 A 20 kA air switch vertical break manually gang operated DS26D3(IEC)	1	TS12-14-S34	SL	10
A4-3	27 kV 1600 A 20 kA air switch 1 pole vertical break hook operated DS26E3(IEC)	15	TS12-14-S34	SL	10
		18	TS12-16-RSV	RSV	10

Thai Port = BKK Port

Invitation to Bid No. TS12-MJ2-05 and GBA3-MJ2-04
Delivery Schedule and Distribution List
Bulk Power Supply for The Greater Bangkok and Vicinity Area Phase 3
Schedule B1 : 230 kV Power Circuit Breaker

Item No.	Description	Qty	Job no.	Substation	Delivery Required by EGAT (within months after receipt of Award of Contract)
					CFR Thai Port / Ex-works / DDP EGAT's Store
B1-1	245 kV 4000 A 50 kA GCB 3 pole trip CB8955(IEC)	2	GBA3-08-S17	TPR	10
B1-2	Steel Supporting Structure for CB8955(IEC)	2	GBA3-08-S17	TPR	10
B1-3	Complete pole of Circuit Breaker for CB8955(IEC)	1	GBA3-08-S17	TPR	10
B1-4	Closing Coil for CB8955(IEC)	1	GBA3-08-S17	TPR	10
B1-5	Tripping Coil for CB8955(IEC)	1	GBA3-08-S17	TPR	10
B1-6	Maintenance closing device for CB8955(IEC)	1	GBA3-08-S17	TPR	10

Thai Port = BKK Port

Invitation to Bid No. TS12-MJ2-05 and GBA3-MJ2-04
Delivery Schedule and Distribution List
Bulk Power Supply for The Greater Bangkok and Vicinity Area Phase 3
Schedule B2 : 115 kV Power Circuit Breaker

Item No.	Description	Qty	Job no.	Substation	Delivery Required by EGAT (within months after receipt of Award of Contract)
					CFR Thai Port / Ex-works / DDP EGAT's Store
B2-1	123 kV 3150 A 40 kA GCB CB7846(IEC)	1	GBA3-08-S17	TPR	10
B2-2	Steel Supporting Structure for CB7846(IEC)	1	GBA3-08-S17	TPR	10
B2-3	Complete pole of Circuit Breaker for CB7846(IEC)	1	GBA3-08-S17	TPR	10
B2-4	Closing Coil for CB7846(IEC)	1	GBA3-08-S17	TPR	10
B2-5	Tripping Coil for CB7846(IEC)	1	GBA3-08-S17	TPR	10
B2-6	Maintenance closing device for CB7846(IEC)	1	GBA3-08-S17	TPR	10

Thai Port = BKK Port

Invitation to Bid No. TS12-MJ2-05 and GBA3-MJ2-04
Delivery Schedule and Distribution List
Bulk Power Supply for The Greater Bangkok and Vicinity Area Phase 3
Schedule B3 : 230 kV and 115 kV Disconnecting Switch

Item No.	Description	Qty	Job no.	Substation	Delivery Required by EGAT (within months after receipt of Award of Contract)
					CFR Thai Port / Ex-works / DDP EGAT's Store
B3-1	245 kV 3150 A air switch (high creepage) manually gang operated DS88BH(IEC)	6	GBA3-08-S17	TPR	10
B3-2	123 kV 2000 A air switch (high creepage) manually gang operated DS77BH(IEC)	1	GBA3-08-S17	TPR	10
B3-3	123 kV 2000 A air switch (high creepage) manually gang operated DS77BH(IEC)	2	GBA3-08-S17	TPR	10
B3-4	Steel Supporting Structure for DS88BH (IEC) (for Item no. B3-1)	6	GBA3-08-S17	TPR	10
B3-5	Steel Supporting Structure for DS77BH (IEC) (for Item no. B3-2)	1	GBA3-08-S17	TPR	10
B3-6	Steel Supporting Structure for DS77BH (IEC) (for Item no. B3-3)	2	GBA3-08-S17	TPR	10

Thai Port = BKK Port

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**SECTION D
CONTRACT**

CONTRACT

**SUPPLY OF POWER CIRCUIT BREAKER AND
DISCONNECTING SWITCH**

**TRANSMISSION SYSTEM EXPANSION PROJECT NO.12
BULK POWER SUPPLY FOR THE GREATER BANGKOK AND
VICINITY AREA PHASE 3**

No. _____

This Contract is executed and delivered this _____ day of _____,
B.E. _____ (A.D. _____), between

ELECTRICITY GENERATING AUTHORITY OF THAILAND

represented by _____ of said Authority, hereinafter called "EGAT", and

(Contractor)

represented by _____, age _____ years, nationality _____, hereinafter called
the "Contractor".

EGAT and the Contractor mutually agree as follows :

D-1. Contract Documents

The following documents attached to this Contract are incorporated and made a part of this
Contract, as though fully written out and set forth herein :

Data Sheet

- A. Invitation to Bid
- B. Instructions to Bidders
- C. Contract Price, Delivery Time of Equipment and Proposal Data
- D. Contract
- E. General Conditions
- F. Special Conditions
- G. Ratings and Features
- H. Bill of Materials (None)
- I. Specifications
- J. Drawings
- K. Supplemental Notices

L. Attachments :

M. Changes :

All of the foregoing documents are referred to herein as the Contract Documents. They are also incorporated into this Contract and made a part hereof all codes, designations, standards, standard specifications and similar Equipment which are referred to in the Specifications and Special Conditions.

D-2. Acceptance of Proposal

EGAT has accepted the proposal of the Contractor for furnishing the Equipment in conformity and in accordance with and subject to all the terms and conditions of these Contract Documents.

D-3. Agreement

The Contractor agrees to sell and EGAT agrees to buy the Equipment as described in these Contract Documents.

D-4. Obligation of Contractor

The Contractor agrees to perform well and faithfully all of the services and to furnish all of the Equipment described in these Contract Documents, and to supply and provide all Equipment, labor and other things requisite for or incidental to the said Work.

D-5. Obligation of EGAT

EGAT agrees, subject to the terms and conditions of these Contract Documents, to pay to the Contractor the amount shown, and at the rates and times and in the manner set forth in these Contract Documents.

D-6. Mutual Obligations

EGAT and the Contractor mutually agree to perform, fulfill, abide by, and submit to any and all of the provisions and requirements and all matters and things contained or expressed in, or reasonably to be inferred from these Contract Documents.

D-7. Deposit of Performance Security

The Contractor agrees to deposit with EGAT an acceptable performance security in accordance with the Contract Documents.

D-8. Assignment

The Contract or any part thereof shall not be assigned or pledged without the written consent of EGAT, nor shall the Contractor assign or pledge any money due, or to become due, to him hereunder, without the prior written consent of EGAT.

D-9. Notices

All notices called for by the terms of this Contract shall be effective only at the time of receipt thereof and only when received by the parties to whom they are addressed at the following addresses :

EGAT : Governor
Electricity Generating Authority of Thailand
Bangkruai, Nonthaburi 11130
Thailand

Contractor : _____

All notices called for by the terms of this Contract shall be in the form of registered letters or facsimile in the English language.

D-10. Integration

EGAT and the Contractor agree that this Contract, including the Contract Documents, expresses all of the agreements, understandings, promises, and covenants of the parties, and that it integrates, combines, and supersedes all prior and contemporaneous negotiations, understandings, and agreements, whether written or oral, and that no modification or alteration of this Contract shall be valid or binding on either party, unless expressed in writing and executed with the same formality as this Contract, except as may otherwise be specifically provided in this Contract.

D-11. Counterpart

This Contract is executed in *two (2)* identical counterparts: *one (1)* for EGAT and one (1) for the Contractor.

ELECTRICITY GENERATING AUTHORITY
OF THAILAND

CONTRACTOR :

BY _____
(_____)

BY _____
(_____)

WITNESS :

WITNESS :

BY _____
(_____)

BY _____
(_____)

DRAFT

SECTION E
GENERAL CONDITIONS

GENERAL CONDITIONS

E-1. Definitions

Whenever the following terms are used in the Contract Documents, they will have the following meanings :

- EGAT : The Electricity Generating Authority of Thailand, having its Head Office at Nonthaburi, Thailand, and its authorized representative or representatives
- Engineer : Firm or company assigned by EGAT to provide engineering, consulting or construction management services in support of EGAT
- Bidder : Any person or firm or company or joint venture or consortium of firms submitting bid to EGAT for furnishing the services and Equipment described in the Contract Documents, in response to this Invitation to Bid
- Contractor : Any person or firm or company or joint venture or consortium of firms including appointed representatives, successors and assignees thereof, whose bid has been accepted by EGAT for furnishing of the services and Equipment described in the Contract Documents
- Subcontractor : Any person or firm or company (other than the Contractor) to whom any part of the Contract has been sublet, with the consent of EGAT, by the Contractor
- Contract : The agreement between EGAT and the Contractor, and all Appendices and Schedules thereto including Invitation to Bid, Instructions to Bidders, Proposal, General Conditions, Special Conditions, Specifications, Ratings and Features, Drawings, Supplemental Notices and any other documents referred to in, or connected with the Contract, even though the said documents are issued after execution of the Contract
- Contract Price : The sum specified in Section C which is inclusive of VAT (if any) subject to such additions thereto or deductions therefrom as may be made under the provisions hereinafter contained

Equipment	:	Machinery, apparatus, materials, goods, including accessories and spare parts to be supplied under the Contract and specifically described in the Specifications
Work	:	All the work to be done by the Contractor for design manufacture, shop test, transportation, and delivery of the Equipment ex-works, FOB Port of Shipment/Vessel or CFR Thai Port or at EGAT's store/site as agreed, including, if required, supervision for installation at site and supervision for field tests of the Equipment under the Contract
Thai Port	:	Commercial ports in Thailand including but not limited to Bangkok Port, Laem Chabang Port, Sriracha Harbour Port, Siam Seaport, Maptaphut Port, Songkhla Port, Phuket Harbour Port or Suvarnabhumi Airport, as the case may be
Bangkok Port	:	Bangkok Wharf (Klong Toey Port) and all other commercial ports in Bangkok Metropolitan area
Supervisor (if required)	:	Contractor's employee assigned as installation supervisor including assistant supervisor, to supervise and be responsible for the installation, erection, adjustment, field tests, and commissioning of the Equipment supplied under the Contract
Option (if any)	:	Equipment to be quoted by the Bidder which EGAT reserves the right to accept or omit in whole or in part
Year	:	Calendar year
Month	:	Calendar month
Day	:	Calendar day

E-2. Intent of Contract Documents

All of the Contract Documents are complementary, and what is called for by one shall be as binding as if called for by all. In the case of any discrepancy between any of the Contract Documents, or any defective description or ambiguity, the matter shall be promptly submitted to EGAT, which shall promptly make a determination in writing. Any adjustment by the Contractor without this determination shall be at the Contractor's own risk and expense. In all cases of discrepancy, defective description, or ambiguities,

the interpretation given by EGAT shall be binding on the Contractor, subject to the provisions of Article E-31. Dispute Resolution, included in these General Conditions.

E-3. Applicable Law and Legal Jurisdiction

The applicable law of this Contract shall be the law in force in the Kingdom of Thailand. Should there be any ambiguity or discrepancy arising out of or in connection with the Contract Documents, the interpretation thereof shall be made in accordance with Thai laws. Any litigations between the parties that may arise out of or in connection with this Contract or the breach or termination thereof or the performance of work thereunder shall be submitted to the Court of Thailand for decision, except as may be otherwise specifically provided in these Contract documents.

E-4. Statutory Requirements

Throughout the continuance of the Contract, the Contractor shall conform to all laws of the Kingdom of Thailand, and to all regulations, by-laws, ordinances, or orders made thereunder, and to the lawful requirements of any public, municipal, or other authority, in any way affecting or applicable to the Contractor or its operations.

E-5. Patents and Copyrights

The Contractor shall indemnify and hold EGAT, its officers, agents, and employees harmless against and from liability of any nature or kind, including costs and expenses for or on account of any copyrighted or uncopyrighted composition, secret process, patented or unpatented invention, article, or appliance manufactured, delivered, or used in carrying out the Work under the Contract. All drawings and the information contained therein as well as the use of any process, material or Equipment developed in the course of carrying out the Work under the Contract shall become the property of EGAT where EGAT shall have the right to use any or all of them for any purpose either for present or future projects. For the avoidance of doubt, none of them will be used solely for any commercial benefit which is not related to EGAT work.

E-6. Subcontracts

The Contractor shall not assign or transfer the Contract or any part thereof or any benefit or interest therein or thereunder, any monies due or become due under this Contract to any other person or persons.

The Contractor shall not be allowed to subcontract the whole of the Work under this Contract. Subcontracting of any part of the Work shall be subject to the prior written consent of EGAT. Such consent, if given, shall not relieve the Contractor from full and entire responsibility under this Contract.

If the Contractor desires to subcontract any part or parts of the Work called for by the Contract, he shall notify EGAT in writing to that effect and shall state in such notice the nature and extent of the part or parts of the Work called for by the Contract proposed to be subcontracted and name of the person proposed as Subcontractor. Unless and until written approval is given by EGAT, approval for which shall not be unreasonably withheld, the Contractor shall not subcontract any part of the Work. All requirements specified in these Contract Documents shall be applicable to Subcontractors also.

No contractual relation shall exist between EGAT and the Subcontractors, and the Subcontractors are not to enjoy any privileges conferred on the Contractor by this Contract.

Any Work done by any Subcontractor who has not been approved by EGAT shall be subject to rejection or stoppage of Work by EGAT. In such case the Contractor cannot claim delay or request for time extension of the Contract completion date and/or make financial claim to EGAT.

E-7. Export Charges

All tariffs, duties and other taxes or charges levied by the country of origin of the Equipment shall be paid by the Contractor, and such expenses shall be included in the cost of the Equipment.

E-8. Import Duty and Taxes

EGAT will pay all costs of procuring the necessary permits and licenses for importation into Thailand, and will pay import duty and any taxes including value added tax imposed at the port of entry on the Equipment to be supplied by the Contractor and imported into Thailand for the Work under this Contract.

EGAT will not pay import duty and taxes on either the personal effects of the Contractor's employees, such as personal articles, household furnishings and appliances, and goods of any kind imported for the personal use of the Contractor's employees whether imported by an employee or by the Contractor, or in respect of food, tobacco, liquor and other commissary goods imported by the Contractor or by his employees.

EGAT will not pay import duty and taxes including value added tax on equipment, tools, instruments and machinery imported by the Contractor for purpose of carrying out the work under the Contract. All processes of importation shall be arranged by the Contractor.

Equipment, tools, instruments and machinery which are certified by the Contractor that they are required for installation, test and commissioning of the Work at the site and they are intended for re-exportation can be temporarily exempted from import duty and taxes including value added tax. All Equipment thereof shall be imported under the name of the Contractor and be in accordance with the rules and regulations of the Customs Department of the Kingdom of Thailand.

EGAT will assist the Contractor for such temporary exemption of import duty and taxes including value added tax by issuing a letter confirming such temporary import. Import duty and taxes including value added tax for the temporarily imported Equipment shall be paid by the Contractor to the Customs Department before re-exportation at the rate to be specified by the Customs Department at the time of importation for the whole period they have been imported into the Kingdom of Thailand. Temporary importation of the Equipment is subject to approval of the Customs Department and the deposit of a bond with the Customs Department in the amount to be notified by the Customs Department is required. All costs for submission of information and data if required by the Customs Department and the cost of provision of the bond shall be borne by the Contractor.

In view of numerous advantages, the ATA Carnet system or other systems may be arranged for shipment of the said temporarily imported equipment by the Contractor (if required). Any charge incurred and/or any liability shall be borne by the Contractor.

E-9. Value Added Tax

Pursuant to the Revenue Code of Thailand, EGAT shall be responsible and pay when due for the value added tax imposed on the supply of Equipment, including local transportation (if any) and/or on the provision of services under this Contract. EGAT shall in no case be responsible for the value added tax collectible on any payment made by the Contractor under any subcontract or under any other circumstances and the Contractor shall comply with the rules and regulations of the Revenue Code of Thailand.

In case there is any change on the rate of value added tax imposed by the Government of Thailand, the amount of value added tax comprised in the Contract Price shall be adjusted to reflect such change, provided that the price of the Work shall remain unchanged.

E-10. Income and Other Taxes

Income and other taxes assessed or collected by the Government of Thailand, or any subdivision thereof, or any municipality therein on the Contractor and his employees shall be under the responsibility and account of the Contractor.

In accordance with the Revenue Code of Thailand, should the payment under this Contract be subject to income tax and withholding tax of any kind is required to be withheld by EGAT, such withholding tax shall be deducted by EGAT from each payment and EGAT will be responsible to remit such withholding tax to the Revenue Department of Thailand on behalf of the Contractor. In case any payment being made through the letter of credit or being made directly from foreign source whereby the withholding tax cannot be deducted from payment, the Contractor is required to immediately inform EGAT once each such payment is made to the Contractor, and the withholding tax of which will be paid from EGAT's own fund to the Revenue Department in the same manner as aforesaid. Such withholding tax amount as advanced by EGAT on behalf of the Contractor shall be reimbursed by the Contractor to EGAT within the period of time fixed by EGAT.

In the case where the Contractor considers that the transaction under this Contract is exempted from income tax of Thailand (under any circumstance), the Contractor shall submit, together with his proposal(s), a statement detailing such exemption and the valid documentary evidence. Should EGAT rely on the statement so submitted, no deduction for withholding tax shall be made from payment. However, if the tax authority of Thailand determines that such exemption is not applicable, the Contractor shall then be responsible for the amount(s) equal to the withholding tax, plus the amount(s) of tax exceeding those of withholding tax, including the surcharge and/or penalties imposed on EGAT and the Contractor. The responsibility and liability of the Contractor as provided in the preceding sentence shall survive termination of the Contract.

If the Contractor fails to immediately inform EGAT of the payment as required under the second paragraph preventing EGAT from remitting the withholding tax to the Revenue Department within seven (7) Days from the end of the month in which such payment is made, or fails to pay and/or reimburse EGAT for any amount required under this Article within the period of time fixed by EGAT, such period not to be shorter than fifteen (15) Days from the date of EGAT's notice for payment, EGAT has the right to claim directly from the Contractor or claim from Performance Security or Maintenance Security, as the case may be, or deduct or setoff from any money due to the Contractor under this Contract

for the outstanding amount, surcharge and/or penalty (if any) together with interest at the rate of Minimum Overdraft Rate (MOR) plus two (2) per cent calculated from the due date up to the date the payment is made in full.

EGAT will proceed with the tax matters under the Contract by relying on the information and document submitted by the Contractor in relation to the Bidder's status and tax liability. If the Revenue Department of Thailand differently determines the status and tax liability, the Contractor shall be responsible and liable for any cost and expense, penalty and/or surcharge incurred and/or imposed on him and EGAT in relation thereto.

E-11. Fees and Duties

Any and all immigration fees, stamp duties, and other fees assessed or collected by the Government of Thailand, or by any subdivision thereof, or by any municipality therein, on this Contract, on the Contractor and/or his personnel shall be paid by the Contractor. Any taxes collectible under this Contract, other than those stipulated in this Contract, shall be at the responsibility and account of the Contractor.

The stamp duty for any service contract (Construction, Hire of Work, Consultancy Service, Transportation, Supervisor, etc.) with the Contract value of the service portion lower than baht 200,000.- is required to be affixed by the Contractor on the original copy and the counterpart of the Contract. In case the value of the service portion is baht 200,000.- and over, payment of such stamp duty by the Contractor shall be made in cash to the Revenue Department of Thailand or its authorized subdistrict offices. In either case, the stamp duty is required to be affixed or paid, as the case may be, within fifteen (15) Days after the date of Contract execution, otherwise the Contractor shall be liable to pay for any and all penalties imposed for the delay as required by law.

The Contract value of the service portion to be calculated for stamp duty under this provision shall be the price excluding value added tax.

For a foreign Contractor who has no representative in Thailand, EGAT will, upon receipt of written request from the Contractor, affix or pay for stamp duties from EGAT's own fund on behalf of the Contractor, the Contractor is therefore required to reimburse EGAT for such stamp duties plus any and all penalties imposed by law for delay, if such delay is due to Contractor's failure to make written request to EGAT as aforesaid within a reasonable period of time.

If the Contractor fails to reimburse EGAT for any and all amount as required under this Article within the period of time fixed by EGAT, such period not to be shorter than fifteen (15) Days from the date of EGAT's notice for payment, EGAT has the right to claim directly from the Contractor or claim from Performance Security or Maintenance Security,

as the case may be, or deduct or setoff from any and all money due to the Contractor under this Contract for the outstanding amount together with interest at the rate of Minimum Overdraft Rate (MOR) plus two (2) per cent calculated from the due date up to the date the payment is made in full.

E-12. Performance Security

The Contractor shall, at the time of execution of the Contract, deposit with EGAT a performance security for the due and proper performance of this Contract in the amount of ten (10) per cent of the total Contract Price. The performance security shall insure payment of any obligations, penalty, damages, liquidated damages, or expenses for which the Contractor may become liable to EGAT.

The amount of the performance security shall be adjusted or the Contractor may deposit a new performance security in the amount of ten (10) per cent of the additional Contract Price to cover the Contractor's obligation in case the Contract Price is increased due to change of the Work under the Article E-21. Changes and Extra or Omitted Work.

The performance security shall be in the form of a cash deposit, *or a certified cheque issued by a local bank, or a cashier cheque issued by a local bank*, or a bank guarantee or letter of guarantee issued only by a local bank or an acceptable financial institution in Thailand, or by a foreign bank counter-guaranteed by a local bank and, made payable to EGAT in the same currency as that of the Contract. In case of a cash deposit, only Thai baht portion of the Contract Price can be made. EGAT may at any time, upon application by the Contractor, approve the substitution for any performance security held under this Article by other performance security on such terms and conditions as may be approved by EGAT. The Contractor shall bear the cost of the performance security.

The conditions of the guarantor's obligations in the performance security shall include, inter alia, the following :

- (1) The guarantor shall unconditionally guarantee, as primary obligor and not as surety merely, payment of any obligations, penalties, damages, liquidated damages, or expenses for which the Contractor may become liable to EGAT.
- (2) No extension of time, change in, addition to, or other modification of the terms of the Contract or Work to be performed thereunder, or of the specifications or other Contract Documents shall in anyway release the guarantor from any liability under the performance security, and the guarantor shall thereby waive notice of any such extension of time, change, addition or modification.
- (3) The performance security shall be valid and remain in full effect from the date of execution of the Contract until the issuance of the Acceptance Certificate by

EGAT or the acceptance of Equipment deemed to be made by EGAT against submission of the Maintenance Security accepted by EGAT.

Unless and until an official receipt is issued in respect to a security deposit, EGAT will not recognize or accept any such deposit as fulfilling the requirements of this Article. Failure to deposit a performance security at the time specified above in this Article or such extended time as may be approved by EGAT shall be a breach of this Contract and EGAT is entitled to terminate the Contract or suspend any payment for Work performed until the performance security has been accepted by EGAT. EGAT shall not be liable for any losses, expenses and/or damages resulting from such payment suspension.

If any performance security furnished under this Article becomes unacceptable to EGAT, or if any guarantor fails to furnish reports as to guarantor's financial condition from time to time, as requested by EGAT, the Contractor shall promptly furnish such additional or alternative security as may be required by EGAT from time to time to protect the interests of EGAT up to an amount equal to the amount of the security.

In the event of any default or breach of this Contract by the Contractor, EGAT may convert into money any performance security which does not consist of money, and the proceeds shall be deemed to be a cash deposit under this Article. EGAT shall not be liable for any cost, expenses and/or loss incurred in connection with such conversion.

The performance security, in case of a bank guarantee, or letter of guarantee, shall be in conformity with the specimen acceptable to EGAT as shown herein at the end of these General Conditions.

E-13. Inspection and Tests

All Equipment furnished and all work performed under this Contract shall be subject to inspection by EGAT or EGAT's authorized representative(s) at its option. EGAT shall have the right to inspect all Equipment during its manufacture or fabrication and prior to its preparation for shipment, and to witness any or all shop tests for which results are required under this Contract to be approved by EGAT.

The Contractor shall notify EGAT at least two (2) months in advance when and where the Equipment will be available for each inspection or test. Any expenses incurred by EGAT or EGAT's representative(s) to inspect the Equipment or attend the test caused by false call of the Contractor for inspection and tests shall be borne by the Contractor. The acceptance of any services and Equipment covered by these Contract Documents, or the making or waiving of any inspection or witnessing of any test, shall in no way relieve the Contractor of the responsibility for furnishing services and Equipment meeting all of the requirements of this Contract.

Shop tests required in the Specifications shall be at the Contractor's expense. All tools, instruments and other materials necessary for performance of the tests shall be furnished by the Contractor.

In the event the results of the tests do not satisfy the requirements of the Specifications or the guaranteed performance, the Contractor shall rectify to improve the Equipment until satisfactory results are obtained and shall conduct all necessary retests at his own expense.

Any delay in delivery due to the retest shall not constitute a release of the Contractor from his responsibility for delay. Any expenses incurred by EGAT in attending these retests shall be borne by the Contractor. EGAT shall have the right to send one or more of EGAT's employees, not as inspectors, to the Contractor's plant to witness the fabrication, assembly and testing of any or all parts of the Equipment being furnished under this Contract. The purpose of the visit is to familiarize EGAT's personnel with Equipment details and to assist them in future operation and maintenance. Travelling expenses and per diem of such employee or employees shall be borne by EGAT.

E-14. Preparation for Shipment and/or Delivery

The Contractor shall submit shipment and/or delivery schedule for EGAT's approval at least thirty (30) Days in advance before each shipment and/or delivery is made. No shipment and/or delivery shall be made prior to EGAT's approval which will be notified to the Contractor within fifteen (15) Days after receipt of the said shipment and/or delivery schedule.

All imported and local Equipment to be delivered under this Contract shall be satisfactorily packaged in such a manner to protect them from damage during transportation and for outdoor storage at the site in hot, wet, humid and dusty conditions. In addition, the imported Equipment shall also be satisfactorily packaged for moist tropical ocean shipment. Where necessary, heavy parts shall be mounted on skids so that cable slings for handling can readily be attached. Where it is unsafe to apply external slings to a package, attached slings shall be provided and shall project through the package so that attachment can readily be made.

In order to keep the damage to non-water proof Equipment during the transportation at minimum level, the Contractor and/or supplier is required to put an umbrella mark on every package of the Equipment.

In order to accelerate the dispatch of the Equipment to the site, the Contractor is required to arrange packaging of the Equipment in such a manner that a complete set of one unit shall be packed in package(s) or crate(s) with indication of designated substation but each individual package or crate shall contain the Equipment for only one unit or part of a

complete set of one unit or otherwise as directed in the Instructions for Packaging attached at the end of Section E. General Conditions.

For Power Transformer and Shunt Reactor, in addition, all accessories, which are packed in aforesaid manner shall be contained in a container per transformer except for transformer insulating oil, radiators and conservator including other accessories which for dimensional reason after packaging are unable to be contained in the said container. However, spare parts shall be contained in a separate container per each shipment or Contract to be awarded. The containers to be used shall become the property of EGAT. The dimensions of containers shall be as follows : -

<u>Container Dimensions</u>	<u>Door Dimensions</u>
Height 2.59 m.	Height 2.28 m.
Width 2.44 m.	Width 2.33 m.
Length 6.05 m.	

In addition, details of Equipment and substation destination per container shall be identified in Bill of Lading.

Detailed breakdown prices for spare parts of Equipment shall be also indicated in the invoice.

Prior to delivery of all Equipment, packaging details shall also be submitted to EGAT for approval.

The cost incurred for repair or replacement of any damages to the Equipment due to improper packaging shall be at the Contractor's expense.

Each individual package or crate shall be clearly and plainly tagged or marked for identification as follows:

EGAT, THAILAND
PROJECT NAME : _____
CONTRACT NO. : _____
SUBSTATION : _____
CASE NO. : _____
ITEM NO. : _____
DESCRIPTION : _____
EGAT'S SERIAL NO. : _____ (if any)

In addition to this, the following instructions shall be observed :

- a. Each box, crate, case, bundle or piece of loose Equipment shipped must show the following information clearly marked on its body :

1. Gross weight in kilograms
 2. Net weight in kilograms
 3. Dimensions in centimeters
- b. All boxes, crates, cases, bundles, loose pieces, etc. must be marked consecutively from No. 1 upward throughout all shipments to completion of the order without repeating the same number.
- c. The packing list must indicate whether shipment is partial or complete, and shall incorporate the following information on each container, etc., according to its individual shipping number:
1. Export case markings
 2. Case number
 3. Container number (for Power Transformer and Shunt Reactor)
 4. Item number
 5. Gross weight and net weight in kilograms
 6. Dimensions in centimeters
 7. Complete description of Equipment
 8. EGAT's serial No. (if any)

E-15. Clearance and Weight Limitations

The largest unloading facilities at Bangkok Wharf are 35 metric ton cranes. Lifts heavier than 35 tons will have to be handled by ocean freighter on-board lifting equipment. Ocean freighters of the 10,000 tons class regularly calling at Bangkok Wharf have off-loading capacities to handle 50 tons.

The largest unloading facilities at Laem Chabang Port are 30 metric ton cranes. Lifts heavier than 30 tons will have to be handled by ocean freighter on-board lifting equipment.

Generally, unloading at Thai Port and highway transportation are subject to the following limitations:

Dimensions	Limitations		
	Unloading at Bangkok Wharf/ Highway Transportation		Unloading at Laem Chabang Port/Maptaphut Port
Weight (tons)	60.0	>60.0-135.0	120.0
Width (meters)	3.5	3.5	4.5
Length (meters)	10.0	10.0	25.0
Height from Loading Platform (meters)	3.7	4.0	4.0

The Contractor shall therefore exercise due care to pack the Equipment to meet the above transport limitations.

For Power Transformer and Shunt Reactor, the shipping weight of the largest part is indicated in Ratings and Features.

E-16. Shipment

Shipment of Equipment from port of embarkation to the final port of discharge shall be effected by using Thai vessels through the sea freight forwarder appointed by the Contractor. The Contractor is required to notify EGAT of the name of the sea freight forwarder one (1) week prior to shipment.

According to the regulations of the Maritime Promotion Bureau, Marine Department (as amended from time to time), shipments by non-Thai vessels can be made after receipt of permission granted by the Maritime Promotion Bureau, Marine Department as requested by the Contractor.

The Contractor is, therefore, required to immediately contact the Maritime Promotion Bureau, Marine Department for such permission with supporting documents of the case thereof for arrangement of the permission in advance.

The Contractor shall follow all other regulations stated in the Mercantile Marine Promotion Act B.E. 2521 and the regulations of the Maritime Promotion Bureau, Marine Department (as amended from time to time).

The Contractor shall be liable for any and all costs and expenses, losses and/or damages suffered by EGAT as a result of the Contractor's failure to comply with such regulations.

For more information, the Contractor may contact the Maritime Promotion Bureau, Marine Department at telephone No. 66 2233 1311-8 extension 391, 393 and facsimile No. 66 2639 4780.

All imported Equipment shall be shipped on Conference Line or on seaworthy oceangoing vessels which are members or associate members of the International Association of Classification Societies (IACS) and ISM Code Certified Vessels. Vessels over fifteen (15) years of age shall not be used for shipment under this Contract unless they : -

- a) have been used for the carriage of general cargo on an established and regular pattern of trading between a range of specified ports and do not exceed twenty-five (25) years of age, or
- b) were constructed as containerships, vehicle carrier or double-skin open-hatch gantry crane vessels (OHGCs) and have been continuously used as such on an established and regular pattern of trading between a range of specified ports, and do not exceed thirty (30) years of age.

Shipment shall be made under deck except for such Equipment which for dimensional reasons cannot be stowed in the vessels hold. In case Equipment cannot be stowed in the vessel hold, permission shall be obtained from EGAT prior to loading such Equipment on deck. Such approval shall not be unreasonably withheld. The Contractor shall in any case be responsible for proper packing for protection of such Equipment loaded on deck of the vessel. Shipment of all Equipment by dry cargo container will be accepted, but all the incidental expenses shall be borne by the Contractor.

For shipment of Equipment under this Contract, transshipment is allowed.

Any delicate Equipment, materials, instruments and tools including but not limited to computers, electronic parts, etc., shall be shipped by airfreight. The Contractor shall be responsible for proper packing for protection of such Equipment loaded on cargo hold of the aircraft.

Air freight shipment to airport of disembarkation in Thailand shall be effected through the air freight forwarder appointed by the Contractor. The Contractor is required to notify EGAT of the name of the air freight forwarder one (1) week prior to shipment.

E-17. Documents Required for Each Shipment

a. For Seafreight

For accounting procedure, the Contractor is required to send to EGAT the bill of lading, invoice and master packing list immediately by facsimile but not later than

three (3) Days after the Equipment are actually loaded free on board (FOB Vessel) at the port of Shipment.

One (1) original negotiable bill of lading, three (3) original signed invoices and packing lists shall be mailed directly to EGAT by express airmail within four (4) working days after the date of departure of the ocean-going vessel from the port of shipment.

Two (2) original negotiable and five (5) copies of non-negotiable bill of lading, ten (10) original signed invoices and three (3) copies of packing lists shall be submitted to EGAT through the Bank within the time as specified in the letter of credit. - This requirement is applied only in case payment is made by letter of credit.

b. For Airfreight

For accounting procedure, the Contractor is required to send to EGAT the airway bill, invoice and master packing list immediately by facsimile but not later than three (3) Days after the Equipment are actually loaded on the air carrier at the airport of departure.

Three (3) original signed invoices and packing lists shall be attached to the airway bill and dispatched together with the airfreight shipment.

One (1) copy of airway bill, two (2) original signed invoices and packing lists shall be sent directly to EGAT by courier within four (4) working days after the date of departure of the carrier from the airport.

Two (2) copies of airway bill, ten (10) signed invoices and three (3) copies of packing lists shall be submitted to EGAT through the bank within the time as specified in the letter of credit. - This requirement is applied only in case payment is made by letter of credit.

To act in accordance with the rules and regulations of the Customs Department of the Kingdom of Thailand, as well as to enable EGAT to expedite clearing the Equipment from the Customs House accordingly, the following declarations, other than regular statements, have to be made in English in the invoice for any transaction concluded with EGAT.

- a. Country from which Equipment is purchased as well as country of origin; if the Equipment is produced in the country or group of countries where there are trade agreements between such country or group of countries and the Kingdom of Thailand, preferential treatment on import duty and taxes for importation of the Equipment is required;
- b. Electricity Generating Authority of Thailand as consignee and Thailand as consigning country
- c. Date and Number of Contract;

- d. Name of Project, if any;
- e. Marking and numbers, as well as gross weight and volume;
- f. Details of Equipment, i.e. names, kinds, qualities, quantities, net weights, and other particulars as available for each type including trademarks or other symbols of such Equipment. If there are no trademarks or symbols, the invoice shall indicate "no trademarks", "no symbols", as the case may be;
- g. Selling price or value of Equipment per unit expressed in the type of currency under transaction and representing actual price or value of Equipment as stated in the price schedules or price breakdown, as the case may be;

If the Contractor fails to specify the price or value of Equipment according to the Contract in the invoice prepared for shipment, the Contractor shall be held responsible for the following:

1. In case of over value or price of Equipment stated in the invoice, the Contractor shall be responsible for reimbursement to EGAT for the import duty and taxes (excluding value added tax) collected by the Customs Department and the insurance premium (excluding value added tax) on the over value or price of Equipment as well as interest. Value added tax imposed in connection thereto shall be EGAT's responsibility. The Contractor shall also refund to EGAT the amount of over value payment as well as interest. The interest to be applied under this Article shall be Minimum Overdraft Rate announced by Krung Thai Bank plus two (2) (MOR+2) percent calculated from the date of EGAT's payment of the over value payment, import duty and taxes as well as insurance premium until the date of the Contractor's settlement of the same in full.
2. In case of under value or price of Equipment stated in the invoice, the Contractor shall be responsible for reimbursement to EGAT the surcharges imposed on additional import duty and taxes at the rate currently established by the Customs Department as well as interest (if any) and also shall be responsible for compensation to EGAT for cost incurred in repair or replacement of the damaged Equipment which is not covered by insurance due to under value or price of Equipment stated in the invoice.

- h. Other expenses:
 1. Packing charges (if any)
 2. Insurance premiums (if insured)
 3. Freight
 4. Others (if any)

The Contractor shall, at the time of shipment, prepare and submit a certificate of origin(s) for the Equipment required as per point a. above together with the invoice and other shipping documents for EGAT to obtain the benefit from preferential treatment on import duty and taxes for importation of the Equipment from the country or group of countries where there are

trade agreements between such country or group of countries and the Kingdom of Thailand. For each shipment, all items of Equipment requiring certificate of origin shall be included in only one (1) certificate of origin except as otherwise specified in any trade agreement. The trade agreements shall include but not be limited to the following:

1. Common Effective Preferential Tariff (CEPT) Scheme for the ASEAN Free Trade Area (AFTA);
2. Agreement between the Kingdom of Thailand and Japan for an Economic Partnership; and
3. Agreement between the Government of the Kingdom of Thailand and the Government of the People's Republic of China on Accelerated Tariff Elimination under the Early Harvest Programme of the Framework Agreement on Comprehensive Economic Cooperation between ASEAN and China.

If the Contractor advises EGAT in writing before shipment that it is unable to provide a certificate of origin to EGAT, the Contractor shall be responsible for all costs incurred including but not limited to reimbursement to EGAT for the excess amount of the import duty and taxes (except value added tax) paid by EGAT to Customs Department.

Further to the above, if the Contractor delays to provide a proper certificate of origin to EGAT, the Contractor shall be responsible for all costs incurred including but not limited to reimbursement to EGAT for the storage charges and the interest on the excess amount of import duty and taxes (except value added tax) paid by EGAT to the Customs Department at the rate of Minimum Overdraft Rate announced by Krung Thai Bank plus two (2) (MOR+2) percent calculated from the date of EGAT's payment of import duty and taxes up to the date of receipt of the excess amount of import duty and taxes refund from the Customs Department.

However, if the Contractor fails to provide such proper certificate to EGAT, the Contractor shall be responsible for all costs incurred including but not limited to reimbursement to EGAT for the storage charges and the excess amount of import duty and taxes (except value added tax) paid by EGAT to the Customs Department as well as interest on the said excess amount of import duty and taxes at the rate of Minimum Overdraft Rate announced by Krung Thai Bank plus two (2) (MOR+2) percent calculated from the date of EGAT's payment of import duty and taxes up to the date of acknowledgement that the certificate cannot be issued in conformity with requirement of the Free Trade Agreement.

The Contractor is also required to study the existing trade agreements and any new trade agreement between the Kingdom of Thailand and a country or group of countries published in the website of Customs Department (www.customs.go.th) and/or Ministry of Commerce (www.moc.go.th), and ask for more information from EGAT in order that EGAT can obtain the benefit from preferential treatment on import duty and taxes for importation of the Equipment from the country or group of countries where there are trade agreements between such country or group of countries and the Kingdom of Thailand.

Fullest conformity with the requirements of the Customs Department of the Kingdom of Thailand mentioned above is essential as a condition precedent.

Unless by force majeure, failure to furnish EGAT with these shipping documents and the certificate of origin within the specified period and strictly in accordance with conditions stipulated above thereby causing impossibility of making prompt customs clearance of the Equipment from Thai Port, the Contractor shall, upon receipt of the EGAT's notice, reimburse EGAT for go down rent / storage charge and other expenses arising from or in consequence of the nonconformity with the above specified requirement.

E-18. Force Majeure

The Contractor shall not be in default under this Contract because of any delays in delivery or in completion of the Work on the separable parts thereof which delays are caused by force majeure; provided, that the Contractor shall notify EGAT in writing of the cause of any such delay within fifteen (15) Days after the end of the event which results in the delay. Upon receipt of any such notice of delay, EGAT will promptly ascertain the facts and the extent of the delay and will extend the time for the delivery and assembly of the Equipment or the time for completing the Work when, in the opinion of EGAT, the delay is caused by force majeure or the findings of fact to justify an extension. EGAT's decision shall be binding on the Contractor, subject to the provision of Article E-31. Dispute Resolution included in these General Conditions.

"Force Majeure" shall be defined as any event, the happening or pernicious results of which could not be prevented even though a person against whom it happened or threatened to happen were to take such appropriate care as might be expected from him in this situation. (Normal rains, inundation, dearth of water, and the overturning or sinking of barges in canals, rivers, or streams and similar events shall not be considered as force majeure).

E-19. Transportation Insurance

Transportation insurance from the port of shipment/from the Contractor's premise(s) to EGAT's Store and/or EGAT's site will be under the responsibility of EGAT.

E-20. Transfer of Title

The title of ownership for the Equipment furnished under this Contract shall be passed to EGAT at the time the Equipment is actually loaded onto the vessel at the port of shipment, or into charge of the air carrier at the port of departure, or at the time the Equipment is actually delivered ex-works and the Contractor's statement or delivery order confirming delivery of the Equipment ex-works has been certified by EGAT's representative. However, this transfer of title shall not be construed as an acceptance of

the Equipment. The Contractor shall continue to be responsible for the quality and performance of the Equipment, and for their compliance with the Specifications as well as any loss, theft or damage of the Equipment during the course of execution of the Contract, until final acceptance of the Work by EGAT and the fulfillment of the guarantee provision of the Contract.

E-21. Changes and Extra or Omitted Work

EGAT may at any time authorize changes in, additions to, or deductions from the Equipment to be furnished under the Contract. Changes, additions, or deductions *shall* be authorized only by written notice served by EGAT upon the Contractor and such notice shall be treated as an integral part of the Contract. Adjustments, if any, in the amounts to be paid to the Contractor by reason of any such change, addition, or deduction shall be determined by one or more of the following methods :

- a. by unit price contained in the Price Schedules
- b. by an acceptable lump sum or unit price proposal from the Contractor
- c. on a cost-plus limited basis not to exceed a specific limit. A cost-plus limited basis is defined as the cost of Equipment, labor, and insurance, plus fifteen (15) per cent of the said cost to cover superintendence, general expense, and profit.

No claim for an addition to the Contract Price shall be valid unless authorized as described in this Article. If the parties are unable to agree to the method to be employed in determining adjustments in the Contract Price, the method shall be determined by EGAT.

E-22. Termination and Suspension of Contract

EGAT may, by written notice sent to the Contractor, terminate the Contract, in whole or in part, at any time for its convenience. The notice of termination shall specify that termination is for EGAT's convenience, the extent to which performance of work under the Contract is terminated, and the date upon which such termination becomes effective.

The Equipment that are completed and ready for shipment within thirty (30) Days after the Contractor's receipt of notice of termination shall be purchased by EGAT at the Contract terms and prices. For the remaining Equipment, EGAT may elect :

- a. to have any portion completed and delivered at the Contract terms and prices and/or

- b. to cancel the remainder and pay to the Contractor an agreed amount for partially completed Equipment and for materials and parts previously procured by the Contractor.

E-23. Default and Termination

Should the Contractor :

- a. fail to furnish the Equipment or carry out the Work in accordance with this Contract; or
- b. refuse or fail to prosecute the Work or any part thereof which shall ensure its completion within the time specified in this Contract or any authorized extension of time by EGAT; or
- c. fail to furnish the Equipment and/or complete the Work or any part thereof within the time specified in this Contract or any authorized extension of time by EGAT; or
- d. commit any breach or fail to comply with any of the provisions of this Contract; or
- e. notify EGAT in writing that the Contractor is unable or unwilling to furnish the Equipment or complete the Work or any part thereof; or
- f. become insolvent or bankrupt or make an arrangement or composition with the Contractor's creditors or, being a corporation, go into liquidation whether compulsory or voluntary (except for the purpose of reorganization); or
- g. by himself or by any person on his behalf, give or offer any money or benefit of forbearance to any employee of EGAT and/or any employee of the Engineer who has duties or responsibilities in connection with the acceptance of the proposal or the making of this Contract;

then, in any of such events, the Contractor shall be in default under this Contract, and EGAT may at his sole discretion take any one or more of the following actions that it considers appropriate :

- (i) suspend payments under this Contract until the default has been rectified;
- (ii) cancel or terminate the Contract in whole or in part;
- (iii) take that part of the furnishing of Equipment or the Work, in respect of which the delay or default has occurred, out of the hands of the Contractor or any other person in whose control or possession it is;

- (iv) reduce the Contract Price by an amount equal to the reduction in value to EGAT of the Equipment as actually delivered.

The Contractor shall be liable for all losses and/or damages including but not limited to the increased installation costs and increased administrative costs, suffered by EGAT as a result of the Contractor's default. The Contractor shall have no claim for payment with respect to Work thereafter performed.

All such damages may be recovered by EGAT from the Contractor in any court of competent jurisdiction or, without prejudice to that right, by deduction from any money due or becoming due to the Contractor under this Contract, or from any security deposited, or, after use of the property and materials of the Contract for completion of the work, as provided in this Contract, such property and materials may be sold and the proceeds shall be applied to any remaining obligations of the Contractor.

E-24. Indemnification by the Contractor

The Contractor shall fully indemnify and hold harmless EGAT and his employees and officers from and against any and all suit, actions (including any claim for copyright or patent infringement), demands, losses, costs, expenses (including attorney's fees and expenses) and damages of whatsoever nature, except for breach of contract, in respect of death or injury of any person or loss of damage to any property caused by any act or omission of the Contractor or the Contractor's own officers, directors, agents, employees, contractors or sub-contractors arising in any manner whatsoever, except any injury, death or property damage caused by the negligence of EGAT, his contractors, employees, officers, or agents.

E-25. Limitation of Liability

The liability of the Contractor to EGAT arising from default or termination under the Contract in aggregate shall not exceed the total Contract Price.

E-26. Consequential Damages

Neither party shall be liable to the other party for any indirect, incidental, consequential or punitive damages as a result of the performance or nonperformance of the obligations imposed pursuant to this Contract, unless such indirect, incidental, consequential or punitive damages are foreseen or could have been foreseen at the time of execution of the Contract.

E-27. Vesting of Contract in Receiver

If the Contractor shall compound with his creditors, or shall become bankrupt or insolvent, or carry on business under a receiver, or become incapable from any cause whatsoever of carrying out the Work, any such receiver or any person in whom by law the Contract shall become vested, shall forthwith give notice to EGAT of the fact that the Contract has become vested in it and shall take all reasonable steps to carry on the Work at a rate fulfilling the Contract requirements. Thereupon, if EGAT so desires, such receiver or other such person as aforesaid shall have the option, during the period of one (1) Month from the date when the Contract becomes so vested in it, of carrying out the Contract. In the event of the Work being stopped, this option shall be opened only for a period of fourteen (14) Days from the stoppage date. In the event of the receiver or such other person not electing to carry out the Contract or EGAT not approving the carrying out of the Contract by the receiver, the Contractor shall then be in default and EGAT may proceed in accordance with Article E-23. Default and Termination.

E-28. Extension of Time

If, by reason of any of the following :

- a. Negligence or default on the part of EGAT or its agents,
- b. Alteration in or addition to the Work,
- c. Suspension of the Work at the written direction of EGAT for reasons beyond the control of the Contractor,
- d. War, insurrection, riot or civil commotion or delay caused thereby,
- e. Strikes, not caused by the Contractor's management,
- f. Lawful order of civil or military authorities,
- g. Unusually natural calamities, acts of God,
- h. Any other unforeseen circumstance beyond the Contractor's control.

The Contractor claims that he has been unduly delayed in the progress of the Work, he shall make written request to EGAT for an extension of time for completion of the Work or any portion of it.

Should EGAT consider such claim to be valid, it will grant such extension of time as may seem reasonable to EGAT, without thereby prejudicing or in any manner affecting the validity of the Contract. No extension of time will be granted unless the Contractor makes

the written request within fifteen (15) Days after the end of the event which results in the delay.

Other than claiming an extension of time for completion of the Work or any portion of it, the Contractor shall not have any further recourse or claim against EGAT, nor shall he have any right of action against EGAT for loss or damage suffered by reason of such delay.

E-29. Failure to Meet Requirements

EGAT shall have the right to require the Contractor to make any changes in the Equipment or Work covered by this Contract, which may be necessary in the opinion of EGAT, to make the Equipment or Work conform to the requirements of the Contract Documents, without additional cost to EGAT. Any defects in the Equipment or workmanship or other failure, to meet the requirements of the Contract, including errors and omissions on the part of the Contractor, which are disclosed prior to final payment or prior to acceptance by EGAT, or after completion of all tests, whichever occurs at the later date, shall, if so directed by EGAT, be corrected or replaced promptly by the Contractor at the expense of the Contractor.

In case of replacement of Equipment due to non-conformity with EGAT's specifications and/or defects found prior to acceptance of Equipment by EGAT or replenishment for short pack or returning of repaired Equipment due to such defect, the Contractor shall, upon receipt of EGAT's written notice supported with the receipt issued by the relevant parties, be responsible for reimbursement of the expenses incurred for the following :

- All re-export charges (if any)
- Import duty and taxes
- Landing charges, rents and handling charges (ocean freight)
- Storage charges (air freight)
- Truck hire
- Labour charges

These expenses shall exclude value added taxes, which will be EGAT's responsibility.

The contractor shall be also responsible for reimbursement of Service charges for customs clearance (if any) including value added tax.

Any latent defects not disclosed prior to the date of final payment or prior to acceptance or after completion of all tests, whichever occurs at the later date, but disclosed within the guarantee period as specified in Article F-10.a., shall be corrected or replaced promptly by the Contractor at the expense of the Contractor, except that the cost of import duty and taxes, inland transportation and installation of the replacement parts for foreign supply

Equipment, and the cost of inland transportation and the installation of the replacement parts for local supply Equipment will be borne by EGAT.

For Equipment specified in Data Sheet, in case EGAT, at its sole discretion, requires the Contractor to replace any defected Equipment, the Contractor shall replace the Equipment with the whole new set at its own costs and expenses including the cost of all re-export charges (if any), import duty and taxes, landing charges, rents and handling charges (ocean freight), storage charges (air freight), truck hire, labour charges, service charges for customs clearance, inland transportation and installation of the Equipment.

The Contractor shall extend the provisions of his liability to cover all repair and replacement parts furnished from the day immediately following the date of completion of such repair or replacement as follows:

Time of Malfunctioning and/or Defect Found	Guarantee Period Extension				
	Equipment with 1-Year guarantee period	Equipment with 2-Year guarantee period	Equipment with 3-Year guarantee period	Equipment with 4-Year guarantee period	Equipment with 5-Year guarantee period
First Year	For a new period of one (1) Year.	For a new period of two (2) Years.	For a new period of three (3) Years.	For a new period of four (4) Years.	For a new period of five (5) Years.
Second Year	n/a	For a new period of one (1) Year.	For a new period of two (2) Years.	For a new period of three (3) Years.	For a new period of four (4) Years.
Third Year	n/a	n/a	For a new period of one (1) Year.	For a new period of two (2) Years.	For a new period of three (3) Years.
Fourth Year	n/a	n/a	n/a	For a new period of one (1) Year.	For a new period of two (2) Years.
Fifth Year	n/a	n/a	n/a	n/a	For a new period of one (1) Year.

The Contractor shall, if required by EGAT in writing, search under the directions of EGAT for the cause of any defect, imperfection or fault appearing prior to the acceptance of Equipment or in the period of maintenance guarantee. Unless such defect, imperfection or fault shall be one for which the Contractor is liable under the Contract, the cost of the work carried out by the Contractor in searching as aforesaid shall be borne by EGAT. If such defect, imperfection or fault shall be one for which the Contractor is liable under the Contract, the cost of the work carried out in searching as aforesaid shall be borne by the Contractor and he shall in such case repair, rectify and make good such defect, imperfection or fault at his own expense.

E-30 Operation or Use of Unsatisfactory Equipment

If the operation or use of the Equipment proves to be unsatisfactory to EGAT, EGAT shall have the right to operate and use such Equipment until they can be taken out of service for correction by the Contractor of such latent defects, error, or omissions and for replacement in whole or in part, if correction is unsuccessful or infeasible. The period of such operation or use shall not exceed one (1) Year from the day immediately following the date of acceptance of Equipment by EGAT.

E-31. Dispute Resolution

Any dispute arising out of or in connection with this Contract, interpretation, breach, or termination thereof shall be settled by amicable discussion between authorized representatives of each Party. Either Party may at any time send a written notice to the other Party requesting for an appointment of authorized representative for a settlement of any dispute hereunder. The Parties agree to make diligent and good faith attempt to resolve such dispute in an equitable manner. If the authorized representatives of both Parties are unable to resolve such dispute within 30 Days after commencement of the discussion for dispute resolution or other extended period of time as mutually agreed by both Parties, either Party may file a lawsuit to the court having jurisdiction in Thailand for settlement of such dispute. Each Party agrees that the final court judgment shall be conclusive and binding upon the Parties.

Pending decision of the court, both Parties shall continue to perform their respective obligations under this Contract.

E-32. Language and Numbers

All drawings, designs, specifications, manuals, nameplates, markings, operating instructions, statements, schedules, notices, documents, and all written communications between EGAT and the Contractor, concerning this Contract, shall be in the English language and in the metric system of weights and measures unless otherwise specified.

DRAFT

SPECIMEN OF GUARANTEE

To :

Date

Electricity Generating Authority of Thailand
Bangkruai, Nonthaburi, 11130

Thailand

Re : Performance Security for Contract No. _____

Gentlemen :

In accordance with the provision of the Contract for _____ No. _____ (hereinafter referred to as the Contract) the contents of which have been noted by us that Messrs. _____ (hereinafter referred to as the Contractor) has to deposit with Electricity Generating Authority of Thailand (hereinafter referred to as EGAT) a Performance Security for the proper and faithful performance of the Contract in the amount of _____ (in words : _____) which is _____ per cent of the total Contract Price, we, the _____ as instructed by the Contractor, agree unconditionally to irrevocably guarantee as primary Obligor, the payment to EGAT on its first demand, without whatsoever right of objection on our part and without its first claim to the Contractor, in the amount not exceeding : _____ (in words : _____) in the event the obligations expressed in the above mentioned Contract have not been fulfilled by the Contractor, giving EGAT the right of claim for penalty, damages, liquidated damages or any expenses for which the Contractor may become liable to EGAT under the Contract.

We further agree that no extension of time, change in, addition to or other modification of terms of the Contract or Work to be performed thereunder, or of the Specifications or other Contract Documents, which may be made between EGAT and the Contractor, shall in any way release us from any liability under this guarantee, and we shall thereby waive notice of any such change, addition or modification.

This Performance Security shall be valid and remain in full effect from the date of execution of the Contract until the issuance of the Acceptance Certificate by EGAT or the acceptance of Equipment deemed to be made by EGAT against submission by the Contractor of the Maintenance Security accepted by EGAT.

Yours very truly,

Authorized Signature

Instructions for Packaging

Name of Equipment	Packed per complete set of one unit/units	Packed per Substation
1. Power Transformer	√(1)	-
2. Distribution Transformer	√(1)	-
3. Shunt Reactor	√(1)	-
4. Surge Arrester	√(1 or 3)	-
5. Current Transformer	√(1)	-
6. CC, CCVT, VT	√(1)	-
7. GIS	-	√
8. Shunt Capacitor Bank	-	√
9. Power Circuit Breaker	√(1)	-
10. Disconnecting Switch	-	√
11. AC/DC Dist. Board, LCUS, LRP	√(1)	-
12. Stationary Battery	√(1)	-
13. Lighting Fixture	-	√
14. Identification and Danger Notice Plate	-	√
15. Control and Protection System	√(1)*	-
16. Computerized Control System	-	√
17. Power Line Carrier	-	√
18. Teleprotection	-	√
19. Line Trap	-	√
20. Battery Charger	√(1)	-

- Note :**
1. Number in parenthesis represents maximum number of complete set of one unit/units packed in an individual package or crate.
 2. * In case of spare for control and protection system, such Equipment shall be packed per board, but in case of loose control and protection system, such Equipment of whichever substation shall be packed in the same package or crate of that substation.
 3. Other substation Equipment not mentioned shall be packaged in such a manner that it will not cause unreasonable expenses or delay to EGAT in distribution of such Equipment to the designated substation.
 4. Prior to delivery of all Equipment, packaging details shall be submitted to EGAT for approval.

DRAFT

SECTION F
SPECIAL CONDITIONS

SPECIAL CONDITIONS

F-1. Scope of Work

The Contractor shall perform, furnish and deliver the Equipment as required by these Contract Documents.

For imported Equipment, Transportation from Thai Port to sites shall be EGAT's responsibility. However, the Contractor shall, at his own expenses and responsibility, perform unloading the Equipment at the port or airport of disembarkation in Thailand.

For local supply, Transportation from the Contractor's premises to the sites shall be EGAT's responsibility. However, the Contractor shall, at his own expenses and responsibility, perform loading the Equipment on EGAT's trucks or trailers at the Contractor's premises and shall be liable for all losses and/or damages to the Equipment as well as any expenses causing therefrom.

F-2. Responsibility of Contractor

The Contractor shall be solely responsible for ensuring that the Work throughout is executed in the most substantial, proper and workmanlike manner, with the best quality materials and conforming to the best engineering practice for the operating conditions specified; the drawings and quality control are performed or made in accordance with the Contract; and services reasonably to be furnished though not specifically provided in the Contract are furnished; all to EGAT's entire satisfaction notwithstanding that certain portions of the work may be executed by the Subcontractor.

F-3. Cooperation with Other Contractors

The Contractor, if required, shall exchange with other Contractor furnishing associated Equipment, all necessary drawings and other information required to insure the complete and proper design and manufacture of the Equipment to be furnished under these Specifications. One (1) copy of all drawings and correspondence, relating to information interchanged between Contractors, shall be sent to EGAT in Nonthaburi, Thailand.

***F-4. Supervision of Installation**

Subject to the desire and decision of EGAT, the Contractor may be required to furnish the services of qualified and experienced supervisor(s) who has at least three years experience on the particular Work required under the Contract and shall be the permanent employee of the manufacturer of the Equipment. For 230 kV (or lower) Power Circuit Breaker and 115 kV (or lower) Gas-Insulated Switchgear, the permanent employee of the representative of the manufacturer is acceptable, provided that such employee is certified by the manufacturer.

The scope of responsibility of the supervisor on behalf of the Contractor is as follows :

- a. Supervise and be responsible for the installation, erection, adjustment, field test and commissioning of the Equipment.
- b. Prepare formulation sheets for a check list, test sheet, release form and field report to be discussed with EGAT before performing the installation work.
- c. Submit four copies of report summarizing the work performance, from the beginning to the completion of the supervisory period, to EGAT within one month after finish the installation work or final inspection. The report shall include the following :
 1. Note on pending matter i.e. faulty and omitted equipment, performance deficiency etc.
 2. Problem concerning installation performance.
 3. Photographs showing progress of the installation work periodically until the work is completed.

The Contractor shall, in each and every instance, cooperate fully with the construction personnel installing and/or operating the Equipment and the Work, the operations of the supervisor shall be coordinated with the program of construction at the site as directed by EGAT.

The supervisor shall report at EGAT in Nonthaburi, Thailand, on the date designated by EGAT after a reasonable advance notice from EGAT, and shall remain until the Equipment have been in satisfactory operation for at least ten (10) working days as determined by EGAT, unless released earlier by EGAT.

The installation supervisor must be able to understand, speak, read and write the English language fluently. Should an interpreter be necessary, the cost of such interpretation service shall be at the Contractor's expense.

*If installation supervisor is required as specified in Price Schedule, this provision shall apply to this Contract.

F-5. Acceptance Tests

After the Equipment have been installed and placed in satisfactory operation, they may be tested by and at the expense of EGAT to determine whether or not all requirements of these Contract Documents have been met and the Contractor's guarantees have been fulfilled. The Contractor will be permitted to have his representative present at his own expense. If the tests show that the requirements or guarantee have not been met, the Contractor shall, at his own expense, make all necessary corrections. Additional tests will then be made to demonstrate to EGAT's satisfaction the effectiveness of these corrections. These additional tests will be at the Contractor's expense. Unless the necessary corrections have been made, the conditions of the Contract shall be considered unfulfilled.

All tests will be performed in accordance with the latest applicable Test Codes, unless otherwise stated.

F-6. Failure to Meet Performance Guarantees

If EGAT elects to accept the Equipment which do not meet any performance guarantee or which do not meet other requirements of these Contract Documents, as may be determined by factory test, field test or operation under service conditions, appropriate adjustment will be made of the Contract Price for such Equipment; provided that no such adjustment will be made until after the Contractor has been given a reasonable opportunity to repair, improve, or replace defective Equipment or parts thereof wherever practicable.

F-7. Acceptance Certificate

When EGAT is satisfied with the Equipment or agrees to accept the Equipment under the provision of Article F-6. Failure to Meet Performance Guarantees and there are no major unsettled claims against the Contractor by EGAT, EGAT will issue a written Acceptance Certificate against submission by the Contractor of maintenance security(ies) as specified in Article F-12. Maintenance Security and effective for a period of time as specified in Article F-10.a.

The Acceptance Certificate will list all deficiencies and reservations as a result of the inspection and tests performed, if any.

The purpose of the maintenance security is to guarantee the proper functioning of the Equipment supplied by the Contractor with a provision that the effective period of the maintenance security shall automatically be extended in case that the obligations stipulated in Article F-10. Maintenance Guarantee are not fulfilled.

A form of maintenance security acceptable to EGAT is shown in Article F-12. Maintenance Security.

F-8. Payment

Payment in foreign currency will be made in the currency or currencies in which the price has been stated in the price schedules. The Contractor has to inform EGAT the mode of payment he requires for payment for foreign currency portion together with detail of bank account No., beneficiary's name and address etc. *If the Contractor requires the payment of foreign currency portion to be paid directly to the suppliers, he has to inform EGAT which portion of the Contract Price, as stipulated in the term of payment of the Contract, to be paid accordingly.* In case the local Contractor requires foreign currency or currencies to be paid directly to him, payment of such foreign currency or currencies will be made to the local Contractor in Thai Baht by using the *selling* exchange rate published by the Bank of Thailand on the *payment* date.

In case the Contractor requires the payment of foreign currency portion to be made through letter of credit, EGAT will, if there is no fault or any delay caused by the Contractor, establish the letter of credit in the name of the Contractor or Suppliers not later than thirty (30) Days after signing the Contract. The Contractor shall be responsible for all bank charges inside and outside Thailand and including opening, amendment, reimbursing charges, payment commission, cable charges, discrepancy fee, acceptance commission and others (if any) arising from Letter of Credit.

Payment in local currency will be made directly by EGAT.

The Contractor or beneficiary has to inform EGAT by mailed letter or telex or facsimile *immediately the date upon which he has received the original letter of credit opened in his favour.*

Payment will be made in the following manner :

a. Payment for Equipment (except Spare Parts and Optional Items)

Foreign Supply

1. Eighty (80) per cent of the Contract Price will be paid after delivery FOB Port of Shipment (FOB Vessel) on the basis of pro rata value of each shipment against presentation of invoices, shipping documents, EGAT's letters of approval for shipment and EGAT's letter of approval for test report* of the relevant Equipment including EGAT's letter(s) of approval for final drawings only for Control and Protection Equipment.

*Test report means the report of tests specified in Article E-13. Inspection and Tests.

2. Ten (10) per cent of the Contract Price of each Schedule will be paid against presentation of Drawing and Document Acceptance Certificate to be issued by EGAT to certify the receipt of all drawings and documents required from the Contractor under Article F-11. Drawings and Documents to be Furnished by Contractor for such schedule, provided that payment shall not be made until EGAT has received from the Contractor the original signed negotiable Bill of Lading and appertaining documents giving evidence of shipment of the main Equipment of that Schedule.
3. Ten (10) per cent of the Contract Price of each Schedule will be paid after the Equipment have been installed, tested and operated or used for a period of 30 Days and the acceptance of the said Equipment has been made by EGAT against presentation of Acceptance Certificate to be issued by EGAT and submission of maintenance security by the Contractor. EGAT will list the minor pending claim(s), if any, and payment will be made by deducting such claimed amount.

However, if, through no fault of the Contractor or of the Equipment, such installation, test and operation or use of the Equipment are delayed beyond a period of six (6) Months after complete delivery at Thai Port; payment of this ten (10) per cent will be made as soon as possible but not later than the ninth (9th) Month after complete delivery and it shall be deemed as if acceptance of Equipment is made by EGAT at the end of the said sixth (6th) Month and the guarantee period shall start therefrom against submission of maintenance security by the Contractor.

In case there is some minor claim(s) or minor fault of the Contractor, the payment of this ten (10) per cent shall be made by deducting such claimed amount and the guarantee period of this part will start after such minor claim(s) has been settled by the Contractor and acceptance of which has been made by EGAT.

Local Supply

1. Eighty (80) per cent of the Contract Price will be paid on the basis of pro rata value of each delivery against presentation of the Contractor's statement or delivery order confirming the *ex-works delivery* of Equipment duly certified by EGAT's representative*, EGAT's letters of approval for delivery and EGAT's letter of approval for test report** of the

relevant Equipment including EGAT's letter(s) of approval for final drawings only for Control and Protection Equipment.

*EGAT's representative means the authorized EGAT's Store personnel to verify the quantity of Equipment according to the packing list to be delivered to the Site.

**Test report means the report of tests specified in Article E-13. Inspection and Tests.

2. Ten (10) per cent of the Contract Price of each Schedule will be paid against presentation of Drawing and Document Acceptance Certificate to be issued by EGAT to certify the receipt of all drawings and documents required from the Contractor under Article F-11. Drawings and Documents to be Furnished by Contractor for such schedule, provided that payment shall not be made until EGAT has received from the Contractor the statement or delivery order and appertaining documents giving evidence of delivery of the main Equipment of that Schedule.
3. Ten (10) per cent of the Contract Price of each Schedule will be paid after the Equipment have been installed, tested and operated or used for a period of 30 Days and the acceptance of the said Equipment has been made by EGAT against presentation of Acceptance Certificate to be issued by EGAT and submission of maintenance security by the Contractor. EGAT will list the minor pending claim(s), if any, and payment will be made by deducting such claimed amount.

However, if, through no fault of the Contractor or of the Equipment, such installation, test and operation or use of the Equipment are delayed beyond a period of six (6) Months after complete ex-works delivery; payment of this ten (10) per cent will be made as soon as possible but not later than the ninth (9th) Month after complete delivery and it shall be deemed as if acceptance of Equipment is made by EGAT at the end of the said sixth (6th) Month and the guarantee period shall start therefrom against submission of maintenance security by the Contractor.

In case there is some minor claim(s) or minor fault of the Contractor, the payment of this ten (10) per cent shall be made by deducting such claimed amount and the guarantee period of this part will start after such minor claim(s) has been settled by the Contractor and acceptance of which has been made by EGAT.

b. Payment for Spare Parts

One hundred (100) per cent will be paid after complete delivery against presentation of invoices, shipping documents and EGAT's letter of approval for shipment for foreign supply or the Contractor's statement or delivery order confirming the delivery of Equipment ex-works duly certified by EGAT's representative* and EGAT's letter of approval for test report** of the relevant Equipment and the acceptance has been made by EGAT. The guarantee period shall start from the day immediately following the date of the acceptance of the Spare Parts.

*EGAT's representative means the authorized EGAT's Store personnel to verify the quantity of Equipment according to the packing list to be delivered to the site.

**Test report means the report of tests specified in Article E-13. Inspection and Tests.

c. Payment for Optional Items

Payment for Equipment

One hundred (100) per cent will be paid after complete delivery with presentation of invoices, shipping documents and EGAT's letter of approval for shipment and the acceptance has been made by EGAT. The guarantee period shall start from the day immediately following the date of the acceptance of Equipment.

Payment for Mechanical Operation Life Test (if any)

One hundred (100) per cent of the cost of the Mechanical Operation Life Test will be paid after the test has been performed successfully and test report has been accepted by EGAT.

d. Payment for Field Test Cost

One hundred (100) per cent of Field Test Cost will be paid after the test has been performed successfully and the test report has been accepted by EGAT.

e. Payment for Installation Supervisor

Payment for the services of the installation supervisor will be made within thirty (30) Days after his release by EGAT. Payment will be made on the basis of actual working man-days at the quoted cost per man-day up to a maximum equal to the total man-days quoted. For man-days exceeding the quoted total man-days, no payment shall be made by EGAT unless the Contractor can claim for any delays in

the progress of the work caused by EGAT. Any such additional man-days approved by EGAT shall be paid on the basis of the quoted man-day rate.

The number of quoted man-days shall include Sundays and shall cover a seven (7) day workweek, if required by the construction program. The working hours shall be forty-eight (48) hours per week, eight (8) hours per day, the working hours over 8 hours per day if requested by EGAT will be counted as overtime at 1½ times the regular hourly rate.

The amount to be paid for each Day for the services of the supervisor shall include for all salary, subsistence expense, insurance, compensations and personal expense of the supervisor, and all liabilities and responsibilities thereto. EGAT will pay for round-trip economy class air transportation for the installation supervisor between the Contractor's home office and Bangkok by the most expeditious and direct route on trip basis by draft after receipt of the Contractor's invoice supported with the used air ticket of such supervisor. The remission of immigration fees and taxes collectible by the Kingdom of Thailand shall not be paid by EGAT, as described in Article E-11. Fees and Duties.

F-9. Liquidated Damages for Late Delivery of Equipment

In the event of failure by the Contractor to make delivery of any Equipment within the time set forth in the Contract, plus any extension thereof authorized by EGAT as provided in the Contract, such failure shall be a default under the Contract for which the Contractor shall be liable for payment to EGAT as liquidated damages at the rate specified in Data Sheet.

Whenever any Equipment under any item is to be used together with other Equipment in other item as specified in Price Schedule as a complete set or unit, the Contractor shall make sure that they shall be shipped together as a complete set or unit. Failure on the part of the Contractor to comply with this requirement, the liquidated damages for late delivery of partial shipment shall be imposed on the Contractor for the whole amount of the Contract Price of such related items.

Notwithstanding, in case the Contractor fails to make delivery of minor part of any Equipment within the time set forth in the Contract and such late delivery does not have any effect to the performance of the Equipment, the Contractor shall be liable for payment to EGAT as liquidated damages at the rate of one-tenth of one (0.10) per cent of the total price of the minor part of the Equipment not timely delivered for each Day of delay. The price of such delayed minor part of the Equipment shall be determined by EGAT. EGAT shall, at his own discretion, determine whether such late delivery Equipment is the minor part and has any effect to the performance of the Equipment or not.

The payment of such liquidated damages shall not relieve the Contractor of his obligations to complete the Work under the Contract.

In case any Equipment is defective or does not conform to the requirements or specifications of the Contract where replenishment or correction or replacement must be made by the Contractor as per Article E-29. Failure to Meet Requirements, it shall be deemed that such Equipment has not yet been delivered unless such Equipment has been replenished or corrected or replaced, as the case may be, and delivered to EGAT at the delivery point specified in the Contract.

Payment of liquidated damages is contingent exclusively upon late delivery; in no case shall EGAT be required to substantiate any claim for payment of liquidated damages with proof of loss and/or damages. The liquidated damages shall be calculated for each Day of delay until the Equipment is delivered to EGAT excluding a period of time from the actual delivery date at the delivery point set forth in the Contract until the issuance of notification of defect or short pack or out of specification made by EGAT to the Contractor. This sum is payable regardless of the actual loss and/or damages incurred.

The Contractor shall not be liable for liquidated damages in the event of delay caused by force majeure.

F-10. Maintenance Guarantee

- a. The Contractor shall guarantee the proper functioning of the Equipment for a period as specified in Data Sheet from the day immediately following the date of acceptance of Equipment by EGAT; provided, however, that should any malfunctioning and/or latent defect in Equipment under normal use and service be found during the said period, and such malfunctioning and/or defective portion be repaired or replaced as stipulated in (c) and (d) hereinafter, then the guarantee period for such portion shall be extended from the day immediately following the date of completion of such repair or replacement as follows:

Time of Malfunctioning and/or Defect Found	Guarantee Period Extension				
	Equipment with 1-Year guarantee period	Equipment with 2-Year guarantee period	Equipment with 3-Year guarantee period	Equipment with 4-Year guarantee period	Equipment with 5-Year guarantee period
First Year	For a new period of one (1) Year.	For a new period of two (2) Years.	For a new period of three (3) Years.	For a new period of four (4) Years.	For a new period of five (5) Years.
Second Year	n/a	For a new period of one (1) Year.	For a new period of two (2) Years.	For a new period of three (3) Years.	For a new period of four (4) Years.
Third Year	n/a	n/a	For a new period of one (1) Year.	For a new period of two (2) Years.	For a new period of three (3) Years.
Fourth Year	n/a	n/a	n/a	For a new period of one (1) Year.	For a new period of two (2) Years.
Fifth Year	n/a	n/a	n/a	n/a	For a new period of one (1) Year.

The premium for the maintenance guarantee shall be paid by the Contractor.

- b. On the expiration of the maintenance guarantee period and if the Equipment is functioning normally, the Contractor shall thereafter be released of all obligations and responsibilities under the Contract and the maintenance security deposited in accordance with Article F-7. Acceptance Certificate, will be released and returned to the Contractor.
- c. If during the guarantee period EGAT finds any malfunctioning and/or defect in the Equipment, EGAT shall inform without delay the Contractor thereof, stating in writing the nature of the malfunctioning and/or defect, and the Contractor shall promptly commence to repair and make good or replace such malfunctioning and/or defect at the expense of the Contractor, except that the cost of import duty and taxes,

inland transportation and installation of the replacement parts for foreign supply Equipment, and the cost of inland transportation and the installation of the replacement parts for local supply Equipment will be borne by EGAT.

For Equipment specified in Data Sheet, in case EGAT, at its sole discretion, requires the Contractor to replace any defected Equipment, the Contractor shall replace the Equipment with the whole new set at its own costs and expenses including the cost of all re-export charges (if any), import duty and taxes, landing charges, rents and handling charges (ocean freight), storage charges (air freight), truck hire, labour charges, service charges for customs clearance, inland transportation and installation of the Equipment.

- d. If, after the repair or replacement performed in accordance with this Article, such Equipment continues to show malfunctioning and/or defect, EGAT may, at its option, demand further repair or replacement, and reserve the right to claim damages, if applicable, arising therefrom.
- e. If the Contractor fails to take action for starting up the necessary works for repair or replacement within fourteen (14) Days after receipt of EGAT's written notice of defect, the defect will be corrected by EGAT or any third party selected by EGAT at EGAT's discretion, and the cost of the corrections shall be on the responsibility and account of the Contractor.

In the event of an emergency where in the judgement of EGAT the delay resulting from giving formal notice would cause serious loss or damage which could be prevented by immediate action, defects may be corrected by EGAT or a third party chosen by EGAT without giving prior notice to the Contractor, and the cost of the corrections shall be paid by the Contractor. In the event such action is taken by EGAT, the Contractor will be notified promptly and shall assist wherever possible in making the necessary corrections.

F-11. Drawings and Documents to be Furnished by Contractor

The Contractor shall submit by registered airmail for foreign mail and registered mail for local mail with the drawings and other documents listed in the tables attached at the end of this Section.

After the requirement under this Article has been fulfilled by the Contractor, a Drawing and Document Acceptance Certificate will be issued by EGAT to certify the receipt of all required drawings and documents:

a. Drawings

- (1) Drawing Title and Sizes. The title of Contractor's drawing shall also include the followings :

ELECTRICITY GENERATING AUTHORITY OF THAILAND

EGAT's Contract No. _____

Item No. _____

Subs. Name _____

The sizes of the drawings except otherwise specified in the Specification shall be as follows :

<u>Size Designation</u>	<u>Dimensions in MM</u>	<u>Dimensions in Inches</u>
A0	841 x 1,189	(33.11 x 46.81)
A1	594 x 841	(23.39 x 33.11)
A2	420 x 594	(16.54 x 23.39)
A3	297 x 420	(11.69 x 16.54)
A4	210 x 297	(8.27 x 11.69)

- (2) Reference Drawings and Catalogues. General drawings showing principal dimensions and weights of Equipment, including controlling dimensions which affect space and handling requirements.

- (3) Drawings and Data for Approval. The Contractor shall submit for approval checked detail assembly drawings including firm dimensions, foundation details and setting diagrams, physical size and weights of all principal parts, complete operating characteristics and ratings of Equipment, connection and schematic wiring diagrams, descriptive information and any other information sufficient to demonstrate fully that the Equipment to be furnished will conform to the requirements and intent of these Contract Documents.

Schematic diagrams shall indicate the operation and function of all electrical Equipment, accompanied, where necessary, with explanatory notes. Wiring diagrams shall show the external connection required, sufficient for EGAT to complete interconnection cable diagrams.

One print each of the drawings submitted for approval will be returned to the Contractor by EGAT or its authorized representative within thirty (30) Days after receipt at EGAT's office, marked either "Approved",

"Approved Except as Noted", or "Returned for Correction"/"Not Reviewed". The notations "Approved" or "Approved Except as Noted" will authorize the Contractor to proceed with the manufacture of the Equipment covered by such drawing, subject to the correction, if any, indicated thereon. When prints of drawings have been "Returned for Correction"/"Not Reviewed"., the Contractor shall make the necessary revisions on the drawings and shall within thirty (30) Days resubmit drawings for approval in the same manner as before.

Any manufacturing done before approval of the drawings will be at the Contractor's risk. EGAT shall have the right to require the Contractor to make any changes in the design which may be necessary, in the opinion of EGAT, to make the Equipment conform to the requirements and intent of these Contract Documents without additional cost to EGAT. Approval of the Contractor's drawings shall not be held to relieve the Contractor of any part of his obligation to meet all of the requirements of these Contract Documents or of the responsibility for the correctness of his drawings.

- (4) Reproducibles of all final approved drawings shall be made on mylar films.
- b. Report of Shop Test. The Contractor shall furnish certified copies of reports of all tests required of the manufacturer to show compliance with the applicable standards and specifications. The cost of all tests and reports shall be borne by the Contractor.
- c. Instruction Manuals. The Contractor shall furnish complete set of instruction manuals and all final approved drawings (if any) for erection, operation, maintenance and repair of the Equipment, and for identification of parts. The instruction manuals shall be combined, assembled and bound in binders. Each binder cover shall be stamped with proper identification indicating name of Equipment, manufacturer's name and address, EGAT's Contract number, manufacturer's reference, etc.

Prior to the assembly and submittal of the instruction manuals, a proof of the cover lettering and the table of contents shall be submitted in sufficient time for EGAT's acceptance without delaying submittal of the finished manuals.

The CD-ROM (Compact Disc-Read Only Memory) of final drawings, final documents, test report and instruction manual, if required, shall conform to the applicable International Standard Organization 9660 (ISO 9660) and have capacity of approximately 700 Mbytes.

The data in CD-ROM shall be created by the following software :

Drawing

The Contractor shall submit all drawings created by CAD software as follows:

1. MICROSTATION software Version SE or
2. AUTOCAD software Version 2000

Any necessary information supporting the completion of reading files (such as special font etc.) shall be included in CD-ROM.

Documents

The Contractor shall submit all documents in Adobe Portable Document Format File (PDF format) and also Program of Acrobat Reader in order to read the file completely in CD-ROM.

Drawing/Document List

The Contractor shall submit the drawings/documents listing information in work sheets file provided by EGAT in CD-ROM in Microsoft Excel file format.

Drawing list of design drawings, as built drawings, manufacturing drawings shall also be submitted together with the drawings in the CD-ROM.

F-12. Maintenance Security

The Contractor shall provide to EGAT prior to the issuance of the acceptance certificate and as a condition for the release of the payment of the last instalment as specified in Article F-8. Payment, maintenance security(ies) in the amount of ten (10) per cent of the total Contract Price or ten (10) per cent of each schedule, excluding the cost of installation supervisor and cost of test(s), guaranteeing the Contractor's performance of the provision of Article F-10. Maintenance Guarantee. The Contractor shall oblige himself to attend to and replace, during the period of maintenance, all malfunctioning parts and for repair of all defects noted in the Work and communicated to the Contractor in writing by EGAT. In case of extended guarantee of the repaired or replaced Equipment, the Contractor may request for return of the original maintenance security and submit a new maintenance security in the amount of ten (10) per cent of the Contract Price of Equipment under the extended guarantee.

The maintenance security shall be in the form of a cash deposit, *or a certified cheque issued by a local bank, or a cashier cheque issued by a local bank*, or a bank guarantee or letter of guarantee issued only by a local bank or an acceptable financial institution in Thailand, or by a foreign bank counter-guaranteed by a local bank, and made payable to EGAT in the same currency as that of the Contract. In case of a cash deposit, only Thai baht portion of the Contract Price can be made. EGAT may at its absolute discretion

refuse to approve any maintenance security offered or may at any time, upon application by the Contractor, approve of the substitution for any maintenance security held under this Article by other maintenance security on such terms and conditions as may be approved by EGAT.

The conditions of guarantor's obligations in the maintenance security shall include, inter alia; the following :

1. The guarantor shall unconditionally guarantee, as primary obligor and not as surety merely, payment of any obligations, damages, liquidated damages, performance penalties, or expenses for which the Contractor may become liable to EGAT.
2. No extension of time, change in, addition to, or other modification of the terms of the Contract or Work to be performed thereunder, or of the Specifications or other Contract Documents shall in anyway release the guarantor from any liability under the maintenance security, and the guarantor shall thereby waive notice of any such extension of time, change, addition or modification.
3. The maintenance security shall be valid and remain in full effect from the date of acceptance of Work until all obligations on the part of the Contractor under the Contract have been fulfilled.

Unless and until an official receipt is issued in respect to a maintenance security deposit, EGAT will not recognize or accept any such deposit as fulfilling the requirements of this Article. Failure to deposit a maintenance security at the time specified above in this Article or such extended time as may be approved by EGAT shall be a breach of this Contract and EGAT may, at its discretion, retain the payment of the last instalment of the total Contract Price.

If any maintenance security furnished under this Article shall become unacceptable to EGAT, or if any guarantor shall fail to furnish reports as to guarantor's financial condition from time to time, as requested by EGAT, the Contractor shall promptly furnish such additional or alternative maintenance security as may be necessary to satisfy the Contract requirements for a maintenance security.

In the event of any default or breach of this Contract on the part of the Contractor, EGAT may convert into money any maintenance security which does not consist of money, and the proceeds shall be deemed to be a cash deposit under this Article. EGAT shall not be liable for any cost, expenses and/or loss resulting from the conversion of any maintenance security deposit into money as herein provided. The Contractor shall bear the cost of the maintenance security.

The maintenance security, in case of a bank guarantee, or letter of guarantee, shall be in conformity with the following specimen.

SPECIMEN OF MAINTENANCE GUARANTEE

To :

Date :

Electricity Generating Authority of Thailand
Bangkruai, Nonthaburi 11130
Thailand

Re : Maintenance Security for Contract
No. EGAT _____

Gentlemen :

In accordance with the provision of the Contract for _____ No. EGAT _____ dated _____ (hereinafter referred to as the Contract), the contents of which have been noted by us that Messrs. _____ (hereinafter referred to as the Contractor) has to deposit with Electricity Generating Authority of Thailand, (hereinafter referred to as EGAT) a Maintenance Security to guarantee the proper functioning of the _____ of the Contract as specified in Article F-10. Maintenance Guarantee in the amount of _____ (in words : _____) which is equivalent to ten (10) per cent of the total Contract Price or ten (10) per cent of each schedule of the said Work, excluding the cost of installation supervisor and cost of test(s), we, the _____ as instructed by the Contractor, agree unconditionally to irrevocably guarantee as primary Obligor, the payment to EGAT at its first demand, without whatsoever right of objection on our part and without its first claim with the Contractor giving EGAT the right of claim for penalty, damages, liquidated damages or any expenses for which the Contractor may become liable to EGAT under the Contract.

We further agree that no extension of time, change in, addition to or other modification of terms of the Contract or work to be performed thereunder, or of the Specifications or other Contract Documents, which may be made between EGAT and the Contractor, shall in any way release us from any liability under the Maintenance Security, and we shall thereby waive notice of any such extension of time, change, addition or modification.

This Maintenance Security shall be valid and remain in full effect for a period of _____ (...) Year(s) from the day immediately following the date of the acceptance of Equipment. If necessary, this Maintenance Security shall be extended as specified in Article F-10. Maintenance Guarantee.

Yours very truly,

Authorized Signature

Drawings and Documents to be Furnished by the Contractor
(For Control and Protection Equipment)

The Contractor shall submit by registered mail with the drawings and other documents listed below by the designated deadlines :

Drawings/Documents	No. of copies		Deadline and Remarks
	P	CD-ROM	
Manufacturing and Delivery Schedule	2	-	Within 60 Days after receipt of Notice of Award of Contract
Quality Assurance Program (If requested by EGAT)	2	-	Within 60 Days after receipt of Notice of Award of Contract
Drawings or Documents "RELAY AND EQUIPMENT INSTRUCTION MANUAL"	1	-	Within 90 Days after receipt of Notice of Award of Contract
Drawings or Documents "FOR APPROVAL"	2	-	Within 90 Days after receipt of Notice of Award of Contract
Drawings or Documents "FOR REAPPROVAL"	2	-	Within 30 Days after receipt of returned approval drawings for correction
Drawings "DRAFT-FINAL DRAWING"	2	-	Within 30 Days for P and 60 Days for CD-ROM after receipt of returned approved drawings
Drawings and Documents "FINAL DRAWING or FINAL DOCUMENT"	2	1	Within 20 Days after Equipment delivery
Test Procedure (Factory Test)	2	-	Within 90 Days after receipt of Notice of Award of Contract
Test Schedule (Factory Test)	2	-	Not less than 60 Days before testing for foreign supply Not less than 30 Days before testing for local supply
Test Report (Factory Test)	2	-	Upon completion of tests
Instruction Manuals	3	3	30 Days before first shipment/delivery

Note : P = Print Drawing or Document
CD-ROM = Compact Disc-Read Only Memory with capacity of approximate 700 Mbytes conforming to ISO 9660

Drawings and Documents to be Furnished by the Contractor
(For All Equipment except Control and Protection Equipment)

The Contractor shall submit by registered mail with the drawings and other documents listed below by the designated deadlines :

Drawings/Documents	No. of copies		Deadline and Remarks
	P	CD-ROM	
Manufacturing and Delivery Schedule	4	-	Within 60 Days after receipt of Notice of Award of Contract
Quality Assurance Program (If requested by EGAT)	2	-	Within 60 Days after receipt of Notice of Award of Contract
Drawings or Documents "FOR REFERENCE"	4	-	Within 90 Days after receipt of Notice of Award of Contract
Drawings or Documents "FOR APPROVAL"	4	-	Within 60 Days for foundation, steel supporting structure (if any) and within 90 Days for others after receipt of Notice of Award of Contract
Drawings or Documents "FOR REAPPROVAL"	4	-	Within 30 Days after receipt of returned approval drawings for correction
Drawings and Documents "FINAL DRAWING or FINAL DOCUMENT"	4	-	Within 30 Days after receipt of approved drawings
Final Design Data	4	-	Within 150 Days after receipt of Notice of Award of Contract
Test Procedure (Factory Test)	2	-	Within 150 Days after receipt of Notice of Award of Contract
Test Schedule (Factory Test)	2	-	Not less than 60 Days before testing for foreign supply Not less than 30 Days before testing for local supply
Test Report (Factory Test)	4	5*	Upon completion of tests
Installation Instruction	9	5*	60 Days before first shipment/delivery
Instruction Manuals	9	5*	Before shipment/delivery

Note : P = Print Drawing or Document
 CD-ROM = Compact Disc-Read Only Memory with capacity of approximate 700 Mbytes conforming to ISO 9660

*CD-ROM of Test Report (Factory Test), Installation Instruction and Instruction Manuals may be created in the same disc.

DRAFT

SECTION G
RATINGS AND FEATURES

G. RATINGS AND FEATURES

G-1. Ratings and Features

The following Ratings and Features sheets are attached hereto and made a part of the Contract Documents :

<u>RF No.</u>	<u>Description</u>	<u>Page</u>
CB8951(IEC)	Power Circuit Breaker	G2
CB8955(IEC)	Power Circuit Breaker	G3
CB7846(IEC)	Power Circuit Breaker	G4
DS89BH(IEC)	Air Switch	G5
DS88BH(IEC)	Air Switch	G6
DS88B1(IEC)	Air Switch	G7
DS88B2(IEC)	Air Switch	G8
DS78BH(IEC)	Air Switch	G9
DS78BI(IEC)	Air Switch	G10
DS77B1(IEC)	Air Switch	G11
DS77B1U(IEC)	Air Switch	G12
DS77B3(IEC)	Air Switch	G13
DS77BH(IEC)	Air Switch	G14
DS77BJ(IEC)	Air Switch	G15
DS26D3(IEC)	Air Switch	G16
DS26E3(IEC)	Air Switch	G17
DS36D1(IEC)	Air Switch	G18
GS71A1(IEC)	Air Switch	G19
-	Interlocking Sheet for Schedule No. A3	G20

**Power Circuit Breaker
Specification No. 156 or 1001**



**Substation Electrical
Equipment Engineering Department**

Ratings and Features	Designed : <i>[Signature]</i>	Validated : <i>[Signature]</i>	Revision 5	Page 1/1
RF No. CB8951(IEC)	Verified : <i>[Signature]</i>	Approved : <i>[Signature]</i>	Dated : <i>[Date]</i>	

a. Type	SF6 gas, outdoor installation Live tank Class C1	
b. Rated Voltage	245	kV
c. Rated Frequency	50	Hz
d. Rated Insulation Level		
- Power Frequency Withstand (Dry), rms	395	kV
- Lightning Impulse Withstand, Peak	950	kV
e. Current Ratings		
- Rated Normal Current	4,000	A
- Rated Short Time withstand Current	50	kA
f. Breaking Ratings		
- Rated Short Circuit Breaking Current	50	kA
- Rated Duration of Short Circuit	1	s
- Rated Breaking Time	3	cycles
g. Rated Capacitance Switching Current		
- Line Charging Breaking Current	125	A rms
- Cable Charging Breaking Current	250	A rms
- Capacitor Bank Breaking Current	-	A rms
- Capacitor Bank Inrush Making Current (Back to Back)	-	kA
- Frequency of Inrush Current	-	Hz
h. Rated Peak Withstand Current	125	kA
i. Rated Operating Sequence	O + 0.3 s + CO + 15 s + CO	
j. Rated Reclosing Time	20	cycles
k. Type of Tripping	Single pole and Three pole	
l. Creepage Distance	≥ 6,125 mm (≥ 25 mm/kVmax)	
m. Control Circuit Voltage		
- Nominal Voltage	125	Vdc
- Tripping Circuit, min - max	87.5 – 137.5	Vdc
- Closing Circuit, min - max	106.25 – 137.5	Vdc
n. External Power Source	400 / 230 V, 50 Hz	
o. Terminal Connectors	Horizontal take-off terminal pad (NEMA, 6 holes)	
p. Applicable Standards	IEC 62271-100	

**Power Circuit Breaker
Specification No. 156 or 1001**



**Substation Electrical
Equipment Engineering Department**

Ratings and Features	Designed : <i>Handwritten signature</i>	Validated : <i>Handwritten signature</i>	Revision 6	Page 1/1
RF No. CB8955(IEC)	Verified : <i>Handwritten signature</i>	Approved : <i>Handwritten signature</i>	Dated : <i>Handwritten date</i>	

a. Type	SF6 gas, outdoor installation Live tank Class C1	
b. Rated Voltage	245	kV
c. Rated Frequency	50	Hz
d. Rated Insulation Level		
- Power Frequency Withstand (Dry), rms	395	kV
- Lightning Impulse Withstand, Peak	950	kV
e. Current Ratings		
- Rated Normal Current	4,000	A
- Rated Short Time withstand Current	50	kA
f. Breaking Ratings		
- Rated Short Circuit Breaking Current	50	kA
- Rated Duration of Short Circuit	1	s
- Rated Breaking Time	3	cycles
g. Rated Capacitance Switching Current		
- Line Charging Breaking Current	125	A rms
- Cable Charging Breaking Current	250	A rms
- Capacitor Bank Breaking Current	-	A rms
- Capacitor Bank Inrush Making Current (Back to Back)	-	kA
- Frequency of Inrush Current	-	Hz
h. Rated Peak Withstand Current	125	kA
i. Rated Operating Sequence	O + 0.3 s + CO + 15 s + CO	
j. Rated Reclosing Time	20	cycles
k. Type of Tripping	Three pole	
l. Creepage Distance	≥ 6,125 mm (≥ 25 mm/kVmax)	
m. Control Circuit Voltage		
- Nominal Voltage	125	Vdc
- Tripping Circuit, min - max	87.5 - 137.5	Vdc
- Closing Circuit, min - max	106.25 - 137.5	Vdc
n. External Power Source	400 / 230 V, 50 Hz	
o. Terminal Connectors	Horizontal take-off terminal pad 6-Hole Wide NEMA PAD (2x3 Bolt Hole Pattern)	
p. Applicable Standards	IEC 62271-100	

**Power Circuit Breaker
Specification No. 156 or 1001**



**Substation Electrical
Equipment Engineering Department**

Ratings and Features	Designed : 24/11/15 (UJ)	Validated : HOC	Revision 5	Page 1/1
RF No. CB7846(IEC)	Verified : 27/2/2016	Approved : [Signature]	Dated : 6/10/15	

a. Type	SF6 gas, outdoor installation Spring Mechanism Live tank Class C1	
b. Rated Voltage	123	kV
c. Rated Frequency	50	Hz
d. Rated Insulation Level		
- Power Frequency Withstand (Dry), rms	230	kV
- Lightning Impulse Withstand, Peak	550	kV
e. Current Ratings		
- Rated Normal Current	3,150	A
- Rated Short Time withstand Current	40	kA
f. Breaking Ratings		
- Rated Short Circuit Breaking Current	40	kA
- Rated Duration of Short Circuit	1	s
- Rated Breaking Time	3	cycles
g. Rated Capacitance Switching Current		
- Line Charging Breaking Current	31.5	A rms
- Cable Charging Breaking Current	140	A rms
- Capacitor Bank Breaking Current	-	A rms
- Capacitor Bank Inrush Making Current (Back to Back)	-	kA
- Frequency of Inrush Current	-	Hz
h. Rated Peak Withstand Current	100	kA
i. Rated Operating Sequence	O + 0.3 s + CO + 15 s + CO	
j. Rated Reclosing Time	20	cycles
k. Type of Tripping	Three pole	
l. Creepage Distance	≥ 3,075 mm (≥ 25 mm/kVmax)	
m. Control Circuit Voltage		
- Nominal Voltage	125	Vdc
- Tripping Circuit, min - max	87.5 – 137.5	Vdc
- Closing Circuit, min - max	106.25 – 137.5	Vdc
n. External Power Source	400 / 230 V, 50 Hz	
o. Terminal Connectors	Horizontal take-off terminal pad 6-Hole Wide NEMA PAD (2x3 Bolt Hole Pattern)	
p. Applicable Standards	IEC 62271-100	

**Air Switch
Specification No. 202 or 1001**



**Substation Electrical
Equipment Engineering Department**

Ratings and Features	Designed : <i>[Signature]</i>	Validated : <i>[Signature]</i>	Revision 6	Page 1/1
RF No. DS89BH(IEC)	Verified : <i>[Signature]</i>	Approved : <i>[Signature]</i>	Dated : 16/10/16	

- | | |
|--|---|
| a. Type | 3-pole, double side break, outdoor |
| b. Rated Voltage | 245 kV |
| c. Rated Frequency | 50 Hz |
| d. Rated Insulation Level | |
| - Power Frequency Withstand (Dry), rms | |
| - Common value | 395 kV |
| - Across the isolating distance | 460 kV |
| - Lightning Impulse Withstand, Peak | |
| - Common value | 950 kV |
| - Across the isolating distance | 1050 kV |
| - Switching Impulse Withstand, Peak | - kV |
| e. Current Rating | |
| - Rated normal current | 4,000 A |
| - Rated short time withstand current | 50 kA |
| - Rated peak withstand current | 125 kA |
| - Rated duration of short circuit | 1 s |
| f. Post Insulator Designation | C8-950 |
| - Creepage distance | ≥ 25mm/kV _{maxL-L} |
| - Top/Bottom fitting pitch circle diameter | 127mm/254mm |
| g. Earthing Blades for Earthing Switch | |
| - Type | - |
| - Rated short time withstand current | - kA |
| - Rated peak withstand current | - kA |
| h. Mounting Position | Horizontal |
| i. Phase Spacing | As specified in Price Schedule |
| j. Operating Mechanism | Manually gang operated |
| k. Terminal Connectors | Horizontal take-off terminal pad
6-Hole Wide NEMA PAD
Ø-hole = 14.3 mm
(2x3 Bolt Hole Pattern) |
| l. Applicable Standards | IEC 62271-102 |
| m. Interlocks | See interlocking sheet attached |

Note

- | | |
|---|-----------|
| - Applicable Standards for
Post Insulator Designation : C8-950 | IEC 60273 |
|---|-----------|

**Air Switch
Specification No. 202 or 1001**



**Substation Electrical
Equipment Engineering Department**

Ratings and Features	Designed : <i>MS/2001</i>	Validated : <i>SIV/2001</i>	Revision 6	Page 1/1
RF No. DS88BH(IEC)	Verified : <i>MS/2001</i>	Approved : <i>[Signature]</i>	Dated : <i>19/10/60</i>	

a. Type	3-pole, double side break, outdoor	
b. Rated Voltage	245	kV
c. Rated Frequency	50	Hz
d. Rated Insulation Level		
- Power Frequency Withstand (Dry), rms		
- Common value	395	kV
- Across the isolating distance	460	kV
- Lightning Impulse Withstand, Peak		
- Common value	950	kV
- Across the isolating distance	1050	kV
- Switching Impulse Withstand, Peak	-	kV
e. Current Rating		
- Rated normal current	3,150	A
- Rated short time withstand current	50	kA
- Rated peak withstand current	125	kA
- Rated duration of short circuit	1	s
f. Post Insulator Designation	C8-950	
- Creepage distance	≥ 25mm/kVmax _{L-L}	
- Top/Bottom fitting pitch circle diameter	127mm/254mm	
g. Earthing Blades for Earthing Switch		
- Type	-	
- Rated short time withstand current	-	kA
- Rated peak withstand current	-	kA
h. Mounting Position	Horizontal	
i. Phase Spacing	As specified in Price Schedule	
j. Operating Mechanism	Manually gang operated	
k. Terminal Connectors	Horizontal take-off terminal pad 6-Hole NEMA PAD Ø-hole = 14.3 mm (2x3 Bolt Hole Pattern)	
l. Applicable Standards	IEC 62271-102	
m. Interlocks	See interlocking sheet attached	

Note

- Applicable Standards for Post Insulator Designation : C8-950 IEC 60273

**Air Switch
Specification No. 202 or 1001**



**Substation Electrical
Equipment Engineering Department**

Ratings and Features	Designed : <i>anpssw</i>	Validated : <i>anpssw</i>	Revision 7	Page 1/1
RF No. DS88B1(IEC)	Verified : <i>anpssw</i>	Approved : <i>A.C.</i>	Dated : <i>19 Nov 60</i>	

- | | |
|--|---|
| a. Type | 3-pole, double side break, outdoor |
| b. Rated Voltage | 245 kV |
| c. Rated Frequency | 50 Hz |
| d. Rated Insulation Level | |
| - Power Frequency Withstand (Dry), rms | |
| - Common value | 395 kV |
| - Across the isolating distance | 460 kV |
| - Lightning Impulse Withstand, Peak | |
| - Common value | 950 kV |
| - Across the isolating distance | 1050 kV |
| - Switching Impulse Withstand, Peak | - kV |
| e. Current Rating | |
| - Rated normal current | 3,150 A |
| - Rated short time withstand current | 50 kA |
| - Rated peak withstand current | 125 kA |
| - Rated duration of short circuit | 1 s |
| f. Post Insulator Designation | C8-950 |
| - Creepage distance | $\geq 20\text{mm/kVmax}_{L-L}$ |
| - Top/Bottom fitting pitch circle diameter | 127mm/254mm |
| g. Earthing Blades for Earthing Switch | |
| - Type | - |
| - Rated short time withstand current | - kA |
| - Rated peak withstand current | - kA |
| h. Mounting Position | Horizontal |
| i. Phase Spacing | As specified in Price Schedule |
| j. Operating Mechanism | Manually gang operated |
| k. Terminal Connectors | Horizontal take-off terminal pad
6-Hole Wide NEMA PAD
$\text{\O-hole} = 14.3 \text{ mm}$
(2x3 Bolt Hole Pattern) |
| l. Applicable Standards | IEC 62271-102 |
| m. Interlocks | See interlocking sheet attached |

Note

- | | |
|---|-----------|
| - Applicable Standards for
Post Insulator Designation : C8-950 | IEC 60273 |
|---|-----------|

**Air Switch
Specification No. 202 or 1001**



**Substation Electrical
Equipment Engineering Department**

Ratings and Features	Designed : 202020	Validated : 202020	Revision 6	Page 1/1
RF No. DS88B2(IEC)	Verified : 202020	Approved : A.S.	Dated : 19/09/20	

- | | |
|--|---|
| a. Type | 3-pole, double side break, outdoor |
| b. Rated Voltage | 245 kV |
| c. Rated Frequency | 50 Hz |
| d. Rated Insulation Level | |
| - Power Frequency Withstand (Dry), rms | |
| - Common value | 395 kV |
| - Across the isolating distance | 460 kV |
| - Lightning Impulse Withstand, Peak | |
| - Common value | 950 kV |
| - Across the isolating distance | 1050 kV |
| - Switching Impulse Withstand, Peak | - kV |
| e. Current Rating | |
| - Rated normal current | 3,150 A |
| - Rated short time withstand current | 50 kA |
| - Rated peak withstand current | 125 kA |
| - Rated duration of short circuit | 1 s |
| f. Post Insulator Designation | C8-950 |
| - Creepage distance | ≥ 20mm/kVmax _{L-L} |
| - Top/Bottom fitting pitch circle diameter | 127mm/254mm |
| g. Earthing Blades for Earthing Switch | |
| - Type | 3- pole, manually gang operated on line end of the switch, class B |
| - Rated short time withstand current | 50 kA |
| - Rated peak withstand current | 125 kA |
| h. Mounting Position | Horizontal |
| i. Phase Spacing | As specified in Price Schedule |
| j. Operating Mechanism | Manually gang operated |
| k. Terminal Connectors | Horizontal take-off terminal pad
6-Hole Wide NEMA PAD
Ø-hole = 14.3 mm
(2x3 Bolt Hole Pattern) |
| l. Applicable Standards | IEC 62271-102 |
| m. Interlocks | See interlocking sheet attached |

Note

- Applicable Standards for Post Insulator Designation : C8-950 IEC 60273

**Air Switch
Specification No. 202 or 1001**



**Substation Electrical
Equipment Engineering Department**

Ratings and Features	Designed : <i>Shyamsul</i>	Validated : <i>Shyamsul</i>	Revision 3	Page 1/1
RF No. DS78BH(IEC)	Verified : <i>Shyamsul</i>	Approved : <i>J. S.</i>	Dated : <i>19/11/2020</i>	

- | | |
|--|--|
| a. Type | 3-pole, double side break, outdoor |
| b. Rated Voltage | 123 kV |
| c. Rated Frequency | 50 Hz |
| d. Rated Insulation Level | |
| - Power Frequency Withstand (Dry), rms | |
| - Common value | 230 kV |
| - Across the isolating distance | 265 kV |
| - Lightning Impulse Withstand, Peak | |
| - Common value | 550 kV |
| - Across the isolating distance | 630 kV |
| - Switching Impulse Withstand, Peak | - kV |
| e. Current Rating | |
| - Rated normal current | 3,150 A |
| - Rated short time withstand current | 40 kA |
| - Rated peak withstand current | 100 kA |
| - Rated duration of short circuit | 1 s |
| f. Post Insulator Designation | C8-550 |
| - Creepage distance | $\geq 25\text{mm/kV}_{\text{maxL-L}}$ |
| - Top/Bottom fitting pitch circle diameter | 127mm/127mm |
| g. Earthing Blades for Earthing Switch | |
| - Type | - |
| - Rated short time withstand current | - kA |
| - Rated peak withstand current | - kA |
| h. Mounting Position | Horizontal |
| i. Phase Spacing | As specified in Price Schedule |
| j. Operating Mechanism | Manually gang operated |
| k. Terminal Connectors | Horizontal take-off terminal pad
6-Hole Wide NEMA PAD
$\text{Ø-hole} = 14.3 \text{ mm}$
(2x3 Bolt Hole Pattern) |
| l. Applicable Standards | IEC 62271-102 |
| m. Interlocks | See interlocking sheet attached |

Note

- | | |
|--|-----------|
| - Applicable Standards for Post Insulator Designation : C8-550 | IEC 60273 |
|--|-----------|

**Air Switch
Specification No. 202 or 1001**



**Substation Electrical
Equipment Engineering Department**

Ratings and Features	Designed : 202/1001	Validated : 202/1001	Revision 3	Page 1/1
RF No. DS78BI(IEC)	Verified : 202/1001	Approved : [Signature]	Dated : 19/10/20	

- | | |
|--|---|
| a. Type | 3-pole, double side break, outdoor |
| b. Rated Voltage | 123 kV |
| c. Rated Frequency | 50 Hz |
| d. Rated Insulation Level | |
| - Power Frequency Withstand (Dry), rms | |
| - Common value | 230 kV |
| - Across the isolating distance | 265 kV |
| - Lightning Impulse Withstand, Peak | |
| - Common value | 550 kV |
| - Across the isolating distance | 630 kV |
| - Switching Impulse Withstand, Peak | - kV |
| e. Current Rating | |
| - Rated normal current | 3,150 A |
| - Rated short time withstand current | 40 kA |
| - Rated peak withstand current | 100 kA |
| - Rated duration of short circuit | 1 s |
| f. Post Insulator Designation | C8-550 |
| - Creepage distance | $\geq 25\text{mm/kVmax}_{L-L}$ |
| - Top/Bottom fitting pitch circle diameter | 127mm/127mm |
| g. Earthing Blades for Earthing Switch | |
| - Type | 3-pole, manually gang operated on line end of the switch, class B |
| - Rated short time withstand current | 40 kA |
| - Rated peak withstand current | 100 kA |
| h. Mounting Position | Horizontal |
| i. Phase Spacing | As specified in Price Schedule |
| j. Operating Mechanism | Manually gang operated |
| k. Terminal Connectors | Horizontal take-off terminal pad
6-Hole Wide NEMA PAD
Ø-hole = 14.3 mm
(2x3 Bolt Hole Pattern) |
| l. Applicable Standards | IEC 62271-102 |
| m. Interlocks | See interlocking sheet attached |

Note

- Applicable Standards for Post Insulator Designation : C8-550 IEC 60273

**Air Switch
Specification No. 202 or 1001**



**Substation Electrical
Equipment Engineering Department**

Ratings and Features	Designed : 01822004	Validated : 0114 0104	Revision 6	Page 1/1
RF No. DS77B1(IEC)	Verified : 0114 0104	Approved : <i>[Signature]</i>	Dated : 19/01/20	

- | | |
|--|---|
| a. Type | 3-pole, double side break, outdoor |
| b. Rated Voltage | 123 kV |
| c. Rated Frequency | 50 Hz |
| d. Rated Insulation Level | |
| - Power Frequency Withstand (Dry), rms | |
| - Common value | 230 kV |
| - Across the isolating distance | 265 kV |
| - Lightning Impulse Withstand, Peak | |
| - Common value | 550 kV |
| - Across the isolating distance | 630 kV |
| - Switching Impulse Withstand, Peak | - kV |
| e. Current Rating | |
| - Rated normal current | 2,000 A |
| - Rated short time withstand current | 40 kA |
| - Rated peak withstand current | 100 kA |
| - Rated duration of short circuit | 1 s |
| f. Post Insulator Designation | C8-550 |
| - Creepage distance | ≥ 20mm/kV _{maxL-L} |
| - Top/Bottom fitting pitch circle diameter | 127mm/127mm |
| g. Earthing Blades for Earthing Switch | |
| - Type | - |
| - Rated short time withstand current | - kA |
| - Rated peak withstand current | - kA |
| h. Mounting Position | Horizontal |
| i. Phase Spacing | As specified in Price Schedule |
| j. Operating Mechanism | Manually gang operated |
| k. Terminal Connectors | Horizontal take-off terminal pad
4-Hole Wide NEMA PAD
Ø-hole = 14.3 mm
(2x2 Bolt Hole Pattern) |
| l. Applicable Standards | IEC 62271-102 |
| m. Interlocks | See interlocking sheet attached |

Note

- | | |
|--|-----------|
| - Applicable Standards for Post Insulator Designation : C8-550 | IEC 60273 |
|--|-----------|

**Air Switch
Specification No. 202 or 1001**



**Substation Electrical
Equipment Engineering Department**

Ratings and Features	Designed : W.M.F.	Validated : M.P.C.	Revision 0	Page 1/1
RF No. DS77B1U(IEC)	Verified : S.P.	Approved : J.S.	Dated : 25 Dec 16	

- | | |
|--|--|
| a. Type | 3-pole, double side break, outdoor |
| b. Rated Voltage | 123 kV |
| c. Rated Frequency | 50 Hz |
| d. Rated Insulation Level | |
| - Power Frequency Withstand (Dry), rms | |
| - Common value | 230 kV |
| - Across the isolating distance | 265 kV |
| - Lightning Impulse Withstand, Peak | |
| - Common value | 550 kV |
| - Across the isolating distance | 630 kV |
| - Switching Impulse Withstand, Peak | - kV |
| e. Current Rating | |
| - Rated normal current | 2,000 A |
| - Rated short time withstand current | 40 kA |
| - Rated peak withstand current | 100 kA |
| - Rated duration of short circuit | 1 s |
| f. Post Insulator Designation | C8-550 |
| - Creepage distance | $\geq 20\text{mm/kVmax}_{L-L}$ |
| - Top/Bottom fitting pitch circle diameter | 127mm/127mm |
| g. Earthing Blades for Earthing Switch | |
| - Type | - |
| - Rated short time withstand current | - kA |
| - Rated peak withstand current | - kA |
| h. Mounting Position | Upside Down (as shown in drawing) |
| i. Phase Spacing | As specified in Price Schedule |
| j. Operating Mechanism | Manually gang operated |
| k. Terminal Connectors | Horizontal take-off terminal pad
4-Hole Wide NEMA PAD
\varnothing -hole = 14.3 mm
(2x2 Bolt Hole Pattern) |
| l. Applicable Standards | IEC 62271-102 |
| m. Interlocks | See interlocking sheet attached |

Note

- | | |
|--|-----------|
| - Applicable Standards for Post Insulator Designation : C8-550 | IEC 60273 |
|--|-----------|

**Air Switch
Specification No. 202 or 1001**



**Substation Electrical
Equipment Engineering Department**

Ratings and Features	Designed : <i>01/05/2016</i>	Validated : <i>01/05/2016</i>	Revision 8	Page 1/1
RF No. DS77B3(IEC)	Verified : <i>01/05/2016</i>	Approved : <i>[Signature]</i>	Dated : <i>19/07/16</i>	

a. Type	3-pole, double side break, outdoor
b. Rated Voltage	123 kV
c. Rated Frequency	50 Hz
d. Rated Insulation Level	
- Power Frequency Withstand (Dry), rms	
- Common value	230 kV
- Across the isolating distance	265 kV
- Lightning Impulse Withstand, Peak	
- Common value	550 kV
- Across the isolating distance	630 kV
- Switching Impulse Withstand, Peak	- kV
e. Current Rating	
- Rated normal current	2,000 A
- Rated short time withstand current	40 kA
- Rated peak withstand current	100 kA
- Rated duration of short circuit	1 s
f. Post Insulator Designation	C8-550
- Creepage distance	≥ 20mm/kV _{max(L-L)}
- Top/Bottom fitting pitch circle diameter	127mm/127mm
g. Earthing Blades for Earthing Switch	
- Type	3- pole, manually gang operated on line end of the switch, class B, the fixed contact of ground blade shall be separated from the fixed contact of main blade by insulator Post Insulator Designation C8-95 class I
- Rated short time withstand current	40 kA
- Rated peak withstand current	100 kA
h. Mounting Position	Horizontal
i. Phase Spacing	As specified in Price Schedule
j. Operating Mechanism	Manually gang operated
k. Terminal Connectors	Horizontal take-off terminal pad 4-Hole Wide NEMA PAD Ø-hole = 14.3 mm (2x2 Bolt Hole Pattern)
l. Applicable Standards	IEC 62271-102
m. Interlocks	See interlocking sheet attached

Note

- Applicable Standards for Post Insulator Designation : C8-550 and C8-95 IEC 60273

**Air Switch
Specification No. 202 or 1001**



**Substation Electrical
Equipment Engineering Department**

Ratings and Features	Designed : 01876304	Validated : 2142674	Revision 6	Page 1/1
RF No. DS77BH(IEC)	Verified : 21430714	Approved :	Dated : 19/10/60	

a. Type	3-pole, double side break, outdoor	
b. Rated Voltage	123	kV
c. Rated Frequency	50	Hz
d. Rated Insulation Level		
- Power Frequency Withstand (Dry), rms		
- Common value	230	kV
- Across the isolating distance	265	kV
- Lightning Impulse Withstand, Peak		
- Common value	550	kV
- Across the isolating distance	630	kV
- Switching Impulse Withstand, Peak	-	kV
e. Current Rating		
- Rated normal current	2,000	A
- Rated short time withstand current	40	kA
- Rated peak withstand current	100	kA
- Rated duration of short circuit	1	s
f. Post Insulator Designation	C8-550	
- Creepage distance	≥ 25mm/kV _{maxL-L}	
- Top/Bottom fitting pitch circle diameter	127mm/127mm	
g. Earthing Blades for Earthing Switch		
- Type	-	
- Rated short time withstand current	-	kA
- Rated peak withstand current	-	kA
h. Mounting Position	Horizontal	
i. Phase Spacing	As specified in Price Schedule	
j. Operating Mechanism	Manually gang operated	
k. Terminal Connectors	Horizontal take-off terminal pad 4-Hole Wide NEMA PAD Ø-hole = 14.3 mm (2x2 Bolt Hole Pattern)	
l. Applicable Standards	IEC 62271-102	
m. Interlocks	See interlocking sheet attached	

Note

- Applicable Standards for Post Insulator Designation : C8-550	IEC 60273
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**Air Switch
Specification No. 202 or 1001**



**Substation Electrical
Equipment Engineering Department**

Ratings and Features	Designed : 01/07/2010	Validated : 01/07/2010	Revision 0	Page 1/1
RF No. DS77BJ(IEC)	Verified : 01/07/2010	Approved : [Signature]	Dated : 16/02/20	

a. Type	3-pole, double side break, outdoor	
b. Rated Voltage	123	kV
c. Rated Frequency	50	Hz
d. Rated Insulation Level		
- Power Frequency Withstand (Dry), rms		
- Common value	230	kV
- Across the isolating distance	265	kV
- Lightning Impulse Withstand, Peak		
- Common value	550	kV
- Across the isolating distance	630	kV
- Switching Impulse Withstand, Peak	-	kV
e. Current Rating		
- Rated normal current	2,000	A
- Rated short time withstand current	40	kA
- Rated peak withstand current	100	kA
- Rated duration of short circuit	1	s
f. Post Insulator Designation	C8-550	
- Creepage distance	≥ 25mm/kV _{maxL-L}	
- Top/Bottom fitting pitch circle diameter	127mm/127mm	
g. Earthing Blades for Earthing Switch		
- Type	3- pole, manually gang operated on line end of the switch, class B, the fixed contact of ground blade shall be separated from the fixed contact of main blade by insulator Post Insulator Designation C8-95 class I	
- Rated short time withstand current	40	kA
- Rated peak withstand current	100	kA
h. Mounting Position	Horizontal	
i. Phase Spacing	As specified in Price Schedule	
j. Operating Mechanism	Manually gang operated	
k. Terminal Connectors	Horizontal take-off terminal pad 4-Hole Wide NEMA PAD Ø-hole = 14.3 mm (2x2 Bolt Hole Pattern)	
l. Applicable Standards	IEC 62271-102	
m. Interlocks	See interlocking sheet attached	

Note

- Applicable Standards for Post Insulator Designation : C8-550 and C8-95 IEC 60273

**Air Switch
Specification No. 202 or 1001**



**Substation Electrical
Equipment Engineering Department**

Ratings and Features	Designed : <i>[Signature]</i>	Validated : <i>[Signature]</i>	Revision 1	Page 1/1
RF No. DS26D3(IEC)	Verified : <i>[Signature]</i>	Approved : <i>[Signature]</i>	Dated : <i>26 Jan 19</i>	

- a. Type 3-pole, vertical break, outdoor
- b. Rated Voltage 27 kV
- c. Rated Frequency 50 Hz
- d. Rated Insulation Level
 - Power Frequency Withstand (Dry), rms
 - Common value 70 kV
 - Across the isolating distance 77 kV
 - Lightning Impulse Withstand, Peak
 - Common value 150 kV
 - Across the isolating distance 165 kV
 - Switching Impulse Withstand, Peak - kV
- e. Current Rating
 - Rated normal current 1,600 A
 - Rated short time withstand current 20 kA
 - Rated peak withstand current 50 kA
 - Rated duration of short circuit 1 s
- f. Post Insulator Designation C10-200
 - Creepage distance ≥ 950 mm
 - Top/Bottom fitting pitch circle diameter 76mm/76mm
- g. Earthing Blades for Earthing Switch
 - Type -
 - Rated short time withstand current - kA
 - Rated peak withstand current - kA
- h. Mounting Position Vertical
- i. Phase Spacing As specified in Price Schedule
- j. Operating Mechanism Manually gang operated
- k. Terminal Connectors Horizontal take-off terminal pad
4-Hole Wide NEMA PAD
Ø-hole = 14.3 mm
(2x2 Bolt Hole Pattern)
- l. Applicable Standards IEC 62271-102
- m. Interlocks -

Note

- Applicable Standards for Post Insulator Designation : C10-200 IEC 60273

**Air Switch
Specification No. 202 or 1001**



**Substation Electrical
Equipment Engineering Department**

Ratings and Features	Designed : <i>[Signature]</i>	Validated : <i>[Signature]</i>	Revision 1	Page 1/1
RF No. DS26E3(IEC)	Verified : <i>[Signature]</i>	Approved : <i>[Signature]</i>	Dated : <i>28 Jan 59</i>	

- | | |
|--|---|
| a. Type | 1-pole, vertical break, outdoor |
| b. Rated Voltage | 27 kV |
| c. Rated Frequency | 50 Hz |
| d. Rated Insulation Level | |
| - Power Frequency Withstand (Dry), rms | |
| - Common value | 70 kV |
| - Across the isolating distance | 77 kV |
| - Lightning Impulse Withstand, Peak | |
| - Common value | 150 kV |
| - Across the isolating distance | 165 kV |
| - Switching Impulse Withstand, Peak | - kV |
| e. Current Rating | |
| - Rated normal current | 1,600 A |
| - Rated short time withstand current | 20 kA |
| - Rated peak withstand current | 50 kA |
| - Rated duration of short circuit | 1 s |
| f. Post Insulator Designation | C10-200 |
| - Creepage distance | ≥ 950 mm |
| - Top/Bottom fitting pitch circle diameter | 76mm/76mm |
| g. Earthing Blades for Earthing Switch | |
| - Type | - |
| - Rated short time withstand current | - kA |
| - Rated peak withstand current | - kA |
| h. Mounting Position | Vertical |
| i. Phase Spacing | - |
| j. Operating Mechanism | Hook operated |
| k. Terminal Connectors | Horizontal take-off terminal pad
4-Hole Wide NEMA PAD
Ø-hole = 14.3 mm
(2x2 Bolt Hole Pattern) |
| l. Applicable Standards | IEC 62271-102 |
| m. Interlocks | - |

Note

- Applicable Standards for Post Insulator Designation : C10-200 IEC 60273

**Air Switch
Specification No. 202 or 1001**



**Substation Electrical
Equipment Engineering Department**

Ratings and Features	Designed : <i>U. S. D. S. D.</i>	Validated : <i>S. J. S.</i>	Revision 2	Page 1/1
RF No. DS36D1(IEC)	Verified : <i>S. J. S.</i>	Approved : <i>S. J. S.</i>	Dated : <i>16 Apr 60</i>	

a. Type	3-pole, vertical break, outdoor	
b. Rated Voltage	38	kV
c. Rated Frequency	50	Hz
d. Rated Insulation Level		
- Power Frequency Withstand (Dry), rms		
- Common value	95	kV
- Across the isolating distance	105	kV
- Lightning Impulse Withstand, Peak		
- Common value	200	kV
- Across the isolating distance	220	kV
- Switching Impulse Withstand, Peak	-	kV
e. Current Rating		
- Rated normal current	1,600	A
- Rated short time withstand current	20	kA
- Rated peak withstand current	50	kA
- Rated duration of short circuit	1	s
f. Post Insulator Designation	C10-200	
- Creepage distance	≥ 950 mm.	
- Top/Bottom fitting pitch circle diameter	76mm/76mm	
g. Earthing Blades for Earthing Switch		
- Type	-	
- Rated short time withstand current	-	kA
- Rated peak withstand current	-	kA
h. Mounting Position	Vertical	
i. Phase Spacing	As specified in Price Schedule	
j. Operating Mechanism	Manually gang operated	
k. Terminal Connectors	Horizontal take-off terminal pad 4-Hole Wide NEMA PAD Ø-hole = 14.3 mm (2x2 Bolt Hole Pattern)	
l. Applicable Standards	IEC 62271-102	
m. Interlocks	-	

Note

- Applicable Standards for Post Insulator Designation : C10-200 IEC 60273

**Air Switch
Specification No. 202 or 1001**



**Substation Electrical
Equipment Engineering Department**

Ratings and Features	Designed : 08/05/16	Validated : 21/11/16	Revision 4	Page 1/1
RF No. GS71A1(IEC)	Verified : 21/11/16	Approved : [Signature]	Dated : 16/11/16	

- a. Type 3-pole, single throw, outdoor air earthing switch
- b. Rated Voltage 123 kV
- c. Rated Frequency 50 Hz
- d. Rated Insulation Level
- Power Frequency Withstand (Dry), rms
 - Common value 230 kV
 - Across the isolating distance 230 kV
 - Lightning Impulse Withstand, Peak
 - Common value 550 kV
 - Across the isolating distance 550 kV
 - Switching Impulse Withstand, Peak - kV
- e. Current Rating
- Rated normal current - A
 - Rated short time withstand current - kA
 - Rated peak withstand current - kA
 - Rated duration of short circuit - s
- f. Post Insulator Designation C8-550
- Creepage distance $\geq 20\text{mm/kVmax}_{L-L}$
 - Top/Bottom fitting pitch circle diameter 127mm/127mm
- g. Earthing Blades for Earthing Switch
- Type 3-pole, single throw, outdoor air earthing switch, vertical break, class B
 - Rated short time withstand current 40 kA
 - Rated peak withstand current 100 kA
- h. Mounting Position **Horizontal**
- i. Phase Spacing **As specified in Price Schedule**
- j. Operating Mechanism **Manually gang operated**
- k. Terminal Connectors **Horizontal take-off terminal pad
4-Hole Wide NEMA PAD
 $\text{\O}-\text{hole} = 14.3 \text{ mm}$
(2x2 Bolt Hole Pattern)**
- l. Applicable Standards **IEC 62271-102**
- m. Interlocks **See interlocking sheet attached**

Note

- Applicable Standards for Post Insulator Designation : C8-550 **IEC 60273**

Interlocking Sheet for Schedule No. A3

Substation	(1) interlock with (2)			
	(1) Main Blade		(2) Ground Blade	
	Item No	Quantity	Item No	Quantity
BGS	A3-3	4	A3-2	4
BKN	A3-4	1	A3-6	1
KS	A3-4	2	A3-6	2
PK3	A3-7	2	A3-8	2
BGS	Existing	1	A3-8	1
PK2	A3-9	1	A3-10	1
MM2	A3-9	2	A3-10	2
BLG	Existing	2	A3-11	1

Air switches not mentioned in the above table have no interlock.

Note : key interlock shall also be provided for the existing air switches (if any).

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**SECTION 1
SPECIFICATIONS**

I. SPECIFICATIONS

I-1. Specifications

The following specifications are attached hereto and made a part of the Contract Documents :

<u>Specification No.</u>	<u>Description</u>	<u>Page</u>
156 (Jan 2018)	Power Circuit Breaker	156.1 – 156.21
202 (Jan 2018)	Disconnecting Switches (Disconnectors)	202.1 – 202.15

DRAFT

Specification No 156

Power Circuit Breaker

156-1 General. This specification covers the general requirements for design, manufacture, test and supply of the outdoor power circuit breaker.

The specific ratings, characteristics and the special requirements and features of the equipment not covered herein are given in the accompanying Ratings and Features sheet (if any).

156-2 Materials and Workmanship. All materials shall be new and shall be the best available for the purposes used, considering strength, ductility, durability and suitability for the intended services and best engineering practice. Workmanship shall be of the highest grade and in accordance with the best modern standard practice.

156-3 Service Conditions. All materials shall be suitable for installation and use at an altitude of 1000 m or less in a tropical climate with a maximum ambient temperature of 45°C and 100% relative humidity for outdoor equipment (or a maximum ambient temperature of 40°C and 90% relative humidity for indoor equipment) without corrosion, deterioration or degradation of performance characteristics.

156-4 Codes and Standards. All equipment, materials, devices, fabrication and testing shall conform to the codes, specifications and standards listed below and all applicable codes, specifications and standard referred therein.

ANSI American National Standards Institute

ASME American Society of Mechanical Engineers

ASTM American Society for Testing and Materials

AWS American Welding Society

IEEE The Institute of Electrical and Electronics Engineers

IEC *International Electrotechnical Commission*

ICEA Insulated Power Cable Engineer Association

NEMA National Electrical Manufacturers Association

All threaded parts requiring external connection shall have UNC screw and pipe threads. All internal parts may have threads in accordance with the established specification in the country of manufacturer.

It is the intent that all equipment, materials, devices, fabrication and testing shall conform to the application codes, specifications and standards even though they are not specifically noted herein. Equivalent codes, specifications and standards established and approved in the country of equipment or material manufacture may be used subject to EGAT's approval. If this election is made, the Bidder shall so state and include in his bid the governing codes, specifications, and standards proposed together with an itemized list of specific deviations from the requirements of codes, specifications and standards referred herein.

The latest issue of all codes, specifications and standards shall govern.

The most stringent requirement, in the event of code, specification or standard conflict, shall govern. This specification shall govern in the event of discrepancies between it and applicable codes, specifications and standards.

156-5 Design and Construction. The power circuit breaker shall be new and a current standard production model. Liberal factors of safety shall be used through out, especially in the design of all parts subject to reversal of stress or shock. They shall be designed, rated, tested and manufactured in accordance with applicable portions of *IEC 62271-100* or approved equivalent standards, unless otherwise specified. Each power circuit breaker shall be of the 3-pole, outdoor type, trip free, suitable for remote electrical closing and tripping, as well as for single-pole and/or three-pole tripping and reclosing (as specified in the Ratings and Features sheets) and furnished complete with operating mechanism and other accessories. The circuit breaker control system shall be completed with the anti-pumping circuit. Mounting wheels will not be accepted.

156-5.1 Bushings and Insulators. Material, dimensions, general contour or *profile*, structural, mechanical and electrical characteristics of bushings and insulators units of assemblies shall comply with the applicable requirements of ANSI and NEMA bushings and *IEC* insulators standards. The colour of all bushings and insulators shall be chocolate brown.

156-5.2 Interrupters. Interrupter unit contact current carrying surfaces shall not be subject to deterioration caused by arcing. Arcing contacts faced with arc resistant material sufficient to interrupt circuit breaker full interrupting capability arcs shall be provided.

156-5.3 Operating Mechanism. *The operating mechanism shall have supply records with successful manufacturing and operation / use of at least three (3) consecutive years.*

Each mechanism shall consist of two (2) operation counters (One shall be resettable and the other shall be non resettable). The operating mechanism shall be mounted and enclosed in a weather-

proof housing whose doors are so arranged as to make accessible parts of the mechanism usually requiring inspection or maintenance *without removing interrupter or releasing SF₆ gas from the interrupter.*

For purposes of inspection and adjustment, means shall be provided for safe manual closing of the breaker at a conveniently accessible place. *The maintenance closing device shall be designed for the propose that the contacts can be operated slowly by one man to adjust the breaker when it is not in service. The maintenance closing device shall be provided in the quantity shown in the Price Schedule.*

a. *Spring Operating Mechanism. A mechanical spring mechanism usually consists of two springs, one for open and one for close operation. The closing spring generates the required force to close the circuit breaker and charge the opening spring. The energy stored in the spring will be released and transmitted through a system of levers and links and the contacts will move to the open or closed position. A complete and separate spring operating system shall be furnished and installed for each three pole breaker or for each single pole breaker. This spring operating system shall be in accordance with applicable portion of IEC 62271-100.*

Each operating mechanism shall be provided with its own motor spring-charge equipped with a common control cabinet and shall be provided for :

1. The time required to charge the closing spring after the closing operation shall not exceed 15 s.
2. Under-voltage alarm relay with contact suitable for operation on 125 Vdc circuit to permit remote indication of loss of potential on the supply to the spring charged motor and its controls.
3. Spring-charged indicator to indicate the state of energy stored in the spring.
4. Means shall be provided to prevent the operation of the mechanism when maintenance work is being done. The mechanism shall be so arranged that emergency manual charging and release of the spring is possible without electrical means. Hand crank shall be provided for each circuit breaker.

The spring-charged motor shall be rated 125 Vdc.

The manual spring-charged hand crank shall be provided for each circuit breaker.

156-5.4 Control Cabinet. A control cabinet shall be furnished with each breaker. This cabinet shall have a blank, removable, accessible steel plate, with a gasket, through which the control and power leads will enter the bottom of the cabinet. All material necessary to interconnect the various components of the circuit breaker, including control, and operating mechanism facilities shall also be furnished. Each control cabinet shall be equipped with lighting, outlet and suitable heater complete with miniature circuit breaker, and shall be designed to maintain the temperature rise inside the cabinet within 5°C above the surrounding temperature. *Electrical schematic and wiring diagram drawing shall be provided on the control cabinet of every circuit breaker.*

A 25 mm wide x 6 mm thick copper ground bus with 4 mm drilled and taped holes shall be provided near the bottom of the control cubicle, control cabinet and/or operating mechanism for cable shield grounding. The ground bus shall be solidly bolted to the steel framework as to make good electrical contact. The holes shall be spaced on 20 mm center-lines minimum. A 10 mm long binding neat screw or screw with bronze spring washer shall be provided in each hole. The ground bus shall have a minimum of ten holes and screws for control cable shields and shall be solidly connected to ground terminal connector located the control cabinet housing.

The control cabinet shall be installed at the place convenient for operation and maintenance. Any necessary supported equipment; ladder for example, shall be supplied to enable the possible operation and maintenance.

156-5.5 Supporting Structures. The breaker supporting structure shall be hot-dip galvanized after fabrication, in accordance with ASTM A123, A153 and A53. All necessary galvanized bolts, nuts and washers to complete the erection shall be furnished, including embedded anchor bolts for securing the supporting structure to the concrete foundation.

The zinc coating shall be uniform clean of a standard thickness on the entire surface of all materials.

The galvanizing coating shall meet the values as shown in the following table.

Galvanizing Coating Weight

Description	Thickness	Coating Weight (g/m ²)	
		Average Value	Minimum Value
Shaped steel and steel plate	6 mm and over under 6 mm	more than 702 more than 610	more than 610 more than 550
Steel pipe	-	more than 550	more than 490
Bolts, nuts	-	more than 381	more than 305
Washers, filters	5 mm and over under 5 mm	more than 381 more than 305	more than 305 more than 259

Finished materials shall be dipped into the solution of dichromate after galvanizing for white rust protection.

All individual pieces shall be marked with the correct designations shown on the approved shop drawings. Marking shall be done by die stamping the marks into the metal before galvanizing and shall be clearly legible after galvanizing. The number and letter shall be a minimum of 12 mm in height and 8 mm wide.

The breaker supporting structure with clamp type ground terminal connector shall be supplied to provide adequate isolation above ground, of energized portions of each circuit breaker with minimum vertical clearance as follows :

500 kV : 5.65 m (18 ft 7 in)

230 kV : 4.60 m (15 ft)

138 and 115 kV : 3.60 m (11 ft 7 in)

69 kV : 3.20 m (10 ft 6 in)

33 kV and below : 2.75 m (9 ft)

156-5.6 Multiratio Bushing-Type Current Transformers. All current transformers, if required, shall be in accordance with the latest standards of the IEEE Std C57.13. All secondary leads from all current transformers furnished with each circuit breaker shall be brought to short-circuiting-type terminal blocks located in the circuit breaker control cabinet.

- 156-5.7 Terminal Pad.** Each equipment terminals for connecting to the line or other equipment shall be equipped with a suitable terminal pad unless otherwise specified. The terminal pad shall be provided with 14.3 mm (9/16 in) diameter holes with 45 mm (1 3/4 in) spacing between the centers of each hole in accordance with the NEMA Standards CC1.
- The terminal pad shall be of high conductivity bronze, copper or aluminum alloy and, *unless it is made of aluminum alloy*, shall be plated with electro-tin to a thickness of not less than 0.0127 mm (0.0005 in).
- 156-5.8 Ground Terminal Connector.** The grounding terminal of the equipment shall be of the clamp type suitable for 4/0 AWG copper stranded conductor. Terminal connector shall be made of high conductivity material and shall be complete with corrosion resistance bolts, nuts and lock washers.
- 156-5.9 Brass Pipe.** Brass pipe shall conform to the requirements of ASTM Specifications B 43 for "Seamless Red Brass Pipe, Standard Sizes".
- 156-5.10 Copper Pipe.** Steel pipe shall conform to the requirements of the latest issue of ASTM Specifications B 42 for "Seamless Copper Pipe, Standard Sizes".
- 156-5.11 Steel Pipes.** Steel pipe shall conform to the requirements of ASTM Specification A 53 "Welded and Seamless Steel Pipe".
- 156-5.12 Copper Tubing.** Copper tubing shall conform to requirements of the latest issue of ASTM Specification B 88-78 or "Seamless Copper Water Tube", Type K.
- 156-5.13 Welding.** All welding shall be in accordance with AWS and ASTM Specifications and standards for Unfired Pressure Vessels, as they may apply.
- 156-5.14 Rigid Conduit.** Rigid Conduit shall conform to the requirements of ANSI C80.1 for "Rigid Steel Conduit Zinc Coated"
- 156-5.15 Overpressure Relief Device.** Each circuit breaker shall be equipped with overpressure relief device to relieve abnormal pressure occurred in interrupter compartment.
- 156-6 Control Circuit.** The functional control requirement shall be according to the functional control requirement as shown on the typical schematic diagram attached.
- a. The tripping circuit shall be directly connected to the power supply and two (2) sets of separating current and magnetic circuit tripping

coils for primary and back-up tripping shall be provided for the following circuit breakers.

- (a) Single-pole and three-poles operated circuit breaker.
- (b) 115 kV and above three-poles operated circuit breaker.

- b. For single-pole and three-poles operated circuit breaker, pole disagreement shall be provided. The necessary relays shall be provided to trip all phases of each circuit breaker in the event that the three poles are not closed properly after a close signal is given to the circuit breaker.

In the event that all three poles of the generator transformer breaker do not trip properly after a trip signal, the pole disagreement relays shall also operate the breaker failure timers and trip appropriate circuit breakers after a time delay, similar to a normal breaker failure protection. *The pole disagreement relays shall be heavy duty type.*

The time setting range of the pole disagreement timer shall be 0.05 to 2.0 second.

Any additional equipment required for complete functions of the pole disagreement circuits shall also be included with each pole disagreement scheme.

Each pole disagreement protective relaying scheme shall be ABB (Sweden, Switzerland and U.S.A.), GE (U.S.A., Canada), ALSTOM (U.K.), or SIEMENS (Germany).

156-7 Interrupting Performance. The circuit breaker shall be suitable for reclosing duty cycle as specified in Ratings and Features sheet.

156-8 Design Load. The circuit breaker including its supporting structure shall be designed to withstand without damage to or impairments operation of the equipment wind with a velocity up to 125 km/h.

156-9 Insulated Wire. Insulated wire shall be tin coated copper conductor and shall *not be less than 1.5 mm²*, minimum voltage classification of 600 V with high temperature PVC insulation. Hinge wire shall be extra flexible Class K stranding *or equal* and current transformer secondary leads shall not be less than *6 mm²* stranded.

156-10 SF₆ Gas. The Contractor shall furnish SF₆ gas for use with SF₆ gas circuit breaker under this specification. The amount furnished shall be sufficient for filling all breakers plus 15%. The SF₆ gas shall be shipped in non-returnable steel bottles which shall become the property of

EGAT. Specification of the SF₆ gas used shall be furnished with the breakers.

156-11 Cleaning and Painting. All interior and exterior surfaces of ferrous metalwork shall be either galvanized in accordance with ASTM Designation A123 and A153 or painted. Surfaces to be painted shall be thoroughly cleaned to base metal by sand blasting or shot blasting and shall be thoroughly dry before the application of any paint. After cleaning, the surfaces shall be give priming or sealing coat of paint followed by two coats of light gray Munsell Notation No 7.5 BG 6/1.5.

156-12 Accessories

156-12.1 Gas Density Detector. The gas density detector, responding to the gas temperature and pressure, shall have two different functions according to the gas condition. The first step for alarm and the second step for locking the operation or automatically trip shall be provided for each pole of the single pole tripping circuit breaker or each circuit breaker of the three pole tripping circuit breaker.

156-12.2 Pressure Switches. The pressure switches of monitoring air or hydraulic fluid pressure. Electrically separate air or hydraulic fluid pressure switch contacts that close when the pressure falls to approximately 110% of the minimum operating pressure shall be provide and wired to operating mechanism cabinet terminal block for remote alarm. Pressure switch contacts shall be provided to prevent the operating mechanism from attempting a closing operation when the pressure is too low to complete close-open operations at rated short circuit current or at other related required capabilities.

The pressure switches shall be provided for each pole of the single pole tripping circuit breaker or each circuit breaker of the three pole tripping circuit breaker.

156-12.3 Pressure Gauges. *Pressure gauge shall be gas-filled pressure gauge (It should not be oil seal type) and it shall be precisely shown in figure with SI unit in bar or kg/cm²,* having transparent window on a part of the control cabinet shall be provided.

156-12.4 Auxiliary Switches. All contacts shall *conformed to class 1 according Table 6 of IEC 62271-1* at 125 Vdc ungrounded circuit.

Each circuit breaker shall be equipped with auxiliary switches providing not less than **twenty** independent single-pole control circuits, which shall be readily changeable to "circuit opening" or "circuit closing" as required, in addition to those required by the manufacturer for the circuit breaker standard control scheme.

156-12.5 Selector Switches. Each mechanism shall be equipped with a selector switch for **Local - Test - Remote** position. The test position shall disconnect the circuit to remote closing, reclosing and tripping.

156-12.6 Position Indicator. The mechanical position indicator shall be equipped with each pole of the single-pole tripping circuit breaker or each circuit breaker of the three-pole tripping circuit breaker. The indicator shall be of white letter "I" on red background and white letter "O" on green background for closed and open position respectively and shall be located in such a way that visible from the far distance is possible.

156-12.7 Lighting and Universal Outlet. Lighting, completed with control switch and two sets of 10 A, 250 V, *universal* outlet, one of two-pole outlet with side earthing contacts (conformed to IEC 83) and one of two-pole three wire grounding device outlet for connection to the EGAT-furnished single phase alternating current supply, shall be furnished and mounted in control cubicle, control cabinet and/or operating mechanism where specified.

156-12.8 Terminal Blocks. All accessories and control devices shall be completely wired. Both ends of wires shall be terminated by compression type, ring tongue type terminal lug and shall be provided with terminal number rings. The terminal number shall be recorded in the wiring diagram. All wiring which connects to the external circuits shall terminate on the terminal blocks installed in the control cabinet. The terminal block shall be of 600 V molded block type with insulating barrier between terminals. Terminal blocks used for current transformer leads shall be of the short circuit type. Each terminal block shall have marking strips, and shall be equipped with the compression type, ring tongue type terminal lugs for 4 mm^2 or higher to make connection with the outgoing cable. The terminal blocks shall be provided with 10% but not less than 10 additional terminals as spares besides the necessary number. Two (2) or more external wires shall not be connected in one (1) terminal.

The terminal blocks shall have the size suitable for the termination of the following cables :

- For AC supply and DC supply : 6 - 35 mm²
- For CT leads : 2 x 6 mm²
- For others and spares : 2 x 4 mm²

The terminal blocks for AC circuit and the terminal blocks for DC circuit shall be separately grouped as well as the AC terminal blocks shall be covered with transparent plastic box.

- 156-12.9 Nameplates.** Nameplates of anodized aluminum or stainless steel shall be provided for all equipment including control cabinet and local control component identification. *The nameplate of a circuit-breaker and its operating devices shall be conformed to IEC 62271-100 and shall be visible in the position of normal service and installation.*

In addition to all nameplate data, the EGAT serial number of the equipment shall be indicated on the nameplate of each unit of equipment. If possible, it should be indicated close to the manufacturer serial number.

The EGAT serial numbers of the equipment will be advised after the Contract is signed.

- 156-13 Test.** Test of equipment shall be performed according to the requirements specified in each referred test item. The costs of all tests and reports shall be borne by the Contractor.

- 156-13.1 Type Test.** The proposed equipment shall already have the *type* test record of the same type and same rating as EGAT called for, in accordance with the tests specified in each equipment test items, which is subject to EGAT's approval (unless otherwise specified in each equipment test item). The *type test* record shall be required and submitted together with the tender document during the bidding.

- 156-13.2 Routine Test.** Each equipment shall be completely assembled at the factory *or shall be conformed to IEC 62271-1* and subject to the tests specified in each equipment test item.

- 156-13.3 Sample Test.** The *sample test* shall be performed by selecting the sample from each lot of equipment. The numbers of samples for the test shall be as specified in the Standard.

- 156-13.4 Test Report.** The report of all tests, curves and standard application data shall be furnished to EGAT immediately after the completion of the tests.

- 156-13.5 Test Procedure.** The Contractor shall submit the test procedure of specified tests and actual design tests to EGAT for approval. The test procedure shall consist of procedures, applied voltage, current and criteria to justify the result of the tests.

156-13.6 Test Items for Power Circuit Breaker. The tests shall be performed in accordance with *IEC 62271-100*, unless otherwise specified.

a. Type Tests

(a) Dielectric tests

(b) Measurement of the resistance of the main circuit

(c) Temperature-rise tests

(d) Short-time withstand current and peak withstand current tests

(e) Additional tests on auxiliary and control circuits

(f) Mechanical operation test at ambient temperature

(g) Short-circuit current making and breaking tests

(h) Radio interference voltage tests (Rated voltage ≥ 123 kV)

(i) EMC tests (Electronic equipment or components are included in the secondary system)

(j) Extended mechanical endurance tests on circuit breakers for special service conditions (Class M2 rating assigned)

(k) Static terminal load tests (Outdoor circuit breaker with rated voltage ≥ 52 kV)

(l) Short-line fault tests

(m) Out-of-phase making and breaking tests (Out-of-phase rating assigned)

(n) Electrical endurance tests (only for Rated voltage ≤ 52 kV)

(o) Capacitive current switching tests

(p) Switching of shunt reactors and motor (Assigned switching rating)

b. Routine Tests

- (a) Dielectric test on the main circuit*
- (b) Tests on auxiliary and control circuits*
- (c) Measurement of the resistance of the main circuit*
- (d) Tightness test*
- (e) Design and visual checks*
- (f) Mechanical operating tests*
- (g) Timing and motion tests, oscillograph shall be provided.*

156-13.7 Test Item for Bushing Current Transformer. The test shall be performed in accordance with the latest IEEE Std. C57.13.

a. Routine Tests

- (a) Applied voltage test**
- (b) Induced voltage test**
- (c) Accuracy test for each ratio of all winding (including excitation curve of one unit of each item for relaying class)**
- (d) Polarity check**
- (e) Winding resistance measurement for maximum ratio of all winding but one unit of each item shall be performed for each ratio of all winding.**
- (f) Insulation resistance measurement or Insulation power factor measurement.**

156-13.8 Test Items for Insulators. The tests shall be performed in accordance with *IEC 62155*.

a. Type Tests

(a) Pressure test

(b) Bending test

b. Routine Tests

(a) Visual examination

(b) Electrical test

(c) Pressure test

(d) Bending test

(e) Creepage distance measurement. One unit of each rating and type shall be subject to this test. The test shall be performed on insulators being supply.

c. Sample Tests

(a) Verification of dimensions

(b) Control of the roughness of the ground parts

(c) Porosity test

(d) Temperature cycle test

(e) Galvanizing test

(f) Pressure test

(g) Bending test

156-13.9 Test Items for Bushing. The tests shall be performed in accordance with IEEE Std. C57.19.

156-14 Spare Parts. All spare parts subject to damage or deterioration by moisture shall be packed in moisture-proof material. All spare parts shall be of the same materials and workmanship as the corresponding original parts and shall be interchangeable therewith. The Bidder shall include in his bid a list of recommended spare parts *for maintenance*.

156-15

Appliances & Tools. The Contractor shall furnish all tools and appliances necessary for satisfactory installation, operation and maintenance of the equipment, including any special tool or appliance that are necessary for assembling and disassembling the equipment. The Contractor shall submit to EGAT for approval a list of all appliances and tools required for the above stated purposes and shall indicate thereon all appliances and tools he proposes to furnish.

DRAFT

156-16 Drawings and Documents for Circuit Breaker

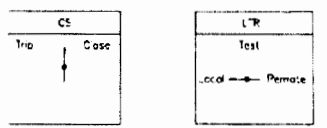
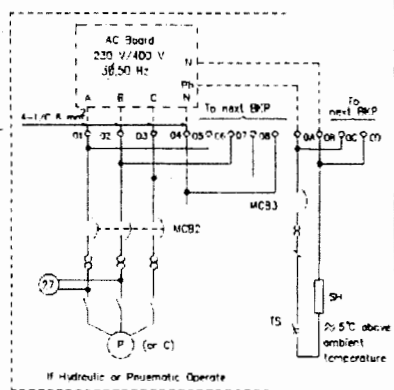
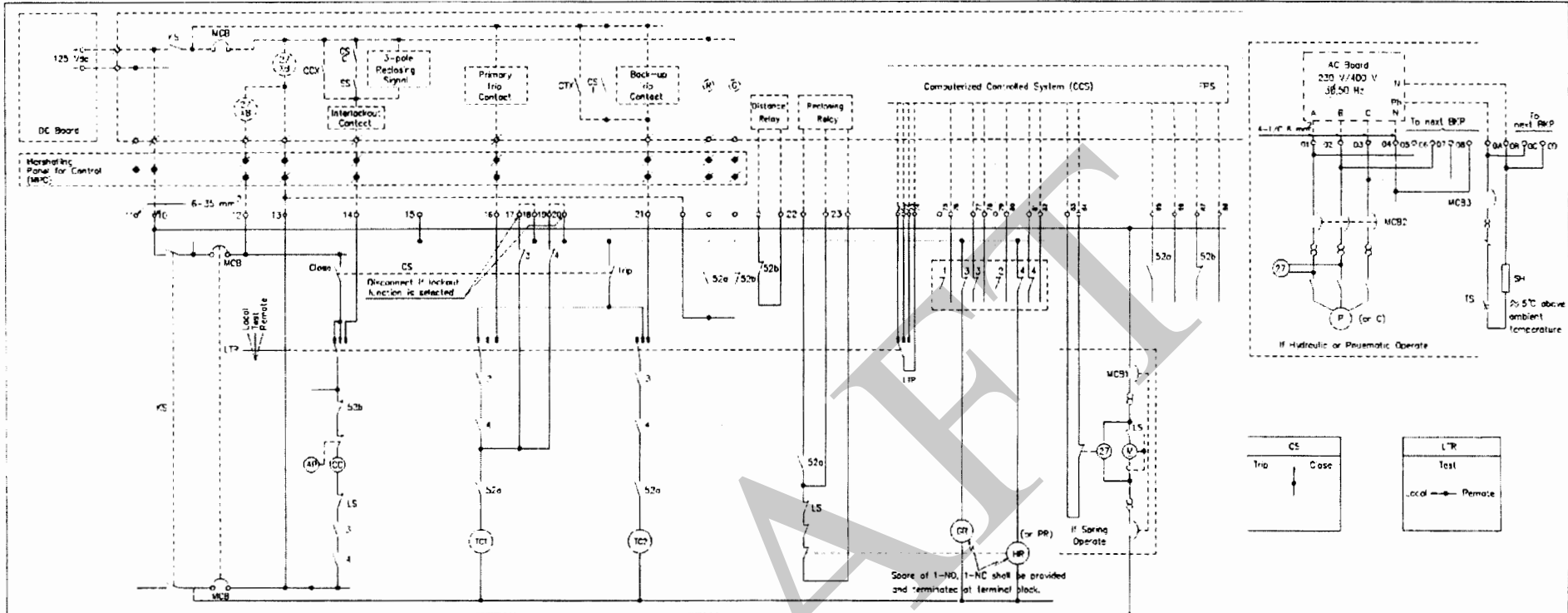
Drawings and documents shall at least comprise the followings :

Item	Drawings Title	Approval and Final Dwgs	CD-ROM (Including CAD Files)
1	Drawing list of drawings submitted for approval	x	-
2	Circuit breaker outline including legend of each component	x	x
3	Steel supporting structures and anchor bolt <i>(The normal size of drawings shall be A1)</i>	x	x
4	Circuit breaker nameplate	x	x
5	Shipping sketch	x	-
6	Schematic diagram	x	x
7	Wiring diagram	x	x
8	Terminal blocks arrangement	x	-
9	Control cubicle outline including component layout completed (if any)	x	-
10	Terminal pads of circuit breakers and of current transformers (if any)	x	-
11	Earthing terminal	x	-
12	CT nameplate (if any)	x	x
13	Outline, schematic diagram and wiring diagram for motor compressor set, or the like for hydraulic system (if any)	x	x
14	Manufacturing schedule and test schedule	x	-
15	Operating time chart of main contacts, auxiliary contacts and command duration of closing and opening signal <i>completed with Time travel recordings.</i>	(For Reference only)	(For Reference only)

156-17 Instruction Manual for Power Circuit Breaker

Instruction manual shall consist of all necessary information and shall comprise at least the following parts.

- Part A** The instruction including installation, operation adjustment and maintenance of circuit breaker and operating mechanism, circuit breaker accessories, current transformer, bushings and support insulators.
- a. Detailed equipment description.
 - b. Receiving, inspection, storage, handling and damage claim instruction.
 - c. Assembly and disassembly instructions including a complete list of required tools.
 - d. Drawings, photographs and other material showing all adjustment, lubrication, test and check points.
 - e. Complete component parts list including ordering numbers, designation of part number and part identification drawings.
- Part B** All applicable manufacturer bulletins, instructions and other descriptive material.
- Part C** Complete set of all final drawings and/or documents arranged in order of each complete item.



LOCK-OUT (CLOSE POSITION) CONTACT

- Low hydraulic pressure (stage 2) or
- Low pneumatic pressure (stage 2)
- Low SF6 gas density (stage 2)

LOCK-OUT (TRIP POSITION) OF TRIP CONTACT

- Low hydraulic pressure (stage 2) or
- Low pneumatic pressure (stage 2)
- Low SF6 gas density (stage 2)

CONTACT OF HYDRAULIC OR PNEUMATIC RELAY

- Low SF6 gas density (stage 1)
- Low SF6 gas density (stage 2)
- Low hydraulic pressure (stage 1)
- Low pneumatic pressure (stage 1) or
- Low hydraulic pressure (stage 2)
- Low pneumatic pressure (stage 2) or

LOW SF6 GAS DENSITY/LOW HYDRAULIC OR PNEUMATIC PRESSURE

- Stage 1 = Alarm

Gas density (1) = at °C
 H (or P) Pressure (2) = at 40 °C

Stage 2 = Lock (close) and lock (trip) or trip

Gas density (3) = at °C
 H (or P) Pressure (4) = at 40 °C

LOCK-OUT AT CB IN CLOSE POSITION

Switch means shall be provided to keep circuit breaker at close position, automatic self opening of circuit breaker at further rise in pressure is not accepted.

DEVICE	DESCRIPTION	RATING	TYPE	MANUFACTURER
CS	Trip/Close Control Switch	V A		
LTP	Local/Test/Remote Selector Switch	V A		
CC	Closing coil	90-140 Vdc A mS		
TC1	Primary tripping coil	V A mS		
TC2	Back-up tripping coil	V A mS		
AP	Anti-pumping relay	V A		
DS	Gas density auxiliary relay	V A		
H (or PR)	Hydraulic (or Pneumatic) pressure auxiliary relay	V A		
M	Motor	V A HP		
P (or C)	Pump (or Compressor)	V A HP		
27	DC under voltage alarm relay, 'Slow drop out'	V A		
LS	Limit switch	V A		
MCB	Molded case circuit breaker with thermal trip, 2-pole	V A kA		
MCB1	Molded case circuit breaker with thermal trip, 2-pole	V A kA		
MTR1	Molded case circuit breaker with thermal trip, 1-pole	V A kA		
MCB2	Molded case circuit breaker with thermal and instantaneous trip, 1-pole	V A kA		
TS	Thermocouple	Range °C		
SH	Spring handle	V A W		
TB	Terminal block	400 °C A		
LS	Limit switch for spring charge motor	V A		
1	Gas density switch (stage 1)	V A		
2	Pressure switch (P or H) (stage 1)	V A		
3	Gas density switch (stage 2)	V A		
4	Pressure switch (P or H) (stage 2)	V A		

Hydraulic (or Pneumatic) Pressure and Operating Time

True (V) / False (F)

Safety valve (Open) -----

Safety valve (Close) -----

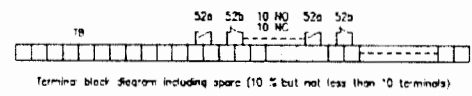
Out of (Pump Stop) -----

Oil in (Pump start) -----

Alarm -----

Lockout (or Trip) -----

Minimum Operating Pressure -----



The Schematic Status

- CT at open position
- Gas at low density (stage 2)
- Hydraulic or Pneumatic at low pressure (stage 2)
- Voltage at under voltage
- Mechanism closing springs charged

Note

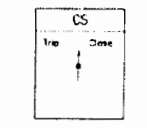
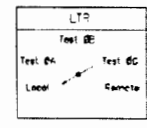
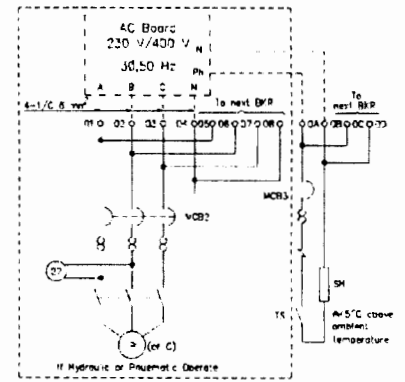
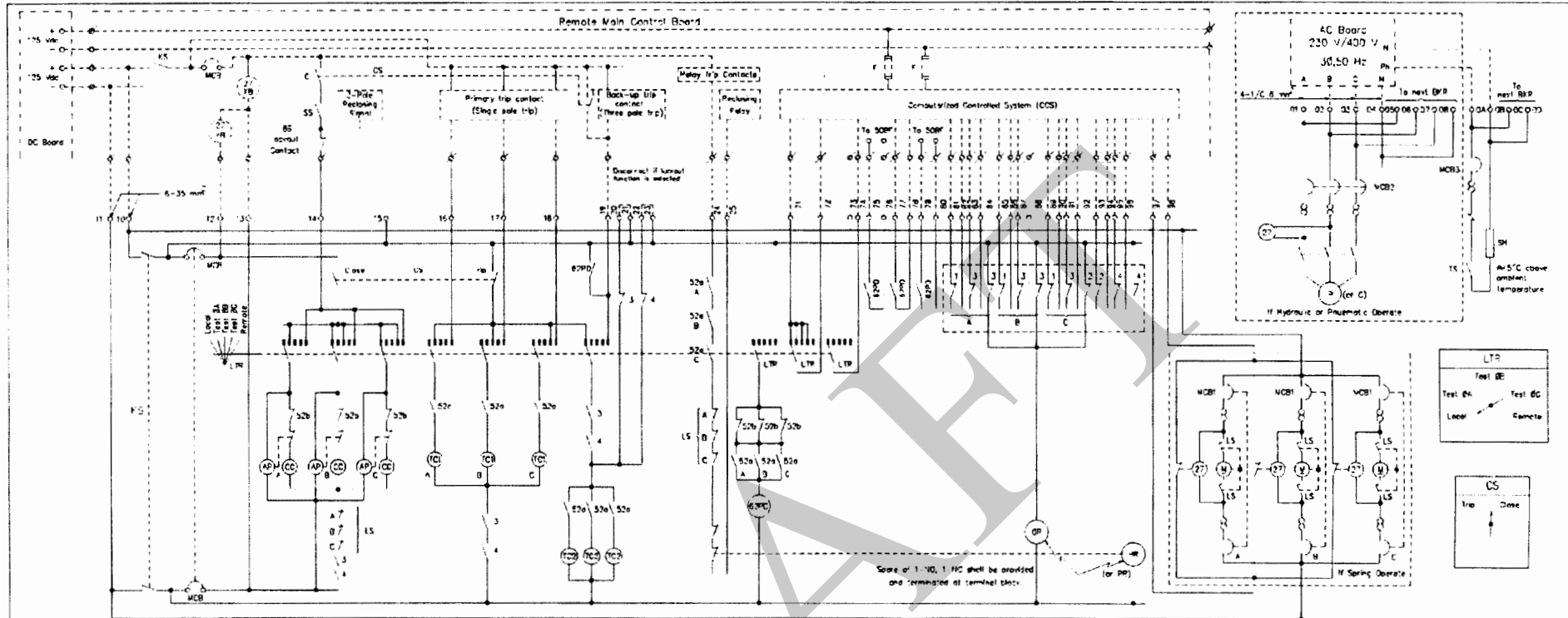
- This schematic diagram is intended to show functional control requirement only, actual schematic diagram corresponding to this functional requirement shall be designed by manufacturer.

SUBSTATION ELECTRICAL EQUIPMENT ENGINEERING DEPARTMENT

THREE POLE OPERATED CIRCUIT BREAKER

TYPICAL SCHEMATIC DIAGRAM

Date: 03/2016 Dwg No.: TP-F-CB 51 SH: 01/01 Rev: 5



DO/OU* (CLOSE/OPEN) CONTACT

- Low hydraulic pressure (stage 2) or low pneumatic pressure (stage 2)
- Low SF6 gas density (stage 2)

LOCK OUT (MTP) (MUTUAL) OR (MOP) CONTACT

- Low hydraulic pressure (stage 2) or low pneumatic pressure (stage 2)
- Low SF6 gas density (stage 2)

CONTACT OF DESIGNATED OR PRESSURE RELAY

- Low SF6 gas density (stage 1)
- Low SF6 gas density (stage 2)
- Low hydraulic pressure (stage 1) or low pneumatic pressure (stage 1)
- Low hydraulic pressure (stage 2) or low pneumatic pressure (stage 2)

ON SF6 GAS DENSITY/LOW HYDRAULIC OR PNEUMATIC PRESSURE

- Stage 1 = Alarm

Gas density (1) ----- at ----- °C
 H (or P) pressure (2) ----- at ----- °C

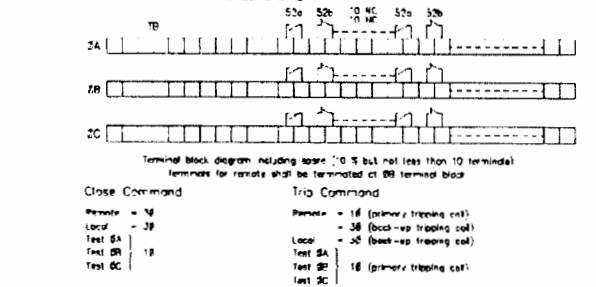
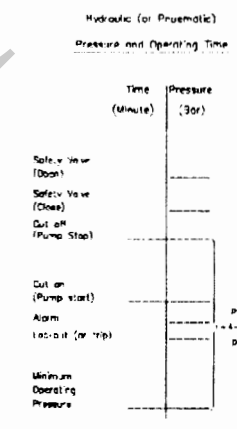
- Stage 2 = Lock (Inter) and Lock (No) or Trip

Gas density (3) ----- at ----- °C
 H (or P) pressure (4) ----- at ----- °C

DO/OU* AT OR IN CLOSE POSITION

Suitable means shall be provided to keep circuit breaker at close position, automatic well opening or circuit breaker at further over pressure is not accepted.

DEVICE	DESCRIPTION	RATING	TYPE	MANUFACTURER
CS	Trip/Close Control Switch	V, A	A	
LTR	Lock/Trap/Remote Selector Switch	V, A	A	
CC	Closing coil	93-140 Vdc, A, ms		
TC1	Primary tripping coil	70-140 Vdc, A, ms		
TC2	Back-up tripping coil	70-140 Vdc, A, ms		
AR	Anti-ramping relay	V, A, ms		
6SPO	Gas density assessment relay	50-1000 ms		
6SPC	Gas density auxiliary relay	V, A		
MTP (or MOP)	Hydraulic (or Pneumatic) pressure auxiliary relay	V, A		
M	Magnet	V, A, ms		
P (or C)	Pump (or Compressor)	V, A, ms		
27	DC under voltage alarm relay, size drop out	125 Vdc		
6S	Interlocking switch	V, A		
MCB1	Motored case circuit breaker with thermal trip, 2-pole	V, A, AF		
MTP1	Motored case circuit breaker with thermal trip, 2-pole	V, A, AF		
MCB2	Motored case circuit breaker with thermal trip, 3-pole	V, A, AF		
MCB3	Motored case circuit breaker with thermal and instantaneous trip, 3-pole	V, A, AF		
TS	Thermostat	Range, °C		
SH	Space heater	V, A, W		
1B	Terminal block	600 V, A		
LS	Limit switch for spring charge motor	V, A		
1	Gas density switch (stage 1)	V, A		
2	Pressure switch (P or H) (stage 1)	V, A		
3	Gas density switch (stage 2)	V, A		
4	Pressure switch (P or H) (stage 2)	V, A		



Close Command

Remote = 16
 Local = 3P
 Test SA = 18
 Test BA = 18
 Test BC = 18

Trap Command

Remote = 16 (primary tripping coil)
 Local = 3P (back-up tripping coil)
 Test SA = 3P (back-up tripping coil)
 Test BA = 18 (primary tripping coil)
 Test BC = 18 (primary tripping coil)

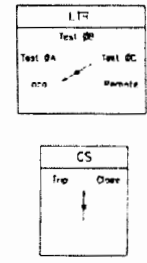
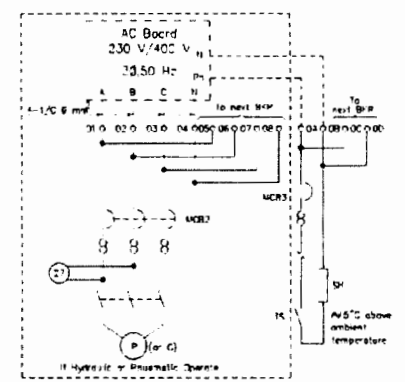
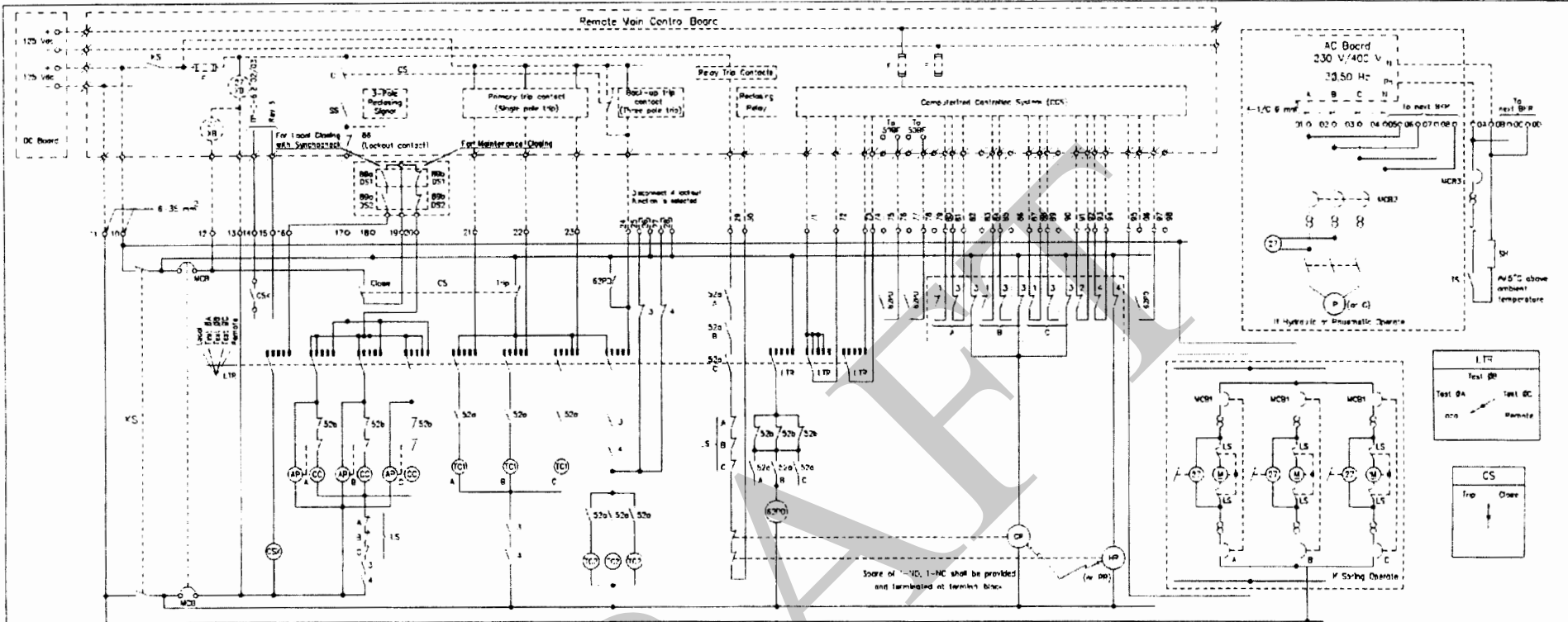
The Schematic Status

- CB at open position
- Gas at low density (stage 2)
- Hydraulic or Pneumatic at low pressure (stage 2)
- Voltage of under voltage

Note

This schematic diagram is intended to show functional control requirement only, actual schematic diagram corresponding to the functions requirement shall be designed by manufacturer.

SUBSTATION ELECTRICAL EQUIPMENT ENGINEERING DEPARTMENT			
SINGLE POLE & THIRN POLE OPERATED CIRCUIT BREAKER			
TYPICAL SCHEMATIC DIAGRAM			
Date	02/2016	Dwg No.	TP-CR-08 6.7
SH		Rev.	01/2016 6



LOCKOUT (CLOSE CIRCUIT) CONTACT

- Low Hydraulic Pressure (stage 2) or Low pneumatic pressure (stage 2)
- Low SF6 gas density (stage 2)

LOCKOUT (TRIP CIRCUIT) OF TRIP CONTACT

- Low Hydraulic pressure (stage 2) or Low pneumatic pressure (stage 2)
- Low SF6 gas density (stage 2)

CONTACT OF DEVIANT OR PRESSURE RELAY

- Low SF6 gas density (stage 1)
- Low SF6 gas density (stage 2)
- Low Hydraulic pressure (stage 1) or Low pneumatic pressure (stage 1)
- Low Hydraulic pressure (stage 2) or Low pneumatic pressure (stage 2)

LOW SF6 GAS DENSITY/LOW HYDRAULIC OR PNEUMATIC PRESSURE

Stage 1 = Alarm

Gas density (1) = _____ at _____

M (or P) pressure (2) = _____ at _____

Gas density (3) = _____ at _____

M (or P) pressure (4) = _____ at _____

Stage 2 = Lock (Close) and Lock (Trip) or Trip

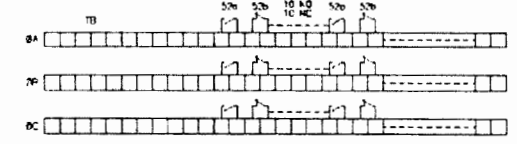
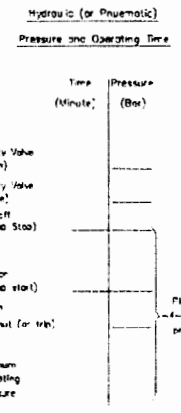
Gas density (3) = _____ at _____

M (or P) pressure (4) = _____ at _____

LOCKOUT AT CB IN CLOSE POSITION

Switches means that be provided to stop circuit breaker at close position, automatic self opening of circuit breaker at higher than pressure is not operation

DEVICE	DESCRIPTION	RATING	TYPE MANUFACTURER
CS	Trip/Close Control Switch		
LTP	Local/Test/Remote Selector Station	V A	
CC	Driving coil	90-140 VAC, A, _____ms	
TCT	Primary tripping coil	70-40 VAC, A, _____ms	
LTCT	Lock-up tripping coil	20-40 VAC, A, _____ms	
AP	Anti-pumping relay	_____VAC, A, _____ms	
RSPD	Roller disengagement relay	50-1000 mS	
OP	Gas density auxiliary relay	_____V _____A	
HP (or PP)	Hydraulic (or Pneumatic) pressure auxiliary relay	_____V _____A	
M	Water	_____V _____A HP	
P (or C)	Pump (or Compressor)	_____V _____A HP	
Z	DC under voltage alarm relay	125 VAC	
VSD	Under voltage alarm relay	_____V _____A	
MCB	Molded case circuit breaker with thermal trip, 2-pole	_____V _____A	
MCB1	Molded case circuit breaker with thermal trip, 2-pole	_____V _____A	
MCB2	Molded case circuit breaker with thermal trip, 2-pole	_____V _____A	
MCB3	Molded case circuit breaker with thermal and instantaneous trip, 1-pole	_____V _____A	
TK	Thermistor	Phase _____V _____A _____W	
SH	Space heater	_____V _____A	
TB	Terminal block	600 V _____A	
LS	Limit switch for spring charge motor	_____V _____A	
1	Gas density switch (stage 1)	_____V _____A	
2	Pressure switch (P or M) (stage 1)	_____V _____A	
3	Gas density switch (stage 2)	_____V _____A	
4	Pressure switch (P or M) (stage 2)	_____V _____A	
BRDS	Disconnecting Switch aux. contacts (Motor Operated)		
CB	ALV relay for back-up closing		
	2 NO contacts, 125 VDC, 10 A continuous setting		



Close Command

Remote = 3B
Local = 3B (back-up tripping coil)
Test BA = 1B
Test BC = 1B

Trip Command

Remote = 1B (primary tripping coil)
Local = 3B (back-up tripping coil)
Test BA = 1B
Test BB = 1B (primary tripping coil)
Test BC = 1B

the Schematic Status

- CB at open position
- Gas at low density (stage 2)
- Hydraulic or Pneumatic at low pressure (stage 2)
- Voltage at under voltage

Note

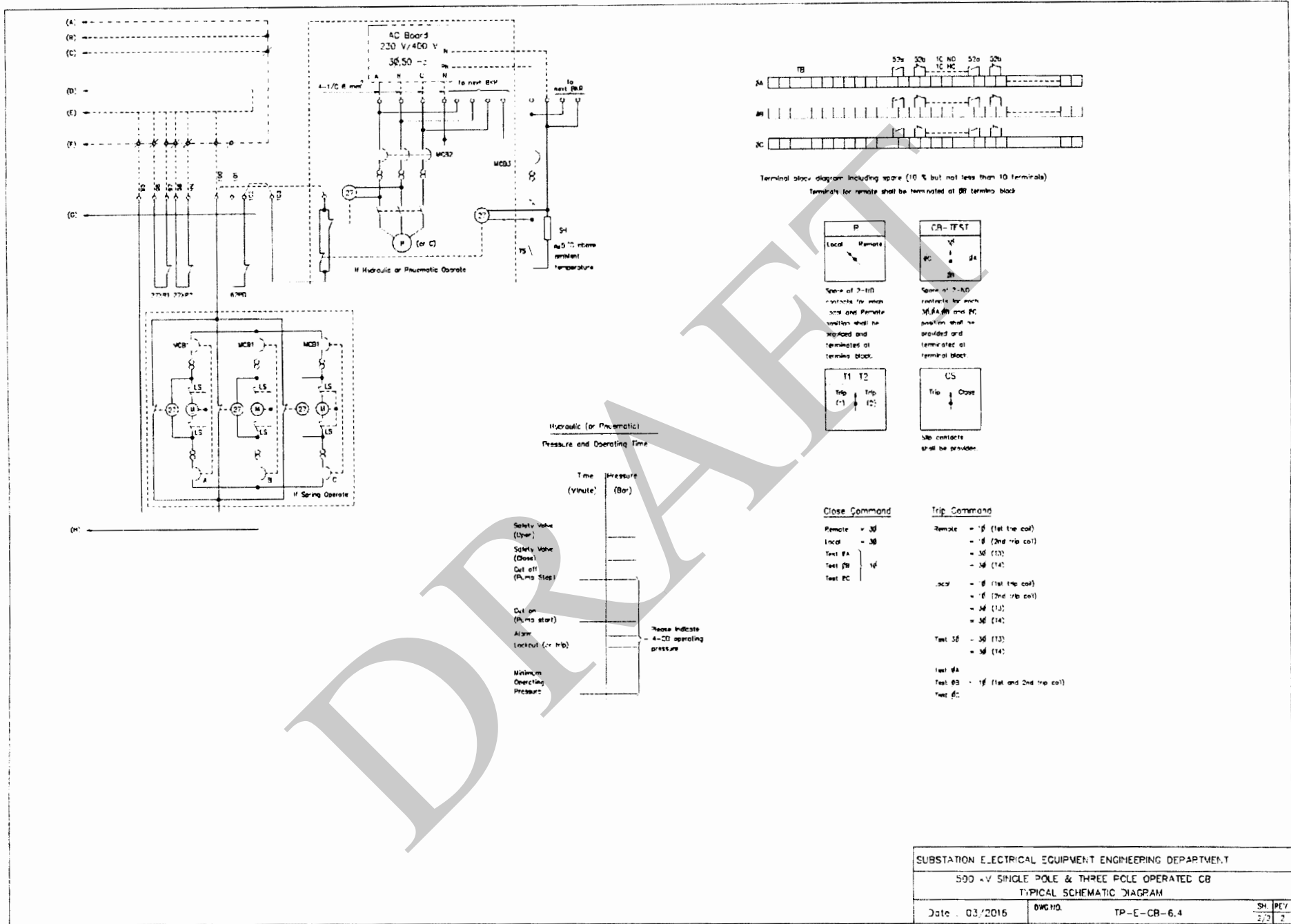
This schematic diagram is intended to show functional control requirement only, actual schematic diagram corresponding to this functional requirement shall be designed by manufacturer.

SUBSTATION ELECTRICAL EQUIPMENT ENGINEERING DEPARTMENT

SINGLE POLE & 1-POLE OPERATED CIRCUIT BREAKER WITH SYNCHROCHECK CLOSING

TYPICAL SCHEMATIC DIAGRAM

Date: 03/20/16 | Dwg No.: TP-E-CB 6.3 | Rev: 4



Specification No 202

Disconnecting Switches (*Disconnectors*)

202-1 General. This specification covers the general requirements for design, manufacture, test and supply of the outdoor disconnecting switches.

The specific ratings, characteristics and the special requirements and features of the equipment not cover herein are giving in the accompanying Ratings and Features sheet (if any).

202-2 Materials and Workmanship. All materials shall be new and the best available for the purposes used, considering strength, ductility, durability and suitability for the intended services and best engineering practice. Workmanship shall be of the highest grade and in accordance with the best modern standard practice.

202-3 Service Conditions. All materials shall be suitable for installation and use at an altitude of 1000 m or less in a tropical climate with a maximum ambient temperature of 45°C and 100% relative humidity for outdoor equipment (or a maximum ambient temperature of 40°C and 90% relative humidity for indoor equipment) without corrosion, deterioration or degradation of performance characteristics.

202-4 Codes and Standards. All equipment, materials, devices, fabrication and testing shall conform to the codes, specifications and standards listed below and all applicable codes, specifications and standard referred therein.

ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWS	American Welding Society
IEEE	The Institute of Electrical and Electronics Engineers
<i>IEC</i>	<i>International Electrotechnical Commission</i>
ICEA	Insulated Power Cable Engineer Association
NEMA	National Electrical Manufacturers Association

All threaded parts requiring external connection shall have UNC screw and pipe threads. All internal parts may have threads in accordance with the established specification in the country of manufacturer.

It is the intent that all equipment, materials, devices, fabrication and testing shall conform to the application codes, specifications and standards even though they are not specifically noted herein. Equivalent codes,

specifications and standards established and approved in the country of equipment or material manufacture may be used subject to EGAT's approval. If this election is made, the Bidder shall so state and include in his bid the governing codes, specifications, and standards proposed together with an itemized list of specific deviations from the requirements of codes, specifications and standards referred herein.

The latest issue of all codes, specifications and standards shall govern.

The most stringent requirement, in the event of code, specification or standard conflict, shall govern. This specification shall govern in the event of discrepancies between it and applicable codes, specifications and standards.

202-5 Design and Construction. All switches shall be three poles or single pole, single throw, outdoor, vertical break, double side break or center side break, group operated type or etc. as specified.

All switches shall be designed and fabricated in accordance with *IEC 62271-1 and IEC 62271-102*. Each switch shall be complete with bases, insulators, contacts, terminals, blades, operating mechanisms and mounting bolts. *Linking Rod shall be supplied in one piece. Welded rod is not acceptable.*

All switch bases, operating mechanisms, rods and other steel parts shall be hot-dip galvanized after all machining and threading operations have been complete. Threads shall be undercut to allow for galvanizing.

Liberal factors of safety shall be used throughout, especially in the design of all part subject to reversal of stress or shock.

202-5.1 Contacts. The main blades of all switches shall have adequate strength and current carrying capacity conforming to the maximum ratings of the switches. The main blade shall be counter balanced to prevent them from falling closed from any position. The current path shall not be through any springs or movable pin connection. The contacts shall be designed to be adjustable, self-aligning, high pressure, providing self-cleaning action.

Exposed contacts shall be self-wiping, silver to silver. All other current carrying contacts, including hinged end contacts, shall be silver to silver, unless sealed and insulated from contamination and corrosion. Internal sealed contacts may be either silver to silver or silver to copper. All exposed contacts, both fixed and movable, shall be replaceable in the field.

The thickness of silver coating for external contact surface shall be suitable for equipment but not less than 20 µm.

202-5.2 Grounding Switch (Earthing Switch). Grounding switch shall be either cooperative grounding switch furnished for installation on the main switch or independent grounding switch as specified. The

cooperative grounding switch shall be three poles, manually group operated. Each cooperative grounding switch shall be interlocked with its own main switch and, if specified, with another corresponding main switch to prevent closure of the ground blades when the main blades are closed and to prevent closure of the main blades when the ground blades are closed.

Each grounding switch shall have a *rated short-time withstand current* as specified in Ratings and Features sheets. Each grounding switch shall be supplied with all necessary linkages, clamps, couplings, operating pipes, operating handle, supporting bracket, guide plates, auxiliary switches and other miscellaneous equipment to make a complete installation.

The current path from grounding blade shall be connected directly to the clamp type grounding connector at switch base for common ground wire connection and shall not be through any spring or movable pin connection.

202-5.3 Insulators. Material, dimensions, general *profile*, structural, mechanical and electrical characteristics of insulators, units or assemblies shall be in compliance with the applicable requirements of *IEC* bushings and insulators standards. The color of all insulators shall be chocolate brown.

202-5.4 Operating Mechanism. The switch operating mechanism shall be so designed and fabricated that it will not cause excessive deflections on the member to which it is attached.

All switches shall be self-locking in the open and closed positions independent of the control shaft restraint. Each mechanism shall be provided within an indicator showing direction of rotation for opening or closing, and shall be provided for grounding and for pad locking in the open and closed positions.

The switch operating mechanism shall be mounted in an enclosure which is made of a weather-proof, rigidly framed stainless steel, aluminum or hot-dipped galvanized sheet steel and suitable for secure mounting on the switch supporting structure.

Each operating mechanism shall be furnished complete with all necessary operating pipes, interphase shafts, pipe couplings, guide bearings, ground braids, mounting brackets, mounting bolts, operating *lever or hand-crank*, auxiliary switches, and offsets required for operation from the ground. All operating rods and levers shall be cut to length and all machining operations and threading shall be complete in the factory.

Bearings and gears. All switch bearings and gears shall be contained in a weather sealed housing and shall be designed to provide maximum axial and lateral loading capacity with minimum friction. All ball or roller bearings shall be stainless steel packed with a

permanent type grease and with a corrosion inhibitor to eliminate future lubrication or maintenance.

Each cabinet shall be equipped with suitable heater completed with miniature circuit breaker and shall be design to maintain the temperature rise inside the cabinet within 5°C above the surrounding temperature.

The ground bus with ground terminal connector shall be provided inside each cabinet for connection of the cable shield grounding. All switches with electrical control for closing and opening operation shall be 2-pole controls.

The functional control requirement shall be according to the functional control requirement as shown on the typical schematic diagram attached.

- a. **Manual Operating Mechanism.** All switches shall be equipped with a manual operating mechanism. *The manual operating mechanism shall be of torsion type suitable for operation in the horizontal plan with an operating force should not exceed 250 N. A peak value of 450 N is accepted during a rotation of 15° maximum.* The manually gang-operated mechanism shall affect a thoroughly smooth controlled movement throughout the entire operating cycle. The operating levers shall be equipped with each switch and shall be arranged for mounting on the steel base supporting structures at approximately 1.05 m above the foundation. Means shall be provided on each switch for taking up loose motion in the operating mechanism and for adjusting the travel of each blade independently. The Contractor shall furnish all supplemental members required to secure the installation of the complete switch mechanism to the supporting structures.
- b. **Motor Operating Mechanism.** The switch motor operating mechanism shall be of the dead-front type with a hinged door complete with a keyed latch. The housing shall be provided with a detachable conduit plate suitable for drilling in the field.

The mechanism shall be of torsion type and provided with the necessary gear drive assembly, with an electrical interlock to cut-out the motor on manual operation. The (emergency) manual operation shall be possible and, in this case, the maximum operating force shall not be higher than 60 N with a possible peak of 120 N during a maximum of 10% of the total required revolutions. (For the complete operation requiring more than one revolution)

Hand-crank shall be provided for each switch and, if detachable, the hand-crank shall be arranged for mounting inside the operating mechanism housing.

The motor operating mechanism shall have an operating time as followings :

For voltages up to **230 kV** : not exceeding **10 s**

For **500 kV** : not exceeding **20 s**

The motor operated mechanism shall be equipped with a high-starting torque, reversible motor wound with moisture resistance insulation. The motor shall be capable of operating at a nominal voltage ratings as specified with a voltage variation between **15%** under and **10%** over the rated voltage. The motor shall be protected with suitable fused cut-out switches, over travel limit switches, and magnetic disc brakes **or other suitable protection for the operating mechanism**. The magnetic disc brakes shall be spring set and solenoid released with long wearing friction linings for minimum adjustment. All brakes shall be tested and set for maximum torque.

The motor operated mechanism shall be furnished complete with operation "**Local-Remote**" selector switch and control switch for opening and closing operation.

202-5.5

Equipment Supporting Structure. The equipment supporting structure shall be hot-dip galvanized after fabrication, in accordance with ASTM A123, A153 and A53. All necessary galvanized bolts, nuts and washers to complete the erection shall be furnished, including embedded anchor bolts for securing the supporting structure to the concrete foundation.

The zinc coating shall be uniform clean of a standard thickness on the entire surface of all materials.

The galvanizing coating shall meet the values as shown in the following table.

Galvanizing Coating Weight

Description	Thickness	Coating Weight (g/m ²)	
		Average Value	Minimum Value
Shaped steel and steel plate	6 mm and over	more than 702	more than 610
	under 6 mm	more than 610	more than 550
Steel pipe	-	more than 550	more than 490
Bolts, nuts	-	more than 381	more than 305
Washers, filters	5 mm and over	more than 381	more than 305
	under 5 mm	more than 305	more than 259

Finished materials shall be dipped into the solution of dichromate after galvanizing for white rust protection.

Marking. All individual pieces shall be marked with the correct designations shown on the approved shop drawings. Marking shall be done by die stamping the marks into the metal before galvanizing and

shall be clearly legible after galvanizing. The number and letter shall be a minimum of 12 mm in height and 8 mm wide.

- 202-5.6 Terminal Pad.** Each equipment terminals for connecting to the line or other equipment shall be equipped with a suitable terminal pad unless otherwise specified. The terminal pad shall be provided with 14.3 mm (9/16 in) diameter holes with 45 mm (1 3/4 in) spacing between the centers of each hole in accordance with the NEMA Standards CC1.
- The terminal pad shall be of high conductivity bronze, copper or aluminum alloy and, *unless it is made of aluminum alloy*, shall be plated electro-tin to a thickness of not less than 0.0127 mm (0.0005 in).
- 202-5.7 Ground Terminal Connector.** The grounding terminal of the equipment shall be of the clamp type suitable for 4/0 AWG copper stranded conductor. Terminal connector shall be made of high conductivity material and shall be complete with corrosion resistance bolts, nuts and lock washers.
- 202-5.8 Brass Pipe.** Brass pipe shall conform to the requirements of ASTM Specifications B 43 for "Seamless Red Brass Pipe, Standard Sizes".
- 202-5.9 Copper Pipe.** Steel pipe shall conform to the requirements of the latest issue of ASTM Specifications B 42 for "Seamless Copper Pipe, Standard Sizes".
- 202-5.10 Steel Pipes.** Steel pipe shall conform to the requirements of ASTM Specification A 53 "Welded and Seamless Steel Pipe".
- 202-5.11 Copper Tubing.** Copper tubing shall conform to requirements of the latest issue of ASTM Specification B 88-78 or "Seamless Copper Water Tube", Type K.
- 202-5.12 Welding.** All welding shall be in accordance with AWS and ASTM Specifications and standards for Unfired Pressure Vessels, as they may apply.
- 202-5.13 Rigid Conduit.** Rigid Conduit shall conform to the requirements of ANSI C80.1 for "Rigid Steel Conduit Zinc Coated"
- 202-5.14 Temperature Rise.** *When the rated current flows through the disconnecting switch, The temperature rise of its various parts shall not exceed the values specified in Table 3 of IEC 62271-1.*
- 202-5.15 Radio and Telephone Interference.** All equipment shall be designed and constructed in accordance with *IEC 62271-102* such that no interference shall be caused to radio reception or to telephone communication circuits.
- 202-6 Insulated Wire.** Insulated wire shall be tin coated copper conductor and shall *not be less than 1.5 mm²*, minimum voltage classification of 600 V

with high temperature PVC insulation. Hinge wire shall be extra flexible Class K stranding *or equal*.

202-7 **Cleaning and Painting.** All interior and exterior surfaces of ferrous metalwork shall be either galvanized in accordance with ASTM Designation: A123 and A153 or painted. Surfaces to be painted shall be thoroughly cleaned to base metal by sand blasting or shot blasting and shall be thoroughly dry before application of any paint. After cleaning, the surfaces shall be given a priming or sealing coat of paint followed by two coats of light gray Munsell Notation No 7.5 BG 6/1.5.

202-8 **Accessories**

202-8.1 **Auxiliary Switches.** All contacts shall be *conformed to class 1 in Table 6 of IEC 62271-1* at 125 Vdc ungrounded circuit. All contacts shall be electrically independent and adjustable for late on early opening or closing and all "a" and "b" contacts shall be readily interchangeable.

Each main switch and grounding switch mechanism shall be provided with a mechanically driven auxiliary switch with all necessary contacts for proper motorized disconnect operation, electrical interlocking (For main and cooperative grounding switch) remote indication and control, local control and indication including eight (8) "a" and eight (8) "b" spare contacts.

The auxiliary switch shall be supplied in a weather-proof housing provided with detachable conduit plates suitable for drilling in the field.

202-8.2 **Interlocks.** All main switches without cooperative grounding switch, the main blades shall be interlocked with grounding switches of another corresponding switches with key interlock when specified.

The key interlock shall be kirk key or approved equal.

The interlocking arrangement shall be as shown on EGAT's Drawing No 202-1. Each key for motor operating mechanism shall include one normally open and one normally close electrically separate auxiliary switch rated 125 Vdc, 10 A continuous.

All main switches, with and without grounding blades, for which key interlocks are not specified, shall have all provisions necessary to accommodate the future addition of the key interlocks.

202-8.3 **Terminal Blocks.** All accessories and control devices shall be completely wired. Both ends of wires shall be terminated by compression type, ring tongue type terminal lug and shall be provided with terminal number rings, the terminal number shall be recorded in the wiring diagram. All wiring which connects to external circuits shall terminate on terminal blocks installed in the control cabinet. The terminal block shall be of 600 V molded block type with insulating

202-9.3 **Sample Test.** The *sample test* shall be performed by selecting the sample from each lot of equipment. The numbers of samples for the test shall be as specified in the Standard.

202-9.4 **Test Report.** The report of all tests, curves and standard application data shall be furnished to EGAT immediately after completion of the tests.

202-9.5 **Test Procedure.** The Contractor shall submit the test procedure of specified tests and actual design tests to EGAT for approval. The test procedure shall consist of procedures, applied voltage, current and criteria to justify the result of the tests.

202-9.6 **Test Items for Disconnecting Switches.** The tests shall be performed in accordance with the latest *IEC 62271-102* unless otherwise specified.

a. Type Tests

(a) Dielectric tests

(b) Radio interference voltage (r.i.v.) tests (For rated voltages 123 kV and above)

(c) Measurement of the resistance of main current path

(d) Temperature-rise tests

(e) Short-time withstand current and peak withstand current tests

(f) Electromagnetic compatibility tests

(g) Operating and mechanical endurance tests

b. Routine Tests

(a) Dielectric tests on auxiliary and control circuits

(b) Measurement of the resistance of the main circuit

(c) Tightness Test.

(d) Mechanical operating tests. One unit of switch for each type and rating shall be subjected to this test.

202-9.7 **Test Items for Insulators.** The tests shall be performed in accordance with *IEC 60273 and IEC 60168*.

a. Type Tests

(a) Dry lightning-impulse withstand voltage test.

(b) *Wet switching-impulse withstand voltage tests (For 500 kV Disconnecting Switch only).*

(c) *Wet power-frequency withstand voltage test.*

(d) *Mechanical failing load test.*

b. Routine Tests

(a) *Visual examination.*

(b) *Mechanical test.*

(c) *Creepage distance measurement. One unit of each rating and type shall be subjected to this test. The test shall be performed on insulators being supply.*

c. Sample Tests

(a) *Visual and dimension tests.*

(b) *Temperature cycle test.*

(c) *Mechanical failing load test.*

(d) *Porosity test.*

(e) *Galvanizing test.*

202-10 Spare Parts. All spare parts subject to damage or deterioration by moisture shall be packed in moisture-proof material. All spare parts shall be of the same materials and workmanship as the corresponding original parts and shall be interchangeable therewith. The Bidder shall include in his bid a list of recommended spare parts *for maintenance*.

202-11 Appliances and Tools. The Contractor shall furnish all *special* tools and appliances necessary for satisfactory installation, operation, maintenance *and disassembling* of the equipment. The Contractor shall submit to EGAT for approval a list of all appliances and tools required for the above stated purposes and shall indicate thereon all appliances and tools he proposes to furnish.

202-12 Drawings and Documents for Disconnecting Switches

Drawings and documents shall at least comprise the following:

Item	Description	Approval and Final Dwgs	CD ROM (Including CAD Files)
1	Drawing list of all drawings submitted for approval	x	x
2	Outline drawing of disconnecting switches showing <ul style="list-style-type: none"> a) Mounting dimension b) Terminal location and dimensional data including hole size and spacing c) Main and grounding blade arc travel dimensional data d) Open gap e) Total net weight for the purpose of the foundation design 	x	x
3	Insulator stack outline drawing showing all pertinent dimensions with electrical and mechanical characteristics and mechanical vibration, leakage distance and mounting details	x	x
4	Detailed wiring diagram showing all internal and external connections including those for auxiliary and limit switches	x	x
5	Nameplate	x	x
6	Complete three pole schematic diagrams for the motor operator control scheme, auxiliaries, auxiliary and limit switches and heater circuit. The list of accessories equipment including type, rating, and manufacturer shall also be indicated.	x	x

201

Item	Description	Approval and Final Dwgs	CD ROM (Including CAD Files)
7	Outline drawing of operating mechanism showing the dimensions including the connection diagram for auxiliary switches and terminals	x	x
8	Outline drawing showing the position and operation of the key interlock	x	x
9	If the supporting structure is required the following drawings shall be submitted : (The normal size of drawings shall be A1)		
9.1	Outline drawing of supporting structure showing : <ul style="list-style-type: none"> a. Dimensional data showing attachment to the switch and operating mechanism including hole size and spacing b. Dimension of anchor bolt and anchor bolt setting plan c. Position of earthing terminal 	x	x
9.2	Erection drawing of supporting <ul style="list-style-type: none"> a. Size and length of all members b. Mark number of all members 	x	x
9.3	Bill of material of erection of the supporting structures with the list of members per set of all the following details : <ul style="list-style-type: none"> a. Erection member b. Section c. Length d. No of piece e. Weight 	x	x
10	Manufacturing schedule and test schedule	x	-

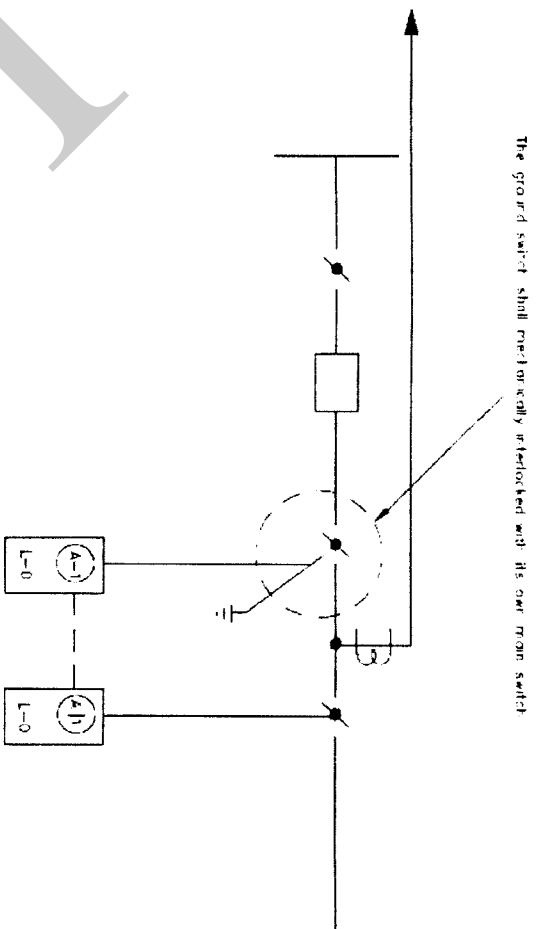


Fig 1

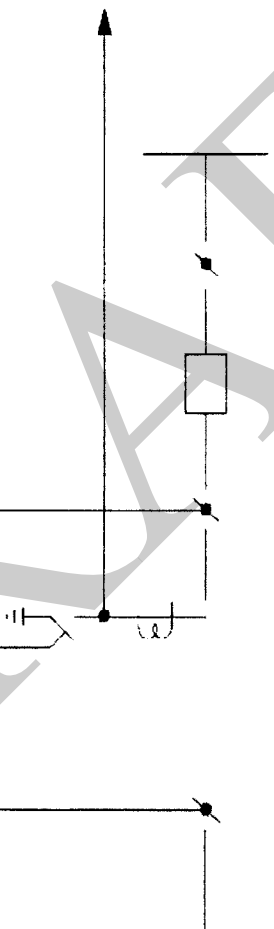


Fig 2

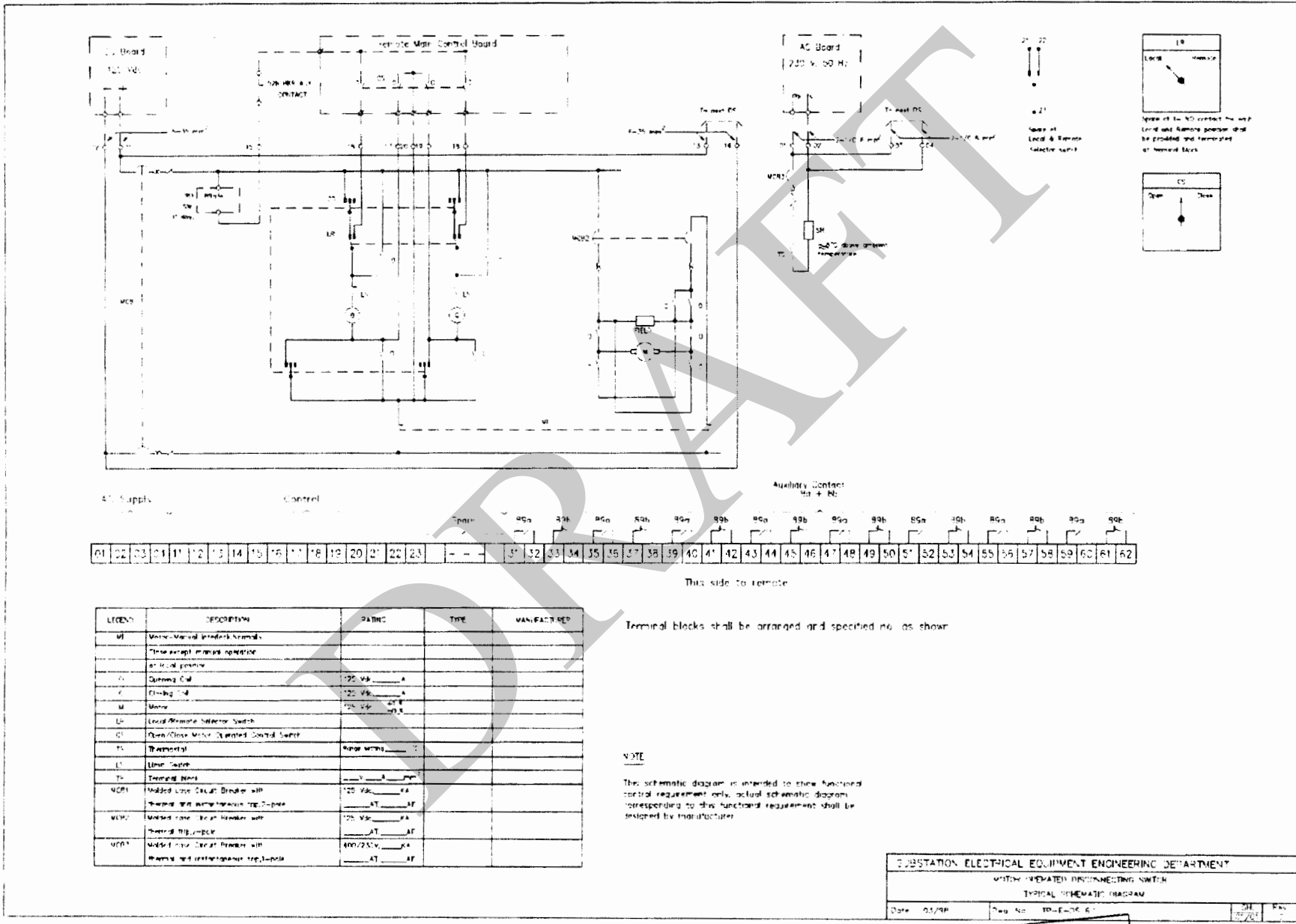
Interlock between grounding switch and shielded contact dry switch shall be key interlock as show
 L-0 = Interlock used to lock switch open

SUBSTATION ELECTRICAL EQUIPMENT ENGINEERING DEPARTMENT	
KEY INTERLOCK SCHEME	
WKT. NO	202-1
SPS REV	1/7/7

- 202.14 -

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 ENGINEERING

Jan 2018



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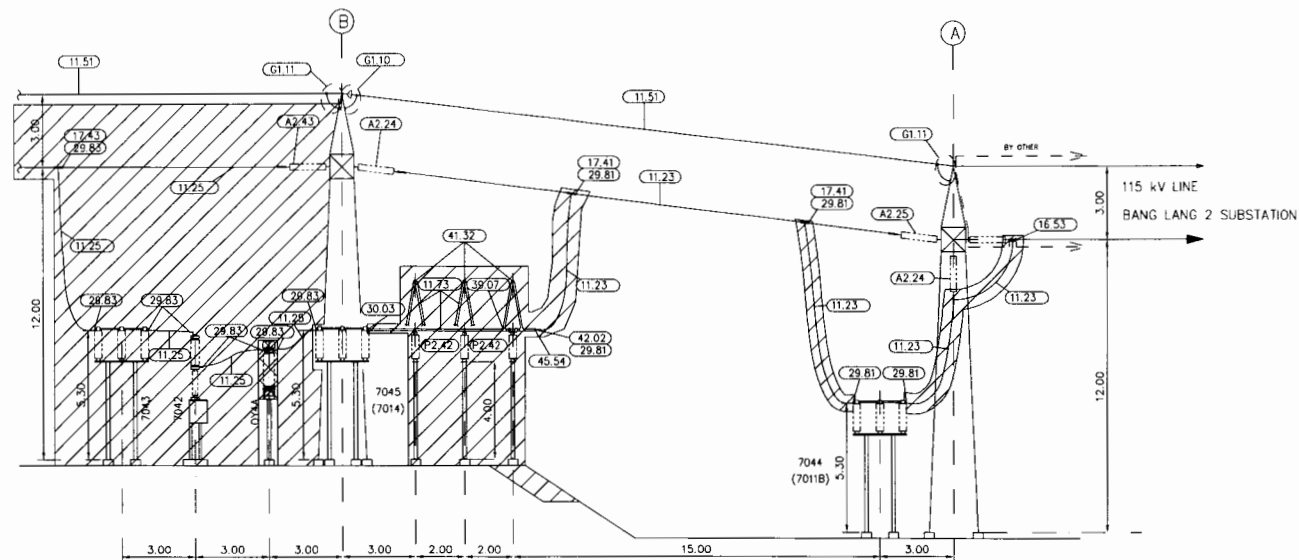
SECTION J
DRAWINGS

J. DRAWINGS

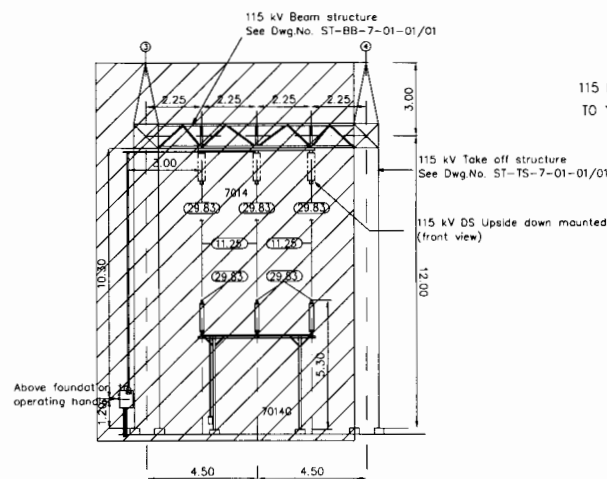
J-1. Drawings

The Following drawings are attached hereto and made a part of the Contract Documents:

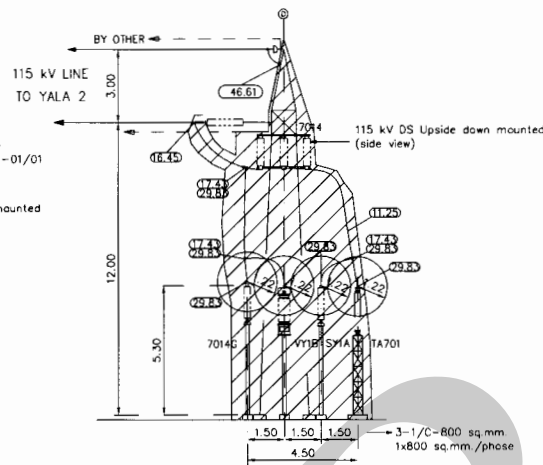
No.	Description	Dwg. No.	Sheet	Rev.
1	BUS STRUCTURE SECTIONS	BLG-S-4	01/01	-
2	115 KV TAKE OFF STRUCTURE (TS701)	ST-TS-7-01	01/01	2
3	115 KV BEAM FOR TAKE OFF & TRANSFORMER STRUCTURE (9.00 M.) (BB701)	ST-BB-7-01	01/01	1
4	DISCONNECTING SWITCH STRUCTURE	ST-DS-4-01	01/01	2
5	DETAILS OF STANDARD BOLTS, NUTS, RING FILLERS, SPRING LOCK WASHERS	SD-AB-0-01	01/01	7
6	GROUNDING SWITCH STRUCTURE	ST-GS-4-01	01/01	4



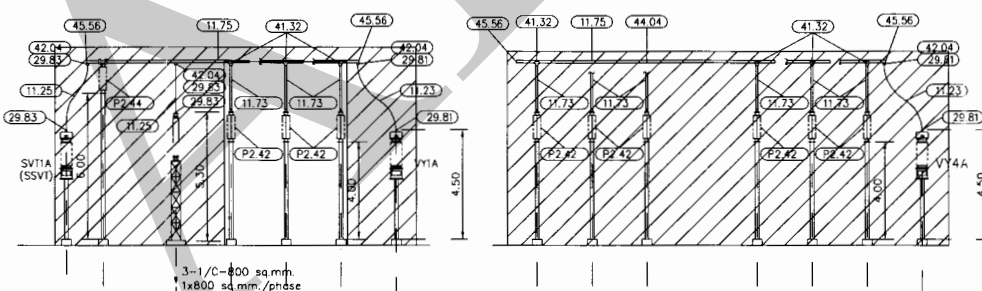
SECTION E-E



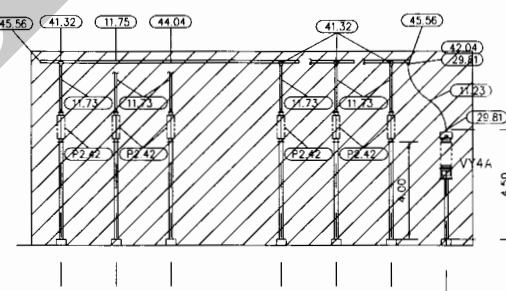
SECTION A-A



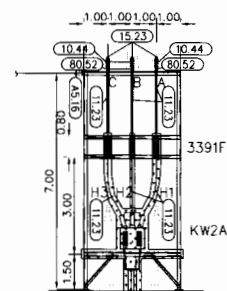
SECTION B-B



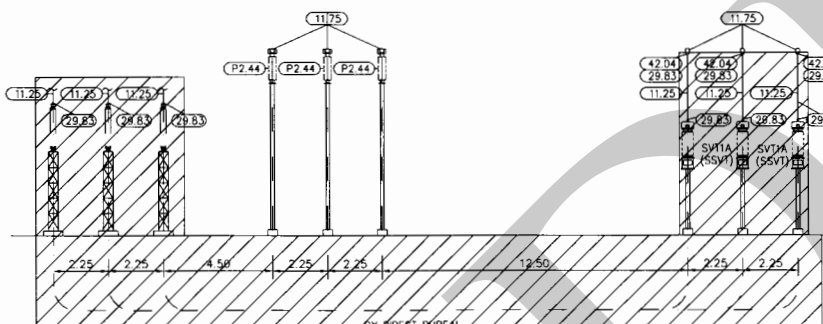
SECTION D-D



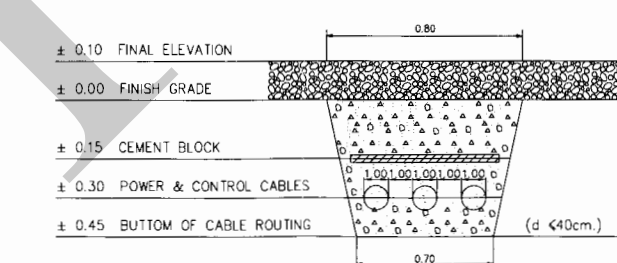
SECTION F-F



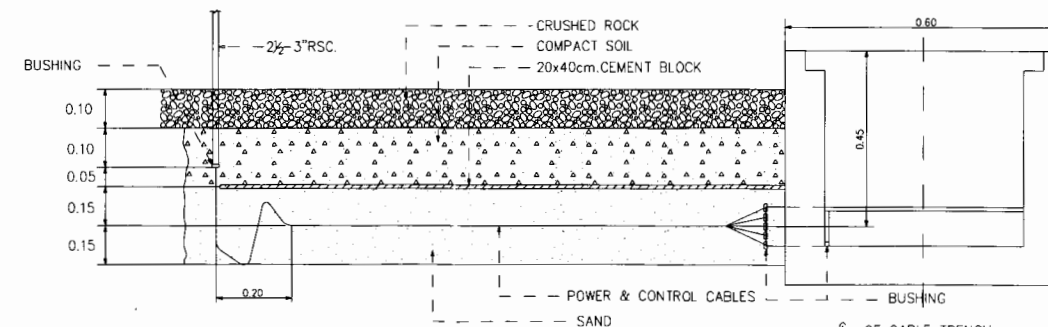
SECTION G-G



SECTION C-C



DETAIL OF POWER & CONTROL CABLE INSTALLATION BY DIRECT BURIAL



SCALE 1 : 150

ได้ตรวจสอบแล้ว
ลงชื่อ..... จิรศักดิ์ กุลแพทป์
(..... น.ส. จิรศักดิ์ กุลแพทป์)
วันที่..... ๗ เม.ย. ๖๒
กองวิศวกรรมสถานไฟฟ้าแรงสูง

LEGEND	DESCRIPTION
A2.24	115KV.Tension insulator assembly for 477 MCM.ACSR.
A2.25	115KV.Tension insulator assembly for 477 MCM.ACSR with turnbuckle
A2.43	115KV.Tension insulator assembly for 1272 MCM.ACSR with turnbuckle (For compression dead end)
A5.16	11-22KV.Tension insulator assembly for 477 MCM.ACSR. (For compression dead end)
G1.10	Overhead ground wire assembly with suspension insulation
G1.11	Overhead ground wire assembly
P2.10	115KV.Station post insulator 45"H assembly ANSI TR.No.286 for 477 MCM.AAC & ACSR
P2.42	115KV.Station post insulator assembly ANSI TR.No.286 for 2" IPS.Al.tube slip or rigid weld type.
P2.44	115KV.Station post insulator assembly ANSI TR.No.286 for 3" IPS.Al.tube slip or rigid weld type.
10.44	33 KV.Station post insulator 3"bc.TR.No.210
11.23	Aluminum conductor 477 MCM.ACSR
11.25	Aluminum conductor 1272 MCM.ACSR
11.51	Overhead ground wire 3/8"-7 strand galvanized steel.
11.73	Aluminum tube 2" IPS.
11.75	Aluminum tube 3" IPS.
15.23	Aluminum alloy bus support clamp slip or rigid bolted type with 3"bc.fitting for 2"IPS.Al.tube.
16.45	Compression terminal connector for 1272 MCM.ACSR,4 holes NEMA PAD.
16.53	Compression terminal connector for 477 MCM.ACSR,2 holes NEMA PAD.
17.41	Compression TEE for 477 MCM.ACSR.run to 4 holes NEMA PAD.
17.43	Compression TEE for 1272 MCM.ACSR.run to 4 holes NEMA PAD.
29.81	Terminal connector weld type for 477 MCM.ACSR,4 holes NEMA PAD.
29.83	Terminal connector weld type for 1272 MCM.ACSR,4 holes NEMA PAD.
30.03	Terminal connector weld type for 2" IPS.Al.tube,4 holes NEMA PAD.
39.07	Connector angle"V" weld type for 2" IPS.Al.tube run to 80'-2" IPS.Al.tube top.
41.32	Connector angle"V" weld type for 3" IPS.Al.tube run to 20'-2" IPS.Al.tube top
42.02	Bar top weld type for 2" IPS.Al.tube to 4 holes NEMA PAD
42.04	Bar top weld type for 3" IPS.Al.tube to 4 holes NEMA PAD
44.04	Aluminum alloy weld type coupler for 3" IPS.Al.tube end to end.
45.56	Corona bell internal type for 3" IPS.Al.tube.
46.61	Cable clamp for 3/8" galvanized steel OHG.wire run to flat surface.
80.52	6"Sub base 3"bc.on top and bottom.

REFERENCE DRAWINGS

- Bang lang substation
- Single Line Diagram.....Dwg.No.BLG-S-1-01/01
- Bus Structure Sections.....Dwg.No.BLG-S-3-01/01

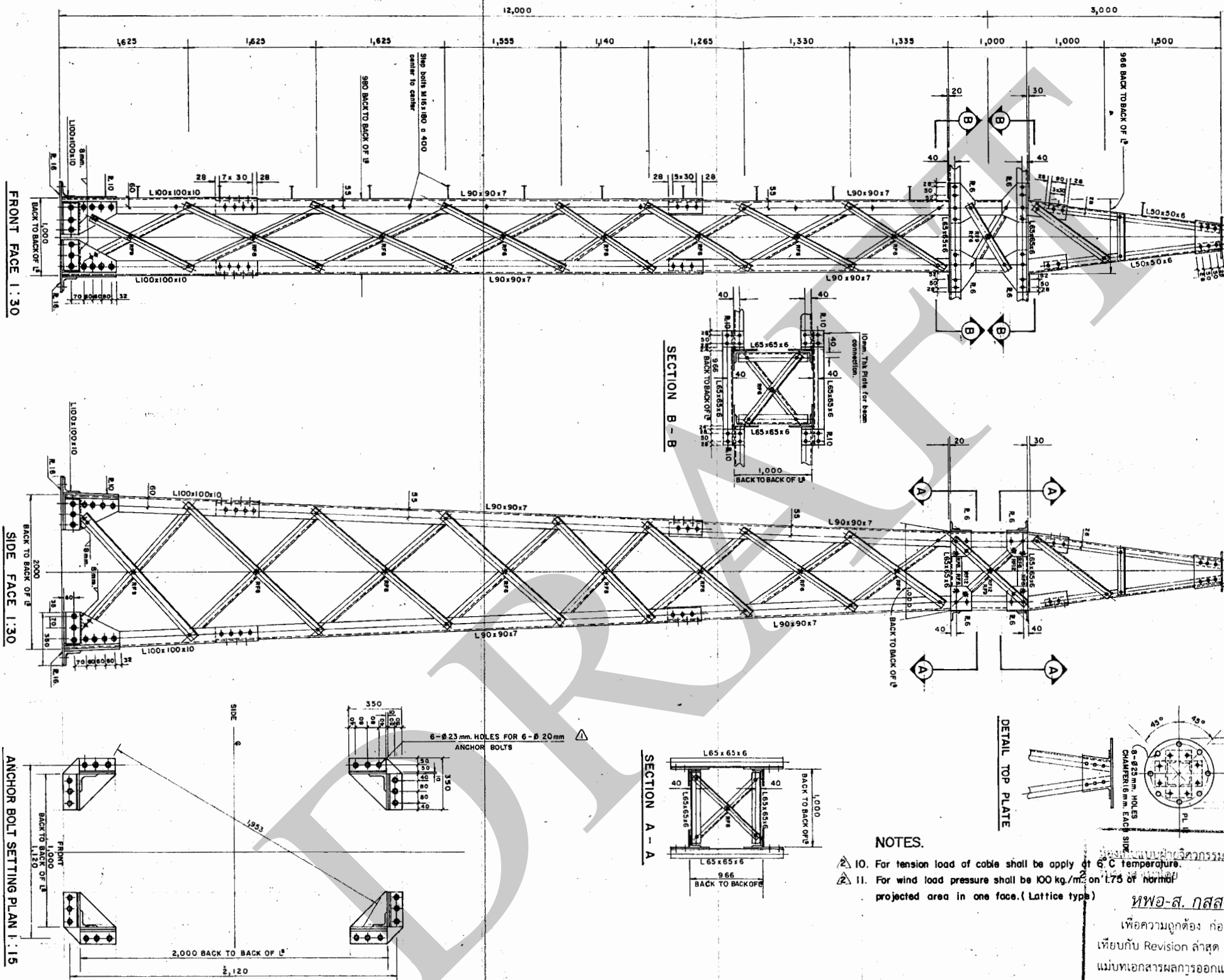
LEGEND

- Existing
- Additional for Job No.TS12-16-S124 (By EGAT)
- Replaced for Job No.TS12-16-S124 (By EGAT)

ELECTRICITY GENERATING AUTHORITY OF THAILAND

DRAWN	SUPACHOK	VALIDATED	CHIEF, STATION ENGINEERING DEPARTMENT	DRAWING NAME	BANG LANG SUBSTATION
DESIGNED		RECOMMENDED	ASSISTANT DIRECTOR, TRANSMISSION SYSTEM ENGINEERING DIVISION	DESCRIPTION OF DETAIL DRAWING	BUS STRUCTURE SECTIONS
VERIFIED		CONCURRED	DIRECTOR, TRANSMISSION SYSTEM ENGINEERING DIVISION	JOB NO.	TS12-16-S124
APPROVED				REPLACING DWG. NO.	BLG-S-4
				DWG. NO.	01
				REV.	01

REV. NO.	JOB NO.	JOB DESCRIPTION	DRAWN	DESIGNED	VERIFIED	VALIDATED	RECOMMENDED	CONCURRED	APPROVED	DATE



- NOTES**
- All dimensions are in millimeters, except otherwise shown.
 - Quality of materials.
 - H Marked member shall conform to ASTM. A440 or equivalent.
 - No marked member shall conform to ASTM. A36 or equivalent.
 - Bolt and nut shall conform to ASTM A394 or equivalent.
 - Spring washer shall be carbon steel conform to ASA G271, regular type
 - Step bolt shall conform to ASTM A307 or equivalent.
 - Blank members are L50x50x4 blank plate are 6mm. thick
 - All materials shall be hot-dip galvanized after fabrication and claming
 - Member and plate conform to ASTM. A123
 - Bolt and nut conform to ASTM A153.
 - Minimum bolt size shall be 12 mm.
 - Detail for bolts

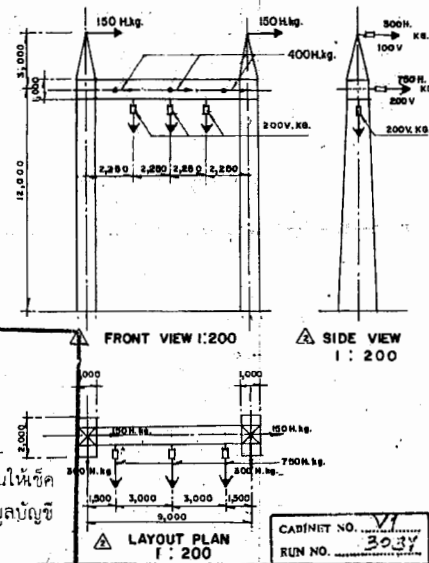
NOMINAL BOLT DIAMETER	12 mm.	16 mm.	20 mm.	24 mm.
Shear edge	22	28	32	40
Roller edge	19	22	25	30
Bolt spacing	35	45	55	70
Hole diameter	13.5	17.5	21.5	25.5

- Kind of bolts
 - Marked ø12mm. bolt with 1 nut & 1 spring washer.
 - Marked ø16mm. bolt with 1 nut & 1 spring washer.
 - Marked ø20mm. bolt with 1 nut & 1 spring washer.
 - Marked ring filler.
 - Marked step bolt with 2 nut & 1 spring washer.
- Standard gauge of member one half of flange
- Detail of standard U-bolt, step bolts and anchor bolt see detail in Dwg. No. SD-AB-0-01

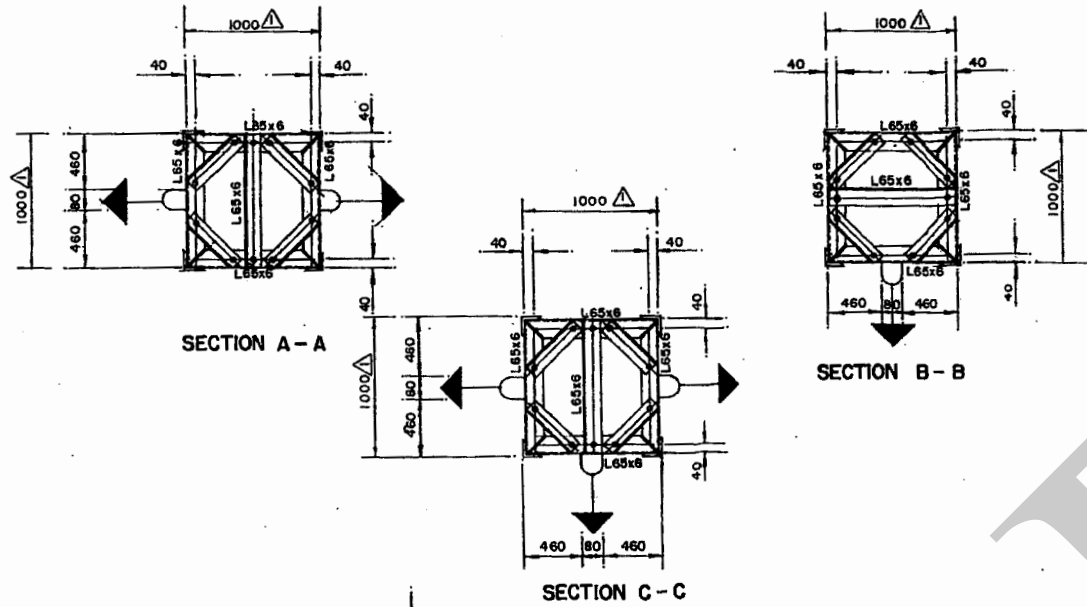
NOTES.

- For tension load of cable shall be apply at 6°C temperature.
- For wind load pressure shall be 100 kg./m² on 1.75 of normal projected area in one face. (Lattice type)

หพอ-ส. กสส-ส. อวส.
เพื่อความถูกต้อง ก่อนนำไปใช้งานให้ขีดเทียบกับ Revision ล่าสุด จากฐานข้อมูลบัญชีแบบเอกสารผลการออกแบบ



ELECTRICITY GENERATING AUTHORITY OF THAILAND																
DESIGNED					STANDARD DRAWING											
DESIGNED	SDEN	ACCE	CSE	SUBMITTED	RECOMMENDED	CONCURRED	APPROVED	DATE	JOB NO.	REPLACING DWG. NO.						
ADD. LAYOUT PLAN, FRONT VIEW & SIDE VIEW.	SDEN	ACCE	CSE	33/4/34	30.1.86			30.1.86								
REVISE HOLES FOR ANCHOR BOLTS.	SDEN	ACCE	CSE	28/4/29												
NO	JOB ASSG	JOB DESCRIPTION & REVISION	ORAWN	DESIGNED	CHECKED	SDEN	ACCE	CSE	SUBMITTED	RECOMMENDED	CONCURRED	APPROVED	DATE	DWG. NO.	01	REV.
														ST-TS-7-01	01	2

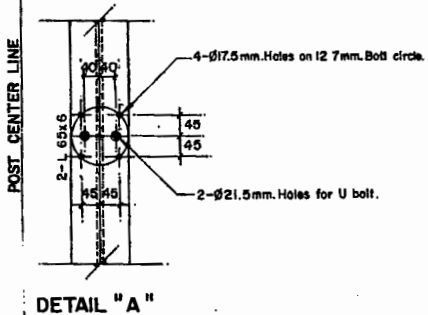
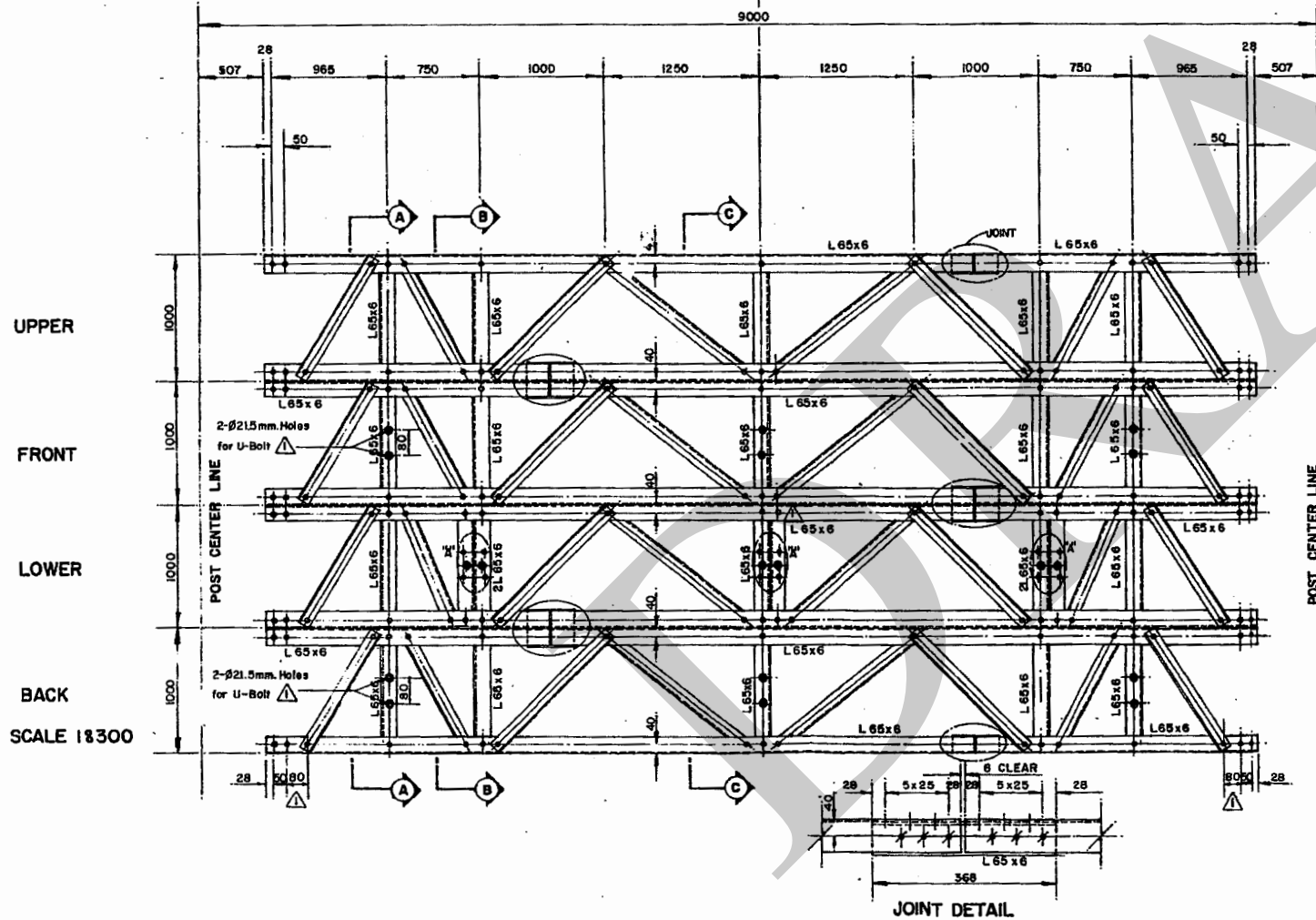


NOTES.

- All dimensions are in millimeters, except otherwise shown.
- Quality of materials.
H Marked member shall conform to ASTM A36 or equivalent.
L marked member shall conform to ASTM A36 or equivalent.
Bolt and nut shall conform to ASTM A394 or equivalent.
Spring washer shall be carbon steel conform to ASA B271, regular type.
Step bolt shall conform to ASTM A307 or equivalent.
- Blank members are L50x4
- All materials shall be Hot-Dip galvanized after fabrication and cleaning.
Member and plate conform to ASTM A123
Bolt and nut conform to ASTM A153
- Detail for bolts.

NOMINAL BOLT DIAMETER	16mm.
Shear edge	28
Rolled edge	22
Bolt spacing	45
Hole diameter	17.5

- Kind of bolts.
 - Marked Ø 12 mm. bolt with 1 nut & 1 spring washer.
 - Marked Ø 16 mm. bolt with 1 nut & 1 spring washer.
 - Marked Ø 20 mm. bolt with 1 nut & 1 spring washer.
- Standard gauge member one half of flange.
- Detail of standard anchor bolt and U bolts see detail in Dwg. No. SD-AB-0-01



REFERENCE DRAWING

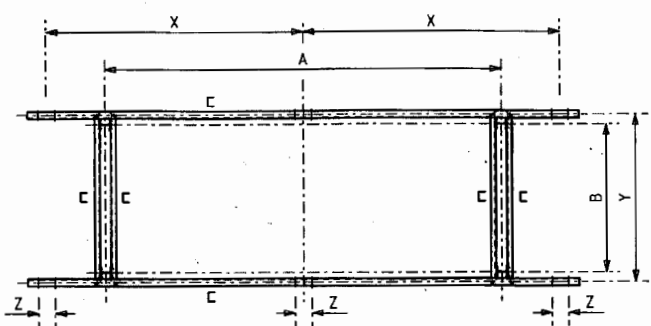
115 KV. Beam for take off & Transformer structure. Dwg. No. TP-252.1A (TOS & TS)

วิศวกรควบคุมการก่อสร้าง
โครงการนี้โดย
ทพอ-ส. กสิณี-ส. อวต.
เพื่อความถูกต้อง ก่อนนำไปใช้งานให้เช็ค
เทียบกับ Revision ล่าสุด จากฐานข้อมูลบัญชี
แม่แบบเอกสารการออกแบบ

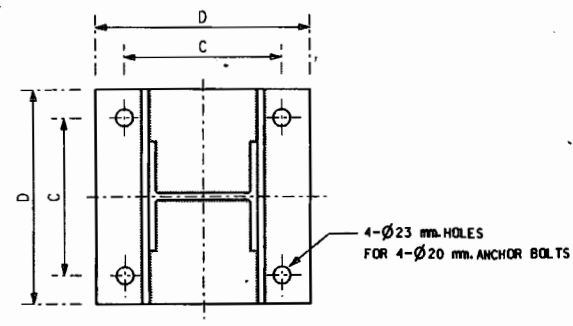
CABINET NO. V1
RUN NO. 300

ELECTRICITY GENERATING AUTHORITY OF THAILAND										STANDARD DRAWING	
DESIGNED	SDEN	ACCE	CSE	SUBMITTED						115KV.BEAM FOR TAKE OFF & TRANSFORMER STRUCTURE (9.00 M.) (BB 701)	
DESIGNED	ACCE	SUPA		RECOMMENDED						DWG. NO. ST-BB-7-01	
DRAWN	RECOMMENDED			CONCURRED						REV. 01 1	
CHECKED							DATE 12-4-28				
APPROVED							DATE 12-4-28				
DEPUTY GENERAL MANAGER											

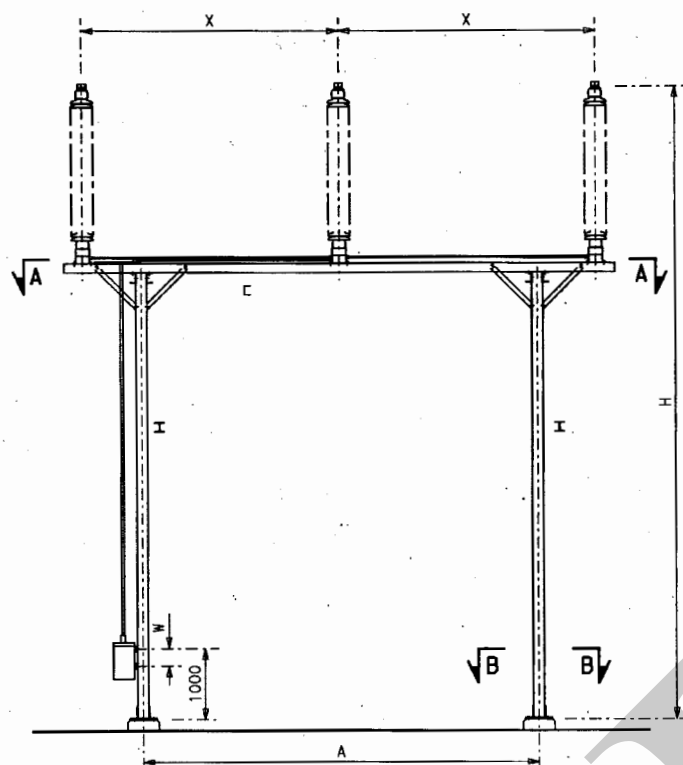
NO.	JOB ASSIG	JOB DESCRIPTION & REVISION	DRAWN	DESIGNED	CHECKED	SDEN	ACCE	CSE	SUBMITTED	RECOMMENDED	CONCURRED	APPROVED	DATE
		ADD. DIMENSIONS, HOLES FOR U-BOLT, REVISE QUALITY OF MATERIALS	S. Wany	D. Das	L. K.	H. P.	SUPA	PP	KK	W. S. M.			21/3/28



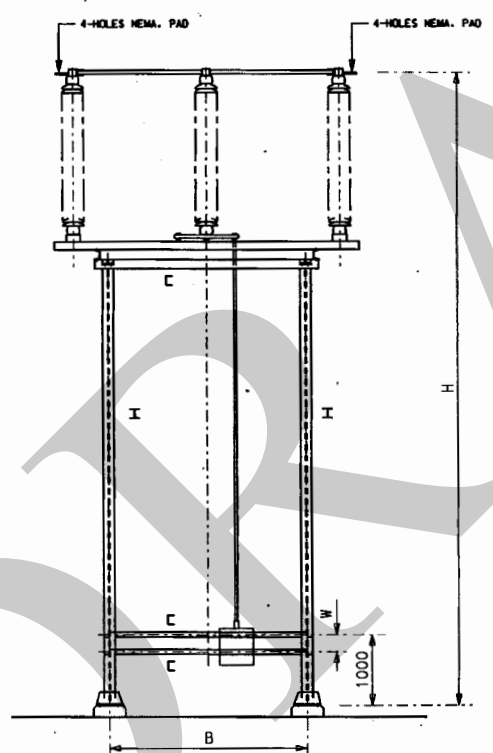
SECTION A-A



SECTION B-B



ELEVATION



SIDE VIEW

ITEM	DESIGNATION	STR. MKD.	DIMENSION (mm.)									REMARK
			A	B	C	D	H	X	W	Y	Z	
1	69 KV DISCONNECTING SWITCH SUPPORTING STRUCTURE	GDS6-1	2.400	1.000	220	300	5.000	2.000				
2	69 KV DISCONNECTING SWITCH SUPPORTING STRUCTURE	GDS6-2	2.400	1.000	220	300	5.000	1.550				
3	115 KV DISCONNECTING SWITCH SUPPORTING STRUCTURE	GDS7-1	2.900	1.100	220	300	5.000	2.250				
4	115 KV DISCONNECTING SWITCH SUPPORTING STRUCTURE	GDS7-2	2.900	1.100	220	300	5.300	2.250				
5	115 KV DISCONNECTING SWITCH SUPPORTING STRUCTURE	GDS7-3	2.900	1.100	220	300	5.500	2.250				
6	115 KV DISCONNECTING SWITCH SUPPORTING STRUCTURE	GDS7-4	2.900	1.100	220	300	5.053	2.250				
7	115 KV DISCONNECTING SWITCH SUPPORTING STRUCTURE	GDS7-5	2.900	1.100	220	300	4.100	2.250				
8	115 KV DISCONNECTING SWITCH SUPPORTING STRUCTURE	GDS7-6	2.900	1.100	220	300	5.800	2.250				
9	115 KV DISCONNECTING SWITCH SUPPORTING STRUCTURE	GDS7-7	2.900	1.100	220	300	7.300	2.250				
10	115 KV DISCONNECTING SWITCH SUPPORTING STRUCTURE	GDS7-8	2.900	1.100	220	300	5.300	2.130				
11	115 KV DISCONNECTING SWITCH SUPPORTING STRUCTURE	GDS7-9	2.900	1.100	220	300	3.800	2.250				
12	115 KV DISCONNECTING SWITCH SUPPORTING STRUCTURE	GDS7-10	2.900	1.100	220	300	7.300	2.000				
13	115 KV DISCONNECTING SWITCH SUPPORTING STRUCTURE	GDS7-11	2.900	1.100	220	300	3.800	2.000				
14	115 KV DISCONNECTING SWITCH SUPPORTING STRUCTURE	GDS7-12	2.900	1.100	220	300	4.500	2.250				
15	230 KV DISCONNECTING SWITCH SUPPORTING STRUCTURE	GDS8-1	4.500	2.200	220	300	5.250	3.500				
16	230 KV DISCONNECTING SWITCH SUPPORTING STRUCTURE	GDS8-2	4.500	2.200	220	300	6.000	3.500				
17	230 KV DISCONNECTING SWITCH SUPPORTING STRUCTURE	GDS8-3	4.500	2.200	260	350	9.000	3.500				
18	230 KV DISCONNECTING SWITCH SUPPORTING STRUCTURE	GDS8-4	6.000	2.200	260	350	6.000	5.000				
19	230 KV DISCONNECTING SWITCH SUPPORTING STRUCTURE	GDS8-5	4.500	2.200	220	300	5.520	3.500				
20	230 KV DISCONNECTING SWITCH SUPPORTING STRUCTURE	GDS8-6	4.500	2.200	260	350	8.520	3.500				
21	230 KV DISCONNECTING SWITCH SUPPORTING STRUCTURE	GDS8-7	4.500	2.200	260	350	8.250	3.500				
22	230 KV DISCONNECTING SWITCH SUPPORTING STRUCTURE	GDS8-8	6.000	2.200	220	300	5.720	4.500				
23	230 KV DISCONNECTING SWITCH SUPPORTING STRUCTURE	GDS8-9	6.000	2.200	260	350	9.000	5.000				
24	230 KV DISCONNECTING SWITCH SUPPORTING STRUCTURE	GDS8-10	4.500	2.200	220	300	5.250	3.400				
25	230 KV DISCONNECTING SWITCH SUPPORTING STRUCTURE	GDS8-11	4.500	2.200	220	300	6.000	3.400				
26	230 KV DISCONNECTING SWITCH SUPPORTING STRUCTURE	GDS8-12	4.500	2.200	220	300	9.000	3.400				

DEPEND ON THE MANUFACTURE'S DESIGN
DEPEND ON THE MANUFACTURE'S DESIGN
DEPEND ON THE MANUFACTURE'S DESIGN

NOTE
1. ALL DIMENSION ARE IN MILLIMETER EXCEPT AS NOTED

ตรวจสอบโดย
ทพอ-ส. กสส-ส. อวส.
เพื่อความถูกต้อง ก่อนนำไปใช้งานให้เช็ค
เทียบกับ Revision ล่าสุด จากฐานข้อมูลบัญชี
แม่แบบเอกสารผลการออกแบบ

DR. S. Somrit	VAL. U. U.	RECOMM. S. Somrit	CONC. S. Somrit	APPROV. U. U.	DATE 22/12/09	DRAWING NAME STANDARD DRAWING	DESCRIPTION OF DETAIL DRAWING DISCONNECTING SWITCH STRUCTURE	JOB NO. -	REPLACING DWG. NO. ST-DS-4-01 REV.1	DWG. NO. ST-DS-4-01	01 REV. 01
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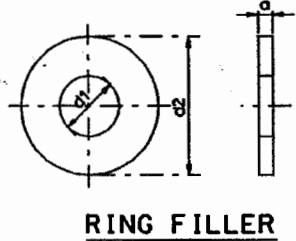
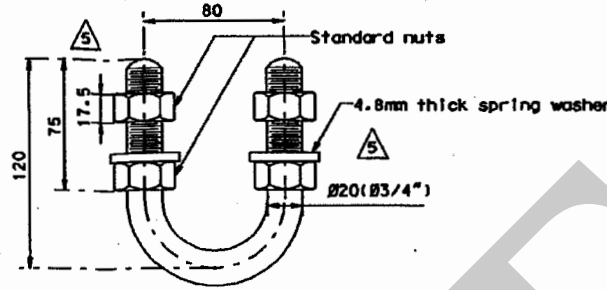


TABLE FOR RING FILLERS Unit : mm RING FILLERS

Nominal Diameter a	d1		d2	
	Nominal	Tolerance	Nominal	Tolerance
M12	13.5	+0.7 -0	30.0	+0 -1.0
M16	17.5	+0.7 -0	40.0	+0 -1.0
M20	21.5	+0.8 -0	50.0	+0 -1.0
M22	23.5	+0.8 -0	57.0	+0 -1.0
M24	25.5	+0.8 -0	65.0	+0 -1.0
M28	29.5	+0.8 -0	75.0	+0 -1.0
M32	33.5	+0.8 -0	85.0	+0 -1.0

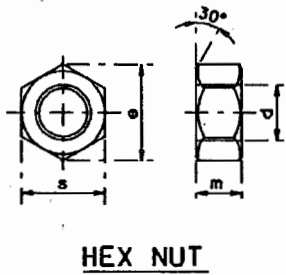
a	Tolerance
4, 5	±0.5
6	±0.7
8	±0.7
9	±0.7
12	±1.0



M20 U-BOLT

NOTES

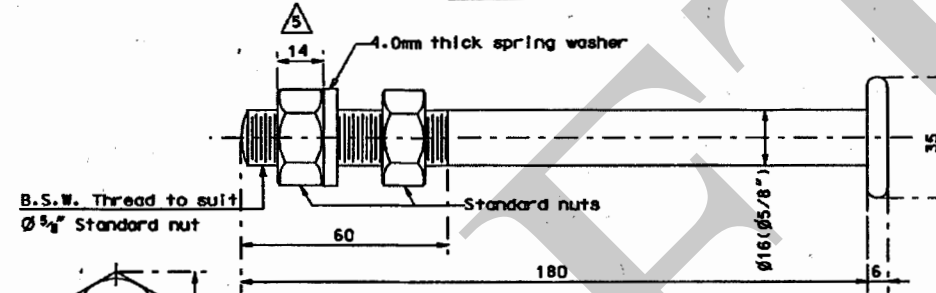
- ALL DIMENSIONS ARE IN MILLIMETER, UNLESS OTHERWISE SHOWN
- ALL MATERIAL SHALL CONFORM TO THE FOLLOWING DESIGNATION OR EQUIVALENT
 HEX. BOLT.....ASTM A394 TYPE 0
 HEX. NUT.....ASTM A563 CLASS A
 U-BOLT.....ASTM A394 TYPE 0 UNLESS OTHERWISE NOTED
 SPRING WASHER.....ASTM A394 TYPE 0 UNLESS OTHERWISE NOTED.
 RING FILLER.....JIS SS 400
 PLAIN WASHER.....JIS SS 400
 ANCHOR BOLTS.....A 307 CLASS C
 STEP BOLTS.....A 307 CLASS A
- ALL MATERIALS SHALL BE HOT-DIP GALVANIZED TO MEET THE REQUIREMENT OF ASTM A 153 AFTER FABRICATION
- LENGTH OF ANCHOR SHALL BE AS SHOWN IN TABLE FOR ANCHOR BOLT UNLESS OTHERWISE SHOWN ON THE INDIVIDUAL TYPICAL DRAWING.
- COMPLETE SET OF BOLT SHALL BE AS FOLLOWING ASSEMBLY UNLESS CONNECTION BOLT.....1 BOLT, 1 NUT AND 1 SPRING WASHER
 ANCHOR BOLT.....1 BOLT, 3 NUT AND 2 PLAIN WASHER OF 6mm THK.
 STEP BOLT.....1 BOLT, 2 NUT AND 1 SPRING WASHER
 U-BOLT.....1 BOLT, 4 NUT AND 2 SPRING WASHER
- THREADS FOR STEP BOLT TO BE UNDER CUT BY 0.3mm FOR GALVANIZING
- ALL NUTS SHALL BE STANDARD HEXAGONAL.
- H=HEIGHT OF STANDARD NUT IN mm



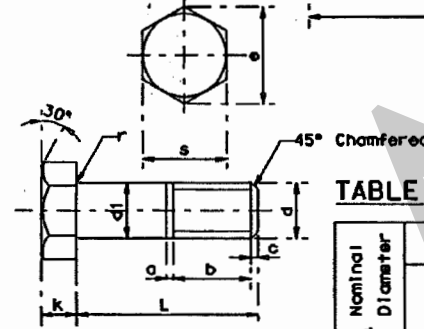
HEX NUT

TABLE FOR HEX NUT Unit : mm

Nominal Diameter a	m		s		e
	Nominal	Tolerance	Nominal	Tolerance	
M12	10.5	±0.8	18.0	+0 -0.8	20.8
M16	14.0	±0.9	24.0	+0 -0.8	27.7
M20	17.5	±0.9	30.0	+0 -0.8	34.6
M22	19.2	±0.9	32.0	+0 -1.0	38.1
M24	21.0	±1.0	36.0	+0 -1.0	41.6
M28	24.5	±1.0	42.0	+0 -1.0	48.5
M32	28.0	±1.0	48.0	+0 -1.0	55.4
M36	31.5	±1.0	54.0	+0 -1.2	62.4
M39	34.1	±1.2	58.5	+0 -1.2	67.6
M42	36.1	±1.2	63.0	+0 -1.2	72.7
M60	52.5	±1.2	90.0	+0 -1.4	103.9



M16 STEP BOLT



HEX BOLT

TABLE FOR HEX BOLTS(JIS) Unit : mm

Nominal Diameter a	d1		k		s		e	r	a			b	L (tolerance)	
	Nominal	Tolerance	Nominal	Tolerance	Nominal	Tolerance			Nominal	Approx	Approx		Nominal	Tolerance
M12	12.0	+0.9 -0.2	8.0	±0.8	19.0	+0 -0.8	21.9	0.6	2.0	2.0	19.5	+1.0 -0	±1.0	±1.4
M16	16.0	+0.9 -0.2	10.0	±0.8	24.0	+0 -0.8	27.7	0.6	2.0	2.0	22.0	+1.0 -0	±1.0	±1.4
M20	20.0	+0.95 -0.35	13.0	±0.9	30.0	+0 -0.8	34.6	0.8	2.5	2.5	26.5	+1.0 -0	±1.0	±1.4
M24	24.0	+0.95 -0.35	15.0	±0.9	36.0	+0 -1.0	41.6	0.8	2.5	3.0	34.0	+1.0 -0	±1.0	±1.4
M28	28.0	+0.95 -0.35	18.0	±0.9	42.0	+0 -1.0	48.3	1.0	2.5	3.0	40.5	+1.0 -0	±1.0	±1.4
M32	32.0	+1.20 -0.40	21.0	±1.0	50.0	+0 -1.0	57.7	1.0	2.5	3.5	47.0	+1.0 -0	±1.0	±1.4

TABLE FOR HEX BOLTS(ANSI) Unit : mm

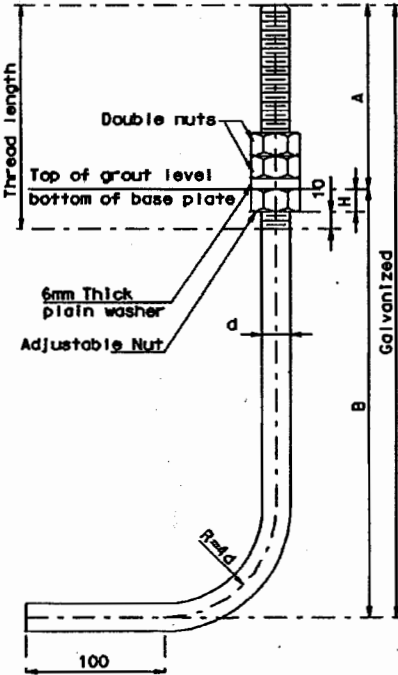
Nominal Diameter a	d1		k		s		e	r	a			b	L (tolerance)	
	Nominal	Tolerance	Nominal	Tolerance	Nominal	Tolerance			Nominal	Approx	Approx		Nominal	Tolerance
M12	12.0	+0.9 -0.2	8.2	±0.8	17.7	+0 -0.8	23.0	0.6	2.0	2.0	19.5	+1.0 -0	±1.0	±1.4
M16	16.0	+0.9 -0.2	10.1	±0.8	24.0	+0 -0.8	27.1	0.6	2.0	2.0	22.0	+1.0 -0	±1.0	±1.4
M20	20.0	+0.95 -0.35	13.0	±0.9	30.0	+0 -0.8	33.9	0.8	2.5	2.5	26.5	+1.0 -0	±1.0	±1.4
M22	22.0	+0.95 -0.35	14.6	±1.1	33.0	+0 -0.8	37.3	0.8	2.5	2.5	30.0	+1.0 -0	±1.0	±1.4
M24	24.0	+0.95 -0.35	17.0	±1.3	36.0	+0 -0.8	40.6	0.8	2.5	2.5	34.0	+1.0 -0	±1.0	±1.4
M28	28.0	+0.95 -0.35	18.8	±1.5	40.0	+0 -0.8	47.4	0.8	2.5	2.5	40.5	+1.0 -0	±1.0	±1.4
M32	32.0	+0.95 -0.35	21.5	±1.6	43.4	+0 -0.8	54.2	0.8	2.5	2.5	47.0	+1.0 -0	±1.0	±1.4

TABLE FOR SPRING LOCK WASHERS(JIS) Unit : mm

Nominal Diameter a	d1		d2	b	s
	Nominal	Tolerance			
M12	12.2	+0.6 -0	21.5	4.2	3.0
M16	16.2	+0.8 -0	28.0	5.2	4.0
M20	20.2	+0.8 -0	33.8	6.1	5.1
M24	24.5	+1.0 -0	40.3	7.1	5.9
M28	28.2	+1.2 -0	46.3	8.2	7.0
M32	32.2	+1.4 -0	53.7	9.1	8.0

TABLE FOR SPRING LOCK WASHERS(ANSI) Unit : mm

Nominal Diameter a	d1		d2	b	s
	Nominal	Tolerance			
M12	12.2	+0.8 -0	21.5	4.5	3.2
M16	16.2	+0.8 -0	27.6	5.2	4.0
M20	20.2	+0.8 -0	33.3	6.0	4.8
M22	22.2	+0.8 -0	36.5	6.5	5.4
M24	24.2	+0.8 -0	39.8	7.2	5.9
M28	28.2	+0.8 -0	46.2	8.2	7.0
M32	32.2	+0.8 -0	52.5	9.3	8.1



ANCHOR BOLT DETAIL

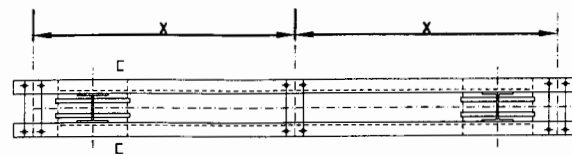
TABLE FOR ANCHOR BOLTS

Anchor bolt size (mm)	Diameter d (mm)	A (mm)	Embedded Length B (mm)	Nut Width H (mm)	Radius R (mm)
M 16x555x100 128mm Thread length	16	105	450	13	64
M 20x712x100 138mm Thread length	20	112	600	16	80
M 22x818x100 146mm Thread length	22	118	700	18	88
M 25x924x100 (OR M24) 153mm Thread length	24	124	800	19	100
M 28x1036x100 168mm Thread length	28	136	900	22	112
M 32x1142x100 178mm Thread length	32	142	1000	26	128
M 35x1253x100 192mm Thread length	35	153	1100	29	140
M 38x1357x100 198mm Thread length	38	157	1200	31	152
M 42x1427x100 221mm Thread length	42	177	1250	34	168
M 45x1585x100 231mm Thread length	45	185	1400	36	180
M 60x2142x100 250mm Thread length	60	192	1950	48	240

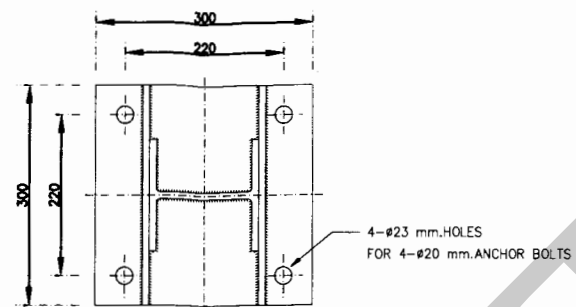
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CABINET NO V5
RUN NO 1601

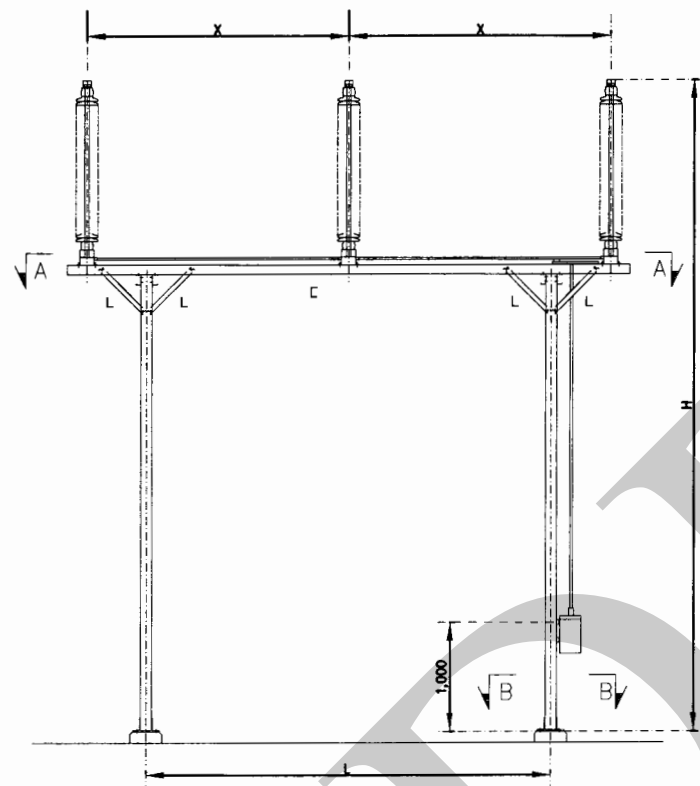
ITEM	DESCRIPTION	STR. MKD.	DIMENSION (mm.)			REMARK
			X	H	L	
1	115 kV GROUNDING SWITCH SUPPORT STRUCTURE	GG5 7-1	2,250	4,500	3,000	
2	230 kV GROUNDING SWITCH SUPPORT STRUCTURE	GG5 8-1	3,500	5,500	4,500	
3	115 kV GROUNDING SWITCH SUPPORT STRUCTURE	GG5 7-2	2,130	4,500	3,000	
4	115 kV GROUNDING SWITCH SUPPORT STRUCTURE	GG5 7-3	2,250	5,300	3,000	



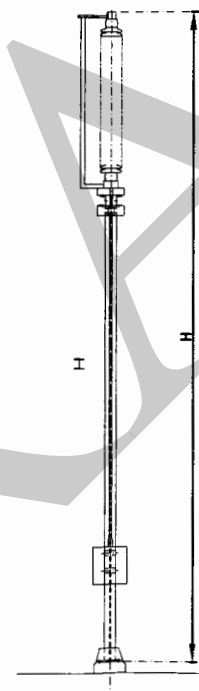
SECTION A-A



SECTION B-B



ELEVATION



SIDE VIEW

วิศวกรตรวจสอบแล้ว
ลงชื่อ.....
(นางสาวสมิตต์ เชื้อนแก้ว)
วันที่ 22 พ.ย. 2562
กองวิศวกรรมสถานไฟฟ้าแรงสูง



REV. NO.	JOB NO.	JOB DESCRIPTION	DRAWN	DESIGNED	VERIFIED	VALIDATED	RECOMMENDED	CONCURRED	APPROVED	DATE
4	-	ADDITIONAL 115 kV GROUNDING SWITCH (GG57-3, H=5,300mm.)	THITWAT	-	-	-	-	-	-	-
3	-	ADDITIONAL 115 kV GROUNDING SWITCH	T. Sukit	-	-	-	-	-	-	-
2	-	ADDITIONAL 230 kV GROUNDING SWITCH	K. WIRASAK	-	-	-	-	-	-	-
1	-	ADDITIONAL HOLE SIZE FOR ANCHOR BOLT	T. Sukit	-	-	-	-	-	-	-

ELECTRICITY GENERATING AUTHORITY OF THAILAND											
DRAWN	THITWAT	VALIDATED	CHW. Assistant Director (Engineering)							DRAWING NAME	TYPICAL DRAWING
DESIGNED		RECOMMENDED	Assistant Director (Transmission System Engineering)							DESCRIPTION OF DETAIL DRAWING	GROUNDING SWITCH STRUCTURE
VERIFIED		CONCURRED	Assistant Director (Transmission System Engineering)							JOB NO.	-
APPROVED		DATE								REPLACING DWG. NO.	ST-GS-4-01-01(Rev.3)
										DWG. NO.	ST-GS-4-01
										01 REV.	01 4