

إعلان طرح عطاء

١. تعلن القيادة العامة للقوات المسلحة الأردنية/ قيادة سلاح الجو الملكي عن طرح العطاء رقم س ج/ت ف/٢٠٢٥/٣٩ وهو عبارة عن شراء وتركيب لوحة الجهد المتوسطة (11 KVA MEDIUM VOLTAGE SWITCHGEAR).
٢. على الراغبين بالاشتراك مراجعة قسم المشتريات بقيادة سلاح الجو الملكي خلال ساعات الدوام الرسمي ليومي الثلاثاء والخميس من كل إسبوع ابتداءً من يوم الثلاثاء الموافق ٢٠٢٥/٨/١٩ ولغاية يوم الثلاثاء الموافق ٢٠٢٥/٩/٩ لإستلام نسخة كشف المواصفات مقابل (٢٠٠) مئتان دينار فقط غير مستردة مصطحبين معهم رخصة مهن سارية المفعول وسجل تجاري.
٣. آخر موعد لبيع المناقصات يوم الثلاثاء الموافق ٢٠٢٥/٩/٩ وخلال ساعات الدوام الرسمي.
٤. تعاد المناقصات بالظرف المختوم خلال ساعات الدوام الرسمي ليس بعد يوم الخميس الموافق ٢٠٢٥/٩/١١ ولن تقبل أية مناقصة ترد بعد هذا الوقت.
٥. للإطلاع على كشف المواصفات المطلوبة للعطاء يرجى زيارة الموقع الإلكتروني الرسمي لقيادة سلاح الجو الملكي WWW.RJAF.MIL.JO.

كشف المواصفات الفنية والمواد المراد شراؤها وصف الأعمال

B كشف المواد :

#	Item	Qty.	Summary of 8 Cubicles	
1	SUPPLING INSTALLING, TESTING AND COMMISSIONING OF NEW (11KV) SWITCHGEAR (8 Cubicles) INCLUDE REMOVING EXISTING SWITCHGEAR:	1	Incomer	Qty.3
			Outgoing	Qty.3
			Bus coupler	Qty.1
			Bus-riser	Qty.1
			DC-System	DC System Consisting of Batteries and Charger
2	SCADA System Substation	----		
3	Wireless H.V. Sequence Instrument	2	Phase Sequence Indicator 11kv/Stick Type	
4	Radio detection Cable Locator Device	2	Can Locate Energized and De-energized Cables For Both (LV/MV Cables)	

ب. وصف العمل :

١. على الشركات الراغبة بتقديم عرض سعر القيام بزيارة ميدانية للموقع (Site Survey) للاطلاع على طبيعة العمل المطلوب في قيادة سلاح الجو الملكي/ماركا.
٢. تقديم تصميم لوحة جهد متوسط (11KV MEDIUM VOLTAGE SWITCHGEAR) بالإضافة الى أنظمة الحماية الكهربائية (Protection Relays) واجهزة القياس والتحكم (Control and Metering Devices include CT, VT...etc.) ونظام (SCADA SYSTEM) الخاصة بلوحة الجهد المتوسط وحسب المواصفات المعمول بها في هذا المجال من قبل الشركات الصانعة لمثل هذه الأنظمة وعلى الشركات الراغبة أن تقوم بتقديم (Single Line Diagram) للوحة تبين تفصيلية الخزائن (Cubicles) المكونة للوحة (Switch Board) وأبعادها وتوضيح ما تحتويه من حجات الكوابل وحجات التحكم وحجات القواطع الكهربائية ومحولات الجهد المطلوب تركيبها على جميع مصادر التغذية وعددها (٣) (JEPCO, TR NO.1, TR NO.2) في المخطط المرفق المقترح للوحة الجديدة (ومحولات التيار والباسبارات ومفاتيح الفصل واي معدات واجزاء مع تحديد الموديل الخاص بها ويتم اعتمادها من قبل المعنيين في سلاح الجو الملكي .
٣. توريد وتركيب وتشغيل وفحص لوحة جهد متوسط (11KV MEDIUM VOLTAGE SWITCHGEAR) .
٤. إزالة لوحة الجهد المتوسط القديمة من موقعها الحالي في محطة الكهرباء الرئيسية في قيادة سلاح الجو الملكي/ماركا وتسليمها للمعنيين في الموقع .
٥. تصميم وتقديم غرفة معدنية (Steel Structure) حول اللوحة الجديدة التي سيتم تركيبها من قبل المقاول داخل هجر محطة الكهرباء القائم حاليا لحماية اللوحة من مختلف الظروف الجوية بحيث تكون مساحتها مناسبة للقيام بأعمال الصيانة وتلائم مع حجم اللوحة من حيث الابعاد وقياس الباب مع تجهيز فتحة زجاجية في احد جدران الغرفة للرؤية وتحسين أرضية الغرفة وتركيب أجهزة تكييف (Inverter) تتناسب مع الحمل الحراري داخل الغرفة الجديدة وتركيب وحدات انارة LED وتجهيز ما يلزم انشائها لتهيئة اسفل موقع تركيب لوحة الجهد المتوسط الجديدة وحسب المواصفات والابعاد المبينة في التصميم التي سيتم تقديمها من قبل الشركة المتقدمة ويتم اعتماد الاعمال من قبل المعنيين في مديرية الاسناد الفني والهندسي.
٦. فك كوابل الجهد المتوسط الموصولة على اللوحة القديمة وإعادة شبكها (Jointing and Terminating) مع اللوحة الجديدة وجميع ما يلزم للتركيب وإعادة التيار الكهربائي وتشغيل اللوحة.

تصميم اللوحة بناءا على المواصفات التالية

Regulations and Standards	
General	IEC 62271-200
Capacitive Voltage Indication	IEC 61243
Instrument Transformers	IEC 60044
Plug-In Type Bushes	EN50181
Vacuum circuit-breaker	IEC 62271-100
Protection Against Accidental Contact ,Foreign Object, Water	IEC 60529
Installation	HD 637 S1

General Technical Specification	
Rated Voltage	12KV
Rated Operated Voltage	11KV
Rated Power Frequency Withstand	28 KV
Rated Short Time Withstand Current	25 KA (RMS) or above
Rated short circuit Duration	1-3 s
Rated Peak Making Current	63 KA or above
Rated Frequency	50 Hz
Busbar Rated Current	1250 A or as Manufacturer recommendation
Internal Arc withstand Current	25 KA 1S
Rated Short Circuit Breaking Current	25 KA
Lightening Impulse withstand Voltage	75 KV
Circuit Breaker (Withdrawable Type)	Vacuum Circuit Breaker VCB 1250A
Type of Metal-Enclosed Switchgear	Loss of Service Continuity LSC 2B Metal CLAD
Class of Partitions	PM (metallic partition IEC 62271-200)
Internal Arc Classified (IAC)	AFLR
Ambient Temperature (IEC 60694)	-5 to +40
Degree of Protection (Outer Cover)	IP4X
Degree of Protection (Inner Partitions)	IP2X
Colored Mimic Diagram	Yes
Internal Security Function And Interlocks	Yes

Notes:

- Documents to be submitted as an integral part of the offer, and to be evaluated with the tender:
 ١. Type test certificates for the offered panels from any European STL member laboratory (KEMA, CESI, and IPH) or equivalent (subjected to approval by the Engineer).
 ٢. Fully detailed reference list (Especially in Jordan and Middle East).
 ٣. ISO certificate. And any documents that will assist in the evaluation.
 ٤. Compliance Sheet.

د. الوصف العام لأهم مكونات اللوحة:

• الأجزاء (COMPARTEMENT):

يجب ان تحتوي كل section داخل اللوحة على ثلاث أجزاء على الأقل (circuit-breaker, busbars and cables) بحيث يحتوي كل جزء على عناصر الضغط المنخفض (LOW VOLTAGE) وأدوات القياس اللازمة (auxiliary instruments) وتكون هذه الأجزاء مفصولة عن بعضها بفواصل معدنية (METALLIC PARTITION) و تكون اللوحات مصممة على أساس المواصفة (IEC 60371-200) (AC metal-enclosed switchgear and control gear for rated voltages above 1 kV and up to and including 52 kV).

• الباسبار (BUSBAR):

يجب ان يكون مصنوعا من النحاس (electrolytic copper) ومعزولا بمادة عازلة (INSULATING MATERIAL) وبحيث يكون من قطعة واحدة على طول مسار اللوحة ويكون قادرا على تحمل التيارات التشغيلية (RATED CURRENT) .

• القواطع (CIRCUIT BREAKER):

يجب ان تكون القواطع من نوع (MOTOR CHARGED SPRING) وبحيث يمكن اغلاقها يدويا بالإضافة الى إمكانية شحنها يدويا و ان تكون القواطع من النوع القابل للسحب (WITHDRAWABLE TYPE) وتحتوي القواطع عداد يبين عدد العمليات الواقع عليه بالإضافة الى إشارات (LED INDICATOR LIGHTS) تبين الحالات التالية (POWER (AVAILABLE,CLOSED,OPEN,EARTHED).

• محولات قراءة الجهد والتيار (INSTRUMENT TRANSFORMER):

يجب ان تتناسب محولات القراءة مع قيم تيار القصر المدرجة في التصميم وبحيث يتناسب تصميمها مع طبيعة القاطع واللوحة وبحيث يتم حمايتها عن طريق قواطع (MCB) او فيوزات (HRC) وتكون معزولة بمادة (epoxy resin) وبحيث تزود القراءات لانظمة القياس والحماية ويتناسب تصميمها مع المواصفات العالمية (IEC 61869-1, IEC 61869-2, IEC 61869-3).

• أنظمة التحكم:

يجب ان تحتوي اللوحات على نظام تحكم (controller) وبحيث تكون قادرة على حماية اللوحة ويكون لها صلاحية الاتصال مع نظام ال (scada) ومعرفة حالة النظام ومكوناته وتكون قادرة على اجراء الحماية الناتجة عن ارتفاع التيار والاعطال الأرضية (phase overcurrent, earth fault, under voltage, over voltage, arc flash trip) وتحتوي الشاشة على (mimic display) تبين قراءة الجهد والتيار وتيار الأرضي وساعات التشغيل.

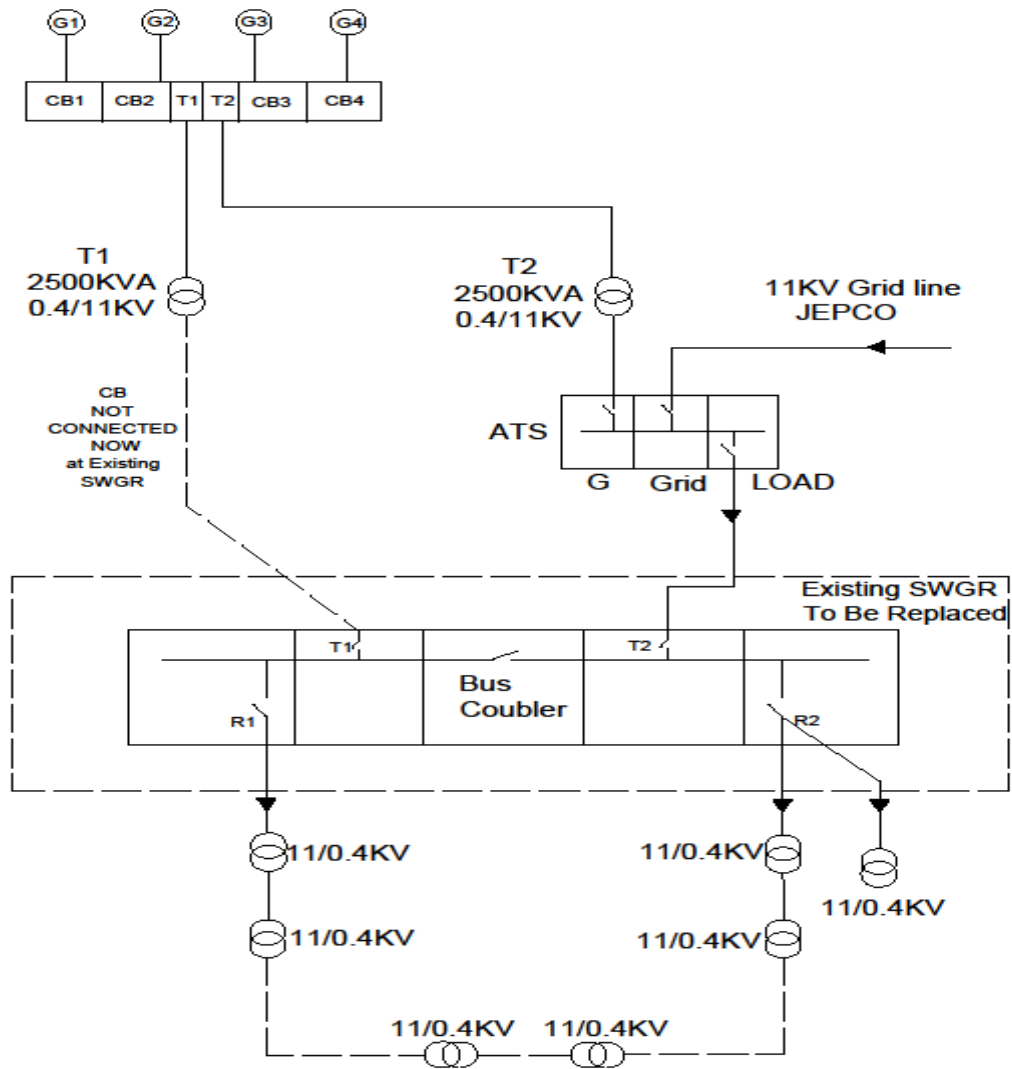
على الشركات الراغبة بالتقديم أن تقوم بتعبئة الجدول المبين أدناه شاملة الأعداد والنوع في كل من (Incomer, Outgoing, Bus-section, Riser)

#	INCOMER	OUTGOING	BUS SECTION	BUS RISER
ENCLOSURE (NO. of Cubicles)				
CIRCUIT BREAKER (Type, Quantity and Rating of CB)				
FEEDER PROTECTION RELAYS (Type, Qty. of Main Protection Relay)				
VOLTAGE TRANSFORMER (qty. and Rating)				
CURRENT TRANSFORMER (qty. and Rating)				
HEATERS				
BATTERY CHARGER				
Surge Arrester				
Gas Duct				
CABLE COMPARTEMENTS (Cable Entry/Connection) (Type of cable may be connected) (Cable Size) (No. Of Cable/phase)				
MANUAL OPERATED EARTH SWITCH				
LOW VOLTAGE COPARTEMENT INCLUDE: 1.Mimic diagram 2.Voltage detection system 3.LED indicator earth switch 'OPEN/CLOSED' 4. LED indicator truck 'TEST/SERVICE' 5. LED indicator switch 'OPEN/CLOSED' 6. Multi-Function Meter 7. Selector Switch (Local/Remote) 8. Push button, for closing of the the circuit-breaker 9. Push button, for tripping of the circuit-breaker				

10. Coms: Modbus				
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على الشركات المتقدمة أن تقوم بإحضار الفحوصات الخاصة بلوحة الجهد المتوسط وكما هو مبين أدناه:

Routine Test		Type Test	تقديم الفحوصات
Insulation Resistance Test	Mechanical Operation Test	Short Circuit Withstand Test	FAT
Dielectric Withstand Test	Interlocking Test	Partial Discharge Test	SAT
Contact Resistance Test	Trip and Close Circuit Test	Temperature Rise Test	
Protection Relay Test			



Single Line Diagram For 11kv MV. Grid and Existing Switchgear

11 KV INDOOR METAL-ENCLOSED SWITCHGEAR (LSC2B-PM)

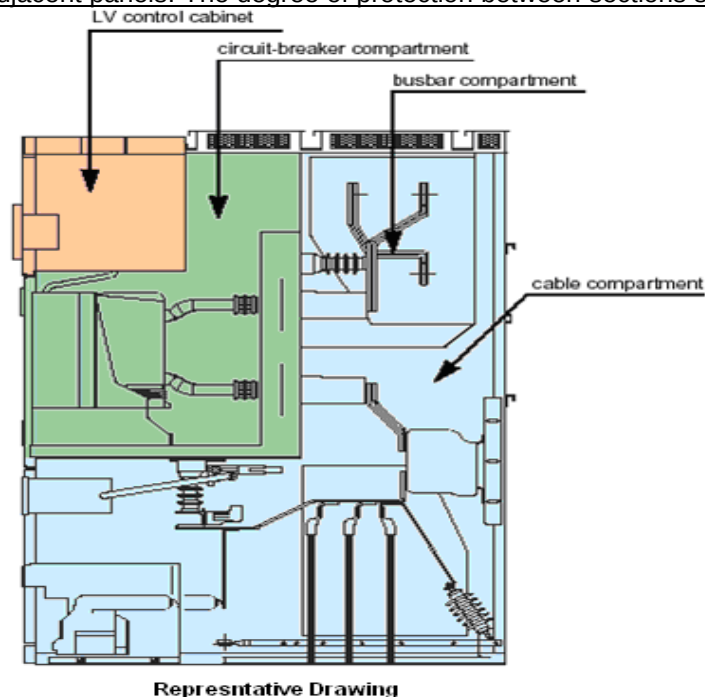
The complete switchboard shall be defined by IEC 62271-200, and shall be constructed in accordance with IEC 62271.

The assemblies comprising the switchboard shall be aligned with the front faces flush and of equal height; each circuit breaker compartment shall have a lockable door. Panels having cable boxes (feeder and transformer panels) shall be of equal depth. The complete switchboards shall be designed to give maximum reliability in service, having regard to the need for speed of operation and ease of inspection and maintenance. All relays and other components shall be accessibly mounted in the switchboard and shall not impede access to wiring or terminals.

Circuit breaker units shall be of Cassette type, the poles and operating mechanism are fixed onto a metal support and can be withdrawn or put into service by means of handling truck with the front door closed. The contacts of the offered circuit breaker shall be of Tulip type; contacts of other types shall be subjected to approval by the Engineer.

The degree of protection of the enclosure shall be IP41 according to IEC 60144 and 60529.

The various sections of each panel of the switchboard shall be compartmented, typically CT/cable, circuit breaker, busbar and LV relaying and metering where each compartment is completely separated from other compartment of the same panel as well as the adjacent panels. The degree of protection between sections shall be minimum IP2X.



Anti-condensation heaters of an approved type shall be provided inside each cubicle. They shall be shrouded and located so as not to cause injury to personnel or damage to equipment. Unless otherwise specified the heaters shall be controlled from a common double-pole miniature circuit breaker, with a lamp to indicate 'cubicle heaters on'. An indication alarm shall be provided in case of heater circuit failure. The indicating lamp shall be mounted externally at the front of the switchboard. The heaters shall operate from a single phase ac supply. The heater shall be hydrostatically controlled over the humidity range 50 per cent to 100 per cent.

Enclosures shall be constructed so that, in the event of an arcing fault within a compartment, there shall be a controlled exhaust of hot gases. Means of relieving the excess pressure created shall be provided in such a way as to minimize the risk of the personnel in the front or side or back of the panel. The pressure

release device shall be of sufficient strength to withstand predictable external pressure without collapsing. All doors to which this requirement applies shall be fitted with interlocks to prevent the switchgear being operated while they are open and to prevent them being opened while the switchgear is in service. The design of the panel shall comply with the internal arcing requirements of IEC 62271.

A set of metallic shutters conforming to BS 5227 shall be provided to cover each group of stationary contacts. Each set of shutters shall be capable of being individually operated and individually padlocked closed. The shutters shall open automatically by a positive drive initiated by the movement of the circuit breaker. The closing operation shall also be automatic by positive drive. When padlocked closed, the shutters shall completely shroud, and shall prevent access to, the stationary contacts.

The switchgear shall be constructed of non-hygroscopic and non-flammable materials. All cubicles shall be sufficiently ventilated to ensure an adequate movement of air through the units, particularly when out of service.

Circuit breakers in similar panels (ie feeders, transformers, bus sections) shall be of the same type and rating and shall be fully interchangeable with each other.

A means of alignment shall be provided so that a circuit breaker may be readily placed and secured in the correct position within the cubicle frame. Where appropriate, means shall be provided to allow the circuit breaker units to be lifted by jacks or similar equipment.

The visual mechanical indicating device specified for the operating mechanism shall be operative when the circuit breaker is in the "Service", "Test" and "Isolated-earth" location. Indicators shall be provided showing the position of the circuit breaker or isolators, visible without the opening of access doors and of earth switches with or without the opening of access doors.

The switchboard shall be suitable for extension at either end.

High Voltage Circuit breakers

High voltage circuit breaker shall be of a type that have been tested and certified by an Official Authority approved by RJAF, to meet the requirements of the relevant regulations and as a minimum the requirements of IEC 62271-100.

Vacuum type circuit breakers shall be used.

Circuit breakers employing the vacuum interruption principle shall incorporate vacuum.

The HV power switching device shall be complete with high integrity operating and isolating mechanisms, primary and secondary disconnecting devices, auxiliary contacts, lockable mechanical closing and mechanical tripping facilities, operations counter, mechanical position indicator, control wiring, protection and auxiliary relays and contactors as required.

Operating mechanism (circuit breakers)

The circuit breaker mechanism shall be a motor charged spring type stored energy mechanism, charged normally by an electric motor and manually with the use of a manual charging tool. All operating devices shall be fed from substation low voltage ac/dc supplies.

The charging time for spring charged mechanisms shall not be longer than 25 seconds, and the spring shall be automatically re-charged immediately the switching device has been closed.

All circuit breaker operating mechanisms shall be fitted with two electrical shunt trip release coils, one closing coil and lockable mechanical hand closing and tripping devices. The switching units shall be capable of being manually tripped if the control power fails.

The circuit breaker shall be capable of being mechanically closed or opened whilst the front door of the circuit breaker compartment is closed.

The electrical tripping and closing devices shall be suitable for operation from a power supply as stated in this Specification and shall operate satisfactorily over the ambient temperature range when the voltage at their terminals is any value within the voltage range stipulated in IEC 62271-100.

The mechanical position indicator for the HV switching device shall have one marking for the closed position with "I" and/or a red flag and a second marking for the open position with "O" and/or a green flag. An indicator shall be provided to show the state of charge of the spring.

Draw-out mechanisms

The draw-out mechanism shall allow the HV switching device to be moved into two positions, the engaged service position and the intermediate testing position

In the test position the fixed and withdrawable primary disconnecting busbar contacts shall be separated by a safe working distance, and safety shutters used to cover the live contact access.

When the HV switching device is removed completely from the switchboard panel, all live HV connections, contacts and busbars in the panel shall be automatically covered by lockable safety shutters.

All mechanical and Electrical interlocks shall provided to prevent the HV switching device from being withdrawn from or inserted into the normal service position when the HV switching device is 'closed', ie 'on'.

Padlocking facilities shall be provided to allow the HV switching device to be locked in the test or withdrawn position. If a stored energy spring operating mechanism is used for the HV switching device, then it shall be possible to safely discharge the spring in the test or withdrawn position or for maintenance.

Isolating devices

Where circuit breakers are connected to their associated busbars and cables through isolating devices, these shall be of the off-load type but suitable for operation whilst the busbars or feeder circuits are live.

The design shall be such that it is impossible for the isolating devices to be opened by forces due to current in the primary circuit and shall be interlocked with the circuit breaker so that it is impossible to make or break current with the isolating device. Attempted isolation shall be clearly indicated.

Preferably a mechanical selector mechanism shall be utilized such that when a particular position is selected, it is impossible to locate the circuit breaker in any other position.

Interlocking

All interlocks provided throughout the switchboard shall be of the preventive rather than corrective type, ie, an attempt to disconnect a closed circuit breaker shall not result in tripping of the circuit breaker.

The following interlocks shall be provided:

- i. The withdrawal or engagement of a circuit breaker shall be impossible unless it is in the open position. The operation of a circuit breaker shall be impossible unless it is in the service, disconnected, removed test or earthing position.
- ii. It shall be impossible to open the rear cable box compartment unless the earth switch is in the on-position (electrical and mechanical interlocking).
- iii. Compartments containing disconnectors shall be interlocked such that the disconnector must be open and the incoming side disconnected/earthed before compartment cover/door can be opened.

It shall be possible to operate, independently, each set of shutters such that either can be padlocked in the closed position whilst the other is open for earthing and maintenance purposes.

Earth switches shall be interlocked with their associated circuit breaker so that they cannot be closed unless the circuit breaker is open and disconnected, meanwhile, capacitive voltage indicator indicates no voltage at circuit side.

The guarding and screen work of all equipment shall be interlocked with the circuit breaker and the isolating devices in such manner that it cannot be opened unless the circuit breaker and isolating devices are opened and all equipment within the guarded area is de-energized and safe. Unless otherwise approved it shall not be possible to make the apparatus alive while the guarding/screenwork is open.

Earthing

All primary equipment (CB, CT'S, VT'S, surge arrestor, earth switch, capacitive voltage indicator....etc.) shall be directly earthed to the main earth bar.

Each circuit shall be provided with the facility to earth the cable by means of a device having a making capacity and short-time rating equal to that of the circuit breaker. This may be achieved by means of integral earthing via the circuit breaker for earthing purposes, or by means of an earth switch installed within the switchboard and located between the circuit breaker and cable box.

A suitable electrical interlock shall be provided to prevent closing of the earth switch whilst the cable side of the panel is energized.

Earth switch operation locking coil shall be normally de-energized and shall be energized -prior to the operation of the earth switch- through a push button provided on the LV compartment front door.

Busbars and connections

The internal busbars and connections shall be either copper, copper alloy or copper clad and shall comply with the requirements of BS 159.

Busbars shall be insulated with heat shrinkable material or by other suitable material.

All busbar connections shall be silver plated and shrouded.

The busbars shall be arranged so that they may be extended without undue disturbance of the adjacent busbar chambers. Where necessary expansion joints shall be provided in long busbar runs. Cast resin bushing type partitions shall be provided at each junction between adjacent cubicles.

Cable terminations

The panel shall be provided with appropriate facilities for the independent termination of the HV main cables and the LV instrumentation, control and auxiliary cables. The switchboard supplier shall provide all cable termination facilities including bracing structure, supporting clamps, glands and removable gland plates for the cables.

Cable terminal connections shall be silver plated.

Circuit side connection bars shall be insulated with heat shrinkable material or other suitable material and shall be silver plated at the connection joints.

Insulation sheets between phases shall be of anti-flammable material.

-Switchboard wiring and LV terminals

All control, metering and other secondary wiring shall be stranded switchboard type wire not smaller than 2.5 mm². The wire shall be 600 volt grade insulated with a thermo-plastic material which will withstand the ambient and environmental conditions and any heat generated within the switchboard.

All wiring shall be so arranged that remote control, indicating or metering devices may be added to any or all of the circuits without causing a serious disruption to the wiring or terminal blocks. Twenty per cent spare terminal block ways shall be furnished to allow for reasonable future modifications, tripping, closing, interlocking and indication circuits.

All wires and cable cores shall be clearly, precisely and indelibly identified at both ends with individual non-ambiguous numbers and/or letters, using plastic labels and ferrules.

Internal panel wiring of all earth circuits shall have an insulation colour, green and yellow, which is distinctly different from all other wiring colours.

All wire and cable cores shall be terminated with crimped lugs or terminals. Bare wires or cores secured in terminal blocks will not be acceptable.

All panel internal wiring shall be completed before delivery and additional site wiring shall be kept to a minimum.

Wiring shall be arranged neatly in vertical and horizontal wire ways or trunking and clipped or secured at regularly spaced intervals, all wiring in low and high voltage compartments shall be enclosed by an earthed metallic rigid, or flexible, conduit. No joints shall be made in the wiring between terminals.

-Rating plates

The switchboard shall have a rating plate permanently fixed in front to a non-removable part and carrying at least the following information:

- a. Rated operational voltage, frequency and number of phases.
- b. Rated short-circuit capacity and current carrying capacity of the busbars and circuit breakers.
- c. Specification, standard authority to which the equipment conforms.
- d. Year of manufacture.
- e. Manufacturer's name, type and serial number.

Switching devices, current and voltage transformers shall be fitted with inscriptions or rating plates in accordance with the latest relevant BSI and IEC Specifications.

Rating plates shall be made of corrosion-resistant metallic material and shall be indelible or engraved with inscriptions in the language specified in the requisition or order.