

## Technical and Financial Requirements for Multiplication Power Station (%500-%300)



The innovative power station is a complete unit with all its components. Some components are newly invented, and others use parts from other manufacturers. This is the norm in industry, and there is no need to refer to the names of any parts we used to build the station, although we shall use the specifications of such brand-name parts since we are using them as part of the station operation.

Question no "1"	Answer in English	الإجابة بالعربي
Have the performance tests of the station components been conducted according to international standards and norms? What are they with numbers?	<p>. Yes. BS EN 60034-1: 2010 Section 9.1</p> <p>The electric motor, the kinetic energy source, is the new addition to the plant. It has undergone rigorous testing to ensure it can operate effectively under varying pressures and temperatures for more than four consecutive months.</p> <p>All the station components are of European make and were tested by their respective manufacturers. The station has also been tested under 45°C temperatures for four months without any interruptions to test the efficiency of the coil insulation while carrying 100% of its capacity. Additionally, the station was tested for its ability to maintain</p>	<p>الجزء الجديد في المحطة هو المحرك الكهربائي مصدر الطاقة الحركية وقد تمت عدة اختبارات شاقة له للتأكد من قدرته على العمل تحت ظروف مختلفة وتحت درجات حرارة مختلفة لمدد زمنية مستمرة أكثر من أربعة شهور . كما ان مكونات المحطة المختلفة النمطية تم اختبارها من جهات تصنيعها وهي كلها أوروبية الصنع.</p> <p>كم تم اختبار المحطة ككل بكافة مكوناتها تحت درجات حرارة 45 درجة مئوية لفترة ٤ شهور دون توقف بحمل ١٠٠ ٪ من قدرته لاختبار كفاءة المادة العازلة للملفات؛ كما تم اختبار المحطة تحت مخاطر التغيير المفاجئ للأحمال بشكل سريع للتأكد من مدى مقاومته والمحافظة على سرعته مع التغيير المفاجئ للأحمال اما باقي المكونات فهي تنتمي لماركات وشركات عالمية لها سمعتها ولها ضمنها التي تكفلها لمنتجها</p>

	<p>speed with sudden Changes in loads to ensure its resistance to sudden load variations. The remaining components are of international make and are sourced from reputable companies that guarantee their product quality.</p> <p>We can confirm that the station has undergone thorough testing within international standards using the European Code of Operation testing. The station has worked continuously at a high temperature of 45 degrees for four months and has been subject to pressure changes from high to low. The tests have shown that the station works efficiently and produces the targeted power with no operational hazards.</p>	BS EN 60034-1: 2010 Section 9.1
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## Question no "2"

Was the stability of the generator and Motor when loading studied? Please attach details if available.

Indeed, here is the revised text:

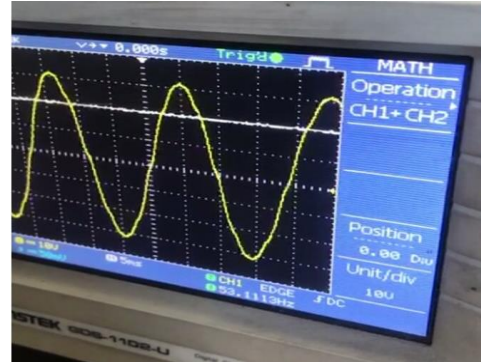
We have attached photos of the power meter readings and reading tables for your reference.

Additionally, we will send you a video of the tests conducted on the generator, including power and voltage readings under high and low pressure. We would also like to inform you that the generator has successfully passed the following tests:

- Insulation Resistance
- Winding Resistance
- Vibration
- No-Load Losses

مرفق صور لأجهزة القياس المستخدمة في التجارب وبها القراءات مع جداول للقراءات حسب ما تم في الفيديو. كذلك المولد خضع للاختبارات التالية: -

- Insulation Resistance
- Winding Resistance
- Vibration
- No-Load Losses
- Residual Voltage (Self-Exciting Machines)
- Voltage Unbalance
- Phase Sequence
- High Voltage AC Breakdown
- PMG voltage level and balance check
- No-load voltage regulation check

	<ul style="list-style-type: none"> <li>• Residual Voltage (Self-Exciting Machines)</li> <li>• Voltage Unbalance</li> <li>• Phase Sequence</li> <li>• High Voltage AC Breakdown</li> <li>• PMG voltage level and balance check</li> <li>• No-load voltage regulation check</li> <li>• Control system function check</li> </ul>	•Control system function check
<b>Question no "3"</b>		
How pure is the sine wave of current and voltage concerning (Pure sine wave)?	<p>Voltages are generated from the generator with a pure wave and constant frequency, and this is because of the efficiency of the generator and the stability of the existing engine that allows the generator. The sine wave generator is entirely intact.</p> <p>But sometimes, a reactive wave comes back from the loads that have files or capacitors, and this can also be dealt with and disposed of by</p>	<p>تتولد الفولتية من المولد بموجة نقية وتردد ثابت وهذا بسبب كفاءة المولد واستقراره المحرك القائم بتشغيل المولد. من طرف المولد الموجة ساين ويف sine wave سليمة تماما</p> 

	installing appropriate filters or filters to get rid of them completely.	لكن أحيانا تأتي reactive wave مرتدة من الاحمال التي بها ملفات او متسعات وهذه يمكن التعامل معها والتخلص منها أيضاً بتركيب فلتر او مرشحات مناسبة للتخلص منها تماماً.
<b>Question no "4"</b>		
Have you been studying and putting protections in place against harmonics that might affect the engine and generator and lead to damage, especially the odd ones? Please mention the protection.	The station has an intelligent drive unit and shunt Active filters to suppress the odd harmonics.	يتم إدارة عمليات التشغيل والحماية بنظام اليكتروني متطور ومنقي أو مصفي لإزالة الموجات التوافقية الفردية
<b>Question no "5"</b>		
From the nominal specifications, the output voltage of 400V / Ph Please add the other nominal data with both connection delta and star (U, I); IP, COS ( $\phi$ ); rpm, cl; IP; weight (kg); Basic impulse insulation level (BIL kV); also,	The voltage is 400 V, and 230 V, P.F. is 0.8, current 1800 A, The, RPM is 1500, For BIL KV, parts are installed on the generator electrodes, feeding the	الجهد هو 400 فولت، و230 فولت، PF 0.8، تيار 1800 أمبير، RPM: 1500 بخصوص BIL KV فإنه يتم تركيب قطع خاصة على أقطاب المولد

please mention the efficiency of the generator (station).	loads to absorb these external hazards.	المغذية للأحمال لامتناس تلك المخاطر الخارجية
<b>Question no "6"</b>		
Can the same generator operate at 50 Hz and 60 Hz when needed, or does each working frequency require a separate ?generator and a separate set	Depending on the requirement, it can work on both generators, 50 or 60 h and 50/60 HZ at the same generator.	يعتمد على المتطلبات ولكن يمكن أن يعمل على نفس المولد 50 or 60 h, 50/60 HZ
<b>Question no "7"</b>		
Have the necessary tests been performed on the generator, no-load test, open circuit, loading test, short-circuit test, and the bound motor according to international norms? What are the Results	Please refer to the answer to question no 2	الرجاء الرجوع لإجابة السؤال الثاني
<b>Question no "8"</b>		
Is it possible to connect the generator in parallel with another generator compatible with it to work in the event of its exit from working so that there is no interruption in the feeding of the loads connected with the	Yes, through a synchronizing system, it takes a minute or even less.	نعم ، من خلال نظام التزامن ويستغرق دقيقة أو حتى أقل.



station, and is it possible to work with the alternating system for generators in case of need?		
<b>Question no “9”</b>		
<p>The following is mentioned in the nominal specifications of the generator: Max over speed: 2250 RPM for 2 minutes. This protects the generator, but the increase in speed is related to the frequency, and this will damage the loads, (a change in the output). Have specific protections been put in place so that the loads will not be affected and burned? How was this problem solved (if it happened) in your station system?</p>	<p>This never happens in our station because a motor controls the speed through the gearbox, and there is a limit for speeds from 1470 rpm up to 1530 rpm. If anything is out of this limit, the drive unit will shut down the station if it is not possible to adjust it immediately and to be within this limit.</p>	<p>هذا لا يحدث أبداً في محطتنا لأن السرعة التي يتحكم بها المحرك من خلال صندوق التروس وهناك حد للسرعة 1470 دورة في الدقيقة حتى 1530 دورة في الدقيقة أي شيء خارج هذا الحد، فإن وحدة القيادة drive ستغلق المحطة إذا لم يكن من الممكن تعديلها على الفور وأن تكون ضمن هذا الحد.</p>
<b>Question no “10”</b>		
<p>What is the efficiency of the motor that will be connected to the station, where it is stated that motor input = 260 KW? Please, in this case, mention the output of the motor, as the other rest nominal data on</p>	<p>Our motor is not like conventional motors. The SPRAM innovative motor is different as it creates rotating twisting, which can drive the alternator to generate 495% of the</p>	<p>الموتور الخاص بمحطة SPRAM ليس مثل المحركات التقليدية. فالموتور في حالة SPRAM مختلف يعتمد على توليد عزم دوران بتقنية معينة ينتج عنها توليد 495</p>



the motor nameplate nominal data with both connection delta and star (U, I); IP, COS( Ø1); rpm, cl; IP; weight (kg); Basic impulse insulation level (BIL kV);	electrical power consumed by the motor. So, with a free power of 395%, we have it ready to supply load.	% من الطاقة الكهربائية المستهلكة وينتج عنها صافي طاقة بنسبة 395% من الطاقة الكهربائية الداخلة.
<b>Question no "11"</b>		
Please mention the Power Triangle data P, Q, S, and P.F. for the generator.	<p>P is real power =VI cosØ cosØ=0.8 Q reactive power =VI sinØ sinØ=0.6 S Apparent power =VI P=400x1800x0.8=567 KW. Q=400x1800x0.6=432 KW, S= 400x1800 =720 KW</p>	<p>P is real power =VI cosØ cosØ=0.8 Q reactive power =VI sinØ sinØ=0.6 S Apparent power =VI P=400x1800x0.8=567 KW. Q=400x1800x0.6=432 KW, S= 400x1800 =720 KW</p>
<b>Question no "12"</b>		
Please attach the equipment LAYOUT for the station	We can do this in a later stage since it is related to the innovation	يمكننا القيام بذلك في مرحلة لاحقة لأنه مرتبط بالابتكار الجديد
<b>Question no "13"</b>		
If linking generators and stations in parallel is possible, please attach another LAYOUT in a separate paper.	The new in the SPRAM station is the electric motor, except that all that is done with it in generators is applied to the same station by linking multiple	الجديد في محطة SPRAM هو الموتور الكهربائي عدا ذلك فكل ما هو معمول به في المولدات يطبق على نفس هذه المحطة

	generators in parallel, distributing loads on more than one generator, or entering a generator into a group or generator exit all of these things are typical. There is nowhere the station belongs.	من ربط عدة مولدات على التوازي او توزيع الأحمال على أكثر من مولد او دخول مولد الى مجموعة او خروج مولد كل هذه الامور نمطية وليس بها ما هو يخص المحطة
<b>Question no "14"</b>		
What are the different electrical energies that the plant can generate (according to Figure 8 of the theoretical foundations for generating electricity WBPS1 100)?	In the case of SPRAM, the station can generate 1250 kw per hour continuously for 24/h daily.	في حالة محطة الكهرباء SPRAM يمكن للمحطة توليد 1250 kw كل ساعة بشكل مستمر دون انقطاع لمدة 24/ساعة يوميا
<b>Question no "15"</b>		
What is the method(s) of grounding used in the station - in general- and in particular for the generator to achieve the grounding purpose	This grounding aims to bond all electrical components and transfer switches to minimize the possibility of uncommon current flow causing a power outage, equipment damage, or personnel injuries.	الغرض من هذا التأريض هو ربط جميع المكونات الكهربائية ومفاتيح التحويل لتقليل احتمالية تدفق التيار غير المألوف مما يؤدي إلى انقطاع التيار الكهربائي وتلف المعدات و / أو إصابة الأفراد.

### Question no "16"

Thermal protection for the generator stator winding may be provided for generator overload

- Most generators have several temperature sensors to monitor the stator winding temperature.
- These sensors are usually resistance temperature detectors (RTD) or thermocouples TC.
- These sensors are used to monitor the stator winding continuously
- The sensors may be connected for alarm purposes.
- In some applications, current measurement is combined with a timing function to establish a thermal Image of the stator winding temperature.

What about your generator stator thermal protection? Please specify

Yes, all these types of sensors and alarm connected.

BS5000, VDE 0530, NEMA MG1-32, IEC34, CSA C22.2-100 and AS1359.

Also, through the internet, all performances of the generator with warnings could be monitored

نعم، كل هذه الأنواع من أجهزة الاستشعار والإنذار متصلة.

BS5000 و VDE 0530 و NEMA MG1-32 و IEC34 و CSA C22.2-100 و AS1359.

أيضا من خلال الإنترنت يمكن مراقبة جميع أداء المولد مع التحذيرات

### Question no "17"

<p>Do you use an advanced differential relay commonly used as the primary protection for phase faults of the generator stator? Or do you use any other advanced technology to protect</p>	<p>There are many types of protections: longitudinal <u>differential relay</u> or relay (59N)</p>	<p>توجد أنظمة كثيرة للحماية ومنها longitudinal <u>differential relay</u> or relay (59N)</p>
<p><b>Question no "18"</b></p>		
<p>What is the procedure you have used to protect the generator from the unbalanced fluxes, which may cause rotor vibration that can quickly damage the machine; also, unbalanced motor winding and rotor body temperatures caused by uneven rotor winding currents can cause similar. Have you also used a voltage relay to detect damaging vibrations? A ground fault produced overvoltage in the field winding.</p>	<p>The Smart Drive used in our station controls all these problems, and if anything exceeds the limit, the station Relay protection will be shut down. also provides more protection from overvoltage in the field winding produced by a ground fault.</p>	<p>يتحكم محرك الأقراص الذكي المستخدم في محطتنا في كل هذه المشاكل وأي شيء يتجاوز الحد الذي سيتم فيه إغلاق المحطة. أيضا هناك حماية التابع المضافة لمزيد من الحماية من الجهد الزائد في اللفات الميدانية الناتجة عن خطأ أرضي</p>
<p><b>Question no "19"</b></p>		
<p>When a synchronous generator loses excitation, it will be overspeed and operate as an induction generator, which causes overheating of the stator winding and the rotor within a short time.</p>	<p>The Smart drive and other control unit building will not allow for such speed, which generates heat at the stator winding, etc.</p>	<p>لن يعطي محرك الأقراص الذكي ووحدات التحكم الأخرى أي سماح لهذه السرعة التي تؤدي إلى توليد الحرارة عند لف الجزء الثابت وما إلى ذلك.</p>

<p>What method have you applied to protect your generator from any vibration that may have occurred?</p>		
<p><b>Question no "20"</b></p>		
<p>Generator rotor currents can quickly cause a high, dangerous temperature because of the harmful sequence components produced by unbalanced currents. What did you do to protect the machine from the negative sequence currents before their specific limits were reached?</p>	<p>We utilize four negative sequence overcurrent relays to identify any unbalanced load on the station that can lead to excessive rotor heating. These relays are also used to detect unbalanced load currents in motors. The relay can be employed for other applications, too, such as unsymmetrical loads that increase the negative sequence current, phase interruptions like a broken conductor, failure on one or two poles of a breaker or disconnect switch and earth-fault detection in a solidly earthed system.</p>	<p>نحن نستخدم 4 مرحلات سالبة للتتابع الزائد للكشف عن الحمل غير المتوازن الذي قد يسبب تسخين مفرط؛ ويستخدم التتابع أيضًا للكشف عن تيارات الحمل غير المتوازنة في الموتور. - يمكن أيضًا استخدام المرحل في التطبيقات الأخرى مثل: - حمل غير متماثل يزيد من تسلسل التيار السلبي. - انقطاع الطور مثل موصل مكسور. - فشل في واحد أو قطبين من قاطع أو مفتاح فصل عند الفتح والإغلاق - الكشف عن خطأ الأرض في نظام مؤرض بقوة</p>
<p><b>Question no "21"</b></p>		

<p>When a generator loses synchronism, the resulting high peak currents and off-frequency operation cause winding stresses, pulsating torques, and mechanical resonances that are potentially damaging to the generator and turbine generator shaft. How did you deal with these phenomena if they happened in your generator(s)?</p>	<p>The drive system prevents such incidents by imposing limits on each function.</p>	<p>جهاز الدرايف يتولى مراقبة دقيقة وسريعة لكل المتغيرات وتوجيه الاوامر السليمة بسرعة. لذلك لا وجود لعملية ارتفاع السرعة بهذه الطريقة.</p>
<p><b>Question no "22"</b></p>		
<p>Overexcitation of a generator will occur whenever the ratio of the voltage to frequency (volts/hertz) applied to the equipment terminals exceeds 1.05 per unit (PU) on the generator base. Voltage/ Hz)-overexcitation can cause severe generator overheating and eventual insulation breakdown. Did you protect your generator against this phenomenon in case it happened? Please describe</p>	<p>A temperature monitoring system is in place for all sensitive parts of the station, enabling the intelligent drive unit to take immediate action in case of any abnormal condition. Additionally, there is a static negative sequence relay SGC for added protection.</p>	<p>يوجد نظام لرصد درجة الحرارة لجميع الأجزاء الحساسة بالمحطة؛ ويتم معالجة أي إجراء غير طبيعي مسجل على الفور من قبل وحدة القيادة الذكية. كما ان هناك تتابع سلبي ثابت تتابع SGC لمزيد من الحماية</p>
<p><b>Question no "23"</b></p>		

<p>Overvoltage may also occur due to voltage regulator failure not only because of the exceeding permissible ratio limit (voltage to frequency)</p> <p>Have you provided your generator with an advanced method or overvoltage Relays to protect it from overvoltage due to that?</p>	<p>Yes, it is controlled by advanced method</p>	<p>نعم يوجد نظام متطور للسيطرة على ذلك</p>
<p><b>Question no "24"</b></p>		
<p>The generator and the turbine are limited in the degree of abnormal frequency operation that can be tolerated.</p> <p>How did you protect them from abnormal frequency variations to guarantee more stability to the set?</p>	<p>The frequency tolerance range is limited to 2%, which means 49 to 51 Hz only. Anything beyond this limit is not allowed.</p>	<p>معدل التغير المسموح به للتردد هو 2% فقط أي ما بين 49 الى 50 هيرتز عدا ذلك غير ممكن.</p>
<p><b>Question no "25"</b></p>		
<p>When the protective relays detect an internal fault or an abnormal operating condition, they attempt to trip the generator. At the same time, initiate the breaker-failure timer; they will attempt to trip the generator.</p>	<p>In addition to the drive system protection, a sensor and protection system have already been installed on the generator.</p>	<p>يوجد نظام حماية خاص بالمولد بالإضافة لنظام الحماية من الدرايف.</p>



<p>If a breaker does not clear the fault or abnormal condition in a specified time, the timer will trip the necessary breakers to remove the generator from the system. Did you take into consideration the necessary protection ?For this case, please describe</p>		
<p><b>Question no "26"</b></p>		
<p>Operating errors, breaker head flashovers, control circuit malfunctions, or a combination of these causes have resulted in generators being accidentally energized while off-line. When a generator is energized from the power system (three-phase source), it will accelerate like an induction motor. While the machine is accelerating, high currents induced into the rotor can cause significant damage in only a matter of seconds.</p>	<p>We can detect it, but an automatic .relay action can isolate it</p>	<p>نحن لدينا جهاز الدرايف ممكن أن يحدد هذه المشكلة ويتعامل معها لكن هذه أيضا ممكن أن تحدد وتعزل بواسطة قاطع Relay أو توماتيكيًا</p>

<p>Detection protection is necessary to protect the generator when it is offline. What is the joint protection you used in your generator to detect inadvertent energizing?</p>		
<p><b>Question no "27"</b></p>		
<p>The current flowing to a fault within a motor can vary significantly in magnitude. The main factors that affect the magnitude of fault currents are the source, motor feeder, grounding impedance, the type of fault (phase or ground), and its location in the motor winding.</p> <p>What did you apply to detect and protect the motor faults caused by the above factors and severe stator current faults? Do you also use alarms in addition to relays?</p>	<p>The drive will take care of this, and there is also a protection system at the generator's side.</p>	<p>جهاز الدرايف يتكفل بالتعامل مع هذه المشكلة وكذلك المولد له نظام حماية خاص به</p>
<p><b>Question no "28"</b></p>		

<p>You mentioned in the nominal data of the station that the method of cooling for the station WBPS1 1000 is (by air)</p> <p>The question is: What is the minimum and maximum operation temperature for the air flows from outside to inside the cabinet, which may reach from (-20 ° C to 70 ° C) depending on the weather on each land?</p> <p>On the other hand, you mentioned that the temperature inside the cabinet should not exceed 25 C.</p> <p>Please explain how to understand compatibility between the two mentioned saying (confliction).</p>	<p>This unit will be fixed inside a closed area with air-conditioning to keep a temperature of not more than 28 degrees Celsius.</p>	<p>المحطة تكون في مكان مغلق مكيف بدرجة حرارة لا تتعدى 28 درجة مئوية</p>
<p><b>Question no "29"</b></p> <p>Let us propose that some fault happened to the gearbox connected between the Motor and the Alternator, which will create a</p>	<p>Our heavy-duty gearbox is built for continuous use and features easy maintenance and serviceability.</p>	<p>إن صندوق التروس للمحطة SPRAM يتمتع بكفاءة عالية ومصنع للخدمة الشاقة للعمل</p>

<p>problem for the station and may stop the energy for the loads.</p> <p>What action should be taken (e.g., changing the whole gearbox or maintenance with spare parts), and how long will it take to return to normal station operation?</p> <p>That led us to return to item No. 8 in this schedule (connection in parallel).</p>		<p>المستمر. من صندوق التروس المصنوع بطريقة لإعطاء المرفق لفتح أو إجراء أي صيانة أو خدمات</p>
<b>Question no "30"</b>		
<p>What kind of motor are you using at the station?</p> <p>DC, synchronizing, induced, reluctance</p>	<p>The motor is not a member of any known platoon of electric motors, but it resembles an induction motor.</p>	<p>المحرك المستخدم لا ينتمي الى فصيل معين من المحركات الكهربائية المعروفة ولكن أقرب ما يكون من المحرك الحثي</p>
<b>Question no "31"</b>		
<p>It is essential to guarantee that the engine is running continuously in the station, so we should emphasize reasonable and adequate engine protection.</p>	<p>The station has an advanced control system that monitors all variables within the station and intervenes in case of any malfunction. For instance, if there is an issue with the load of the station, it can operate at 120% of its</p>	<p>تتميز المحطة بنظام كنترول ذكي يتم من خلاله مراقبة كل ما يتم من متغيرات في المحطة ويقوم بالتدخل في حالة اي خلل مثلا في حالة تعرض المحطة لحمل ذائد فإنها تستطيع العمل بحمل</p>

	<p>capacity for up to 5 minutes. During this time, it will emit a flashing light and sound from the control panel. If the load is not resolved, it will immediately stop and can be restarted. Additionally, the system constantly monitors the frequency and voltage to ensure optimal performance.</p>	<p>يمثل ١٢٠ ٪ من قدرتها لمدة 3 دقائق وخلال هذه المدة تعطي انذار صوتي وصوتي من خلال لوحة الكنترول فان لم يتم تخفيف الأحمال تقوم بالتوقف فورا تستطيع تشغيل كما انها تراقب التردد والفولتية</p>
<b>Question no “32”</b>		
<p>The availability of a fire alarm system. Surge protection and surge protection devices.</p>	<p>Fires are caused by either the presence of flammable substances, such as fuel or oils, or a temperature rise that causes internal components to ignite. However, the plant is not at risk of such an issue because it has no fuel or oils. Additionally, it has a robust cooling circuit that prevents the temperature inside the station from increasing. The plant is also equipped with smoke and heat detectors to alert and disconnect in</p>	<p>من المعروف ان سبب اي حريق اما وجود مادة قابلة للاشتعال مثل الوقود او الزيوت او ارتفاع درجة الحرارة الى درجة نشوب حريق في المكونات الداخلية ولان المحطة لا يوجد بها اي نوع من انواع الوقود ولا الزئبق also بعيدة تماما عن حدوث مثل هذا الامر لوجود دائرة تبريد قوية لا تسمح بزيادة الحرارة داخل المحطة ومع ذلك فإنها مزودة بحثاثات ادخنة وحرارة للتنبيه</p>

	case of any unforeseen circumstances.	والفصل عند حدوث اي خلل كما تم شرحه سابقا
<b>Question no "33"</b>		
Are the following various parameters available in the station: event reporting - full data recording - -remote communication continuous self-checking - -easy configuration	The station has a robust monitoring system that records all activities. The system ensures that the station is well-preserved and can be remotely controlled. Additionally, it can transmit data through the internet to any part of the world.	تتميز المحطة بوجود نظام مراقبة قوي يقوم بتسجيل كل ما يحدث على المحطة ويتحكم فيها من اجل المحافظة عليها كما انه به خاصية التحكم عن بعد ونقل البيانات من خلال شبكة النت الى اي مكان في العالم
<b>Question no "34"</b>		
If the station will be 1 MW or 0.5 MW, what are the approximate dimensions for each?	The station, with a capacity of 1 MB, needs 50 square meters.	المحطة قدرة 1 ميغا تحتاج الى 50 متر مربع
<b>Question no "35"</b>		
The relays should include : <ul style="list-style-type: none"> <li>• Metering and monitoring functions to indicate different electrical variables and non-volatile memory for event records that could help with fault analysis.</li> <li>• the relays should be capable of being serviced by MS Windows-based</li> </ul>	The control system's software can handle all the mentioned activities, and the necessary precautions and protection relays and circuits are in place to provide complete protection to the station.	يوجد نظام سوفت وير لنظام التحكم الذي يمكن أن يعتني بجميع الأنشطة المذكورة وكذلك جميع الاحتياطات ومرحلات الحماية والدوائر التي تم إجراؤها لتوفير الحماية الكاملة للمحطة.

<p>software with a friendly graphic interface .</p> <ul style="list-style-type: none"> <li>• For data access, the relays should provide a front-panel LCD and front-panel LCD and different s for data download, relay configuration, and central SCADA communication.</li> <li>• Protection relays for I power station should be of a multifunction type and include the minimum functions required for equipment to be protected according to the description provided in by international standard</li> <li>• Protection relays should include current inputs, voltage inputs, digital inputs, contact outputs, and RTD inputs for thermal protections</li> <li>• The relays should have programming capacity to perform control and protection logistics, define the Function of digital inputs, and</li> </ul>		
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configure the contact output operations and timer functions.

- The most essential characteristic of auxiliary relays is :
  - high-speed operation to avoid delays in trips due to fault conditions.
  - Lockout relays are utilized to lock out the main circuit breakers.
  - These relays are hand reset types, avoiding an instantaneous restart of the operated circuit breakers or process and forcing station technical personnel to check the system conditions before a system restart .
  - These relays are used also as multiplying contact relays.



## Technical power outlet ability for station SPRAM

HZ 50	60 HZ
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PRIME	STANDBY KVA	PRIME	STANDBY KVA
KVA80	88	100 KVA	110
100 KVA	110	125 KVA	137.5
125 KVA	137	150 KVA	165
350 KVA	385	400 KVA	440
450 KVA	495	500 KVA	605
550 KVA	605	600 KVA	660
700 KVA	770	800 KVA	880
1100 KVA	1210	1100 KVA	1210
1250 KVA	1375	1250 KVA	1375
1505 KVA	1655	1510 KVA	1661
1 MW	1.1 MW	1MW	1.1 MW
2MW	2.2MW	2MW	2.2MW
3MW	3.3MW	3MW	3.3MW
4MW	3.3MW	4MW	3.3MW
5MW	5.5MW	5MW	5.5MW
6MW	6.6 MW	6MW	6.6MW



7MW	7.7 MW	7MW	7.7MW
8MW	8.8 MW	8MW	8.8MW
9MW	9.9 MW	9MW	9.9MW