المواصفات الفنية الخاصة بالمناقصة العامة

رقم المناقصة : (٢٠١٢/٦)

الخاصة بشراء وتوريد (٢٠) موحد كهربائي مختلفة القدرات + (٤٠) مديول احتياطي مع التدريب

المؤسسة العامة للاتصالات السلكية واللاسلكية

الإدارة العامة للمشتريات والمخازن

إدارة المشتريات - قسم العقود والمناقصات

Technical SPECIFICATION FOR (Switch mode Rectifier

(المواصفات الخاصه بالمناقصه رقم(

1. Introduction:

This specification defines the requirements of a Switch mode Rectifiers Power System of multi .modules system for PTC Al-ghuraf site in Sana'a

The bidder shall furnish a completely power system. With Redundancy Parallel Architecture. (RPA) To automatically maintain the continuous regulated DC power with specified tolerances. to critical loads under normal and abnormal conditions. Including loss of the AC power source. All materials and equipment of this system. Shall be fully compatible with electric environment space conditions at the installation site.

1. **The specification describes the continuous duty DC power system.**
2. **The Rectifiers shall automatically provide continuity of electrical power. With in defined limits and without interruption. Upon failure or degradation of the commercial AC source.**
3. **The continuity of conditioned electric power due to mains failure shall be delivered for this time by the battery system.**
4. **The system is driven by vector control algorithms and dedicated digital processor (DSP) system .in intelligent double conversion configuration.**
5. **The system shall provide high quality DC power for electronic equipment loads and shall offer the following features:**
    a. **Increased power quality.**
    b. **Full noise rejection.**
    c. **Full compatibility with all type of loads.**
    d. **Power blackout protection.**
    e. **Full battery care.**
    f. **High Reliability low maintenance.**
    g. **Ease of installation.**
6. **The duration of autonomy in the event of network failure shall be determined by the battery capacity.**
7. **The system shall be capable of continuous operation.**
8. **Rated output should work efficiently and smoothly both from mains or generators.**
9. **After mains failure when power is restored the system should be started automatically.**
10. **The efficiency of system input/output ratio snot be less than90%.**
11. **The system shall disconnect the load from batteries when no source from mains or generators failure if battery voltage decreased to 43.2V and reconnect the load automatically when the source restored.**

2.The system shall consist of the following major components:

1. **Rectifier /Batteries charger electronic battery switch.**
2. **Modular Rectifier N+1**
3. **Digital signal processor DSP.**
4. **Matching battery cubicles and battery management functions.**

3.M0dules specifications:

1. In additional to Rectifier specification system each module shall be product output DC voltage and current with load sharing.
2. Module input shall be 380 volt AC 3phase+N 4wires +G ±15%
   OR 220vac(1phase) +G ±15%
3. Frequency 50HZ ± 6%.
4. Output shall be -48V DC With adjustable output from 43--60V DC 50Aoutput current /rated output power>=3000W.
5. Each module shall be with I/O Protection (thermal over load and short circuit)
6. Each module shall have LEDs indicator and parameters.

4.Modules configuration:

1. The system shall have multi modules that operate simultaneously in parallel configuration with load sharing equally between the connected modules.
2. The malfunction of one of the modules should cause that this module to be disconnected from the critical load. And the remaining modules should continue to carry the load.
3. Each module shall permit setting parameters for the environment and type of usage to be specified by project manger
4. Each Rectifier module should be self diagnostic type and equipped with self test functions to verify correct system operation.
5. The self test should identify the parts the system which requiring repair in case of fault.

5.Modes of operation:

1) Normal modules operate in parallel.
2) Upon a failure of power supply. The batteries should immediately continue supply to the load.
3) The system shall not start operation in cause of AC input has phase sequence reverse, phase missing, low/high voltage, low/high frequency.
4) The system shall be provided individual phase to phase compensation to obtain phase balance.
5) The system shall be provided with monitoring and control circuit to protect the batteries from damage due to excessive discharge.
6) The system control cabinet provides the means of paralleling the output of the modules. in addition a control and indication panel is incorporated to show system alarms and give essential common control.
7) All materials and components comprising the System must be new and of current manufacture.
8) Contain cable terminals should be suitable for power cables.
9) Wiring shall be identified at cable ends and shall relate to the circuit diagrams.
10) All wiring shall be adequately supported and shall be secured.
11) Full protection shall be provided to prevent contact with surfaces subject to heat or vibration.
12) The interface wiring shall be in harness with one end disconnected for shipment where its passes.
13) All incoming and outgoing cable terminations shall be complete with all items, sockets…ets.
14) The system must be operating in parallel configuration with common tow or three sets of batteries and share the common batteries bank.

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15) The system must be start in soft start and gradual walk-in of the current taken from the input voltage of network or generators to avoid the simultaneous startup of different Rectifiers.
16) The Rectifier shall has provision for connecting two or three sets of 24cells Battery (2 sets or 3sets / 24 cells x 2V/cell).

6.Protections:

1) System should be with input/output protection (thermal output overload short-circuit protection.
2) Batteries isolation and protection(2 LVD).
3) Leds indication to indicate the normal and abnormal operation.
4) surge suppression.
5) Electromagnetic effects of internal or external origin shall be minimized in order to ensure that electronic loads adversely affected by not effect the system.
6) Batteries isolation and protection devices. Isolator for each battery group should be with fuses and ON/OFF aux contacts.
7) Battery management of LVD contactors should be in own separated card for each battery

7.Input condition:

1) The system normally works with 380 volt AC 3phase+N 4wires +G ±15% Frequency 50HZ ± 6%.

8.Input supplies

1) Input power will be provided from mains source or from tow diesel generator sets
2) Characteristics of output of generator sets and Rectifier system to be coordinated for best results. Should any of special requirements of generators output characteristics. And the stability required must be addressed. so that arrange all requested details

9.Output condition:

The system must be supply the equipments by -48V DC With manual adjustable output from 43--60V DC capacity XXXXA scalable to XXXA.(see the schedule quantities)

a) The rectifier shall be work within Battery manager at:

b)	Floating voltage	adj	53 V DC.	2.21V/cell.
c)	Equalization boost charge voltage	adj	54V DC	2.25V/cell.
d)	Cut off Battery voltage	adj	43.2VDC	1.8V/cell
e)	Cut off output rectifier high voltage		57V. DC	2.37V/cell

10.Environment:

All the equipment shall be designed and suitably finished for continuous operation at:

a) Temperature 0 °c to40 °c. at 100% rated output equipment is to be capable of operating up to 55 °c with slight de-rating factor per deg c (to be determined by supplier)
b) Humidity 30 to 90% R/H
c) Altitude 2500M a.s.l specify details of de-rating.
d) Noise level of complete assembly is not to exceed 65dB@1 M.
e) Electromagnetic Compatibility

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11.Instrumentation and Controls.

1) System Display and Control Panel must be for each module more than 50A and in the main rectifier to present status that indicates I/P& O/P Voltage, I/P& O/P Current.
2) Battery volt, battery current,.
3) Mimic LCD shows the following measurement:
4) AC voltmeter for I/P of each module for each phase.
5) AC ammeter for I/P Current &load current for each module for each phase.
6) Frequency meter for I/P.
7) Load in KVA/KW.
8) DC voltmeter& DC ammeter for rectifier O/P & Batteries Ch /Disch current.
9) CBs status and active alarms and status information for:
   a. Load on rectifier.
   b. Load on batteries.
   c. Module failure.
   d. Batteries low.
   e. Overload.
10) Remote Digital signaling monitoring devices shall be provided.
11) The system shall be connected to a Remote Monitoring Panel (RMP) that allows the possibility to monitor the parameters from the control panel and from the several different locations at the same time and Network management and monitoring software in a WAN system.
12)The remote monitoring system shall be complete with fault and condition indicator lamps, audible alarm lamp test and mute bush button.

12.Information required with tender:

1. A statement of compliance with this specification shall be submitted.
2. Description of the equipment.
3. MTBF and MTTR (figures)
4. Weights and dimensions of the equipment.
5. Manufactures standard test schedule.
6. Manufacturer's certification of origin.
7. The current rating of all the power cables.
8. Documentation: three set of documents, electrical and electronic diagrams.
9. Spare parts list and price.
10. The tender shall be provide the installation materials and provide full details.
11. The tender shall be provided with complete three sets of installation, instructions comprising of drawing, and documents, software, modems, communication cables, and PC laptop including four copies of operating system.
12. The system shall be provided with multi-password levels to limits access to software and data

13.Training:

1. The tender shall include training course for two persons on the operation, maintenance, and troubleshooting of the complete system in manufacturing factory

Technical Specification for Switch Mode RectifierSystem		
description	PTC Specification	Tender Specificationtes
Name of devices		
Manufacture		
Country of origin		
date of manufacture		
Type		
Operating Temperature	0 to 40 °C	
Maxi Relative humidity	30 to 98%	
Altitude	2500 M a.s.l	
Efficiency of Rectifier Half load %	94	
Efficiency of Rectifier Full load %	94	
Elevation with derating (M)		
without derating (M)		
MTBF and MTTR figures		
Maximum line current		
protection degree IP		
Noise @1Meter dB@1M	65	
Cooling		
Rectifier safety		
Performances and test		
Classification		
Capucity of main cabinet	see the schedule quantities	
AC ut Connection	flexible wire4wires (3ph+G)	
Input suggested cables size mm^2		
output suggested cables size mm2		
Dimensions (H * W * L) mm		
Weight (net +-2%) KG		
Floor area M^2		
Cable entry		
Cable access		
OTHERS		
Input condition		
Nominal input voltage V	400V 3PH PURE 3wires	
Tolerance on voltage %	± 20	
Nominal frequency Hz	50	
Tolerance frequency %	±6	
Power factor @400V ± 0.02	0.8-0.9	

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Technical Specification for Switch Mode RectifierSystem		
description	PTC Specification	Tender Specificationtes
Input current@maximum input power A		
Walk-in /soft start (programmable SEC		
Inrush current A		
Input monitoring		
High /iow voltage		
High / low frequecy		
Phase sequence		
Phase missing		
Output condition		
Nominal output voltage V	48v DC adjustable output (43--60V DC)	
Total output current A		
Output rippls	< 20mv	
Current limit range A		
Load sharing		
Others		
Module Input condition		
Nominal input voltage V	400V 3PH PURE 3wires OR SINGLE PHASE	
Tolerance on voltage %	± 20	
Nominal frequency Hz	50	
Tolerance frequency %	±6	
Power factor @400V ± 0.02	0.8-0.9	
Input current@maximum input power A		
Input current for module A		
Walk-in /soft start (programmable SEC		
Inrush current A		
M0dule Output condition		
Rated power	50A	
Nominal output volt V	48 DC adjustable output (43--60V DC)	
Output current A		
Output rippls	< 20mv	
Current limit range A		
Load sharing %		
Others		
protection		
Surge protection		
Batteries isolation and protection.	LVD	

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Technical Specification for Switch Mode RectifierSystem		
description	PTC Specification	Tender Specificationtes
Input protections with thermal Overload	MCB	
Output protections with thermal short circuit	MCB	
EMC and surge suppression.		
Alarms facilities&Indication facilities		
Mains not available		
Rectifier ON		
Rectifier OFF		
Input lower than the range		
Over load		
Load on batteries.		
Module failure		
Input more than the range		
Batteries low		

المعايير الفنية الأساسية للموحدات
(High Level Requirements **for**
RECTIFIERS)

- **THE SYSTEM MUST BE HEAVY DUTY,HIGH QUALITY , CONSIST OF MODULAR (N+ 1) AND LOAD SHARING.**
- **THE SYSTEM** normally works on 380 VAC ± 15% 3phase 4wire ,TN–S,50 HZ ± 6%
- **THE SYSTEM AND EACH MODULE** produces (48 VDC _ 60 VDC) and current shared with the other modules .
- Site conditions :

  altitude: up to 2500 a s l

  ambient temp :35c°
- **CONTROLLING** and monitoring module .
- **DC DISTRIBUTION**
- **ELECTRICAL DIAGRAMS FOR ALL COMPONENT AND ELECTRICAL DIAGRAMS** of electronic cards
- **TECHNICAL SPECIFICATION** and data of rectifier system performance from original company .
- The manufacture company must be give an answer table for every item of the P.T.C specifications (item by item).

جدول الكميات لأنظمة الموحدات

القدرة بالأمبير	الكمية	الوصف	التكلفة الواحد	الإجمالي
نظام قدرة 600A / 48v	10	مجهز بالسعة كاملة 12x50A مديول لكل نظام وفيوزات خرج 2x160A+3X64A وبسبار خرج مناسب		
نظام قدرة 300A/48v	10	مجهز بالسعة كاملة 6x50A مديول لكل نظام وفيوزات خرج 2X100A+2X63A وبسبار خرج مناسب		
مديول قدرة 50A/48v	40	مديولات احتياطية 40X50A		
الإجمالي				

ملاحظات :

1- يجب توفير قائمة مستقلة بأسعار قطع الغيار

2- موفق ملحق تفصيلي بالمواصفات الفنية والمعايير الأساسية للأصناف المذكورة أعلاه ولعدد 8 صفحات .