

**المواصفات الفنية الخاصة بال مناقصة العامة**

**رقم المناقصة : (٢٠١١/٤٠)**

**الخاصة بشراء وتوريد :-**

**المجموعة الأولى : (٢٢) موحد مختلفة القدرات مع التدريب**

**المجموعة الثانية : (١٠) عاكسات مختلفة القدرات مع التدريب**

**المؤسسة العامة للاتصالات السلكية واللاسلكية**

**الإدارة العامة للمشتريات والمخازن**

**إدارة المشتريات - قسم العقود والمناقصات**

## Technical SPECIFICATION FOR (Switch mode Rectifier (150A-600A)

(المواصفات الخاصة بالمنافسة 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. Modules 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  $\pm 15\%$   
OR 220vac(1phase) +G  $\pm 15\%$
3. Frequency 50HZ  $\pm 6\%$ .
4. Output shall be -48V DC With adjustable output from 43--60V DC 50Aoutput current /rated output power  $\geq 3000W$ .
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.

- 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  $\pm 15\%$  Frequency 50HZ  $\pm 6\%$ .

## 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

## 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 free of charge for two persons on the operation, maintenance, and troubleshooting of the complete system in manufacturing factory

NOTS:

1-:XXX Rated capacity for each system(see the schedule quantities)

2-THE CABINET FOR RECTIFIER WITH CAPPACITY(150A) MUST BE SMALL AND WALL MOUNTED.

| Technical Specification for Switch Mode Rectifier System |                             |                       |
|--|-----------------------------|-----------------------|
| description  | PTC Specification           | Tender Specifications |
| 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   |                             |                       |
| Capacity of main cabinet                                 | see the schedule quantities |                       |
| AC Input Connection                                      | flexible wire4wires (3ph+G) |                       |
| input suggested cables size mm <sup>2</sup>              |                             |                       |
| output suggested cables size mm <sup>2</sup>             |                             |                       |
| Dimensions ( H * W * L ) mm                              |                             |                       |
| Weight (net +-2%) KG                                     |                             |                       |
| Floor area M <sup>2</sup>                                |                             |                       |
| 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                                | 1 0.8-0.9                   | MS                    |



### Technical Specification for Switch Mode Rectifier System

| description                            | PTC Specification                     | Tender Specifications |
|--|---------------------------------------|-----------------------|
| Input current@maximum input power A    |                                       |                       |
| Walk-in /soft start (programmable) SEC |                                       |                       |
| Inrush current A                       |                                       |                       |
| Input monitoring                       |                                       |                       |
| High /low voltage                      |                                       |                       |
| High / low frequency                   |                                       |                       |
| Phase sequence                         |                                       |                       |
| Phase missing                          |                                       |                       |
| Output condition                       |                                       |                       |
| Nominal output voltage V               | 48v DC adjustable output (43--60V DC) |                       |
| Ter output current A                   |                                       |                       |
| Output ripples                         | < 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                               |                       |
| Inrush current@maximum input power A   |                                       |                       |
| Inrush current for module A            |                                       |                       |
| Walk-in /soft start (programmable) SEC |                                       |                       |
| Inrush current A                       |                                       |                       |
| Module Output condition                |                                       |                       |
| Rated power                            | 50A                                   |                       |
| Nominal output volt V                  | 48 DC adjustable output (43--60V DC)  |                       |
| Output current A                       |                                       |                       |
| Output ripples                         | < 20mv                                |                       |
| Current limit range A                  |                                       |                       |
| Load sharing %                         |                                       |                       |
| Others                                 |                                       |                       |
| protection                             |                                       |                       |
| Surge protection                       |                                       |                       |
| Batteries isolation and protection.    | 2 LVD                                 | MS                    |



| Technical Specification for Switch Mode Rectifier System |                   |                       |
|--|-------------------|-----------------------|
| description  | PTC Specification | Tender Specifications |
| 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  |                   |                       |



الرقم : \_\_\_\_\_  
التاريخ : \_\_\_\_\_

جدول الكميات لأنظمة الموحدات الخاصة بالمناقصة رقم ( ٢٠١١/ )

Schedule Quantities

| No.          | Item   | Qty.             | Unit price \$ | Total Price \$ |
|--------------|--|------------------|---------------|----------------|
| A            | Switch mode Rectifiers System consist of racks cabinets 48V/600A with suitable busbars for output and output fuses (2x160A+2x63A)<br>Output installed with 12 module 48V/50A for each module   | 5                |               |                |
| B            | Switch mode Rectifiers System consist of racks cabinets 48V/300A with suitable busbars for output and output fuses (2x100A) + (1x63A)<br>Output installed with 6 module 48V/50A for each module                                      | 7                |               |                |
| C            | Switch mod rectifier system consist of racks cabinets 48V/150A with suitable bus bars for output and output fuse (2x50A 1x63A)<br>output installed with 5 module 48V/30A<br><b>Note: The cabinet must be small and wall mounted.</b> | 10               |               |                |
| D            | Spare modules for future expansion 48V output  | 30x50A<br>10x30A |               |                |
| E            | Spare parts (complete for each system) must be specify the price for each spare part   | -----            | -----         | -----          |
| <b>TOTAL</b> |  |                  |               |                |



## **Technical SPECIFICATION FOR Inverter Power Supply:**

### **1.Introduction:**

This specification defines the requirements of a Digital Uninterruptible Power System. INVERTER of multi modular system for PTC data center 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 AC power with specified tolerances to critical loads under normal and abnormal conditions.

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 three -phase insulated gate bipolar transistor (igbt) Inverter system
2. The Inverter shall automatically provide continuity of electrical power with in defined limits and without interruption. Upon Rectifier failure or degradation of the commercial AC source.
3. The continuity of conditioned electric power due to rectifier failure shall be delivered for this time by the battery system.
4. The Inverter system is driven by vector control algorithms and dedicated digital processor (DSP) system .in intelligent double conversion configuration.
5. The electronic static bypass switch shall be integrated into the Inverter system and manual by pass switch.
6. The system shall provide high quality AC 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) High Reliability low maintenance.
  - f) Ease of installation.
7. The duration of autonomy in the event of network failure shall be determined by the battery capacity.
8. The system shall be capable of continuous operation.
9. Rated output should work efficiently and smoothly.
10. The efficiency of system output ratio should not be less than 90% with 0.9 PF.
11. The Inverter should be modular system N+1 controlled by main cabinet

### **2.Inverter modules configuration:**

- 1) The Inverter 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 Inverter 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 Inverter which requiring repair in case of fault.

The Inverter system shall consist of the following major components:

- a) IGBT Modular Inverter.
- b) Digital signal processor DSP.
- c) Electronic static bypass switch.
- d) Manual bypass switch.

### **3. Modes of Operation:**

- 1) Normal no break modules operate in parallel.
- 2) Upon a failure of rectifier the Batteries should immediately continue supply to inverter.
- 3) The inverter shall be provided with monitoring and control circuit.
- 4) 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 and the system bypass shall be fitted in control cabinet
- 5) All materials and components comprising the Inverter must be new and of current manufacture.
- 6) Contain cable terminals should be suitable for power cables.
- 7) Wiring shall be identified at cable ends and shall relate to the circuit diagrams.
- 8) All wiring shall be adequately supported and shall be secured.
- 9) Full protection shall be provided to prevent contact with surfaces subject to heat or vibration.
- 10) The interface wiring shall be in harness with one end disconnected for shipment where it passes.
- 11) All incoming and outgoing cable terminations shall be complete with all items, sockets... etc.
- 12) The Inverter must be operating in parallel configuration with common batteries and share the common batteries bank.
- 13) The Inverter must start in soft start and gradual walk-in of the current.

### **4. Protections:**

- 1) System should be with input/output protection (thermal output overload short-circuit protection).
- 2) Led indication to indicate the normal and abnormal operation.
- 3) EMC and surge suppression.
- 4) Electromagnetic effects of internal or external origin shall be minimized in order to ensure that electronic loads and computer system are not adversely affected by their effect on the Inverter.
- 5) The neutral for output shall be electrically isolated from the Inverter chassis except for RFI filter.

### **5. Input Condition:**

The Inverter input shall be -48V DC With voltage tolerance from 43--60V DC.

### **6. Input supplies**

- Input power will be provided from rectifiers or batteries.

### **7. Output condition.**

The system must supply the equipments by 380 VAC OR 230VAC (3phase OR 1phase) +N +G  
Frequency 50 HZ  $\pm$  1% pure sine wave output.



## 8.Environment

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

- a) Temperature 0 °c to 40 °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 specifies details of de-rating.
- d) Noise level of complete assembly is not to exceed 65dB@1 M.
- e) Electromagnetic Compatibility

## 9.Instrumentation and Controls.

- 1) Inverter Display and Control Panel must be for each module 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 O/P of each module for each phase.
- 5) AC ammeter for O/P Current & load current for each module for each phase.
- 6) Frequency meter for O/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 INV.
  - b) Load on batteries.
  - c) Module failure.
  - d) Load on bypass.
  - e) Batteries low.
  - f) Overload.
- 10) Remote 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 button.

## 10./Information required with Tender:

1. A statement of compliance with this specification shall be submitted.
2. Description of the equipments schedule from the manufacture company.
3. MTBF and MTTR (figures).
4. Weights and dimensions of the equipment.
5. Manufacturer's 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 four copies of software operating system.
12. The system shall be provided with multi-password levels to limits access to software and data

## 11. Training:

The tender shall include as a separate item a quotation for training course for two persons on the operation, maintenance, and troubleshooting of the complete system in manufacturing factory.

### Inverter Modules specifications:

1. In addition to inverter specification each module shall be product output AC voltage and current with load sharing.
2. Input shall be -48V DC With manual adjustable output from 43--60V DC.
3. Module output shall be 380/230VAC ( 3phase/1phase) +N +G
4. Frequency 50HZ.
5. Each module shall be with I/O Protection (thermal over load and short circuit)
6. Each module shall have LED indicator and parameters.



## Technical Specification for Inverter System

| description                                  | PTC Specification                       | Tender Specifications |
|--|---|-----------------------|
| Name of devices                              |   |                       |
| Manufacture                                  |   |                       |
| Country of origin/TYP                        |   |                       |
| date of manufacture                          |   |                       |
| Operating Temperature                        | 0 to 40 °C                              |                       |
| Maxi Relative humidity                       | 30 to 98%                               |                       |
| Altitude                                     | 2500 M a.s.l                            |                       |
| Efficiency @ full/Half load %                | 94                                      |                       |
| Elevation with derating (M)                  |   |                       |
| without derating (M)                         |   |                       |
| Maximum line current                         |   |                       |
| protection degree IP                         |   |                       |
| Noise @1Meter dB@1M                          | 65                                      |                       |
| Cooling                                      |   |                       |
| INV safety                                   |   |                       |
| Performances and test                        |   |                       |
| Classification                               |   |                       |
| Capacity of main cabinet                     | N+1= KVA/KW                             |                       |
| AC input Connection for static by pass       | flexible wire4wires (3ph+G)orsingl phas |                       |
| AC output Connection                         | flexible5wires (3phor1phas+N+G)         |                       |
| Input suggested cables size mm <sup>2</sup>  |   |                       |
| output suggested cables size mm <sup>2</sup> |   |                       |
| Dimensions ( H x Wx L ) mm                   |   |                       |
| Weight (net +-2%) KG                         |   |                       |
| Floor area M <sup>2</sup>                    |   |                       |
| Cable entry                                  |   |                       |
| Cable access                                 |   |                       |
| Input protection with thermal short circuit  | MCCB                                    |                       |
| Output protection with thermal short circuit | MCCB                                    |                       |
| INV Input condition                          |   |                       |
| Nominal input voltage V                      | 48 DC adjustable output (43--60V DC)    |                       |
| DC input Connection                          | 2wires                                  |                       |
| input ripples                                | < 20mv                                  |                       |
| Current limit range A                        |   |                       |
| Load sharing                                 |   |                       |
| INV output condition                         |   |                       |
| Nominal by pass output voltage               | 400V 3PH PURE 4wires or singl phase     |                       |
| Tolerance on voltage %                       | ± 2                                     |                       |
| Nominal frequency Hz                         | 50                                      |                       |
| Tolerance frequency %                        | ±0.1                                    |                       |
| Power factor @400V                           | 0.8-0.9                                 |                       |
| Input current@maximum input power A          |   |                       |
| Input current for each module A              |   |                       |

### Technical Specification for Inverter System

| description  | PTC Specification             | Tender Specifications |
|--|-------------------------------|-----------------------|
| Walk-in /soft start (programmable)      SEC                              |                               |                       |
| <b>Module condition</b>  |                               |                       |
| Nominal input voltage                      V                             | 48 DC adjustable (43--60V DC) |                       |
| Output current                                      A                    |                               |                       |
| Output ripples   | < 20mv                        |                       |
| Current limit range                              A                       |                               |                       |
| Load sharing                                      %                      |                               |                       |
| Input current for each module              A                             |                               |                       |
| <b>Automatic static bypass switch</b>                                    |                               |                       |
| Nominal voltage  | 400/230 3ph +N or 230v+N      |                       |
| Voltage range                                      %                     | ± 5                           |                       |
| Nominal frequency  | 50 HZ                         |                       |
| Frequency range                                %                         | ± 0.2                         |                       |
| Efficiency    %                | 93                            |                       |
| Switcing capacity  |                               |                       |
| Maximum over load capacity                %                              | 125% for 1 minute             |                       |
| Transfer time      Inverter to reserve      ms<br>Reserve to inverter ms |                               |                       |
| Retransfer delay   | sec                           |                       |
| Input protection with thermal short circuit                              | MCCB                          |                       |
| Output protection with thermal short circuit                             | MCCB                          |                       |
| <b>protection</b>  |                               |                       |
| Surge protection   |                               |                       |
| Input protections with thermal Overload                                  |                               |                       |
| Output protections with thermal short circuit                            | MCCB                          |                       |
| EMC and surge suppression.   |                               |                       |
| <b>Alarms facilities&amp;Indication facilities</b>                       |                               |                       |
| INV on   |                               |                       |
| Output ON transfer   |                               |                       |
| Input lower than the range   |                               |                       |
| Over load  |                               |                       |
| Load ON Automatic static bypas   |                               |                       |
| Inverter out of service  |                               |                       |
| Cutoff / output short circuit  |                               |                       |
| Input out of limit   |                               |                       |

Republic of Yemen

Public Telecommunication Corp.

Tender Board (Technical Board)

الرقم : \_\_\_\_\_

التاريخ : \_\_\_\_\_



الجمهورية اليمنية  
المؤسسة العامة للاتصالات السلكية واللاسلكية  
لجنة المناقصات  
اللجنة الفنية

جدول الكميات للعاكسات Inverters الخاصة بالمناقصة رقم ( 2011/ )

Schedule Quantities

| No.          | Item   | Capacity | Qty.  | Unit price \$ | Total Price \$ |
|--------------|--|----------|-------|---------------|----------------|
| 1            | Inverter system input 48V DC/output 3Phase or Single Phase consists of (N) Modules | 8 KVA    | 4     |               |                |
| 2            | Inverter system input 48V DC/output 3Phase or Single Phase consists of (N) Modules | 12 KVA   | 6     |               |                |
| 3            | Spare Modules for future expansion   | -----    | ----- |               |                |
| 4            | Spare Parts  | -----    | ----- |               |                |
| <b>TOTAL</b> |  |          |       |               |                |