

GENERAL SPECIFICATION

ELECTRICAL

GS EP ELE 152

AC Uninterruptible Power Systems (UPS)

09	10/2012	General Revision
08	01/2012	Data sheet as Annex and minor modifications
07	10/2010	Obsolescence requirements
06	10/2009	Precisions regarding harmonic requirements
00	03/2001	First issue
Rev.	Date	Purpose of the revision

Owning entity: DEV/TEC	Managing entity: DEV/TEC/ELE
------------------------	------------------------------

General Specification		GS EP ELE 152
AC Uninterruptible Power Systems (UPS)		
Rev.: 09	Effective date: 10/2012	Page: 2 of 28

Contents

1. Scope	4
2. Reference documents.....	4
3. General.....	5
3.1 Environmental data	5
3.2 Reliability	6
3.3 Deviations to specification.....	6
4. Construction requirements	6
4.1 General.....	6
4.2 Internal wiring	7
4.3 Cable termination.....	7
4.4 Earthing	7
4.5 Electromagnetic Compatibility (EMC).....	7
5. Batteries.....	8
5.1 IEC definitions.....	8
5.2 Battery type.....	8
5.3 Battery construction	8
5.4 Battery installation.....	9
5.5 Operating duty	9
5.6 Battery terminals	10
5.7 Battery capacity	10
5.8 Battery feeder cable sizing	10
5.9 Maintenance requirement	10
6. Battery chargers - Rectifiers	10
6.1 Electrical service conditions	10
6.2 Battery charger characteristics.....	11
6.3 Battery charger operations	11
7. Inverter	12
7.1 Inverter characteristics	12

General Specification		GS EP ELE 152
AC Uninterruptible Power Systems (UPS)		
Rev.: 09	Effective date: 10/2012	Page: 3 of 28

7.2	Inverter operations	13
8.	Static transfer switch	13
9.	Bypass transformer	14
10.	Minimum features to be provided	14
10.1	Battery chargers.....	14
10.2	Inverter	14
10.3	Bypass transformer.....	15
10.4	Control and monitoring.....	15
10.5	Marking.....	16
11.	AC distribution panel	16
12.	Accessories	16
13.	Design Life & Obsolescence (IEC 62402).....	17
14.	Documentation	17
15.	Inspection and testing	18
15.1	Factory acceptance tests	19
15.2	Routine tests.....	19
15.3	Test report	19
16.	Transport/Packing.....	19
Appendix 1	Data Sheet AC Uninterruptible Power Systems.....	20

General Specification		GS EP ELE 152
AC Uninterruptible Power Systems (UPS)		
Rev.: 09	Effective date: 10/2012	Page: 4 of 28

1. Scope

This specification covers the basic requirements for the design, manufacture, operation and testing of AC uninterruptible power systems (UPS).

The UPS shall provide power to critical loads including instrumentation and telecommunication systems.

2. Reference documents

The reference documents listed below form an integral part of this General Specification.

The following order of precedence applies specifically to electrical equipment:

- Applicable laws and regulations of the country in which the system will be operated. In cases where no "local" regulations exist, the French laws and regulations shall be used
- Company Particular Specifications and data-sheets (if any)
- Company General specifications
- Applicable International Electro-technical Commission IEC Standards
- Applicable recognised standards and codes (UTE-NFC, BS, VDE, etc.) when IEC publications have not yet been issued.

Any conflict or inconsistency between the above set of documents (standards, specification, codes and local regulation or laws) shall be raised to COMPANY attention for resolution at tender stage.

External Documents

Unless otherwise stipulated, the applicable version of these documents, including relevant appendices and supplements, is the latest revision published at the effective date of this document.

Reference	Title
IEC 60076-11	Power transformers - Part 11: Dry-type transformers
IEC 60079 (All parts)	Electrical apparatus for explosive gas atmospheres - All parts
IEC 60146 (All parts)	Semi-conductor convertors - All parts
IEC 60529	Degrees of protection provided by enclosures (IP Code)
IEC 60622	Secondary cells and batteries containing alkaline or other non-acid electrolytes - Sealed nickel-cadmium prismatic rechargeable single cells
IEC 60623	Secondary cells and batteries containing alkaline or other non-acid electrolytes - Vented nickel-cadmium prismatic rechargeable single cells
IEC 60993	Electrolyte for vented nickel cadmium cells
IEC 61000 (All parts)	Electromagnetic compatibility (EMC) - All parts

AC Uninterruptible Power Systems (UPS)

Rev.: 09

Effective date: 10/2012

Page: 5 of 28

Reference	Title
IEC 61439 (Parts 1; 3)	Low-voltage switchgear and controlgear assemblies - Parts 1; 3
IEC 61892-3	Mobile and fixed offshore units - Electrical installations - Part 3: Equipment
IEC 62040 (All parts)	Uninterruptible power systems (UPS) - All parts
IEC 62259	Secondary cells and batteries containing alkaline or other non-acid electrolytes-Nickel cadmium prismatic secondary single cells with partial gas recombination
IEC 62402	Obsolescence management - Application guide
IEEE 519	IEEE Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems
94/9/EC (ATEX 100a ¹ / ATEX 95 ²)	European Directive 94/09/EC (23/03/94) on the approximation of the laws of the Member States concerning equipment and protective systems intended for use in potentially explosive atmospheres

Total General Specifications

Unless otherwise stipulated, the applicable version of these documents, including relevant appendices and supplements, is the latest revision published in the applicable yearly collection.

Reference	Title
GS EP ELE 001	Electrical design criteria
GS EP ELE 021	Electrical design criteria for floating units
GS EP TEC 007	Obsolescence and Lifetime Cycle Management

3. General

3.1 Environmental data

The equipment shall be installed inside an air-conditioned technical room, with an average ambient air temperature of 25°C but shall be able to operate on unusual condition such as specified in the project data sheet.

If the equipment shall be installed in an offshore unit, special requirement of IEC 61892-3 shall be applied.

In case H₂S might be present in the technical room, as specified in the project data sheet, special provision shall be taken by the Manufacturer to avoid equipment/material corrosion. The Manufacturer shall indicate the proposed protection measures in his offer.

¹ Reference to Articles 100 of the Treaty of Rome.

² Reference to Articles 95 of the Treaty of Amsterdam.

General Specification		GS EP ELE 152
AC Uninterruptible Power Systems (UPS)		
Rev.: 09	Effective date: 10/2012	Page: 6 of 28

3.2 Reliability

Reliability of equipment to perform continuously is essential. Prototype or unproven equipment not having a well-established operating record will not be considered.

Manufacturer shall state in his offer the availability, reliability and Mean Time Between Failure (MTBF) data for similar units in service.

If redundancy is required, the UPS shall be a redundant system with the following:

- Two units in parallel, each unit being equipped with a battery sized for the rated battery back-up at half-rated power and one static switch
- A by-pass transformer.

3.3 Deviations to specification

The Manufacturer shall advise the Company of any deviations made in respect of this Specification at the time of tendering. Should this Specification conflict with requirements of the listed standards the Manufacturer shall request clarification from the Company.

4. Construction requirements

4.1 General

Battery chargers, inverters, transformer and static switches shall be completely assembled and wired in free standing sheet steel cabinets suitable for indoor operation as per [GS EP ELE 001](#) and [GS EP ELE 021](#).

For redundant UPS, each battery charger-inverter branch shall be installed in separate cabinets.

The equipment shall be arranged such that internal access can be made without shutting down. Removable side panels may be provided, but rear access shall not be required. Warning labels shall be fitted in prominent positions advising care to be taken when gaining access to live equipment.

Adequate ventilation shall be provided in order to guarantee the proper operation of the UPS at rated condition, whatever the mode of operation and the battery autonomy. Where natural air convection is not practical, forced air cooling shall be considered provided that air intakes are fitted with air filters to allow for long operation without cleaning. The fans shall be provided as an 'n+1' arrangement to ensure redundancy of the cooling system. Fan failure detection shall be provided with local and remote alarm.

Fan motors shall be individually protected (multi-pole switching) and controlled.

Access doors shall be lockable with a common key provided. They shall be fitted with an internal pocket suitable for a complete drawing set.

Enclosures shall have at least IP21 protection degree and IP20 when the door is open as defined in [IEC 60529](#).

Unless otherwise specified, the enclosures shall be cleaned, primed and painted according to Manufacturer standard.

The cubicles shall be designed to be lifted by use of detachable eyebolts.

General Specification		GS EP ELE 152
AC Uninterruptible Power Systems (UPS)		
Rev.: 09	Effective date: 10/2012	Page: 7 of 28

4.2 Internal wiring

Internal wiring shall be PVC insulated 1000 V grade, flame retardant and stranded copper conductors, except for connection on printed circuits.

Cabling between components shall be continuous, joining of cables is not permitted.

Internal wiring within the board shall be securely held in position (either loomed or run in conduit/trunking).

Wiring identification shall be by numbered and/or lettered ferrules, of insulating material and located adjacent to the terminals.

Wiring connections for external connections shall be brought out to individual terminals on a readily accessible terminal block. Wires shall be terminated using compression type lugs or crimp sleeves.

Wiring penetrations through compartment or cubicle sections shall be fitted with protecting strips or alternative means to prevent insulation damage.

Wiring installed across hinged doors shall be protected by the use of flexible conduit or sleeving.

4.3 Cable termination

External cable terminating facilities and terminals shall be suitable for the specified cable type, conductor size. Cable supports shall be provided by the Manufacturer to avoid undue strain on the cable termination. The number of conductors connected to each terminal shall not exceed two for internal cabling and one for external cabling.

Power and control external cabling and relevant terminals shall be fully segregated and separated. Protection covers shall be split in order to provide independent access to power and control terminals.

4.4 Earthing

An earthing copper busbar shall be provided along the full length of the equipment structure with provision for earth cable connections at each end.

All metallic non-current carrying parts of the equipment shall be bonded together and connected to the earth busbar. All doors shall be bonded to the main structure by means of a flexible copper connection arranged so that it cannot be trapped as the door is opened or closed.

4.5 Electromagnetic Compatibility (EMC)

The Manufacturer shall ensure that effects of induced voltages, electromagnetic interference and "noise" are carefully considered, and means taken to prevent any mis-operation, erratic performance or failure due to these effects. Compliance with the [IEC 61000](#) is mandatory.

The equipment EMC requirements shall be as a minimum per Category C3 as defined in the [IEC 62040-2](#).

General Specification		GS EP ELE 152
AC Uninterruptible Power Systems (UPS)		
Rev.: 09	Effective date: 10/2012	Page: 8 of 28

5. Batteries

5.1 IEC definitions

Ni-Cd sealed cell type - IEC 60622:

Cell which remains closed and does not release either gas or liquid when operated within the limits of charge and temperature specified by the manufacturer. The cell is equipped with a safety device to prevent dangerously high internal pressure. The cell does not require addition to the electrolyte and is designed to operate during its life in its original sealed state.

Ni-Cd vented cell type - IEC 60623:

A secondary cell having a cover provided with an opening through which gaseous products may escape.

Note: The opening may be fitted with a venting system.

Ni-Cd partial recombination cell type - IEC 62259:

Ability of a cell to recombine most of the gases evolved during charging under the conditions specified in chapter 7.9. (Chapter 7.9: Gas recombination shall not be less than 70%).

5.2 Battery type

The batteries shall be one of the following types in accordance with IEC standards and the final cell type selection shall be indicated in the Project particular specification or data-sheet.

Manufacturer shall provide cell type certification by a recognised Certifying Authority with his offer.

5.2.1 Vented type nickel-cadmium cells as per IEC 60623

End of discharge voltage shall not be lower than 1.0 V per cell at 20°C.

The composition, purity and properties of electrolytes used in these vented nickel-cadmium cells shall be as per IEC 60993 in the absence of specific recommendations from the battery manufacturer.

5.2.2 Sealed or partial recombination type nickel-cadmium cells as per IEC 60622 or IEC 62259

These types of cell shall have a gas recombination rate equal to or greater than 90% in any charge mode.

End of discharge voltage shall not be lower than 1.0 V per cell at 20°C.

Manufacturer shall provide recombination rate measurement test certificate issued by independent third party with his offer.

5.3 Battery construction

Vented and partial recombination battery cells containers shall be assembled in flame retardant, heat resistant, shock -absorbing plastic containers with covers attached to form a permanent

General Specification		GS EP ELE 152
AC Uninterruptible Power Systems (UPS)		
Rev.: 09	Effective date: 10/2012	Page: 9 of 28

leak-proof seal. Each container shall provide visual indication of electrolyte level with level lines marked on front side.

For all batteries type, covers shall be sealed against leakage of electrolyte and shall be fitted with spray-proof vent plugs.

5.4 Battery installation

The battery installation shall be as indicated in the data sheet.

5.4.1 Outdoor Installation in hazardous area

Batteries shall be installed in suitable certified battery boxes and the battery shall comply with the requirements of the [IEC 60079-7](#) and [ATEX 94/9/EC](#).

5.4.2 Battery stands

Large batteries shall be installed on impregnated hardwood racks or insulated electrolyte resistant metal racks

The stands shall be supplied by the battery manufacturer. An electrolyte resistant retention basin shall be provided by the Manufacturer and installed under the stands.

5.4.3 Battery cabinet

The battery shall be installed in a free standing steel cabinet assembled and wired with the battery chargers.

Provision for exhaust duct connection shall be provided at the top of the cabinet in order to ensure proper forced ventilation (with redundant fan units) to avoid gas accumulation. Air inlet shall be at the bottom of the cabinet (side air inlet is not allowed).

The cabinet shall consist in electrolyte resistant sliding drawers, with electrolyte retention capability, provided with stoppers. Mechanical interlock shall be provided to prohibit withdrawal of more than one drawer at a time.

Each sliding rack shall be securely connected to the main earth busbar by means of flexible copper connections.

Easy access shall be provided for topping up batteries in position.

5.5 Operating duty

During normal operation, the battery will be floating on line with the battery charger maintaining the battery in the fully charged condition, at the same time supplying the normal steady state loads

The batteries shall have the capacity to supply via the inverters, the loads according to the provided load profile and relevant autonomy defined in the data sheet, with the charger being off.

During this time, the cells voltage shall remain above the value stated in section 5.2, and the inverter output voltage shall remain within the tolerance specified in the data sheet.

General Specification		GS EP ELE 152
AC Uninterruptible Power Systems (UPS)		
Rev.: 09	Effective date: 10/2012	Page: 10 of 28

The isolation of the batteries at the end of discharge shall be made on threshold of voltage.

5.6 Battery terminals

All cell terminals shall have adequate current carrying capacity. Cell terminal posts shall be equipped with connector bolts. Cell terminal posts, bolts and associated hardware shall be of electrolyte resisting material and protected by insulating screens to prevent risk of contact with live parts.

5.7 Battery capacity

A load curve versus time shall be provided by Engineer/Contractor to allow definition of battery rating. Also minimum voltage at the end of discharge shall be defined

An appropriate de-rating factor for ageing (20% minimum) shall be considered for battery sizing.

The Manufacturer shall provide at the tender stage a calculation note justifying:

- The type and reference of the battery selected
- The number of elements
- The ageing factor taken into account.

5.8 Battery feeder cable sizing

The maximum voltage drop in main power cables between remotely located batteries and main equipment cubicles shall be limited to 1%, unless otherwise specified.

5.9 Maintenance requirement

A connection system shall be designed in order to perform the test of battery stored energy.

6. Battery chargers - Rectifiers

6.1 Electrical service conditions

All equipment shall be rated for continuous operation, with variations of voltage and frequency as stated hereafter:

- AC supply voltage: +10% -10%
- Frequency: $\pm$ 5%.

The performance of the equipment shall not be affected by:

- Transient voltage depressions down to 80% of rated voltage
- Harmonic voltage THD up to 10% and each IHD within the limits of class 3, tables 3 and 4 of [IEC 61000-2-4](#).

Unless otherwise stated in the data-sheet, the UPS shall be fed from two different three phase AC supplies with highly impedant neutral and insulation monitoring by low frequency current injection.

AC Uninterruptible Power Systems (UPS)

Rev.: 09

Effective date: 10/2012

Page: 11 of 28

6.2 Battery charger characteristics

The charger rating shall be adequate for the normal operation duty, and for charging the battery from “discharged state” to a state of charge which will provide for execution of discharge at full load while respecting the autonomy after eight hours of charging.

Unless otherwise specified, voltage of battery and charger and its tolerances are left to the discretion of the Manufacturer but shall satisfy the inverter input characteristics.

The maximum allowable voltage fluctuation ($\pm 10\%$ of the rated value) shall apply during charging of the battery. The rectifiers shall be protected from an over temperature by thermal switches that will de-energise the charger and initiate an alarm. A loss of control caused by a failure shall block the rectifier bridge.

Each charger shall be fed through an isolating three-phase transformer and designed in order to minimise the harmonic current rejected to the network. The charger shall be capable of limiting the battery charging current in accordance with battery Manufacturer's requirements.

Rectifier shall consist in a three phase rectifying bridge, and load upstream of the isolating transformer shall be equally split on the three phases. Isolating transformer shall be removable without requiring the dismantling of other components within the cubicle.

The isolating transformer shall be built in accordance with the requirement of the [IEC 60076-11](#) and [IEC 60146-1-3](#).

The ratio of peak magnetising current of primary winding of the isolating transformer shall be less than 15 times the rated current. If this is not practical a two step soft energisation of the transformer shall be provided to limit the inrush current to an acceptable value.

Current harmonic rejection shall remain between the limits defined in [IEEE 519](#) Table 10-3, with I_{sc}/I_L ratio of less than 50, as a minimum requirement (i.e. ratio even less than 50 could be considered in particular project conditions).

6.3 Battery charger operations

a) Normal operation modes

Chargers shall have two modes of operation: “boost charge” and “float charge”.

Facilities shall be provided to manually initiate both modes of operation but the return to safe operation for the battery shall always be automatic.

Facilities shall be provided to inhibit the boost charge in case of failure of the battery room ventilation system. If the ventilation failure occurs during boost charge, the charger shall revert to float charge mode. Upon restoration of ventilation (external fault signal cleared), charge mode shall be automatically restored to its previous status.

Boost charge mode shall be automatically initiated upon restoration of AC power after an outage. An adjustable timer started when the battery reaches the second stage of charge shall automatically reset the charger to the float charge mode to prevent the battery from being overcharged.

A volt free contact for remote indication of charge mode status shall be provided.

Float voltage shall be adjusted automatically depending on the battery temperature monitored by a probe.

General Specification		GS EP ELE 152
AC Uninterruptible Power Systems (UPS)		
Rev.: 09	Effective date: 10/2012	Page: 12 of 28

When required in project data sheet, an automatic battery test function shall be provided.

Battery test shall be automatically initiated every week or as per specified in the Project data sheet to check battery condition and stored energy. During this test, the charger's voltage reference will be reduced and the voltage of both batteries will be monitored. If the battery voltage falls too low an alarm is generated. In all cases at the end of the test, the chargers return to float charge or boost charge mode.

b) Off line full discharge test

A switch shall be provided to permit an annual off-line full discharge battery test of each battery on an external load bank connected to extra terminals located in the charger cabinet close to the battery connection terminals.

During this annual test the two chargers and the remaining battery shall continue to supply the load. An auxiliary contact shall be provided for local and remote indication of battery isolated condition.

c) Emergency shutdown (ESD) trip

Unless otherwise stated in the project documentation, a circuit breaker with overcurrent protection only and an undervoltage tripping coil shall also be provided for ESD purpose in an Ex"d" or "de" IIC or IIB+H2 T3 enclosure, located close to each battery.

All power supplies and control circuits shall be arranged such that upon isolation of the battery circuit breaker the connections remaining energised shall be within the Ex"d" or "de" circuit breaker enclosure and at the battery terminals which shall be shrouded.

"Reset" of this breaker shall be possible by an "externally accessible" operating handle. The terminals for the external load bank connection described above shall be arranged so that the "Ex" circuit breaker is in use during the full discharge test.

7. Inverter

The inverter shall be a solid state type, rated to continuously supply load requirements and run in synchronism with the bypass supply.

It shall be operating on-line, i.e. voltage and frequency independent (VFI).

7.1 Inverter characteristics

The inverter shall be capable of operating within the specified output limits either continuously fed from the rectifier output with the battery connected (floating and charge) or directly from the battery over the required period after failure of the electricity supply.

The inverter output shall be 230 V single phase for UPS rated less than 50kVA and 400/230 V three phase + neutral output for larger UPS systems. The output voltage shall be adjustable by $\pm 5\%$ to allow for voltage drop across the 230 V distribution system. Voltage THD shall remain below 3% with 100% linear load and below 5% with 100% non linear load whose scheme is defined in Annex E of [IEC 62040-3](#) (i.e. 100% non linear load means that 33 kVA or 100 kVA limitation for single phase and three phase UPS are not applied, non linear load shall match the UPS rated power, regardless of its value).

Under steady state load conditions the inverter output voltage measured at the UPS distribution bus shall be maintained at $\pm 1\%$ of nominal voltage with a maximum frequency tolerance of

General Specification		GS EP ELE 152
AC Uninterruptible Power Systems (UPS)		
Rev.: 09	Effective date: 10/2012	Page: 13 of 28

$\pm 0.5\%$. The maximum allowable transient voltage variation except where otherwise specified, shall not exceed $\pm 10\%$ under the following conditions:

- Removal of AC supply to charger/rectifier
- Transfer of full load to bypass transformer
- Return of full load to inverter
- Load change.

Voltage recovery to 95% nominal following any of the above disturbances shall be within 50 ms.

The inverter shall be capable of starting up and supplying the load without reference to an external alternate supply. A test facility shall be provided to operate the inverter when the static switch is bypassed.

The current rating of the inverter semi-conductor components shall not be less than 120% of the maximum current flowing through the elements at full load. The maximum allowable operating temperature of the inverter semi-conductors shall be limited to 80% of their maximum permissible value.

The inverter rated output shall, where necessary, take into account the non-sinusoidal nature of the connected load.

7.2 Inverter operations

The inverter shall be automatically disconnected from the load if the inverter output is outside the stated voltage and frequency tolerances and if voltage is available on the by-pass transformer.

For redundant UPS, the inverters shall run in parallel, sharing the load at 50% in normal operation.

8. Static transfer switch

The static switch shall, on inverter failure, transfer the power supply of the loads to the bypass transformer output.

The static transfer switch shall feature continual synchronism between the inverter and bypass transformer outputs. Transfer of load from the inverter to the bypass transformer shall be uninterruptible provided the two supplies are synchronised within the inverter output tolerance. In the event of an inverter failure, the maximum supply interruption to the load shall be 0.5 ms.

Operation of the static switch to the bypass supply shall only take place when voltage is available.

Return to normal operation upon restoration of inverter output shall be a manually initiated sequence when synchronised with the bypass transformer supply.

Facilities for manual operation of the static switch shall be incorporated enabling complete isolation of the inverter for maintenance purposes.

In addition, for maintenance purposes, a manual make-before-break switch shall allow the complete isolation of the static switch and the inverter.

General Specification		GS EP ELE 152
AC Uninterruptible Power Systems (UPS)		
Rev.: 09	Effective date: 10/2012	Page: 14 of 28

The static switch operation shall be adjustable within the following tolerances:

- Frequency: $\pm 5\%$
- Voltage: $\pm 10\%$.

9. Bypass transformer

The transformer shall be double wound type with an earth shield between windings and operated in conjunction with the static transfer switch and manual bypass switch.

By pass transformer may be single phase / single phase for unit less than 10 KVA.

For single phase output UPS above 10 KVA, by pass transformer shall be of Scott type.

Bypass transformer shall be removable without requiring the dismounting of other components within the cubicle

The isolating transformer shall be built in accordance with the requirement of the [IEC 60076-11](#)

When required in the project specification, the bypass transformer, manual bypass switch and distribution shall be installed in separate cabinet in order to allow rectifier/inverter replacement without shutdown.

10. Minimum features to be provided

10.1 Battery chargers

Each charger shall be equipped with the following as a minimum:

- AC supply three pole ON/OFF switch
- Blocking of the bridge in case of abnormal input voltage
- High speed fuses for power semi-conductors
- Miniature circuit breakers for auxiliary circuits
- Imminent battery shutdown remote alarm
- End of discharge remote alarm for ESD trip. Contact shall be open to alarm.

10.2 Inverter

The following shall be provided for the inverter as a minimum:

- Incoming ON/OFF switch
- Outgoing ON/OFF switch
- Ammeter to indicate inverter output current.

Local and remote alarms as follows as a minimum:

- Inverter failure
- Load on bypass
- Out of synchronisation.

General Specification		GS EP ELE 152
AC Uninterruptible Power Systems (UPS)		
Rev.: 09	Effective date: 10/2012	Page: 15 of 28

10.3 Bypass transformer

The transformer shall be equipped with the following as a minimum:

- Incoming ON/OFF isolator
- A local alarm shall be provided for transformer undervoltage condition.

10.4 Control and monitoring

Control and monitoring shall be provided by a microprocessor based controller.

Local control and monitoring shall be given on the front of equipment and shall include as a minimum:

- One alpha-numeric display with pushbuttons for operator interface
- Two LED's normal and fault
- On/off switch
- A buzzer providing audible alarm.

The display shall provide for each branch, the following indications as a minimum:

- Measurements:
 - AC supply voltage
 - AC supply current
 - DC output voltage
 - DC output current
 - Battery current (+ or -)
 - Inverter output current
 - Inverter output voltage
 - Inverter output frequency
- Status of operating modes
- Alarms and faults.

Local and remote alarms and faults shall be provided.

When required in the data sheet remote alarms and faults shall be provided through a serial link with a protocol that shall be defined in the Project specification.

The Manufacturer shall ensure the serial link compatibility with the ECS or ICSS of the plant and, if required, provide the necessary interfaces.

A mimic (graphic display) showing the complete UPS or one mimic per branch, shall be provided on the front of the cubicle with appropriate LED's.

General Specification		GS EP ELE 152
AC Uninterruptible Power Systems (UPS)		
Rev.: 09	Effective date: 10/2012	Page: 16 of 28

10.5 Marking

Permanent nameplates shall be provided identifying each component. Labels shall also be provided for each individual cell to facilitate test, operation and maintenance.

Rating plates shall be provided as per [IEC 62040](#) and riveted or screwed on the front panel.

Components nameplates shall be laminated engraved plastic with black letters on a white background.

11. AC distribution panel

Each source shall be provided with a distribution panel within or adjacent to the UPS cabinet, as indicated in the "project" particular specification. This distribution panel shall be designed as per [IEC 61439-1](#) and [IEC 61439-3](#) and an incoming two pole switch for single Phase UPS output (and four pole switch for three phase UPS) shall be provided.

In case of redundant UPS, the distribution panel shall include two incoming switches. The distribution shall be split into two buses "A" and "B" by means of a bus-tie switch. This would allow replacement or installation of additional outgoing CB without complete UPS distribution shutdown.

Addition of CBs (rating up to 40 A) shall be possible via specific bus connection system and/or spare termination block whose conception allows performing this operation safely while the whole equipment remains energized.

The neutral connections to ground shall be made by means of removable jumpers.

If an earth fault detector relay is required, it shall be based on the detection of a low frequency AC current circulating between AC network and earth.

Each outgoing circuit shall be protected by a two poles circuit breaker with overcurrent protection plus a tripping fault contact and, if specified in the Project particular Specification, also a tripping coil to facilitate isolation.

The circuit breaker shall be sized for the specific circuit requirements and shall be fully selective with other devices in the circuit. The Manufacturer shall state in his offer the maximum rated circuit breaker that can be fitted.

All circuit breaker tripping fault contacts shall be gathered on a signalling loop and brought to control terminals for remote indication.

A minimum of 10% equipped spare outgoing CBs shall be fitted, plus 20% additional space including the clip-on bus ready for use.

Internal wiring shall be 1000 V insulated, at least flame retardant and fitted at both ends with lugs and ferrules. All external cables shall be connected on terminal blocks for connection at bottom.

12. Accessories

A complete set of tools required for maintaining the equipment shall be provided.

A tin of paint shall be provided to permit final touch-up following installation.

General Specification		GS EP ELE 152
AC Uninterruptible Power Systems (UPS)		
Rev.: 09	Effective date: 10/2012	Page: 17 of 28

13. Design Life & Obsolescence (IEC 62402)

Equipment and component obsolescence management shall be as per **GS EP TEC 007**.

Facilities are typically designed with an expected design life in the order of 20 to 25 years.

The UPS design shall therefore take into account the requirement that the equipment will most probably require to be upgraded during the design life of the facilities in particular for all the electronic based components. These requirements shall be incorporated from Basic Engineering stage.

The design will include provisions to allow an upgrade of the UPS to be performed with minimal disturbance to the power generation and distribution systems, fixed cabling infrastructure and infrastructure.

All hardware and software that may be developed by the Manufacturer further to the UPS delivery, shall ensure full ascending compatibility to allow for easy replacement of equipment that became obsolete with limited reconfiguration.

At the Tender stage, the UPS Manufacturer shall detail his lifecycle management strategy focusing on product obsolescence, support options and further migration alternatives. The lifecycle/obsolescence management plan and associated cost shall be part of the Tender process evaluation.

The UPS Manufacturer shall complete an inventory of all provided equipment (hardware and software) matching to different lifecycles phases, including all Sub-Vendors equipment (e.g. electronic cards and associated software, switches, HMI (Human Machine Interface)...).

UPS Manufacturer shall guarantee that:

- UPS components (including software and hardware) shall remain in the “active products” range (i.e. supporting developments and releases) over a period of at least 10 years after the SAT
- An announcement to Customer is provided 5 years prior the end of the commercial phase
- UPS components (including software and hardware) shall be fully supported and available over a period of at least 20 years after the SAT
- Maintenance services including availability of engineering services shall be available to support the UPS during the plant life time.

14. Documentation

As a minimum, the following documents shall be provided for Company's review at the tender stage:

- Overall arrangement drawing
- One line diagram
- Schematic diagram
- Battery sizing calculation note
- Heat dissipation values for 50%, 75% and 100% load depending on operating mode

General Specification		GS EP ELE 152
AC Uninterruptible Power Systems (UPS)		
Rev.: 09	Effective date: 10/2012	Page: 18 of 28

- Availability, reliability, Mean Time Between Failure (MTBF) and Mean Time To Repair (MTTR) data for each system. The Manufacturer shall also include this data for similar units currently in service with their offer documentation
- Type test reports (in particular battery and battery charger gas recombination type test by a recognised certifying authority)
- Gas release calculation depending on battery charging mode
- Battery cabinet ventilation calculation note (when applicable)
- Component/equipment obsolescence plan.

Unless otherwise specified in project particular specification, Manufacturer shall at least provide the following documents:

- Overall arrangement drawing
- Civil works drawings
- One line diagram
- Wiring diagram
- Schematic diagram
- Battery cable calculation note
- Battery short circuit capacity calculation note
- DC breaking capacity for all breakers in the DC circuits
- Maintenance and operation instructions
- Spare part list
- Detailed equipment information (technical documentation)
- Obsolescence management dossier
- Type test reports
- FAT reports.

15. Inspection and testing

The Manufacturer shall carry out tests upon completion of construction to demonstrate to Company, or his representative, that the requirements of this Specification and any subsequent amendments have been fulfilled in accordance with the applicable standards and regulations.

The minimum tests required are those specified in [IEC 62040-3](#), plus tests required in the Project data sheet.

AC Uninterruptible Power Systems (UPS)

Rev.: 09

Effective date: 10/2012

Page: 19 of 28

15.1 Factory acceptance tests

Factory acceptance tests shall comprise:

- Visual inspection and operational tests
- Prove integrity of panel earth bonding
- Operation of battery circuit breakers from undervoltage tripping facility
- The completeness and quality of the contractual technical documents.

15.2 Routine tests

The Manufacturer shall allow in his quotation for the provision of all necessary test equipment, load banks and technical personnel to carry out the following routine and optimal tests required in the Project data sheet.

15.3 Test report

A pro-forma of test report and test procedure shall be presented to the Company for approval before order.

The test report shall detail as a minimum:

- The expected theoretical values
- The permissible tolerance values
- The results of the measurements including, if applicable, any intermediate value which has caused a temporary rejection.

The test report shall be incorporated into the contractual technical documents and shall be considered as an integral part of them.

16. Transport/Packing

In all cases, vented batteries shall be delivered electrically formed by the Manufacturer. They shall be shipped preferably filled and charged, but this choice is left to the Manufacturer and/or Engineer/Contractor based on site delivery and storage, schedule and conditions.

Sealed batteries shall be delivered charged.



General Specification		GS EP ELE 152
AC Uninterruptible Power Systems (UPS)		
Rev.: 09	Effective date: 10/2012	Page: 20 of 28

Appendix 1

Appendix 1 Data Sheet AC Uninterruptible Power Systems

AC Uninterruptible Power Systems (UPS)

Rev.: 09

Effective date: 10/2012

Page: 21 of 28

Appendix 1

TOTAL
Exploration & Production

DATA SHEET	N°
Project:	
DS EP ELE 152	AC Uninterruptible Power Systems
Rev. 03 - 10/08	

Rev. Date						
Written						
Verified						
Approved						

Appel d'offres/Call for tender ☐		Commande/Order ☐	
1	2	3	4
Repère de l'équipement Equipment Tag No.	Nombre d'onduleurs Number of inverters	Nombre de batteries Number of batteries	
CONDITIONS GENERALES D'INSTALLATION INSTALLATION CONDITIONS			
8	9	10	11
Température ambiante Ambient temperature	Normale Normal	Maximum Maximum	Minimum Minimum
12	13	14	15
Hygrométrie relative: Relative humidity	Normale Normal	Maximum Maximum	
16	17	18	19
Altitude : > 1000 m Altitude: > 1000 m	Intérieur Indoor	A terre Onshore	En mer Offshore
20	21	22	23
Salle ventilée Ventilated room	Salle climatisée Air conditioned room	Salle surpressée Pressurized room	Présence H ₂ S H ₂ S presence
24	25	26	27
Mise en place Installed on	Sol béton/planéité 2 mm/1000 Concreted floor/flatness	Faux-plancher False floor	Chassis Base frame
NORMES INTERNATIONSALES APPLICABLES INTERNATIONAL STANDARDS			
IEC 60146 IEC 62040			
CARACTERISTIQUES TECHNIQUES DE L'EQUIPEMENT TECHNICAL DATA			
31	32	33	34
Tension de sortie Output voltage	Mono SP	Tri 3P	Fréquence de sortie Output Frequency
35	36	37	38
Puissance Input Power	A cos phi At cos phi	Autonomie Battery back-up	à at
39	40	41	42
Taux global de distorsion admissible Maximum permissible distortion	% Un		
43	44	45	46
Variation de tension admissible en régime permanent Maximum voltage variation, continuous operation	+	-	
47	48	49	50
Variation de tension admissible en régime transitoire Maximum voltage variation, transient operation	+	-	ms
51	52	53	54
Variation de fréquence admissible en régime permanent Maximum frequency variation, continuous operation	+	-	
55	56	57	58
Variation de fréquence admissible en régime transitoire Maximum frequency variation, transient operation	%	-	ms
59	60	61	62
Fonctionnement possible en parallèle Parallel operation possible		Régulation de la charge des batteries en fonction de la température Battery charger temperature regulated	
ORIGINE DU DOCUMENT/ENGINEERING'S REFERENCE		FABRICANT SUPPLIER'S REFERENCE	
Société/Company:		Société/Company:	

AC Uninterruptible Power Systems (UPS)

Rev.: 09

Effective date: 10/2012

Page: 22 of 28

Appendix 1

TOTAL
Exploration & Production

DATA SHEET	N°
Project:	
DS EP ELE 152 Rev. 03 - 10/08	AC Uninterruptible Power Systems

Appel d'offres/Call for tender ☐		Commande/Order ☐	
1			
2	Passage en floating forcé par manque ventilation local ☐ Démarrage ventilation en cas de charge ☐		
3	Float mode forced by room ventilation failure ☐ Start room ventilation by charge ☐		
4			
5	Arrêt onduleur en fin d'autonomie batterie ☐ Chargeur-onduleur capable de fonctionner sans batterie ☐		
6	Inverter stop at end of battery discharge ☐ Charger-inverter operable without battery ☐		
7			
8	Démarrage Secteur présent ☐ Secteur absent ☐		
9	Start-up with mains present with mains off		
10			
11	Contacteur statique de by-pass ☐ By-Pass manuel ☐ Transformateur d'isolement sur réseau 1 ☐		
12	Static transfer switch Manual bypass Isolating transformer on mains input 1		
13			
14	Transformateur sur réseau 2 ☐ Ecran électrostatique ☐ Réglage secondaire +/- %		
15	Bypass transformer on mains input 2 Electrostatic screen Secondary adjustment		
16			
17	Distribution aval en schéma TT ☐ TNS ☐ IT ☐ Neutre distribué ☐		
18	Output distribution system Distributed neutral		
19			
20	Contrôleur permanent d'isolement Sur utilisation ☐ Sur batteries ☐		
21	Continuous isolation monitoring On load On battery		
22			
23	Batteries d'accumulateurs Ouverts au nickel-cadmium ☐ Etanches au nickel-cadmium ☐		
24	Accumulator battery Vented nickel-cadmium Sealed nickel-cadmium		
25			
26	Ouverts au plomb ☐ Etanches au plomb ☐ Durée de vie ans/years		
27	Vented lead-acid Sealed lead-acid Life duration		
28			
29	En armoire ☐ Sur tiroirs extractibles ☐ Sur chantier ☐ En coffret extérieur ☐		
30	In cabinet In pull out compartments On racks In outdoor cabinet		
31			
32	Accessoires entretien batterie ☐ Cache bornes ☐		
33	Battery maintenance tools Terminals cover		
34			
35	CARACTERISTIQUES DE L'ALIMENTATION DU REDRESSEUR (réseau amont 1)		
36	RECTIFIER SUPPLY SPECIFICATIONS (mains input 1)		
37			
38	Tension V + 10 % - 10 % Mono ☐ Tri ☐ Fréquence Hz + - 5 %		
39	Voltage SP 3P Frequency		
40			
41	Schéma TT ☐ TN ☐ IT ☐ Neutre distribué ☐		
42	System Distributed neutral		
43			
44	Icc au point de raccordement de l'alimentation Sur réseau kA Sur GE (subtransitoire) kA		
45	Icc at supply connection point On mains On Genset (subtransient)		
46			
47	CARACTERISTIQUES DE L'ALIMENTATION DU TRANSFORMATEUR DE BY-PASS (réseau amont 2)		
48	BYPASS TRANSFORMER SUPPLY SPECIFICATIONS (mains input 2)		
49			
50	Tension V + 10 % - 10 % Mono ☐ Tri ☐ Fréquence Hz + - 5 %		
51	Voltage SP 3P Frequency		
52			
53	Schéma TT ☐ TN ☐ IT ☐ Neutre distribué ☐		
54	System Distributed neutral		
55			
56	Icc au point de raccordement de l'alimentation Sur réseau kA Sur GE (subtransitoire) kA		
57	Icc at supply connection point On mains On Genset (subtransient)		
58			
59			
ORIGINE DU DOCUMENT/ENGINEERING'S REFERENCE		FABRICANT SUPPLIER'S REFERENCE	
Société/Company:		Société/Company:	

AC Uninterruptible Power Systems (UPS)

Rev.: 09

Effective date: 10/2012

Page: 23 of 28

Appendix 1

TOTAL
Exploration & Production

DATA SHEET	N°
Project:	
DS EP ELE 152	AC Uninterruptible Power Systems
Rev. 03 - 10/08	

Appel d'offres/Call for tender ☐		Commande/Order ☐	
CONTROLE COMMANDE CONTROL AND MONITORING			
	Fonction/Function	sur appareil on cabinet	Pour report à distance/Remote
1			
2			
3			
4			
5			
6			
7			
8	Marche/arrêt/on/off	☒	☐
9	Arrêt urgence/emergency stop	☐	☐
10			
11			
12	Marche sur onduleur / operation from inverter	☐	☐
13	Marche sur batterie / operation from battery	☐	☐
14	Marche sur by-pass / load on by-pass	☒	☒
15	Alarme mini tension réseau 2 / undervolt. bypass tr. alarm	☒	☒
16	Batterie en charge / battery on charge mode	☒	☒
17	Défaut chargeur/redresseur / charger/rectifier fault	☐	☐
18	Alarme basse tension batterie / battery low voltage alarm	☐	☐
19	Alarme décl. batt. Imminente/immint bat. shutdown alarm	☒	☒
20	Alarm fin de décharge / end of discharge alarm for ESD	☒	☒
21	Batterie isolée / battery isolated	☒	☒
22	Défaut d'isolement DC / DC insulation fault	☐	☐
23	Défaut d'isolement AC / AC insulation fault	☐	☐
24	Défaut onduleur / inverter failure	☒	☒
25	Onduleur hors synchro / inverter out of synchronisation	☒	☒
26	Défaut ventilateur / fan fault	☐	☐
27	Défaut général / general fault	☐	☐
28	Défaut groupé distribution / Grouped fault	☐	☐
29	Tension utilisation / Output voltage	☐	☐
30	Ampèremètre courant utilisation/output current ammeter	☒	☐
31	Fréquence utilisation / output frequency	☐	☐
32	Tension batterie / battery voltage	☐	☐
33	Courant batterie / battery current	☐	☐
34	Liaison série / Serial Link RS 485	☒	☐
35	Signaux analogiques pour report à distance (4-20 mA ou autre) obligatoirement isolés galvaniquement		
36	Analog remote signals (4-20 mA or other) must be electrically isolated		
37	Tous signaux de contrôle disponibles sur bornier/All monitoring signals available on terminal block		
38	Au minimum toutes les données câblées pour report à distance (contacts et/ou valeurs) doivent être mises à disposition via la liaison série		
39	As a minimum all wired remote data (contact and/or values) shall be made available via the serial link		
40	CARACTERISTIQUES DE L'ENVELOPPE CABINET SPECIFICATIONS		
41			
42			
43	Accès arrière : Rear access	Oui Yes ☐	Non No ☐
44			
45			
46	Entrée des câbles : Cable entry	Par le haut Top ☐	Par le bas Bottom ☐
47			
48			
49			
50	Par PE Via cable gland ☐	Nature PE Gland type	
51			
52	Raccordement des câbles de puissance et de protection sur bornier Power and protection cables connected to terminal box	☐	Résistances de réchauffage Space heaters
53			
54	Visserie cadmiée Cadmium plated	☐	Zinguée bichromatée Bichromate zinc plated
55			
56	Anneaux de levage Lifting rings	☐	Plaque signalétique inox 316 Rating plate 316 stainless steel
57			
58	Etiquettes de repérage rivées ou vissées sur support fixe (collage exclus) Identifying labels riveted or screwed to fixed support (no adhesive bonding)		
59			
60	Peinture standard constructeur Standard paint finish constructor	☐	Autre Other
61			
ORIGINE DU DOCUMENT/ENGINEERING'S REFERENCE		FABRICANT SUPPLIER'S REFERENCE	
Société/Company:		Société/Company:	

AC Uninterruptible Power Systems (UPS)

Rev.: 09

Effective date: 10/2012

Page: 24 of 28

Appendix 1

TOTAL
Exploration & Production

DATA SHEET	N°
Project:	
DS EP ELE 152 Rev. 03 - 10/08	AC Uninterruptible Power Systems

Appel d'offres/Call for tender ☐		Commande/Order ☐	
ESSAIS/TESTS suivant IEC 62040-3			
1			
2			
3			
4			
5			
6			
7			
8	Isolement ☐	Vérification des dispositifs ☐	Vérification des protections ☐
9	Insulation	Checking of auxiliary devices	Checking of protections
10			
11	Vérification des circuits de surveillance et de signalisation ☐	Vérification des appareils de mesure ☐	
12	Checking of supervising and remote signalling circuits	Checking of measuring devices	
13			
14	Essai de synchronisation ☐	Essai de coupure du réseau d'alimentation alternative ☐	
15	Synchronization test	AC input failure test	
16			
17	Essai de retour du réseau d'alimentation alternative ☐	Essai de transfert ☐	
18	AC input return test	Transfer test	
19			
20	Simulation de défaillance d'une alimentation en redondance active ☐		
21	Simulation of parallel redundant UPS fault test		
22			
23	Essai en faible charge ☐	Essai en pleine charge ☐	Rendement de l'ASI ☐
24	Light load test	Full load test	UPS efficiency
25			
26	Essai en charge déséquilibrée ☐	Déséquilibre de tension sortie ☐	
27	Unbalanced load test	Balance load test	
28			
29	Répartition du courant entre ASI en parallèle ☐	Essai autonomie batterie ☐	
30	Test of current division in parallel UPS	Stored energy time test	
31			
32	Temps de recharge assigné ☐	Courant d'ondulation batterie ☐	Essai du pouvoir de surcharge ☐
33	Rated restored energy time	Battery ripple current measurement	Overload capability test
34			
35	Essai de court-circuit ☐	Essai de court-circuit dernière protection ☐	Remise en marche (y compris après ESD) ☐
36	Short circuit test	Short circuit protection device test	Restart test (including after ESD trip)
37			
38	Surtension de sortie ☐	Mesure Composantes harmoniques ☐	Essai de défaut terre ☐
39	Output overvoltage test	Harmonics components measurement	Earth fault test
40			
41	Essai de variation périodique de tension de sortie ☐	Essai de variation de fréquence ☐	
42	Periodic output voltage variation test	Frequency variation test	
43			
44	Essai d'interférences électromagnétiques ☐	Essai de facteur de puissance ☐	
45	Radiofrequency interference and conducted noise test	Input power factor test	
46			
47	Essai de compatibilité avec générateur de secours ☐	Essai d'échauffement ☐	
48	Stand-by generator compatibility test	On-site ventilation test	
49			
50	Essai de bruits ☐	Contrôle alarme défaut ventilateur et température haute ☐	
51	Audible noise test	Ventilation failure and over temperature alarm check	
52			
53	Essai d'échauffement à pleine charge ☐	Durée Hours	
54	Full load heat run test	Duration	
55			
56			
57			
58			
59			
60			
ORIGINE DU DOCUMENT/ENGINEERING'S REFERENCE		FABRICANT SUPPLIER'S REFERENCE	
Société/Company:		Société/Company:	

AC Uninterruptible Power Systems (UPS)

Rev.: 09

Effective date: 10/2012

Page: 25 of 28

Appendix 1

TOTAL
Exploration & Production

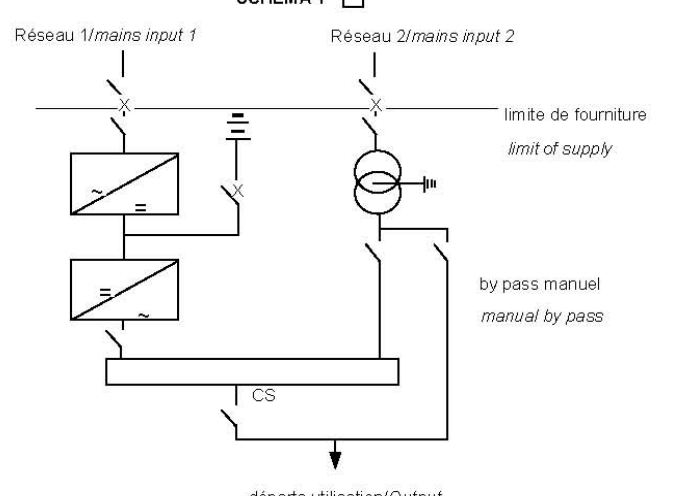
DATA SHEET	N°
Project:	
DS EP ELE 152 Rev. 03 - 10/08	AC Uninterruptible Power Systems

Appel d'offres/Call for tender	☐	Commande/Order	☐
--------------------------------	--------------------------	----------------	--------------------------

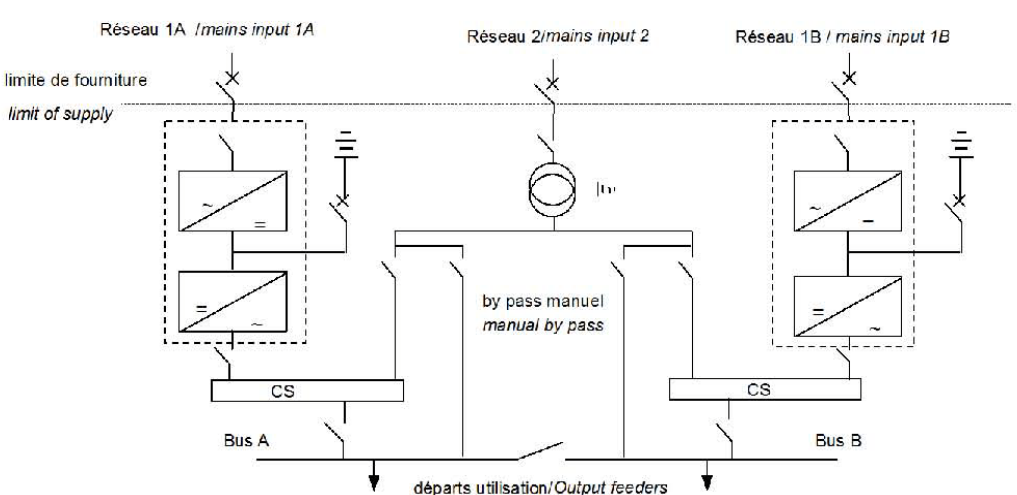
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62

SCHEMAS DE PRINCIPE
SIMPLIFIED SCHEMATIC DIAGRAM

SCHEMA 1 ☐



SCHEMA 2 ☐



Nota: la symbolisation des appareils de coupure matérialise leur existence et non leur nature exacte qui est à déterminer avec le constructeur
the switching device symbols indicate their presence and not their specific type which is to be defined with the Manufacturer

ORIGINE DU DOCUMENT/ENGINEERING'S REFERENCE	FABRICANT SUPPLIER'S REFERENCE
Société/Company:	Société/Company:

AC Uninterruptible Power Systems (UPS)

Rev.: 09

Effective date: 10/2012

Page: 26 of 28

Appendix 1

Exploration & Production

DATA SHEET	N°
Project:	
DS EP ELE 152 Rev. 03 - 10/08	AC Uninterruptible Power Systems

Appel d'offres/Call for tender ☐		Commande/Order ☐																																																																
1	DISTRIBUTION <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th></th> <th>Type 1</th> <th>Type 2</th> <th>Type 3</th> <th>Type 4</th> <th>Type 5</th> <th>Type 6</th> </tr> </thead> <tbody> <tr> <td>Intensité (A) <i>Current</i></td> <td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>Disjoncteur <i>Circuit breaker</i></td> <td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>Calibre <i>Rating</i></td> <td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>Sectionneur <i>Isolator</i></td> <td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>Fusibles <i>Fuses</i></td> <td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>Contacteur <i>Contacteur</i></td> <td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>Relais thermique <i>Thermal relay</i></td> <td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>Nombre de départs identiques <i>Number of identical outgoers</i></td> <td></td><td></td><td></td><td></td><td></td><td></td> </tr> </tbody> </table>				Type 1	Type 2	Type 3	Type 4	Type 5	Type 6	Intensité (A) <i>Current</i>							Disjoncteur <i>Circuit breaker</i>							Calibre <i>Rating</i>							Sectionneur <i>Isolator</i>							Fusibles <i>Fuses</i>							Contacteur <i>Contacteur</i>							Relais thermique <i>Thermal relay</i>							Nombre de départs identiques <i>Number of identical outgoers</i>						
				Type 1	Type 2	Type 3	Type 4	Type 5	Type 6																																																									
Intensité (A) <i>Current</i>																																																																		
Disjoncteur <i>Circuit breaker</i>																																																																		
Calibre <i>Rating</i>																																																																		
Sectionneur <i>Isolator</i>																																																																		
Fusibles <i>Fuses</i>																																																																		
Contacteur <i>Contacteur</i>																																																																		
Relais thermique <i>Thermal relay</i>																																																																		
Nombre de départs identiques <i>Number of identical outgoers</i>																																																																		
2																																																																		
3																																																																		
4																																																																		
5																																																																		
6																																																																		
7																																																																		
8																																																																		
9																																																																		
10																																																																		
11																																																																		
12																																																																		
13																																																																		
14																																																																		
15																																																																		
16																																																																		
17																																																																		
18																																																																		
19																																																																		
20																																																																		
21																																																																		
22																																																																		
23																																																																		
24																																																																		
25																																																																		
26																																																																		
27																																																																		
28																																																																		
29																																																																		
30																																																																		
31																																																																		
32																																																																		
33																																																																		
34																																																																		
35																																																																		
36																																																																		
37																																																																		
38																																																																		
39																																																																		
40																																																																		
41																																																																		
42																																																																		
43																																																																		
44																																																																		
45																																																																		
46																																																																		
47																																																																		
48																																																																		
49																																																																		
50																																																																		
51																																																																		
52																																																																		
53																																																																		
54																																																																		
55																																																																		
56																																																																		
57																																																																		
58																																																																		
59																																																																		
ORIGINE DU DOCUMENT/ENGINEERING'S REFERENCE		FABRICANT SUPPLIER'S REFERENCE																																																																
Société/Company:		Société/Company:																																																																

AC Uninterruptible Power Systems (UPS)

Rev.: 09

Effective date: 10/2012

Page: 27 of 28

Appendix 1

TOTAL
Exploration & Production

DATA SHEET	N°
Project:	
DS EP ELE 152 Rev. 03 - 10/08	AC Uninterruptible Power Systems

Appel d'offres/Call for tender ☐		Commande/Order ☐	
CARACTERISTIQUES A FOURNIR PAR LE CONSTRUCTEUR DATA TO BE COMPLETED BY THE MANUFACTURER			
1	Type/Type:	Puissance/ Input power	kVA
2			
3			
4			
5			
6			
7	Intensité absorbée à 4/4 de charge sur le réseau 1 :	En floating	A
8	Mains input 1 current at 4/4 load	Floating	Battery charging
9			
10	Protection réseau amont 1 :	Calibre	A
11	Mains input 1 protection	Rating	Type d'appareil de coupure
12			Switching device
13			
14	Intensité absorbée à 4/4 de charge sur le réseau 2 :		A
15	Mains input 2 current at 4/4 load		
16			
17	Protection réseau amont 2 :	Calibre	A
18	Mains input 2 protection	Rating	Type d'appareil de coupure
19			Switching device
20	Commutation sans coupure de	Hz à	Hz
21	Switching without load interruption from		
22			
23	Commutation sans coupure de	V à	V
24	Switching without load interruption from		
25			
26	Déséquilibre de charge maximum admissible		Pertes maximum
27	Maximum permissible load balance		Maximum losses
28			
29	Rendement à 4/4		Niveau sonore maximum
30	Efficiency at 4/4 load		Maximum SPL
31			dB à 1 m
32			
33			
34	Dispositif prévu contre les perturbations harmoniques	Harmonic distortion protection	
35	Type de pont redresseur	Alimentation	Mono SP ☐ Tri 3P ☐
36	Rectifier type	Supply	
37			
38	Transformateur de by-pass sur réseau 2	Puissance	kVA
39	Bypass transformer on mains input 2	Power	
40	Tension primaire	Mono SP ☐ Tri 3P ☐	
41	Primary voltage		
42			
43	Tension secondaire	Mono SP ☐ Tri 3P ☐	
44	Secondary voltage		
45			
46	Mode de pilotage du pont onduleur	MPLI ☐ PAM ☐ Autre ☐	
47	Inverter bridge control	MLI	PAM
48			
49	Batterie :	Nombre éléments	Capacité
50	Constructor	Number of cells	Capacity
51			Ah
52	Type	Temps de recharge depuis l'état déchargé	h
53	Type	Battery charging time from discharged state	
54			
55	Températures extrêmes de stockage de l'équipement	Minimum	Maximum
56	Equipment storage temperature limits	Minimum	Maximum
57		°C	°C
58	Températures extrêmes d'utilisation de l'équipement	Minimum	Maximum
59	Equipment operation temperature limits	Minimum	Maximum
60		°C	°C
ORIGINE DU DOCUMENT/ENGINEERING'S REFERENCE		FABRICANT SUPPLIER'S REFERENCE	
Société/Company:		Société/Company:	

AC Uninterruptible Power Systems (UPS)

Rev.: 09

Effective date: 10/2012

Page: 28 of 28

Appendix 1

TOTAL
Exploration & Production

DATA SHEET	N°
Project:	
DS EP ELE 152 Rev. 03 - 10/08	AC Uninterruptible Power Systems

Appel d'offres/Call for tender ☐		Commande/Order ☐	
1	Degré de protection procuré par les enveloppes		
2	Degree of protection provided by enclosures		
3	IP		
4			
5	Dispositif de ventilation de l'équipement	Rejet d'air chaud par le haut	Par le bas
6	Equipment cooling	Hot air exhaust at top	At bottom
7		☐	☐
8	Nombre de turbines installées	Nombre nécessaire au fonctionnement normal	
9	Number of fans installed	Required number for normal operation	
10			
11	Alimentation électrique des ventilateurs différente de celle de l'onduleur	Oui	Non
12	Fans power supply separate from inverter	Yes	No
13		☐	☐
14	Dimensions (mm)	Armoire chargeur/onduleur	L/W=
15	Dimensions	Charger/inverter cabinet	P/D=
16			H=
17			Masse (kg)
18			Weight
19			
20			
21			
22			
23			
24			
25			
26			
27			
28			
29			
30			
31			
32			
33			
34			
35			
36			
37			
38			
39			
40			
41			
42			
43			
44			
45			
46			
47			
48			
49			
50			
51			
52			
53			
54			
55			
56			
57			
58			
59			
60			
ORIGINE DU DOCUMENT/ENGINEERING'S REFERENCE		FABRICANT SUPPLIER'S REFERENCE	
Société/Company:		Société/Company:	