# Base Load Power Hub (BLPH)

## Technical Specification, IDS and DDS for AC UPS System

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# 1 INTRODUCTION

## 1.1 PROJECT OVERVIEW

Crosswind, a Shell and Eneco joint venture, was awarded the tender to develop the offshore Hollandse Kust Noord (HKN) wind farm, located 18.5km off the coast of Netherlands near the town of Egmond aan Zee. The consortium plans to have HKN operational in 2023 with an installed capacity of 759MW generating at least 3.3TWh per year. This is sufficient renewable power to supply more than 1 million Dutch households with green electricity.

Offshore wind farms produce intermittent electricity and balancing these dips and peaks and integrating this electricity into the national energy system requires new technologies. For this reason, the offshore wind farm will include several new technologies that could be implemented at full-scale in the future. The new technologies being explored include a floating solar park, a short-duration battery storage as well as long-term storage via green hydrogen produced by water electrolysis and subsequently consumed in a fuel cell. The combination of these individual measures, herein referred to as the Base Load Power Hub (BLPH) will ensure a continuous power supply regardless of the wind situation.

### 1.1.1 Project Location

The Hollandse Kust Noord (HKN) wind farm is located 18.5km off the coast of the Netherlands near the town of Egmond aan Zee.

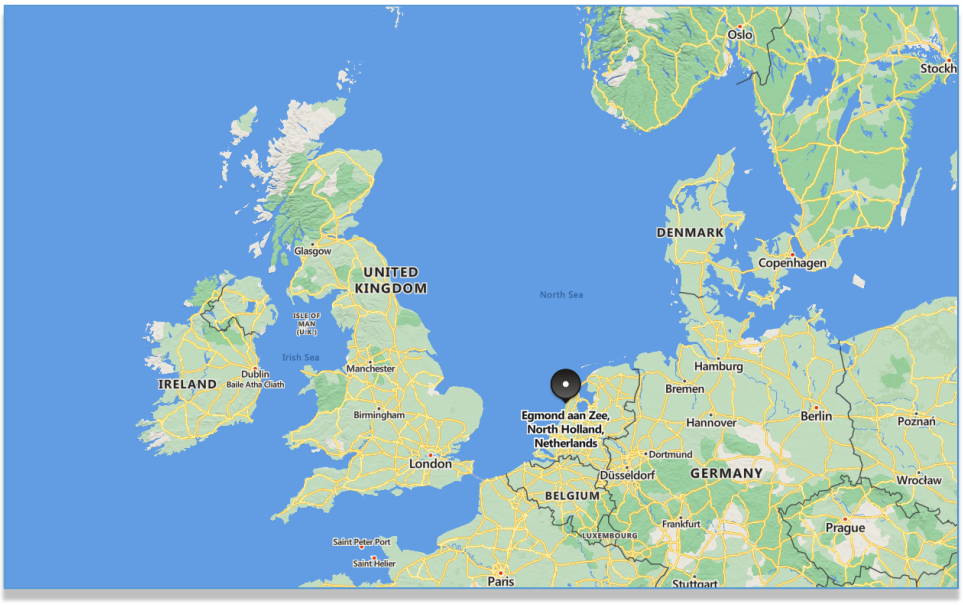



*Figure 1 HOLLANDSE KUST NOORD WIND PARK Location Map*

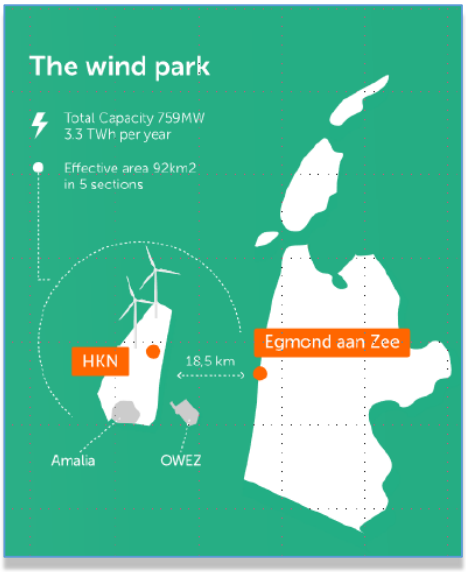



*Figure 2 - Wind Park Details*

The wind farm will consist of No. 69 x 11.5MW wind turbine generators each to be installed on a dedicated monopile structure. A 70th monopile located on coordinates E 590719.1, N 5841602.3 is reserved for installing the platform accommodating the BLPH. The monopile structure was designed and installed by Van Oord Offshore Wind (VooW) and therefore not part of the BLPH scope.

### 1.1.2 Project Concept

All components included in the BLPH will be integrated onshore on a topsides and installed in an offshore location within the boundaries of the HKN wind farm. At its simplest, the BLPH will store energy during periods of high electricity generation from renewable sources (a wind turbine generator and the floating solar PV farm) and release it during periods of low generation. In practice. It is expected that the energy stored will supplement generation from renewable sources to ensure that at least 1.0MW of power is exported to the electrical grid regardless of wind/solar availability.

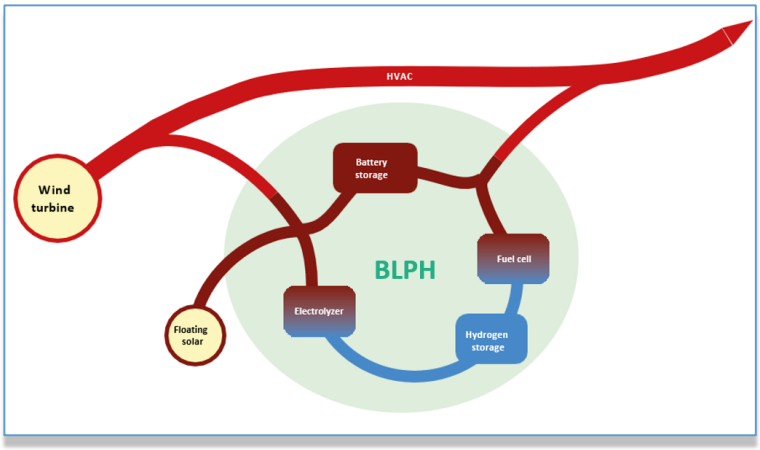



*Figure 3 – BLPH Concept*

Electricity in the BLPH will be stored in the form of electrons in a battery energy storage system (BESS) as well as converted into green hydrogen via water electrolysis. When the power output from the connecting wind turbine drops to below 1 MWe, the BLPH will return its stored energy to supplement the remaining power output. This will be by discharging the BESS, while stored hydrogen will be converted back into electricity using a fuel cell to extend the discharge duration.

The purpose of the BLPH s to function as a testbed for the integration of energy storage technologies with renewable generation. It is expected that equipment installed on the BLPH will operate as Normally Unmanned Installation for at least two (2) years with no or minimal maintenance and it will have its own independent control room with the ability to communicate with Crosswind's control room.

# 2 DOCUMENT SCOPE

This specification covers the general criteria, the scope of work and minimum requirement for the design, material selection, construction, supply, inspection, testing, documentation and preparation for shipment of AC UPS System. Technical requirements of this specification are based upon considerations to performance, and functionality.

Any failure by the Vendor to take exception to any part of this specification in the initial bid proposal shall indicate complete compliance to the specification.

It shall be the Vendor's responsibility to be, or to become, knowledgeable of the applicable requirements of the standards and codes referenced in section 4.

The AC UPS System manufacturing shall follow the International Association of Oil and Gas Producers (IOGP) "Supplementary Spec to IEC 62040-3 AC Uninterruptible Power Systems (UPS) – S-701" attached in the Annex-II, as well as the specifications indicated in the following chapters of this document.

Related to the quality assurance and tests shall be apply the "Quality Requirements - AC Uninterruptible Power Systems (UPS) (IEC 62040-3) – S-701Q" attached in Annex-III, which for the project purpose will be known as "Inspection Data Sheet".

The Documents that shall be supply along with the technical proposal and during the manufacturing phase are indicated in the document "Info Requirements for AC Uninterruptible Power Systems (UPS) (IEC 62040-3) - Specification S-701L", attached in Annex-IV, which for the project purpose will be known as "Documents Data Sheet".

## 2.1 REFERENCES

| Doc. No. | Description |
|---|---|
| 123A90-DDL-EL-DG-20015 | Electrical Single Line Diagram HV & MV Systems |
| 123A90-DDL-EL-DS-20032 | Technical Data Sheet (TDS) for AC UPS Systems |
| 123A90-DDL-EL-LIS-20016 | Electrical Load List & Balance (CCS MODE 'CHARGING') |
| 123A90-DDL-EL-LIS-20143 | Electrical Load List & Balance (CCS MODE 'HOT STANDBY') |
| 123A90-DDL-EL-LIS-20144 | Electrical Load List & Balance (CCS MODE 'DISCHARGING') |
| 123A90-DDL-EL-LIS-20145 | Electrical Load List & Balance (CCS MODE 'COLD STANDBY') |
| 123A90-DDL-EL-LIS-20146 | Electrical Load List & Balance (CCS MODE 'EMERGENCY MODE (Island)' |
| 123A90-DDL-EL-LIS-20147 | Electrical Load List & Balance (CCS MODE 'POWER OUT (Blackout)' |
| S-701 | Supplementary Spec to IEC 62040-3 AC Uninterruptible Power Systems (UPS) |
| S-701Q | Quality Requirements - AC Uninterruptible Power Systems (UPS) (IEC 62040-3) – Specification (IDS) |
| S-701L | Info Requirements for - AC Uninterruptible Power Systems (UPS) (IEC 62040-3) – Specification (DDS) |
| 123A90-PML-DIG-PRO-00002 | Equipment and System Tag Numbering |

*Table 1 - Reference Documents*

## 2.2 DEFINITIONS AND ABBREVIATIONS

| | |
|---|---|
| COMPANY or Client (CPY): | CROSSWIND |
| CONTRACTOR (CTR): | ROSETTI MARINO S.p.A. |
| PROJECT: | HOLLANDSE KUST NOORD WIND PARK Project |
| INSPECTION AUTHORITY: | The organization representing the Owner or Vendor /Contractor that verifies that the equipment and facilities have been designed, constructed, inspected and tested in accordance with the requirements of this specification and the Purchase Order/Contract. |
| INSPECTOR: | A qualified individual representing the Owner, Vendor/Contractor or the assigned Inspection Authority, who verifies that the equipment and facilities have been designed, constructed, inspected and tested in accordance with the requirements of this specification and the Purchase Order/Contract. |
| VENDOR: | Individual, firm or manufacturer that provide Materials/Equipment to COMPANY in accordance with this specification and terms of the Purchase Order. |
| IOGP: | International Association of Oil and Gas Producers |
| IRS: | Information Requirements Specification |
| kVA. | Kilovolt Ampere (apparent power) |
| QRS: | Quality Requirements Specification |
| IDS: | Inspection Data Sheet |
| DDS: | Document Data Sheet |
| UPS: | Uninterruptible Power Supply |

Table 2 - Definitions and Abbreviations

# 3 GENERAL CONDITIONS

## 3.1 LANGUAGE

All correspondence, engineering documents and manuals shall be in the English language.

# 4 APPLICABLE CODES AND STANDARDS

The following standards list shall constitute an integral part of this specification.

IEC - International Electrotechnical Committee (latest edition shall be applied).

- IEC 62040 Uninterruptible power systems (UPS) (as applicable).
- IEC 60529 Degree of Protection provided by Enclosures (IP Code).
- IEC 61000 Electromagnetic compatibility (EMC) (as applicable).
- IEC-60896 Stationary lead-acid batteries.
- IEC-60623 Secondary cells and batteries containing alkaline or other non-acid electrolytes – Vented nickel-cadmium prismatic rechargeable single cells.
- IEC 61892 Mobile and fixed offshore units – Electrical installations.

# 5 ENVIRONMENTAL AND OPERATING CONDITIONS

The site climate conditions are indicated in the relevant Technical Data Sheet.

## 5.1 TROPICALIZATION

All electrical material installed shall be tropicalized.

## 5.2 ELECTRICAL SYSTEM

The A.C. main power supply characteristics (e.g. voltage, frequency, neutral grounding method, voltage and frequency variation) are be defined in the relevant Technical Data Sheet.

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# 6 EQUIPMENT REQUIREMENTS

The design will be based on continuous and reliable service, safety of personnel and equipment, ease of maintenance of equipment and ease of interchangeability.

The electrical equipment shall be selected, designed and manufactured taking into account the site conditions indicated in the relevant Technical Data Sheet.

Each AC UPS shall be a redundant system with two 50% rated batteries (each unit's battery shall be rated for the full rated load and half the autonomy time). As indicated in the relevant Technical Data Sheet, the battery type shall be Sealed Gell Filled VRLA or Sealed NiCd (housed within the UPS cabinet).

A UPS system is only considered to be robust where the overall availability is greater than 99.95%. The overall Mean Time Between Failures (MTBF) shall exceed 200,000 hours with a Mean Time to Repair (MTTR) of eight (8) hours. (These exclude outage time for battery discharge testing and assume that spare parts are available at site).

Battery voltage and capacity shall fulfil the inverter's input power requirements when delivering the rated kVA output (whilst also maintaining the output voltage and frequency within permissible tolerances for the entire autonomy time).

The electrical equipment, components and materials shall be suitable for the combined voltage and frequency variations conditions specified on the attached Technical Data Sheet.

VENDOR standard quality materials shall be used for parts and accessories not detailed in the specifications.

Different materials may be offered as an alternative, and they shall meet or exceed the specified requirements. A technical justification for these changes will be submitted with the Quotation. All modifications will be evaluated before acceptance by the CONTRACTOR and updated in Specifications and Technical Data Sheets.

The units shall be equipped with all the necessary current transformers, relays, instruments, communication card, and other ancillaries needed for the correct functioning.

Units of measurements shall be in S.I. (System International) units; British unit to be shown between brackets.

# 7 TECHNICAL CHARACTERISTICS

All equipment listed here below shall be designed in compliance with Technical Data Sheet. Withstanding momentary overload shall be taken in account designing equipment, as required in the Technical Data sheet.

AC UPS configuration shall be in accordance with the Technical Data Sheet.

## 7.1 UPS SECTION

Typical AC UPS System and Batteries can consist of:

- An incoming breaker.
- A rectifier/battery charger fed by the network thought an isolation transformer.
- Electrics Batteries.
- A dedicated Molded Case Circuit Breaker (MCCB) for the Electric Batteries. EEx-d execution is required if MCCB is installed in a separate box.
- An Inverter
- Integrated distribution section.

UPS shall be designed for permanent supply the overall power and for the required autonomy specified on Technical Data Sheet. The rectifier/battery charger shall fulfil the inverter input power requirement meanwhile recharge the battery, starting also in the worst discharge condition.

The battery charger shall assure that the overall charging current is always limited to 30% of the rated UPS sizing and the time required for charging will be adapted accordingly.

Inverter shall be able to operate directly from the rectifier's output, assuming for example that the battery bank is disconnected.

Plug-in type components shall be used to the maximum extent in the battery charger, and their arrangement shall permit easy replacement of the components.

The output of the inverter shall be always maintained within the voltage and frequency tolerances of the load and required by IEC 62040 with synchronization provided to maintain synchronism with the Integral By-pass supply. Voltage synchronization facilities shall be provided to maintain synchronism and phase with the main bypass supply voltage, if required on the Technical Data Sheet.

Upon failure of external reference, the inverter will maintain the specified frequency on the basis of an internal reference, until external reference is restored. If the external reference frequency exceeds the ± 2% (1 Hz) variation of the rated value, the inverter will switch over the internal reference.

Under synchronous operating condition, the static switch shall initiate uninterrupted transfer of load to the mains bypass supply in the event of inverter failure. When bypass supply is not provided (see Technical Data Sheet), the static switch shall not require and the load shall automatically transferred from the failed inverter to the other one.

Each inverter shall be able to operate also with disconnected battery.

## 7.2 COOLING

AC UPS shall be static type, stabilized, and preferably naturally cooled.

## 7.3 BATTERIES

Storage batteries and their accessories will comply with the requirements of IEC standards with particular reference to IEC-60896 "Stationary lead-acid batteries" or IEC-60623 "Vented Nickel-Cadmium prismatic rechargeable single cell".

Batteries type shall be specified on Technical Data Sheet. The reference temperature for the correct sizing of capacity shall be assured at 25°C.

The batteries shall be suitable to:

- Feed the specified power of loads for the autonomy period specified on the Technical Data Sheet with the rated voltages and the voltage tolerances.
- Operate with a charging system that will perform floating and boosting charge.

For VRLA batteries, temperature compensation of the battery charging voltage shall be provided for the rectifier, with an accuracy of plus and minus 1%. The temperature sensor shall be located in the centre of the battery rack and shall adjust the rectifier output voltage in line with the battery Manufacturers' recommendations. Temperature compensation shall also be considered for other batteries in locations where sustained ambient temperature variations in excess of plus or minus 5 °C are expected.

### 7.3.1 INSTALLATION

Based on what specified on Technical Data Sheet, batteries shall be installed on:

- Steel free standing rack. Rack shall be painted with acid or alkali-resistant paint.
- Free standing cabinet equipped with:
  - removable battery trays;
  - easy accessibility to battery terminals;
  - earthling stud;
  - painted with acid or alkali-resistant paint;
  - lifting bolts.

When batteries are mounted on rack in a separate room, a MCCB shall be installed in a box, closed to batteries to protect cables between batteries and UPS. The MCCB box shall be EEx-d execution, suitable for installation in hazardous area.

## 7.4 DISTRIBUTION SECTION

If specified on the Technical Data Sheet, an AC distribution section shall be equipped with MCB's ("Miniature Circuit breaker"). Quantity and rating of the MCB's shall be as per Data Sheet. A spare DIN rail shall be provided in the distribution section for future MCB's installation.

When the integrated distribution section is not required, UPS shall be equipped with Moulded Case Circuit Breakers (MCCB) suitable to feed a separate distribution panel.

Size and rating of the MCCB shall be specified on the Technical Data Sheet.

## 7.5 OPERATING PRINCIPLE

Under normal operating conditions the loads shall be shared equally between the two UPS. If the back-up line is provided it shall be in stand-by (stand-by passive redundancy).

Each rectifier/battery charger shall guarantee float charge and the equalising charge of the batteries.

In case of a mains failure, batteries shall supply power to the loads through the corresponding inverters until reaching the minimum residue voltage value.

In case of out of service of one or both rectifiers/battery chargers, batteries shall supply power to the loads through the corresponding inverters until reaching the minimum residue voltage value. If the back-up line is provided reached the minimum battery voltage value, the static switch shall transfer the loads onto the back-up line.

When normal operating conditions are restored, the UPS can automatically feed the loads while the battery/ batteries that supplied power shall be automatically charged.

In case of out of service of one inverter, the users shall be automatically transferred to the other inverter, or to the backup line, if provided; in case of out of service of both inverters the users will be transferred (no break) to the backup line, if provided.

As soon as the operating conditions allow it the load can be fed again by the UPS.

## 7.6 RELAYS AND INSTRUMENT

The UPS unit shall incorporate all the necessary equipment to enable operation, protection and control of the UPS in comply with this specification and to safeguard the unit and its components from the consequences of internal and external short circuits, over voltages and any main or control circuit malfunctions, howsoever caused.

Diagnostic, measurement, alarms, operating and status indications on front panel shall be provided.

Microprocessor based protection, control and metering shall be provided for monitoring.

## 7.7 ALARM AND SUPERVISION SYSTEM

All the alarms shall be visible and audible across panel interface, placed in front of the unit.

A general unique hardwired alarm for the overall system shall be provided. This common alarm shall be wired to the terminal strip, suitable for external connection.

A communication card shall be provided to transmit all the needed parameters and alarms for the proper UPS monitoring, the communication protocol shall be as indicated in the Technical Data Sheet.

# 8 CONSTRUCTION CHARACTERISTIC

## 8.1 STRUCTURE

Cabinets shall be self-supporting, metal clad structure, consisting of vertical sections assembled in line.

Panels shall be with mechanical protection degree as indicated in the relevant Data Sheet on the external housing and at least IP2X inside.

Doors and openings shall be fitted with corrosion and age resistant gaskets.

The equipment shall consist of an assembly of prefabricated, vertical, self-supporting panels each one constituted by one or modular units hereinafter termed compartments or cells. Each compartment containing control, switching or metering equipment shall be provided with a door hinged to the vertical panel.

Each panel shall be formed of a metal enclosed, self-supporting rigid and crushproof structure made by steel sheet and shapes or by welded or bolted reinforced steel sheet.

The various panels shall be bolted together. The thickness of the steel sheet shall not be less than 2 mm.

When required on the Data Sheet, the UPS cabinets shall be supplied with a steel shape base frame.

## 8.2 ACCESSIBILITY AND COMPARTMENTING OF EQUIPMENT

The interior of each panel shall be divided into compartments by means of metal sheeting and divisions.

A full segregation to each other shall be provided for the following:

- Cable terminations compartment
- Instrument cells compartment
- Circuit breaker or control equipment compartments
- Bus bar compartment, where applicable.

The components shall be isolated to obtain:

- Access to the various compartments without incurring the risk of any contact with any stationary live parts.

- Complete inaccessibility of the bus bars compartment, where applicable.
- Possibility to connect or disconnect under safe conditions the cables in any compartment while the rest of the board is in operation.

All the compartments housing circuit-breakers, control, metering and protection equipment shall be accessible from the front of the board by the opening of hinged doors.

The compartments containing bus bars, cables and other accessory components shall be accessible by means of bolted doors or sheet metal plates.

It shall be possible to operate Control Devices from outside of the panel.

## 8.3 SAFETY REQUIREMENT

All normal operations shall be possible from the outside of the panels.

All doors shall be provided with locks with removable keys. Door grounding shall be assured by means of a flexible copper connection to the stationary part of the panel.

## 8.4 POWER CONNECTION

Power connections of the equipment shall normally carry out by means of cables entering indicated in the respective Technical Data Sheet.

The equipment shall be delivered complete with termination and support facilities. Cables type and cross-section will be detailed after PO Placement.

Terminal compartments shall be adequately sized to allow inspection, pulling and connection of cables.

The cable gland plate shall be of nonmagnetic material for single core power cables, and the thickness of the sheet shall not be less than 2 mm. The plates shall be supplied undrilled.

External connections directly to component terminals are not accepted.

The cable entry plate of the panel shall be removable to permit the entry of the cables.

## 8.5 AUXILIARY CIRCUITS

Auxiliary circuits shall be realized with flexible insulated copper wires with thermoplastic insulation, with a rated voltage not less than 450/750 V, and with 1.5 sqmm minimum cross-section for general purposes and 2.5 sqmm for power protection and current carrying metering circuits.

Auxiliary contacts used on control circuits shall be rated for operating conditions and in no case less than 5A at 240 VAC and with a breaking capacity not less than 50A at 240 VAC.

Wires shall be marked at each end with plastic rings bearing the numbering indicated on the diagrams.

Auxiliary circuits shall run, as far as possible, far from live equipment and from hot parts Auxiliary circuits, except secondary current transformer circuits, shall be provided with protective devices with an auxiliary contact for signalling or alarm.

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Auxiliary circuits shall be wired to terminal strips of the multiple element type normally mounted in the instrument compartment of each panel.

Every terminal strip shall be provided with a name plate showing the appropriate mark according to diagrams.

Terminals shall be of melamine or steatite, of a non-loosening type and shall be marked as indicated in the diagrams.

The terminal strips shall have a number of terminals not less than 130% of those used.

Terminal strips for auxiliary cables shall be positioned to facilitate the connections of the external cables.

Terminals shall be provided for all external connections; external connections directly to component terminals are not accepted. Only one conductor from external cable shall be terminated in each terminal.

## 8.6 ACCESSORIES & SPECIAL TOOLS

Cabinets shall be furnished complete with all accessories and tools necessary for installation, operation and maintenance.

VENDOR shall provide a detailed special tools list for CONTRACTOR review and reference.

The following tools shall be supplied as minimum (where applicable):

- Component extraction tools
- Relays Protection Software
- Lifting bolts (or any package lifting kit)

Any equipment necessary to perform the Pre-Commissioning and Commissioning activities shall be provided by the VENDOR as part of the supply and shall not be returnable.

## 8.7 SPACE HEATERS

Each cabinet of the equipment shall be provided with space heater to prevent condensation, capable of maintaining the internal temperature at about 5°C above the external temperature.

Space heaters shall be positioned in such a way to not to influence the operation of temperature sensitive components.

Each space heater shall be equipped with a thermostat to switch off the heater when the temperature in the panel reaches the preset value.

Each space heater circuit shall be protected by miniature circuit breaker with an auxiliary contact for signalling or alarm.

Power supply voltage for space heater circuit shall be external, 1Ph+N, 240V AC.

## 8.8 NAME PLATES

A name plate bearing the board identification shall be affixed in the front of each board. Furthermore, nameplates shall be secured to the door of each unit and shall bear the unit's identification mark.

Nameplates with written instructions shall also be provided when a given sequence of operations is foreseen for energizing or de-energizing the units.

Nameplates shall be made of laminated plastic; characters shall preferably be black on a white background.

All plates shall be secured by rivets or screws. The use of adhesive is not acceptable.

## 8.9 FINISH AND PAINTING

All the cabinets' metal parts shall be suitably treated to prevent corrosion and paint deterioration.

Unless an equivalent procedure will be proposed by the Manufacturer, the treatment cycle shall consist of degreasing, pickling, phosphatizing, passivation and surfacing of sheet plates.

Antirust priming will then be applied.

External surfaces shall then receive two oil and moisture resistant enamel coats: internal parts on coat of special anti-condensation varnish finishing.

Hinges, screws and bolts shall be of stainless or cadmium plated: the use of paint as corrosion resistant protection is not acceptable.

Moving metal components, and those subjected to friction shall be protected by rust-proof grease.

UPS will be painted in accordance with Manufacturer standard. However, the painting must be suitable for the specified ambient conditions and must be oil, grease, acid and salt corrosion resistant.

# 9 EQUIPMENT TAGGING AND IDENTIFICATION

Corrosion-resistant identification plate shall be fixed by means of rivets or screws to each panel or equipment front. The plate shall, as a minimum, carry the following information:

- The VENDOR's / CONTRACTOR's name or trademark,
- The equipment/panel tag number and Service
- Degree of mechanical protection,
- Electrical protection mode (EEx) if applicable.

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# 10 INSPECTION AND TESTING

## 10.1 INSPECTIONS

Any supplied equipment shall be subjected to the factory tests stated in the relevant specifications. The CONTRACTOR, or his appointed representative, may, at his discretion, witness all or part of the factory tests. The tests results shall in any case be made available to the CONTRACTOR.

The Manufacturer shall allow the free access of inspectors to his manufacturing shop, shall give all information required and shall make available all copies of internal orders to other sub-suppliers.

## 10.2 TEST PROCEDURES

Tests shall be carried out in Manufacturer's workshop at his care and expense.

The VENDOR shall submit his test procedures in writing to the CONTRACTOR for approval, prior to the start of the testing program.

The tests shall be carried out in the presence of Inspector(s) from the CONTRACTOR's Inspection Authority.

For the tests, the panels shall be fully assembled and fitted with all accessories for the test.

In addition to the Test Reports and letters of conformity, the following certificates shall be provided with each panel/instrument/component as minimum and as applicable:

- Inspection Release Certificate
- Code Compliance Certificate
- Type Test Certificate
- Calibration Certificate

## 10.3 TEST

All tests shall be as per IEC standards and to VENDOR/Manufacturer standards depending on equipment.

The VENDOR shall execute the tests specified in the relevant specifications, data sheets and purchase order documentation, including routine tests, individual tests. Type test reports will be provided where applicable.

Related to the quality assurance and test shall be apply the "Quality Requirements - AC Uninterruptible Power Systems (UPS) (IEC 62040-3) – S-701Q" attached in Annex-III, which for the project purpose will be known as "Inspection Data Sheet".

Acceptance tests to be carried out on each Panel shall include:

- Visual check and dimensional check of compliance with the constructive requirements and certified drawings.
- Power frequency voltage tests on the power circuits carried out at a voltage not less than 2500 V.

- Voltage tests on the control and auxiliary circuits carried out at a voltage not less than 1500 V.
- Insulation resistance test, Phase-to-phase and phase-to-frame insulation resistance shall not be less than 1000 Ohm per rated volt.
- Operation test of all mechanical devices to ascertain the proper functioning of opening, closing, withdrawing and plugging-in of the circuit breakers and the correct functioning of all interlocks.

## 10.4 INSPECTION AND TEST PLANS (ITP)

ITP(s) shall be provided by VENDOR for CONTRACTOR approval.

The ITP(s) shall be issued by VENDOR in compliance with the Inspection and Test requirement, including those considered necessary as standard by VENDOR.

Prior to start any fabrication activities a Pre-Inspection Meeting (PIM) shall be performed at VENDOR workshop to discuss and fix all quality control related issues.

The ITP(s) shall be structured in a sequential manner, including the following requirements against each activity to be carried out:

- Applicable procedure
- Applicable Codes & Standards or Specifications
- Acceptance criteria
- Records to be issued
- Definition of Quality Surveillance Points (as defined below) of the involved CONTRACTOR's and COMPANY's representatives.

Following the first issue, CONTRACTOR will review the ITP(s) with H/W/M/C points to inform VENDOR on the requested quality Surveillance during equipment manufacturing and following inspection / testing activities.

VENDOR shall allow free access to the manufacturing plants for CONTRACTOR's inspectors, expeditors or other nominated representatives.

The ITP shall be supplied to the CONTRACTOR for review and approval.

## 10.5 QUALITY ASSURANCE

VENDOR shall plan and implement for execution of the scope of work an effective Quality System according to latest edition of ISO 9001. VENDOR shall define the QA/QC activities, including the identification of critical materials that will require specific Inspection and testing.

VENDOR shall submit a Project Quality Plan for CONTRACTOR's review and approval.

# 11 SPARE PARTS

VENDOR shall include in its quotation a priced list of spare parts suggested for the period of commissioning, start-up and final performance / acceptance test.

Supply of the suggested spare parts for commissioning, start-up and final performance/ acceptance test shall be included in the base VENDOR scope of work.

If additional spares are required during this period, VENDOR shall supply them on his account released by CONTRACTOR satisfaction.

Spare fuses in quantity not less than 50% of those mounted, and with a minimum of 4 for each type shall always be supplied; the same shall apply for signal lamps.

Miniature Circuit breaker no less than 20% spare shall be provided in the distribution board.

No less than 20% spare the terminal blocks shall be provided inside the Control Panel.

Typology and quantity of the suggested spare parts shall be based on the VENDOR experience and is subject for CONTRACTOR's approval.

VENDOR shall ensure spare availability for at least 10 years form final acceptance certificates released by CONTRACTOR.

The spare parts offered shall be new and original supply from the same equipment Manufacturer.

VENDOR shall submit also a recommended priced spare part list for two (2) years operation.

VENDOR shall analyse the life expectancy of the components of equipment, based on Manufacturer Maintenance Manual; and shall evaluate carefully the required spare parts and quantity. COMPANY will purchase such spares separately.

# 12 DOCUMENTATION

The supply shall include the preparation of any required documentation, with its approval cycle, as stated in the Annex IV.

This section covers the documentation required for the design, fabrication, inspection, selection, fabrication and testing for the supplied equipment including any device and accessory.

Vendor shall provide the documents related to design, selection, fabrication, inspection and testing and all details necessary for the installation, showing UPS and cable arrangements, clearances, mounting of structures on the foundations, structure details and loadings to demonstrate to how the UPS and cables will fit in the installation area. The drawings shall include all necessary horizontal and vertical clearances to walls and roof.

The detailed list of documents that are required will be attached to the Purchase Order/Contract. However, as a minimum the following listed documents shall be provided by the Vendor:

*This document undergoes an issuance cycle within EDMS Fusionlive". Its distribution is electronically controlled. Once printed shall be considered as "NOT CONTROLLED" copy*

- Detailed Drawings of the equipment including accessories.
- General arrangement of all Panels
- Foundation Lay-out
- Electrical connection diagrams
- Data sheets
- Calculations (if applicable)
- Test Procedures
- Material and test certificates
- Result of testing
- Nonconformity list
- Shipping conditions
- Installation / Operations Manual
- Commissioning procedures
- Maintenance

### 12.1 CIVIL REQUIREMENT

Vendor shall provide dimension all loads on foundation (Shears, Moment, Vertical Load) for the equipment included in the scope of supply.

## 13 WARRANTY

Vendor shall guarantee the equipment in term of design, materials and workmanship for two (2) years after being placed in service. The equipment shall be guaranteed to operate satisfactorily at rated conditions and all other conditions within the specified range as indicated in the relevant data sheet and applicable codes/specifications referenced at clause 4.

All equipment and materials within Vendor scope of work shall be designed for a 25 years Design Life.

### 13.1 MAKE GOOD

In case of any equipment and/or components are to demonstrate do not meet the required performance guarantees at the operating/design conditions, VENDOR shall provide at its care and cost any necessary corrective action to comply with the required performance values.

# 14 ANNEX I: VENDOR DEVIATIONS LIST

VENDOR shall list in its proposal any deviation and/or clarification to this specification and applicable code and standards referenced at clause 4.

Any further deviation not listed by VENDOR in its proposal and pointed-out during work execution shall not be accepted by CONTRACTOR.

As guideline the deviation list should be filled-in by VENDOR following the hereunder table

| Document Number / Title | Rev | Paragraph Reference | Deviation |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

Each deviation shall be technically explained and justified.

The final agreed deviation list with CONTRACTOR reply will be part of the documentation for PO as Attachment of this Technical Supply Specification.

# 15 ANNEX II: "SUPPLEMENTARY SPECIFICATION TO IEC 62040-3 AC UNINTERRUPTIBLE POWER SYSTEMS (UPS) – S701"

International Association of Oil & Gas Producers

SPECIFICATION
S-701

August
2020

# Supplementary Specification to IEC 62040-3 AC Uninterruptible Power Systems (UPS)

JIP33
JOINT INDUSTRY PROGRAMME

**Revision history**

| VERSION | DATE | PURPOSE |
|---|---|---|
| 1.0 | August 2020 | Issued for Use |

## Acknowledgements

This IOGP Specification was prepared by a Joint Industry Programme 33 Standardization of Equipment Specifications for Procurement organized by IOGP with support by the World Economic Forum (WEF).

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# Foreword

This specification was prepared under Joint Industry Programme 33 (JIP33) "Standardization of Equipment Specifications for Procurement" organized by the International Oil & Gas Producers Association (IOGP) with the support from the World Economic Forum (WEF). Companies from the IOGP membership participated in developing this specification to leverage and improve industry level standardization globally in the oil and gas sector. The work has developed a minimized set of supplementary requirements for procurement, with life cycle cost in mind, resulting in a common and jointly agreed specification, building on recognized industry and international standards.

Recent trends in oil and gas projects have demonstrated substantial budget and schedule overruns. The Oil and Gas Community within the World Economic Forum (WEF) has implemented a Capital Project Complexity (CPC) initiative which seeks to drive a structural reduction in upstream project costs with a focus on industry-wide, non-competitive collaboration and standardization. The CPC vision is to standardize specifications for global procurement for equipment and packages. JIP33 provides the oil and gas sector with the opportunity to move from internally to externally focused standardization initiatives and provide step change benefits in the sector's capital projects performance.

This specification has been developed in consultation with a broad user and supplier base to realize benefits from standardization and achieve significant project and schedule cost reductions.

The JIP33 work groups performed their activities in accordance with IOGP's Competition Law Guidelines (November 2014).

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# Introduction

The purpose of this specification is to define a minimum common set of requirements for the procurement of AC Uninterruptible Power Systems (UPS) in accordance with IEC 62040-3, Edition 2.0, 2011, Uninterruptible power systems (UPS) - Part 3: Method of specifying the performance and test requirements for application in the petroleum and natural gas industries.

This specification follows a common document structure comprising the four documents as shown below, which together with the purchase order define the overall technical specification for procurement.




**JIP33 Specification for Procurement Documents**
**Supplementary Technical Specification**

This specification is to be applied in conjunction with the supporting data sheet, quality requirements specification (QRS) and information requirements specification (IRS) as follows.

**IOGP S-701: Supplementary Specification to IEC 62040-3 AC Uninterruptible Power Systems (UPS)**

This specification defines the technical requirements for the supply of the equipment and is written as an overlay to IEC 62040-3, following the IEC 62040-3 clause structure. Clauses from IEC 62040-3 not amended by this specification apply as written to the extent applicable to the scope of supply.

Modifications to IEC 62040-3 defined in this specification are identified as *Add* (add to clause or add new clause), *Replace* (part of or entire clause) or *Delete*.

**IOGP S-701D: Data Sheet for AC Uninterruptible Power Systems (UPS) (IEC 62040-3)**

The data sheet defines application specific requirements, attributes and options specified by the purchaser for the supply of equipment to the technical specification. The data sheet may also include fields for supplier provided information attributes subject to purchaser's technical evaluation. Additional purchaser supplied documents may also be incorporated or referenced in the data sheet to define scope and technical requirements for enquiry and purchase of the equipment.

**IOGP S-701Q: Quality Requirements for AC Uninterruptible Power Systems (UPS) (IEC 62040-3)**

The QRS defines quality management system requirements and the proposed extent of purchaser conformity assessment activities for the scope of supply. Purchaser conformity assessment activities are defined through the selection of one of four generic conformity assessment system (CAS) levels on the basis of evaluation of the associated service and supply chain risks. The applicable CAS level is specified by the purchaser in the data sheet or in the purchase order.

**IOGP S-701L: Information Requirements for AC Uninterruptible Power Systems (UPS) (IEC 62040-3)**

The IRS defines the information requirements, including contents, format, timing and purpose to be provided by the supplier. It may also define specific conditions which invoke information requirements.

The terminology used within this specification and the supporting data sheet, QRS and IRS follows that of IEC 62040-3 and is in accordance with ISO/IEC Directives, Part 2 as appropriate.

The data sheet and IRS are published as editable documents for the purchaser to specify application specific requirements. The supplementary specification and QRS are fixed documents.

The order of precedence (highest authority listed first) of the documents shall be:

a) regulatory requirements;

b) contract documentation (e.g. purchase order);

c) purchaser defined requirements (data sheet, QRS, IRS);

d) this specification;

e) IEC 62040-3.

# 1 Scope

*Add to second paragraph*

This specification also specifies the UPS manufacturing requirements of the rectifiers, inverters and static switches, and functional requirements related to measurement, protection and alarms. Packing, handling, preservation and storage requirements are also defined.

# 2 Normative references

*Add to clause*

IEC 60076-1, *Power transformers – Part 1: General*

IEC 60076-11, *Power transformers – 11: Dry-type transformers*

IEC 60076-12, *Power transformers – Part 12: Loading guide for dry-type power transformers*

IEC 60085, *Electrical insulation – Thermal evaluation and designation*

IEC 60092 (all parts), *Electrical installations in ships*

IEC 60529, *Degrees of Protection Provided by Enclosures (IP Code)*

IEC 60947-2, *Low-voltage switchgear and controlgear – Part 2: Circuit-breakers*

IEC 60947-4-1, *Low-voltage switchgear and controlgear – Part 4-1: Contactors and motor-starters – Electromechanical contactors and motor-starters*

IEC 61000-2-4: 2002, *Electromagnetic compatibility (EMC) – 2-4: – Compatibility levels in industrial for low-frequency conducted disturbances*

IEC 61892 (all parts), *Mobile and fixed offshore units – Electrical installations*

IEC 62040 (all parts except part 3), *Uninterruptible power systems (UPS)*

IOGP S-560, *Supplementary Requirements to IEC 61439-1 & 2 LV Switchgear & Controlgear*

*Replace IEC 62040-1:2008 with*

IEC 62040-1:2017, *Uninterruptible power systems (UPS) – Part 1: Safety requirements*

# 3 Terms and definitions, acronyms and abbreviations

*Add new term*

**3.1.33**
**supervisory control and data acquisition**
SCADA
overall site integrated process automation, control and/or monitoring system

*Add new term*

**3.2.33**
**soft start**
walk-in
function to control the gradual increase of the input a.c. current within a specified time when the UPS starts or restarts

## 3.6 Acronyms and abbreviations

HMI human machine interface

MCB miniature circuit breaker

MCCB moulded case circuit breaker

MCT multi cable transit

THD total harmonic distortion

# 5 Electrical conditions, performance and declared values

## 5.1 General

### 5.1.2 Markings and instructions

*Replace second sentence with*

Markings and instructions shall be in accordance with IEC 62040-1, Clause 6.

*Add to subclause*

The nameplate shall include the item serial number, month and year of manufacture.

*Add to subclause*

Caution, danger and warning labels shall display information in English and another language, if specified.

### 5.1.4 Electromagnetic compatibility

*Replace subclause with*

The UPS shall conform to the electromagnetic emission and immunity levels in IEC 62040-2 for the specified category level.

*Add new subclause*

### 5.1.5 Noise

The sound pressure level, measured at a distance of one metre from the UPS in any direction, shall not exceed the specified value, at load conditions ranging from no load to the rated load.

*Add new subclause*

### 5.1.6 UPS design basis

The operational life of the UPS and its components at the rated load shall be in accordance with Table 5.

*Add new table*

**Table 5 – UPS operational life**

| Components | Minimum operation life (years) |
|---|---|
| Rectifier unit, inverter unit and static switch unit | 20 |
| Cooling fans | 5 |
| DC Capacitors | 10 |

*Add new subclause*

### 5.1.7 Availability

Irrespective of its configuration, the UPS shall achieve reliability integrity level 1 (RIL 1) in accordance with Table K.1.

*Add new subclause*

### 5.1.8 Overload capability

#### 5.1.8.1

The UPS shall have a minimum overload capability of 125 % of the rated output current for ten minutes.

#### 5.1.8.2

The UPS shall have a minimum overload capability of 150 % of the rated output current for one minute.

#### 5.1.8.3

The inverter section of the UPS shall deliver the specified short circuit current.

#### 5.1.8.4

The design value for inverter short circuit shall be 200 % of rated current for 0.1 second, if no value is specified.

NOTE Battery sizing is independent of the output overload capability of the UPS.

## 5.2 UPS input specification

### 5.2.1 Conditions for normal mode operation

*Add to the beginning of list item f)*

“for public low voltage networks,”

*Add new list item h) after NOTE 4*

h) for industrial networks, total harmonic distortion (THD) of voltage ≤ 8 % as per class 1 compatibility levels, with a maximum level of individual harmonic voltages in accordance with IEC 61000-2-4, Table 2, Table 3 and Table 4. Refer to IEC 61892-1 for offshore installations.

## 5.3 UPS output specification

### 5.3.4 Performance classification

*Add to subclause*

The UPS shall comply with the requirement of the specified performance-based classification code.

## 5.6 Communication circuits

*Add to subclause*

The UPS shall be provided with communication hardware compliant with the specified interface media and protocol.

*Add to subclause*

Cable distance limitations for the selected protocol shall be specified.

*Add to subclause*

A list of mapping addresses of the data communication and signalling circuits intended to be exchanged with the information technology equipment (e.g. SCADA system, local area networks or telecommunication networks) shall be provided.

*Add new clause*

# 7 Constructional requirements

## 7.1 General

### 7.1.1

The design of the UPS shall minimize the mean time to repair by using self-diagnostics, comprehensive alarm descriptions, and easy accessibility to components and circuits.

### 7.1.2

Components, printed circuit boards, connectors and terminals, and the associated locations of these items shall be identified with labels in accordance with IEC 62040-1.

### 7.1.3

Components requiring periodic replacement shall be listed in the spare parts list with the recommended replacement frequency.

### 7.1.4

An obsolescence management plan in accordance with an industry recognized system (e.g. IEC 62402) shall be provided for all UPS assembly components.

### 7.1.5

An installation manual, maintenance manual, operational manual and manufacturing record book shall be provided with the equipment.

### 7.1.6

The AC distribution board, if integral to the UPS, shall be in accordance with IOGP-S-560.

## 7.2 Enclosure

### 7.2.1

The UPS shall be installed in steel cabinet enclosures that are:

– floor mounted, free-standing and self-supporting; or

– wall mounted.

### 7.2.2

The enclosure shall have a minimum degree of protection of IP31 in accordance with IEC 60529.

### 7.2.3

The battery bank shall be integrated in the UPS cabinets or placed separately, as specified.

### 7.2.4

Undrilled removable gland plates or multi cable transits (MCT) shall be used for cable entry.

### 7.2.5

Gland plates for single core cable entries shall be of non-magnetic material.

## 7.3 Accessibility and maintenance safety

### 7.3.1

Access for operation and maintenance shall be from the front only.

### 7.3.2

The location and grouping of components and auxiliary equipment shall permit identification and access for operational, maintenance and repair purposes, without interruption of power supply to the load.

### 7.3.3

Protection devices that malfunction due to vibration or impact and cause the UPS to trip shall not be mounted on the door.

### 7.3.4

Live components and parts accessible with the compartment door open shall be protected by enclosures, barriers or shrouds to a degree of protection of at least IP2X.

### 7.3.5

The maintenance bypass switch and isolation transformer shall be mounted internally in a common compartment (integral) or separately in an adjacent compartment, as specified.

### 7.3.6

Live parts of the integral maintenance bypass shall be protected by barriers to provide a minimum ingress protection of IP2X.

**7.3.7**

Isolating switches enabling the maintenance bypass mode of operation shall have a facility for padlocking in the open position.

**7.3.8**

Terminals shall be provided in the maintenance bypass compartment for wiring to and from the rectifier/inverter/static bypass compartments, enabling complete isolation of the rectifier/inverter/static bypass compartments.

**7.3.9**

Document holders shall be provided inside the enclosure, if specified.

## 7.4 Components

**7.4.1**

Main circuit switches, miniature circuit breakers (MCBs) and moulded case circuit breakers (MCCBs) shall have a facility for padlocking in the open position.

**7.4.2**

Mechanical type main circuit switches shall be in accordance with IEC 60947-3.

**7.4.3**

Main circuit switches shall comply with utilization category AC22 and DC22 for AC and DC switches respectively in accordance with IEC 60947-3.

**7.4.4**

Main circuit breakers and isolation switches shall be manually operated and air-break type for uninterrupted duty.

**7.4.5**

MCBs and MCCBs shall comply with IEC 60947-2.

**7.4.6**

Contactors shall be rated for uninterrupted duty in accordance with IEC 60947-4-1.

**7.4.7**

Contactors shall comply with utilization category of AC-1 and DC-1 for AC and DC contactors respectively in accordance with IEC 60947-4-1.

**7.4.8**

Transformers and reactors used for input and output isolation shall be air-cooled type in accordance with IEC 60076, parts 1, 11 and 12.

**7.4.9**

Transformers shall be in accordance with IEC 60076-11.

**7.4.10**

Transformers shall have copper or aluminum windings.

**7.4.11**

Transformers shall have a high grade silicon steel core.

**7.4.12**

Transformers shall be an air-cooled type design.

**7.4.13**

The transformer insulation material shall have thermal class 180 (H) rating in accordance with IEC 60085.

**7.4.14**

The UPS shall display the single line diagram and status indication, as specified.

## 7.5 Internal wiring & terminals

**7.5.1**

Insulation material of internal wires shall be zero halogen, flame retardant and have a low smoke index.

**7.5.2**

Wiring shall be labelled with alphanumeric characters located adjacent to the terminals.

**7.5.3**

Wiring for external connections shall be routed to individual terminals on an accessible terminal block.

**7.5.4**

The separation distance between the gland plate and the connection terminals within the cabinet shall permit stress free orientation of the cable cores and avoid mechanical stress on the connection terminals.

## 7.6 Earthing

**7.6.1**

A main protective earthing arrangement shall be provided inside the enclosure in close proximity to the cable entry location.

NOTE The main protective earthing arrangement can be a copper bar, conductor or terminal, as appropriate.

**7.6.2**

The cubicle shall be bonded to the main protective earthing arrangement in accordance with IEC 62040-1.

**7.6.3**

All exposed, non-current carrying parts of the UPS inclusive of the enclosure, components and doors shall be bonded to earth.

**7.6.4**

The gland plates or MCTs shall be earthed to the main protective earthing arrangement.

**7.6.5**

If neutral is required for the AC output distribution system, the inverter output and bypass transformer neutrals shall be connected to the main protective earthing arrangement by a removable link within the enclosure.

## 7.7 Ventilation

**7.7.1**

The cooling system design of the UPS shall be convection cooling or fan assisted forced air cooling.

**7.7.2**

Cooling fans shall be installed with a redundant (N+1) configuration.

**7.7.3**

Fans shall be equipped with monitoring facilities to provide an alarm in the event of a fan failure.

**7.7.4**

Cooling air filters shall be replaceable while the UPS remains in service.

**7.7.5**

Cooling fans shall be replaceable while the UPS remains in service, if specified.

**7.7.6**

If a cooling fan is out of service, the UPS shall continue to deliver the rated load without the maximum continuous temperature of components exceeding the designed limits.

**7.7.7**

If a cooling fan is out of service, the UPS shall continue to deliver the rated load without switching to bypass mode.

## 7.8 Additional requirements for offshore (fixed and floating) installations

**7.8.1**

For offshore installations, the UPS and associated equipment and components shall be in accordance with the general requirements of IEC 62040 (all parts) and:

– the requirements of IEC 61892 (all parts) for mobile and fixed units; or

– the requirements of IEC 60092 (all parts except 301, 305, 306, 501, 502 and 503) for electrical installations in ships.

**7.8.2**

If the requirements according to the International Maritime Organization (IMO), International Association of Classification Societies Ltd. (IACS) or other applicable classification societies contradicts or conflicts with the requirements of the IEC standards, the more stringent shall be applied.

## 7.9 Battery isolator box

**7.9.1**

The battery isolator box shall be suitable for wall, frame or pedestal mounting.

**7.9.2**

The battery isolator shall be lockable in the open position using padlocks.

**7.9.3**

The battery isolator box design shall be in accordance with the location of installation and the environmental conditions specified.

**7.9.4**

The battery isolator box with closed doors shall have a minimum degree of protection of IP31 in accordance with IEC 60529.

**7.9.5**

The battery isolator box enclosure type shall depend on the area classification assigned to its specified location of installation.

**7.9.6**

The battery isolator box enclosure shall have undrilled, removable gland plates.

**7.9.7**

The battery isolator shall be a switch fuse unit or MCCB.

**7.9.8**

The battery isolator shall be selected for the rated DC voltage and DC current rating.

**7.9.9**

The auxiliary supply for the MCCB control element (under voltage coil or shunt trip coil) shall be nominally rated equal to the battery bank voltage.

**7.9.10**

Potential free status contacts of the battery isolator shall be wired to the terminals, if specified.

*Add new clause*

# 8 Functional requirements

## 8.1 Rectifier

### 8.1.1 Rectifier components

#### 8.1.1.1

The rectifier unit of the AC UPS shall have an input transformer to galvanically isolate the AC and DC sections.

#### 8.1.1.2

The rectifier unit and components on the input side of the UPS shall be sized to supply the rated output and simultaneously boost charge the battery at the highest permissible current rating.

#### 8.1.1.3

If a UPS system with a bi-directional rectifier is specified, it shall be provided with an on-line battery capacity discharge test feature by feeding the power back to the power source.

#### 8.1.1.4

The UPS shall have an automatic or manual feature to perform on-line battery capacity testing by discharging of the battery into the load.

#### 8.1.1.5

The UPS shall integrate with the on-line battery monitoring system to continuously assess individual cell condition of the battery bank, if specified.

#### 8.1.1.6

If an on-line battery monitoring system is specified, the UPS shall generate an alarm if the battery parameters are outside the set limits.

#### 8.1.1.7

The total AC ripple at the battery terminals, including that generated by the inverter and load, shall not exceed the tolerance limits specified by the battery manufacturer.

### 8.1.2 Operation

#### 8.1.2.1

The rectifier unit shall operate according to the constant voltage, current limiting and soft start philosophy.

#### 8.1.2.2

The rectifier unit shall restart automatically upon restoration of the input power supply following a power interruption.

**8.1.2.3**

The rectifier unit shall be rated to recharge the battery to a specified nominal value of AH capacity following a discharge at rated load for the specified autonomy time, simultaneously meeting the inverter input requirements while the inverter is delivering the rated output.

**8.1.2.4**

Depending on the type of battery selected for energy storage, the rectifier shall perform battery charging at float, boost and equalization charge, or float and equalization charge.

**8.1.2.5**

The float or boost charge voltage shall be adjustable while the UPS is in operation.

**8.1.2.6**

Upon restoration of input power supply following a power interruption, the rectifier unit shall initiate the boost charge cycle if the rectifier is in auto mode.

NOTE Boost charge initiation depends on the state of charge or type of battery selected for energy storage.

**8.1.2.7**

The duration of the boost charging shall be controlled by:

– automatic timer; or

– feedback of the battery current and voltage indicating that the required adequate battery charge has been achieved.

**8.1.2.8**

The rectifier unit shall revert automatically to float charging upon completion of the boost charging or equalization charging.

**8.1.2.9**

The rectifier unit shall have provision for terminating the boost charging using an external signal (e.g. ventilation failure or H2 detection within the battery room).

**8.1.2.10**

The rectifier unit shall have provision for accepting temperature compensation input for batteries to control the battery charging voltage with an accuracy of ±1 %.

**8.1.2.11**

The UPS shall permit a black start, delivering power to the load at the rated output with only the batteries providing the input power, if specified.

**8.1.2.12**

The UPS shall permit an ESD override feature, if specified.

**8.1.2.13**

The rectifier shall restrict the battery charging current to a safe value specified by the battery manufacturer, depending on the mode of operation.

**8.1.2.14**

Manual initiation of float and boost modes of operation on the rectifier shall be provided.

**8.1.2.15**

The return from boost mode to float mode of operation for the battery shall be automatic.

## 8.2 Inverter

**8.2.1**

The inverter shall be short-circuit proof with a current limiting design.

**8.2.2**

The output voltage regulation shall be maintained within ±1 % of the rated output voltage while operating in non-synchronous conditions.

**8.2.3**

The waveform of the output voltage of the UPS shall be sinusoidal with a THD not exceeding 5 % for linear and non-linear loads.

## 8.3 Static and maintenance bypass

**8.3.1**

The switching devices of the static bypass unit at the inverter output and the bypass path shall be sized for a continuous current rating equivalent to the rated output of the UPS.

**8.3.2**

The static bypass circuit shall have a short time current rating of:

– 1 000 % of the UPS current rating for 50 milliseconds; and

– 150 % of the UPS current rating for 60 seconds.

**8.3.3**

The protection device used in the static bypass circuit shall permit short time rated currents.

**8.3.4**

The protection device used in the static bypass circuit shall prevent damage to the static switch if the overcurrent persists for longer than the specified time.

**8.3.5**

The UPS shall be provided with the facility to initiate a manual transfer from the inverter supply to the bypass supply and vice-versa.

**8.3.6**

An overall maintenance bypass shall be provided across the UPS for servicing purposes.

## 8.4 Measurement, protection and control

### 8.4.1 General

**8.4.1.1**

The UPS shall be equipped with necessary equipment to provide the required data measurements.

**8.4.1.2**

The UPS shall be equipped with necessary equipment to generate the required indications and alarms.

**8.4.1.3**

The UPS shall be equipped with necessary equipment to initiate protection measures to mitigate the consequences of internal/external faults, and component or control circuit malfunctions.

### 8.4.2 Indication and display

**8.4.2.1**

The UPS shall have a real time interactive operator interface using a microprocessor based human machine interface (HMI) mounted on the front door.

**8.4.2.2**

The HMI shall indicate the UPS operation status.

**8.4.2.3**

The HMI shall accept operational input commands.

**8.4.2.4**

The HMI shall monitor operating parameters and display alarms, events and fault diagnostics.

**8.4.2.5**

The following statuses shall be displayed on the HMI or by LED signalling lights located on the UPS front panel:

– AC input power supply healthy;

– bypass power supply healthy;

– rectifier ON;

– inverter ON;

– battery breaker ON;

– load on inverter;

– load on bypass;

– inverter/static bypass synchronized;

– battery discharging;

– common UPS alarm (LED signalling light).

**8.4.2.6**

The HMI display shall have a mimic diagram representing the power flow path as a single line diagram of the UPS and status of components.

**8.4.2.7**

Failure of the HMI display or indicating equipment on the UPS shall not compromise the operation of the UPS.

**8.4.2.8**

The HMI shall have password protected multiple levels of access:

– for viewing, by the operator;

– for settings, by trained operating personnel;

– for service, by the manufacturer's personnel.

**8.4.2.9**

The HMI shall have storage for retaining:

– historical data;

– event/alarm logging with time and date stamping;

– historical trending for assisting troubleshooting and failure analysis.

**8.4.2.10**

The UPS shall have communication facilities as specified for remote monitoring and interface.

**8.4.2.11**

Software and hardware shall be provided for monitoring, review and control of settings on the UPS on-line or off-line, if specified.

### 8.4.3 Measurements

The following measurement data shall be displayed on the HMI or by discrete measuring or display instruments located on the front panel of the UPS:

– UPS input voltage per phase;

– UPS input current per phase;

– DC voltage;

– battery current (charging);

– battery current (discharging);

– UPS output voltage per phase;

– UPS output current per phase;

– UPS output frequency;

– remaining autonomy time of the battery (percentage or minutes).

### 8.4.4 Alarms and protection

#### 8.4.4.1

The alarm and protection functions shall be identified on the operator interface HMI by indicators with a first failure feature.

#### 8.4.4.2

Alarm and trip functions shall be provided in accordance with Table 6 as a minimum.

*Add new table*

**Table 6 – Minimum alarm and trip functions**

| Trouble description | Alarm | Rectifier trip | Inverter trip |
|---|---|---|---|
| AC input power supply - undervoltage | ✓ | Off [a] [b] | |
| Rectifier failure | ✓ | ✓ | |
| DC overvoltage | ✓ | ✓ | |
| DC undervoltage | ✓ | | ✓ |
| Battery discharging | ✓ | | |
| Battery breaker off / battery disconnected | ✓ | | |
| Battery temperature high (VRLA batteries only) | ✓ | | |
| Cooling fan failure | ✓ | | |
| Inverter failure | ✓ | | ✓ |
| Inverter overcurrent | ✓ | | |
| Inverter Output voltage deviation | ✓ | | ✓ |
| Inverter/bypass unsynchronized | ✓ | | |
| Power module overtemperature | ✓ | | ✓ |

[a] In case the AC input power supply falls below allowable limits, the rectifier shall shut down.

[b] When the AC input power supply resumes and remains within allowable limits, the rectifier shall start automatically and no reset is required.

**8.4.4.3**

Alarms associated with trip functions shall be reset manually, locally or remotely, except for the AC input power supply alarm (see Table 6).

**8.4.4.4**

The UPS shall have two programmable output relays, with two potential free contacts per relay, a normally open contact and a normally closed contact, wired to a terminal block for remote interface.

**8.4.4.5**

Alarms and changes in operation modes shall be time stamped and stored chronologically in a non-volatile memory of the HMI in a “first in – first out” rolling manner.

### 8.4.5 Controls

**8.4.5.1**

The settings and threshold limits of parameters shall be adjustable on-line without requiring the outage of the UPS.

**8.4.5.2**

The rectifier unit shall permit battery boost charge operation for vented batteries and partial gas recombination nickel-cadmium (NiCd) batteries, in manual and automatic modes.

**8.4.5.3**

After a period of battery discharge, if the boost-charge cycle is in auto mode, boost charging shall be initiated and continued until the batteries are fully recharged.

NOTE Boost charge initiation depends on the state of charge or type of battery selected for energy storage.

**8.4.5.4**

The internal control supply of the UPS shall be available provided any of the power sources to the UPS are present.

**8.4.5.5**

The inverter unit shall control the output of the UPS to maintain synchronism with the bypass voltage during variations in input frequency, within the specified tolerance limits.

**8.4.5.6**

If variation in the input frequency exceeds the defined synchronization limits, the inverter shall revert to free-running (non-synchronous) operation.

*Add new clause*

## 9 Packing, handling, preservation and storage

The UPS and associated equipment and components shall be packed to protect against damage during transportation.

# Annex A
(informative)
# Uninterruptible power system (UPS) configurations

*Replace Figure A.2 with*

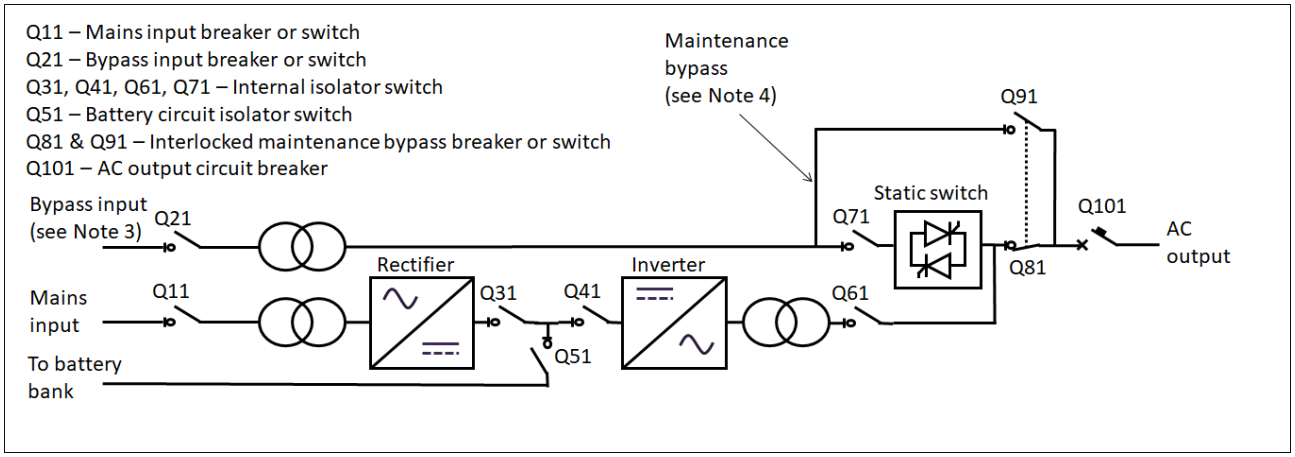



**Figure A.2 – Simplified single UPS with bypass**

*Replace Figure A.3 with Figures A.3A and A.3B*

*Add new figure*

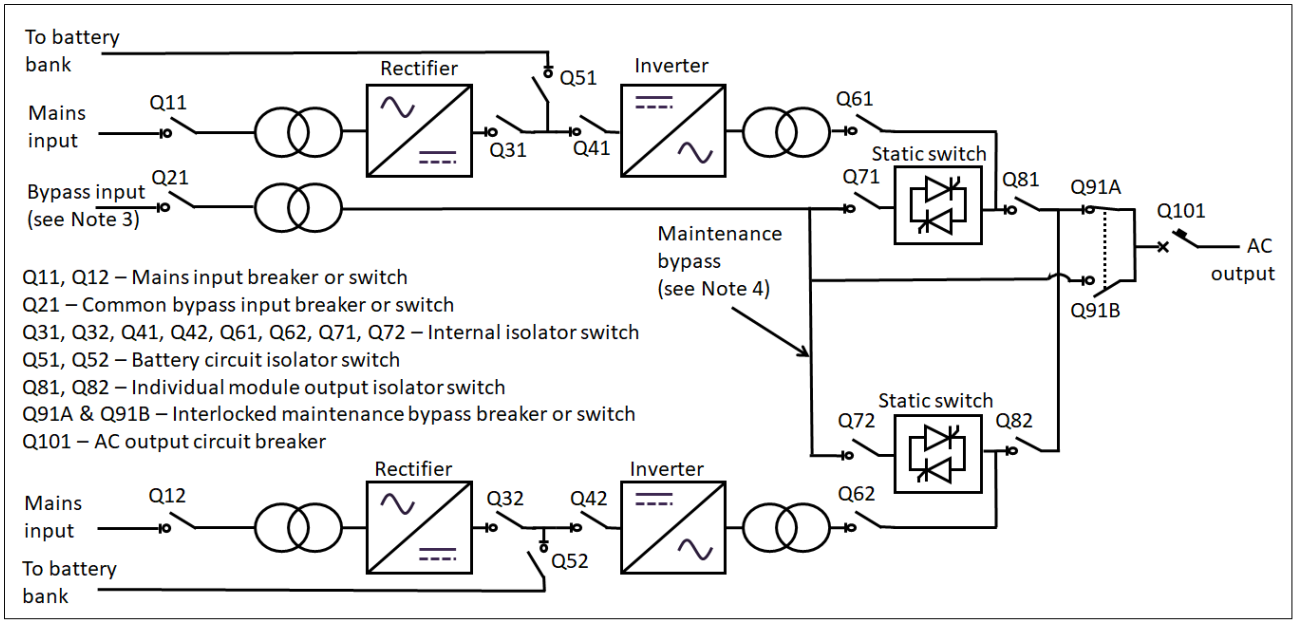



**Figure A.3A – Simplified parallel UPS with common bypass and common output**

*Add new figure*

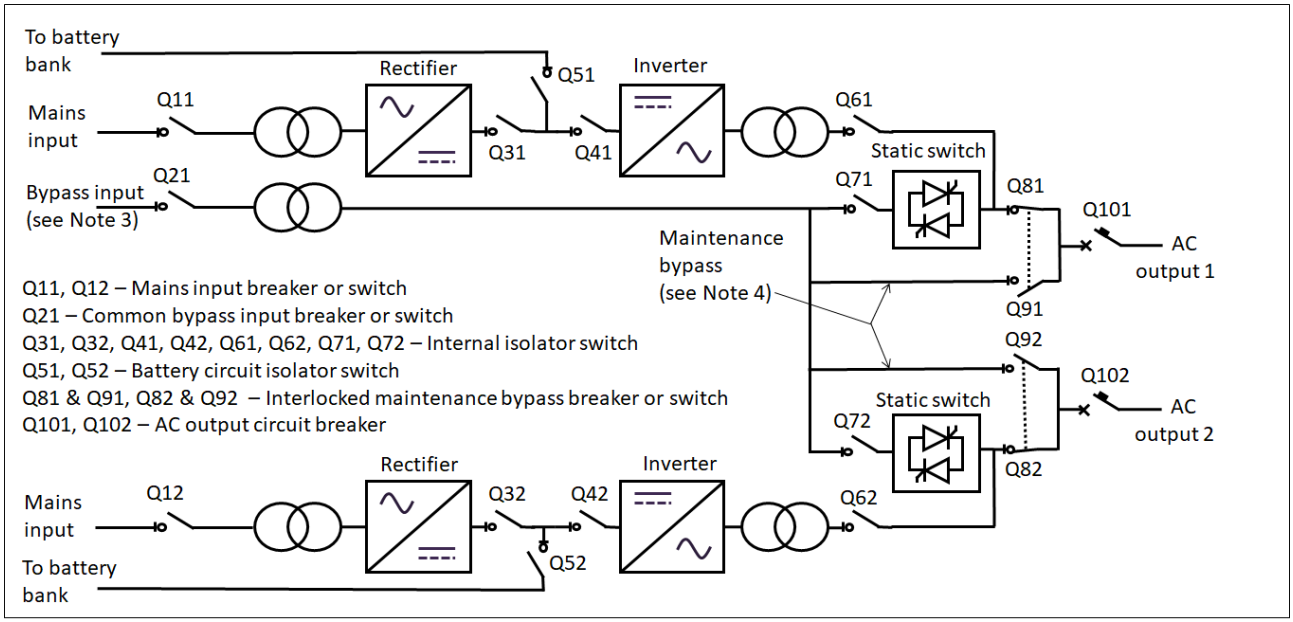



**Figure A.3B – Simplified parallel UPS with common bypass and separate output**

*Replace Figure A.6 with*

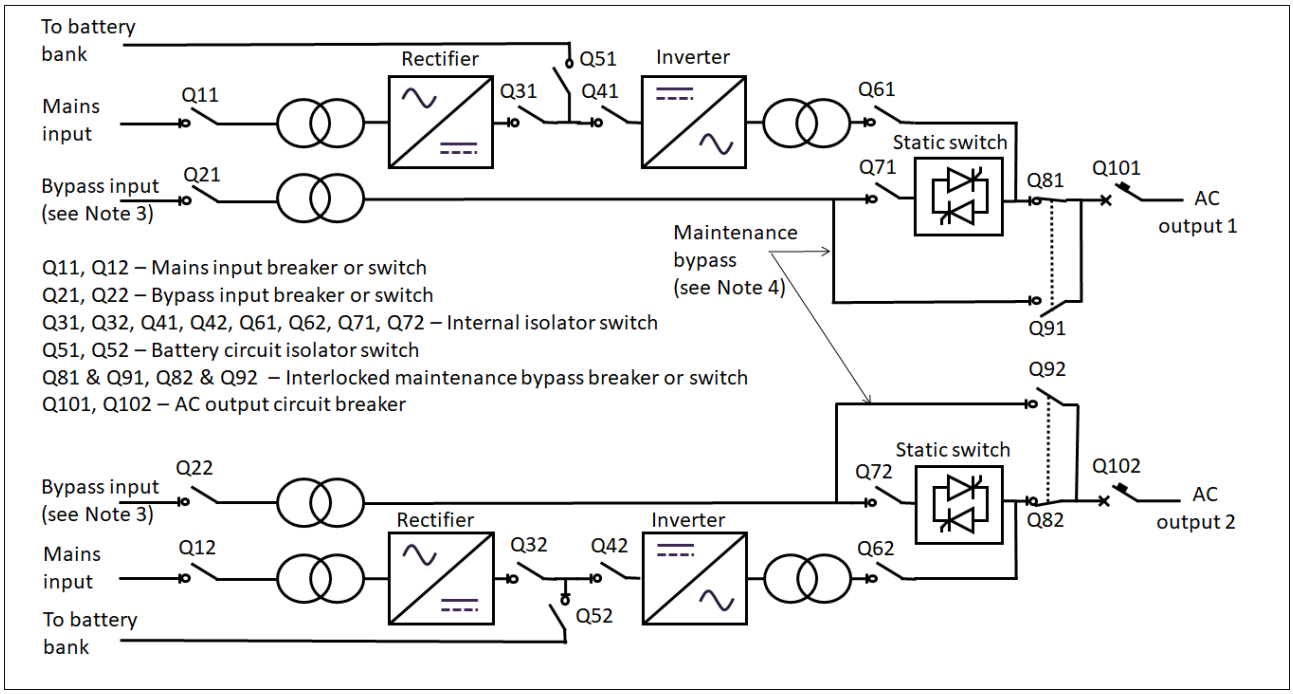



**Figure A.6 – Simplified dual bus UPS with bypass**

# Bibliography

*Add to bibliography*

IEC 62402, *Obsolescence management*

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# 16 ANNEX III: "QUALITY REQUIREMENTS - AC UNINTERRUPTIBLE POWER SYSTEMS (UPS) (IEC 62040-3) – SPECIFICATION (IDS) - S-701Q"

International Association of Oil & Gas Producers

SPECIFICATION
S-701Q

August
2020

# Quality Requirements for AC Uninterruptible Power Systems (UPS) (IEC 62040-3)

JIP33
JOINT INDUSTRY PROGRAMME

**Revision history**

| VERSION | DATE | PURPOSE |
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# Introduction

The purpose of this quality requirements specification (QRS) is to define quality management requirements for the procurement of AC uninterruptible power systems (UPS) in accordance with IOGP S-701 for application in the petroleum and natural gas industries.

The QRS includes definition of a conformity assessment system (CAS) which specifies standardized purchaser interventions against quality management activities at four different levels. The applicable CAS level is specified by the purchaser in the equipment data sheet or purchase order.

This QRS shall be used in conjunction with the supplementary requirements specification IOGP S-701, the information requirements specification IOGP S-701L and the equipment data sheet IOGP S-701D which together comprise the full set of specification documents. The introduction section in the supplementary requirements specification provides further information on the purpose of each of these documents and the order of precedence for their use.




**JIP33 Specification for Procurement Documents**
**Quality Requirements Specification**

# 1 Scope

To specify quality management requirements for the supply of AC UPS to IOGP S-701 Supplementary Specification to IEC 62040-3 AC Uninterruptible Power Systems (UPS) including:

a) manufacturer/supplier quality management system requirements;

b) purchaser conformity assessment (surveillance and inspection) activities;

c) traceability requirements;

d) evidence of conformance;

e) factory acceptance.

# 2 Normative references

For the purpose of this document, the documents referenced in IOGP S-701 and those listed below, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 9001, *Quality management systems - Requirements*

API Specification Q1, *Specification for Quality Management System Requirements for Manufacturing Organizations for the Petroleum and Natural Gas Industry*

IOGP S-701, *Supplementary Specification to IEC 62040-3 AC Uninterruptible Power Systems (UPS)*

# 3 Terms and definitions

For the purpose of this document, the terms and definitions given in IOGP S-701 and ISO 9000 (normative to ISO 9001) and the following shall apply.

## 3.1 Conformity assessment

Demonstration that requirements relating to a product, process, system, person or body are fulfilled.

NOTE 1 Conformity assessment (or assessment) includes but is not limited to review, inspection, verification and validation activities.

NOTE 2 Assessment activities may be undertaken at a supplier/sub-supplier's premises, virtually by video link, desktop sharing, etc. or by review of information formally submitted for acceptance or for information.

## 3.2 Conformity assessment system (CAS)

Systems providing different levels of assessment of the supplier's control activities by the purchaser (second party) or independent body (third party) based on evaluation of the supplier's capability to conform to the product or service specification and obligatory requirements.

NOTE CAS A reflects the highest risk and associated extent of verification. CAS D is the lowest.

## 3.3 Conformity assessment - Hold point (H)

Point in the chain of activities beyond which an activity shall not proceed without the approval of the purchaser or purchaser's representative.

### 3.4 Conformity assessment - Witness point (W)

Point in the chain of activities that the supplier shall notify the purchaser or purchaser's representative before proceeding. The operation or process may proceed without witness if the purchaser does not attend after the agreed notice period.

### 3.5 Conformity assessment - Surveillance (S)

Observation, monitoring or review by the purchaser or purchaser's representative of an activity, operation, process, product or associated information.

### 3.6 Conformity assessment - Review (R)

Review of the supplier's information to verify conformance to requirements.

NOTE Information review requirements are managed on a surveillance basis and as such do not impose schedule constraints, unless specified as hold points in Annex A or as conditions specified in the associated IRS.

## 4 Symbols and abbreviations

For purposes of this document, the following symbols and abbreviations apply:

CAS conformity assessment system

IRS information requirements specification

QRS quality requirements specification (this document)

## 5 Quality requirements

### 5.1 Quality management system

The supplier shall demonstrate that the quality management arrangements established for the supply of products and services conform to ISO 9001, API Specification Q1 or an equivalent quality management system standard.

### 5.2 Conformance assessment

#### 5.2.1

Quality plans and inspection and test plans developed as outputs to operational planning and control shall define the specific controls to be implemented by the supplier to ensure conformance with the specified requirements.

#### 5.2.2

Controls shall address both internally and externally sourced processes products and services.

#### 5.2.3

Quality plans and inspection and test plans shall include provision for the purchaser conformity assessment system (CAS) as specified in the data sheet; see Annex A.

#### 5.2.4

Supplier performance in meeting the requirements will be routinely assessed during execution of the scope and where appropriate, corrective action requested and conformity assessment activities increased or decreased consistent with criticality and risk.

NOTE 1 For industrial proven solutions CAS level D is specified unless risk assessment indicates that a more stringent CAS level is required.

NOTE 2 Irrespective of conformity assessment requirements defined by the purchaser, either, by reference to standard or specification requirements or in the scope, the supplier remains responsible for operational planning and control and demonstration of the conformity of products and services with the requirements. See ISO 9001, 8.1 and 8.2.

## 6 Certification and traceability

The manufacturer/supplier shall maintain traceability of sub-assembly and major components to the original component manufacturer/supplier tag / serial number and where applicable, associated certification. See ISO 9001, 8.5.2.

## 7 Control of nonconforming products and services

Nonconformance with specified requirements identified by or to the supplier shall be corrected such that the specified requirements are satisfied or the purchaser's acceptance of the nonconformance agreed in accordance with purchase order conditions. See ISO 9001, 8.2.3, 8.2.4, 8.5.6 and 8.7.

## 8 Evidence (records)

Plans, procedures, methods and resultant records shall be provided in accordance with the associated IRS.

# Annex A
(normative)
# Purchaser conformity assessment requirements

This annex defines four conformity assessment systems (CAS) or levels of purchaser assessment.

| | PURCHASER ASSESSMENT ACTIVITIES | CAS | | | |
|---|---|---|---|---|---|
| | | A | B | C | D |
| **1** | **Operational planning and control activities** | | | | |
| 1.1 | Quality planning (ISO 9001, 8.1 and ISO 10005) | H | H | - | - |
| 1.2 | Inspection and test planning (ISO 9001, 8.1 and ISO 10005) | H | H | R | R |
| 1.3 | Pre-Inspection/Pre-production planning | H | H | W | S |
| **2** | **Design and development activities** | | | | |
| 2.1 | Calculations (UPS sizing, battery capacity and back up time)<br>(IOGP S-701, 5.3.2 5.4.2.2) | H | H | R | R |
| 2.2 | Verification of the design performance characteristics (datasheet)<br>(IOGP S-701, 5.6, 5.1.1, 5.2.2, 5.2.3, 5.3.2, 5.3.3, 5.3.4, 5.4.2.2, 5.4.2.3) | H | H | R | R |
| 2.3 | Verification of equipment layout design (general arrangement drawings)<br>(IOGP S-701, 7.1.2, 7.2.5, 7.3.2, 7.3.3, 7.3.4, 7.3.8, 7.3.9, 7.4.1, 7.5.4, 7.6.1, 7.6.2, 7.6.3, 7.6.4, 7.6.5, 7.7.1, 7.7.2, 7.7.4, 8.4.2.1, 8.4.2.2, 8.4.2.3, 8.4.2.4, 8.4.2.6) | H | H | R | R |
| 2.4 | Verification of equipment functional design (wiring and interface schematics)<br>(IOGP S-701, 7.5.2, 7.5.3, 7.7.3, 8.1.2.9, 8.4.1.1, 8.4.1.2, 8.4.1.3, 8.4.2.10, 8.4.4.4) | H | H | R | R |
| 2.5 | Verification of component selection (bill of materials)<br>(IOGP S-701, 7.4.2, 7.4.3, 7.4.4, 7.4.5, 7.4.6, 7.4.7, 8.1.1.2, 8.3.1, 8.3.3, 8.3.4) | H | H | R | R |
| 2.6 | Review of certificates (type test certification)<br>(IOGP S-701, 7.4.10, 7.4.11, 7.4.12, 7.4.13, 7.4.8, 7.4.9, 7.5.1, 7.8.1, 7.8.2) | H | H | R | R |
| **3** | **Control of external supply** | | | | |
| 3.1 | External supply scope, risk assessment and controls (ISO 9001, 8.4) | H | W | - | - |
| 3.2 | Nominated sub-suppliers of sub-assemblies, components and accessories | H | W | - | - |
| **4** | **Production and service provision** | | | | |
| 4.1 | Verification of incoming materials (type, condition/integrity, environmental compliance, quantity and certification) | H | S | - | - |
| 4.2 | Verification of assembly (including review of in process records) (IOGP S-701, 6.1.1.2) | W | S | S | - |
| 4.3 | Routine test as listed in IOGP S-701, Table 3 and detailed in IEC 62040-3, 6.2. Tests in accordance with technical requirements under IOGP S-701, Clause 7 (Constructional requirements) and Clause 8 (Functional requirements)<br>(IOGP S-701, 6.1.2, 7.7.6, 7.7.7, 8.1.1.7, 8.1.2.1, 8.1.2.10, 8.1.2.11, 8.1.2.13, 8.1.2.14, 8.1.2.15, 8.1.2.2, 8.1.2.4, 8.1.2.5, 8.1.2.6, 8.1.2.7, 8.1.2.8, 8.2.1, 8.2.2, 8.3.5, 8.4.2.5, 8.4.2.7, 8.4.2.8, 8.4.2.9, 8.4.3, 8.4.4.1, 8.4.4.2, 8.4.4.3, 8.4.4.5, 8.4.5.1, 8.4.5.2, 8.4.5.3, 8.4.5.4, 8.4.5.5, 8.4.5.6, Table 3, Table 6) | H | W | R | S |
| 4.4 | Witness test (IOGP S-701, 6.1.4, Table 3) | H | W | W | W |

| | | | | | |
|---|---|---|---|---|---|
| 4.5 | Type test as listed in IOGP S-701, Table 3 and detailed in IEC 62040-3, 6.4 and 6.5 (IOGP S-701, 6.1.5, Table 3) | W | R | S | R |
| **5** | **Release of product or service** | | | | |
| 5.1 | Closeout of observations (if any) during factory acceptance test | H | W | R | R |
| 5.2 | Handling, packing, preservation and storage (IOGP S-701, Clause 9) | W | W | R | R |
| 5.3 | Final documentation review as per IRS (IOGP S-701L) | H | H | H | R |
| 5.4 | Release equipment | H | H | H | H |
| **6** | **Integration testing** | | | | |
| 6.1 | Site test (IEC 62040-3, 6.1.3, 6.3, Table 3) (IOGP S-701, 6.1.3, 6.3 8.1.1.6) | H | H | W | W |
| H is hold point, W is witness point, S is surveillance and R is review.<br>Note: Definitions for these terms are provided in Clause 3 of this document. | | | | | |

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# 17 ANNEX IV: "INFO REQUIREMENTS FOR - AC UNINTERRUPTIBLE POWER SYSTEMS (UPS) (IEC 62040-3) – SPECIFICATION (DDS) - S-701L"

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International Association of Oil & Gas Producers

SPECIFICATION
S-701L

August
2020

# Information Requirements for AC Uninterruptible Power Systems (UPS) (IEC 62040-3)

JIP33
JOINT INDUSTRY PROGRAMME

**Revision history**

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# S-701L Information Requirements for AC Uninterruptible Power Systems (UPS) (IEC 62040-3)

## Foreword

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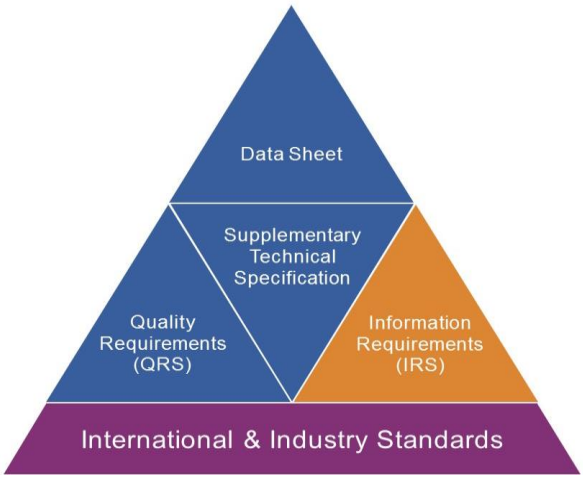
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# S-701L Information Requirements for AC Uninterruptible Power Systems (UPS) (IEC 62040-3)

## Introduction

The purpose of this information requirements specification (IRS) is to define Information requirements for the procurement of AC uninterruptible power systems (UPS) in accordance with IOGP S-701 for application in the petroleum and natural gas industries. This document defines the information requirements, including format, timing and purpose, for information to be provided by the manufacturer. It also defines the specific conditions which must be met for conditional information requirements to become mandatory. The information requirements listed in the IRS provide references to the source of the requirement.

This IRS shall be used in conjunction with the supplementary requirements specification IOGP S-701, quality requirements specification IOGP S-701Q and equipment data sheet IOGP S-701D which together comprise the full set of specification documents. The Introduction section in the supplementary requirements specification provides further information on the purpose of each of these documents and the order of precedence for their use.




**JIP33 Specification for Procurement Documents**
**Information Requirements Specification**

# S-701L Information Requirements for AC Uninterruptible Power Systems (UPS) (IEC 62040-3)

## Supplier Instructions

### In response to Invitation To Tender (ITT)

Tenderers to submit information as defined in column E - 'Submit At Proposal' in 'Requirements' sheet, in accordance with ITT instructions

### On award of contract

Specified Information requirements shall be submitted in accordance with contract information submission instructions.
Suppliers to prepare and submit 'Supplier Master Information Schedule' (SMIS) incorporating information requirements in accordance with columns F - 'First Issue Post Purchase Order' in 'Requirements' sheet.
Supplier to demonstrate compliance with each information requirement either by providing document number cross reference to the Requirement in 'Supplier Master Information Schedule' (SMIS) and, if specified in the Contract, using column J 'Fulfilled by Document Number(s)' in the IRS Requirements Sheet.

### On completion of scope

Supplier to validate that the information delivered meets the IRS requirements either through cross reference to the deliverable type in a as-built version of the 'Supplier Master Information Schedule' SMIS and, if specified in the Contract, by providing an as-built version of the IRS with column J 'Fulfilled by Document Number(s)' in Requirement sheet populated with the specific document numbers issued to the Purchaser.

### IRS Structure Contents

### 1 'Front & Preliminaries' Tab

The 'Front & Preliminaries ' tab includes an IOGP Front sheet for the IRS followed by Acknowledgements, a Disclaimer, Copyright Notice, Foreword and Introduction

### 2 'Supplier Instructions' Tab

This 'Supplier Instructions' tab provides instructions that Suppliers are to follow in response to this IRS.

# 3 'Requirements' Tab

The 'Requirements' tab lists the suite of information requirements that are to be supplied during tendering and following award of the purchase order to deliver the purchase order scope.
The information requirements are grouped under three broad categories;
Management information requirements:
Key information requirements relating to planning, managing, assuring and reporting the execution of the technical scope. Note: Information requirements relating to contractual and administrative terms and conditions or regulatory obligations are to be supplied in accordance with the applicable purchase order or regulation.
Technical information requirements:
Technical information developed by the supplier or their sub suppliers, during the design and development, acquisition, manufacture, assembly and testing of the contracted scope.
Purchase Order Specific Information Requirements:
Information requirements specified by individual owners-operators in addition to those specified by IOGP-JIP33 to meet specific operational, project or legislative requirements.
Note: Information requirements relating to contractual and administrative terms and conditions or regulatory obligations are to be supplied in accordance with the applicable purchase order or regulation.
"The 'Requirements' tab includes columns A to L, including Column A for the relevant requirement code and Column B for the Requirement for the different Information Requirements (Data, Documents and/or Models) to be provided by suppliers, based on the parent standard, IOGP Specification or the specified parent industry Standard.
Condition Invoking Revoking Requirement Column C is included to allow any specific conditions to be identified that may require a additional deliverable(s).
Typical Deliverable Column D is provided for Purchaser to identify the deliverable type that the information would typically appear within; this also allows the Purchaser's Requisitioning Engineers to group the various Information Requirements by Deliverable Type.
Column E includes Submission Requirements (Yes or No) at Proposal, while columns F, G & H identify Issue Purpose (For Information or For Acceptance) and Durations (Period or Weeks/Months) for First Issue of the particular deliverable Post Purchase Order.
Required As Built, Fulfilled by Document Number(s), Translation Required and Remarks columns I, J, K & L are also included. Definitions for each column are contained in the rows above the columns: Abbreviations used for various submission requirements in Column H are shown in table 3.1 below:

| Abbreviation | Description |
|---|---|
| WAD | Weeks After Delivery |
| WAI | Weeks After Inspection |
| WAO | Weeks After Order |
| WAO(Monthly) | Weeks After Order Monthly |
| WAT | Weeks After Test |
| WPTD | Weeks Prior To Delivery |
| WPTF | Weeks Prior to Fabrication |
| WPTT | Weeks Prior To Test |

**Table 3.1 - Information Submission Abbreviations**

## 4 'Definitions' Tab

The 'Definitions' tab includes several columns A to F, including Column A for the relevant Code & Column B for the Requirement for the different Information (Data, Documents and/or Models) Requirements to be provided by Suppliers, all copied from the 'Requirements' tab.
Column C includes a full description of the Information Requirement based on the Parent Standard, IOGP Specification or an Industry Standard.
Column D gives a reference to the Parent Standard, IOGP Specification or an Industry Standard that the Information requirement is identified in.
Column E identifies the Requirement format as listed in Table 9.1 below.
Column F relates the CFIHOS discipline document type that could be used to classify the document having this IRS content.
Definitions for each column are contained in the rows above the columns:

## 5 Abbreviations and definitions

The following abbreviations, terms and definitions have been used in the various tabs of this workbook.

| | |
|---|---|
| Buyer | Organisation placing a Contract or Purchase Order with Supplier for equipment or services on project; may be alternatively referred to as 'User' or 'Purchaser' |
| CFIHOS | Capital Facilities Information Hand Over Specification |
| Company | Project Operating Entity or the organisation Contractor is under contract to |
| Contractor | Project Contractor responsible for procuring equipment. |
| Information | Data, Documents and/or Models |
| IRS | Information Requirements Specification |
| PO | Purchase Order |
| QRS | Quality Requirements Specification |
| SMIS | Supplier Master Information Schedule |
| Supplier | Organisation supplying equipment or services to Company and/or Contractor on project; may alternatively be referred to as "Vendor", "Seller" or “Manufacturer”. |

## 6 CFIHOS

The Information Requirements are also classified according to document classification published in v1.4 of Capital Facilities Information Hand Over Specification (CFIHOS). The objective of CFIHOS is to create a common information standards across the process industries. Further information on CFIHOS can be found at:
https://uspi.nl/index.php/projects/frameworks-methodologies/136-cfihos

# 7 Document Metadata

Typical Metadata for Information Deliverables to be provided by Suppliers is shown in Table 7.1 below

| Property_Name | Definition |
|---|---|
| document number | The unique identifier for the Document according to the Owner/Operator Document numbering scheme. |
| revision code | A code used to identify the content of a document at a certain point in time according to the Owner/Operator Document Revision Coding scheme. It is used to track the evolution of a document during its lifecycle and is applied at time of release from Originator to reflect the document is frozen. |
| document title | Describes in a short and concise manner the content of the document.<br>Remark: The title of the document usually appears on the front page of the document or in title block. |
| revision date | The date of the document revision. |
| originator company | Identifies the name of the Company who has generated the Document. |
| author | Author(s) of the current revision of the document. This should be an individual name, not a role, i.e. Initials and last name, not just initials |
| approved by | Name or UserID of the person who has approved the current revision of the document as per the document management approval workflow. This should be an individual name, not a role, i.e. Initials and last name, not just initials. |
| file name | The unique name of the electronic file (including the file extension). |
| originator document number | The unique identifier for the Document according to originator which doesn't necessarily conform to the Owner/Operator's document numbering scheme.<br>Remark: One potential use is to allow Owner/Operator to identify duplicate documents provided by multiple subcontractors but from the same OEM. |
| originator document revision code | A code used to identify the content of a document at a certain point in time according to the originator which doesn't necessarily conform to the Owner/Operator's document revision coding scheme.<br>Remark: One potential use is to allow Owner/Operator to identify duplicate documents provided by multiple subcontractors but from the same OEM. |
| document status code | A code used to indicate the life cycle status of the document.<br>A code which identifies the state of the document within the publication lifecycle process. A document is classified by a single state, which changes as the document advances through this lifecycle. |
| language | Indicates the language that the document is written in. |
| discipline document type short code | Classifies the Document with a Discipline_Document_Type. |
| project code | A unique code used to identify the Project. |
| document comment | Indicates any additional Comment / Explanation for a Document Revision. |
| plant code | Identifies the Plant that the document is related to. This is a smaller subdivision than 'Site' but larger than 'Unit' or 'Area.' |
| export control classification | Indicate the Export Control Rule applicable for the Document (e.g., ECCN, EAR). |
| transmittal number | A unique transmittal identifier generated by the document control system of the company sending the transmittal. |
| security classification | Indicates internal Owner-Operator access restriction applicable for the Document. |

**Table 7.1 - Supplier Deliverable Metadata**

# 8 Deliverable Formats

The format of the relevant Information Deliverable to be submitted by Supplier for Buyer/Contractor is to be as described in table 8.1 below. Where required to be 'As Built', deliverables are to be updated and handed over in the native format.

| Format | Description |
|---|---|
| Hard Copy | Should be be electronically developed, but in particular and exceptional circumstances, say for legal reasons, may need to be handed over in printed paper format |
| Native | To be electronically developed and must be retained in the original application software format, with no embedded or linked files. |
| Portable Document Format (PDF) | To be electronically developed and must be in Optical Character Recognition (OCR) format which is text searchable & indexed. Embedded graphics in Joint Photographic Experts Groups(JPEG), Graphics Interchange Format (GIF) (suitably compressed) or Tagged Image File Format (TIFF) formats may be allowed but by exception only and with Purchaser's written approval. |
| Intelligent Vector (CAD) | Intelligent vector drawing Like CAD |
| Multi media (Film) | Multi media Like Film, Micro fiche, Video, Sound |
| Raster Image (Bitmap) | Raster Image like a bitmap |
| Structured Data (MS Apps) | Structured Data Like CSV file, MS-access, MS-Excel, Application Database |
| Technical Publication (Text) | Technical publication or Text |

**Table 8.1 – Deliverable Formats**

# S-701L Information Requirements for AC Uninterruptible Power Systems (UPS) (IEC 62040-3)

## Requirements

| Column | Heading - Details and requirements |
|---|---|
| A | **Code** - a unique identifier for the Information Requirement assigned by IOGP JIP33 DigitalTool |
| B | **Requirement** - a short description of the Information Requirement based on the description in the Parent Standard, IOGP Specification or an Industry Standard Information Requirement Title. |
| C | **Condition Invoking Requirement** - describes special condition(s) under which the Information Requirement is required; e.g.. service offshore and weight greater than 1 tonne means information is required. NB: if blank, always required |
| D | **Typical Deliverable** - Purchaser to advise the short description of the Information Deliverable that would typically include this Information Requirement |
| E | **Submit With Proposal** - Yes or No, where 'Yes' means the Information Requirement is required to be submitted with Suppliers Proposal or 'No' is not required |
| F, G, H & I | **Issue Post Purchase Order** - issue purpose ('For Information' or 'For Acceptance'), time in weeks for issue of the Information Requirement and Period defined after Purchase Order placement. |
| J | **Required As Built** - Yes or No, where 'Yes' means the Information Requirement is required to be 'As Built' on completion or delivery of equipment or 'No' is not required 'As Built' |
| K | **Fulfilled by Information Deliverable Number(s)** - identifies which Information Requirement(s) listed in the Supplier Master Information Schedule (SMIS) addresses the Purchasers requirements. NB; it should be noted that one Information Deliverable can fulfil more than one Information Requirement. |
| L | **Translation Required** -Yes or No, where 'Yes' means the Information Requirement should be translated into a language(s) (to be advised) other than English and 'No' means to be provided in English |
| M | **Remarks** - may include bid clarification questions & decisions (specify author & date) |

| Col A | Col B | Col C | Col D | Col E | Col F | Col G | Col H | Col I | Col J | Col K | Col L | Col M |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Code** | **Requirement** | **Condition Invoking Requirement** | **Typical Deliverable** | **Submit At Proposal** | **First Issue Post Purchase Order** | | **Issue for Approval** | **Issue for Construct.** | **Required As Built** | **Fulfilled by Document Number(s)** | **Translation Required** | **Remarks** |
| | | | | (Yes/No) | Purpose | (Weeks) | (Weeks) | (Weeks) | (Yes/No) | | | |
| **Contract Management Information Deliverables** | | | | | | | | | | | | |
| S701-IR-1 | Supplier master information schedule | | Information Deliverables List | No | For Acceptance | 2 | 6 | 8 | Yes | | - | |
| S701-IR-2 | Delivery schedule | | Delivery/Production Schedule | Yes | For Information | 2 | 6 | 8 | No | | - | |
| S701-IR-3 | Progress report | | Progress Report | No | For Information | 2 | 6 | 8 | No | | - | |
| S701-IR-4 | Quality plan | Required for CAS A, B | Quality Plan | - | - | 2 | 6 | 8 | - | | - | |
| S701-IR-5 | Sub-vendor delivery schedule | | Sub-Supplier List | Yes | For Information | 2 | 6 | 8 | No | | - | |
| S701-IR-6 | Inspection and test plan for complete package | | Inspection and Test Plan (ITP) | No | For Information | 4 | 8 | 10 | No | | - | |
| S701-IR-7 | Handling, shipping, storage and preservation procedure | | Handling, shipping and storage procedure | No | For Information | 4 | 8 | 10 | No | | - | |
| S701-IR-8 | Non-conformance records | | Nonconformance History | No | For Acceptance | 4 | 8 | 10 | Yes | | - | |
| S701-IR-9 | Concession requests | | Concession request | No | For Acceptance | 4 | 8 | 10 | Yes | | - | |
| **Technical Information Deliverables** | | | | | | | | | | | | |
| S701-IR-19 | General Arrangement Drawing | | General Arrangement Drawing | Yes | For Information | 2 | 6 | 8 | No | | No | Preliminary GA drawing to be submitted with proposal. |
| S701-IR-20 | Battery Cable Size Calculation | | Cable Size Calculation | No | For Information | 6 | 10 | 12 | No | | No | |
| S701-IR-21 | UPS Sizing Calculation | | Design Calculation | Yes | For Acceptance | 2 | 6 | 8 | No | | No | |
| S701-IR-49 | Battery sizing calculation | | Battery sizing calculation | Yes | For Acceptance | 2 | 6 | 8 | Yes | | Yes | |
| S701-IR-22 | Heat Dissipation Summary | | Heat Dissipation Calculation & Loads | Yes | For Information | 2 | 6 | 8 | No | | No | |
| S701-IR-23 | Reliability, Availability, Safety Integrity Level Calculation | | Reliability, Availability, Safety Integrity Level Calculation | Yes | For Information | 4 | 8 | 10 | No | | No | |
| S701-IR-24 | Equipment Datasheet | | Manufacturer Datasheet | Yes | For Acceptance | 4 | 8 | 10 | No | | No | |
| S701-IR-26 | Single Line Diagram | | Single Line Diagram | Yes | For Acceptance | 2 | 6 | 8 | No | | No | |
| S701-IR-27 | Termination Diagram | | Termination Diagram | No | For Acceptance | 8 | 12 | 14 | No | | No | |
| S701-IR-28 | Wiring Diagram | | Wiring Diagram | No | For Acceptance | 8 | 12 | 14 | Yes | | No | |
| S701-IR-29 | Bill Of Materials | | Bill Of Materials | No | For Information | 8 | 12 | 14 | Yes | | No | |
| S701-IR-30 | Consolidated Spare Parts List | | Consolidated Spare Parts List | No | For Information | 8 | 12 | 14 | No | | No | |
| S701-IR-31 | Commissioning Instruction | | Commissioning Instruction | No | For Information | 8 | 12 | 14 | No | | No | |
| S701-IR-32 | Installation Manual | | Installation Manual | No | For Information | 8 | 12 | 14 | No | | No | Installation Manual index, if required, shall be provided in first revision of the document. When index agreed, Installation manual content shall be provided in subsequent revision of the document. |

# S-701L Information Requirements for AC Uninterruptible Power Systems (UPS) (IEC 62040-3)

## Requirements

| Column | Heading - Details and requirements |
|---|---|
| A | **Code** - a unique identifier for the Information Requirement assigned by IOGP JIP33 DigitalTool |
| B | **Requirement** - a short description of the Information Requirement based on the description in the Parent Standard, IOGP Specification or an Industry Standard Information Requirement Title. |
| C | **Condition Invoking Requirement** - describes special condition(s) under which the Information Requirement is required; e.g.. service offshore and weight greater than 1 tonne means information is required. NB: if blank, always required |
| D | **Typical Deliverable** - Purchaser to advise the short description of the Information Deliverable that would typically include this Information Requirement |
| E | **Submit With Proposal** - Yes or No, where 'Yes' means the Information Requirement is required to be submitted with Suppliers Proposal or 'No' is not required |
| F, G, H & I | **Issue Post Purchase Order** - issue purpose ('For Information' or 'For Acceptance'), time in weeks for issue of the Information Requirement and Period defined after Purchase Order placement. |
| J | **Required As Built** - Yes or No, where 'Yes' means the Information Requirement is required to be 'As Built' on completion or delivery of equipment or 'No' is not required 'As Built' |
| K | **Fulfilled by Information Deliverable Number(s)** - identifies which Information Requirement(s) listed in the Supplier Master Information Schedule (SMIS) addresses the Purchasers requirements. NB; it should be noted that one Information Deliverable can fulfil more than one Information Requirement. |
| L | **Translation Required** -Yes or No, where 'Yes' means the Information Requirement should be translated into a language(s) (to be advised) other than English and 'No' means to be provided in English |
| M | **Remarks** - may include bid clarification questions & decisions (specify author & date) |

| Col A | Col B | Col C | Col D | Col E | Col F | Col G | Col H | Col I | Col J | Col K | Col L | Col M |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Code** | **Requirement** | **Condition Invoking Requirement** | **Typical Deliverable** | **Submit At Proposal** | **First Issue Post Purchase Order** | | **Issue for Approval** | **Issue for Construct.** | **Required As Built** | **Fulfilled by Document Number(s)** | **Translation Required** | **Remarks** |
| | | | | (Yes/No) | Purpose | (Weeks) | (Weeks) | (Weeks) | (Yes/No) | | | |
| S701-IR-33 | Maintenance Manual | | Maintenance Manual | No | For Information | 8 | 12 | 14 | No | | No | Maintenance Manual index, if required, shall be provided in first revision of the document. When index agreed, Maintenance manual content shall be provided in subsequent revision of the document. |
| S701-IR-34 | Operating Manual | | Operating Manual | No | For Information | 8 | 12 | 14 | No | | No | Operating Manual index, if required, shall be provided in first revision of the document. When index agreed, Operating manual content shall be provided in subsequent revision of the document. |
| S701-IR-35 | Factory Acceptance Test (FAT) Procedure | | Factory Acceptance Test (FAT) Procedure | No | For Acceptance | 4 | 8 | 10 | No | | No | |
| S701-IR-36 | Site Acceptance Test (SAT) Procedure | | Site Acceptance Test (SAT) Procedure | No | For Acceptance | 4 | 8 | 10 | No | | No | |
| S701-IR-37 | Factory Acceptance Test (FAT) Records | | Factory Acceptance Test (FAT) Records | No | For Acceptance | TBD | TBD | TBD | No | | No | |
| S701-IR-38 | Site Acceptance Test (SAT) Records | | Site Acceptance Test (SAT) Records | No | For Acceptance | TBD | TBD | TBD | No | | No | |
| S701-IR-39 | Manufacturer Record Book (MRB) | | Manufacturer Record Book (MRB) | No | For Information | TBD | TBD | TBD | Yes | | No | Manufacturer Record Book index, if required, shall be provided in first revision of the document. When index agreed, Manufacturer Record Book content shall be provided in subsequent revision of the document. |
| S701-IR-40 | Inspection Report | | Inspection Report | No | For Acceptance | TBD | TBD | TBD | No | | No | |
| S701-IR-41 | Type Test Report | | Type Test Report | Yes | For Information | TBD | TBD | TBD | No | | No | |
| S701-IR-43 | Obsolescence management plan | | Obsolescence management plan | Yes | For Information | TBD | TBD | TBD | No | | No | |
| S701-IR-44 | I/O data address mapping list | | I/O data address mapping list | No | For Information | 6 | 10 | 12 | Yes | | No | |
| S701-IR-45 | Input data for Harmonic Analysis | | Input data for Harmonic Analysis | No | For Information | 6 | 10 | 12 | No | | No | |
| S701-IR-46 | Calibration Certificate | | Calibration Certificate | No | For Information | TBD | TBD | TBD | No | | No | Document to be retained with Supplier. Document shall be reviewed during FAT, as required. |

# S-701L Information Requirements for AC Uninterruptible Power Systems (UPS) (IEC 62040-3)

## Requirements

| Column | Heading - Details and requirements |
|---|---|
| A | **Code** - a unique identifier for the Information Requirement assigned by IOGP JIP33 DigitalTool |
| B | **Requirement** - a short description of the Information Requirement based on the description in the Parent Standard, IOGP Specification or an Industry Standard Information Requirement Title. |
| C | **Condition Invoking Requirement** - describes special condition(s) under which the Information Requirement is required; e.g.. service offshore and weight greater than 1 tonne means information is required. NB: if blank, always required |
| D | **Typical Deliverable** - Purchaser to advise the short description of the Information Deliverable that would typically include this Information Requirement |
| E | **Submit With Proposal** - Yes or No, where 'Yes' means the Information Requirement is required to be submitted with Suppliers Proposal or 'No' is not required |
| F, G, H & I | **Issue Post Purchase Order** - issue purpose ('For Information' or 'For Acceptance'), time in weeks for issue of the Information Requirement and Period defined after Purchase Order placement. |
| J | **Required As Built** - Yes or No, where 'Yes' means the Information Requirement is required to be 'As Built' on completion or delivery of equipment or 'No' is not required 'As Built' |
| K | **Fulfilled by Information Deliverable Number(s)** - identifies which Information Requirement(s) listed in the Supplier Master Information Schedule (SMIS) addresses the Purchasers requirements. NB; it should be noted that one Information Deliverable can fulfil more than one Information Requirement. |
| L | **Translation Required** -Yes or No, where 'Yes' means the Information Requirement should be translated into a language(s) (to be advised) other than English and 'No' means to be provided in English |
| M | **Remarks** - may include bid clarification questions & decisions (specify author & date) |

| Col A | Col B | Col C | Col D | Col E | Col F | Col G | Col H | Col I | Col J | Col K | Col L | Col M |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Code** | **Requirement** | **Condition Invoking Requirement** | **Typical Deliverable** | **Submit At Proposal** | **First Issue Post Purchase Order** | | **Issue for Approval** | **Issue for Construct.** | **Required As Built** | **Fulfilled by Document Number(s)** | **Translation Required** | **Remarks** |
| | | | | (Yes/No) | Purpose | (Weeks) | (Weeks) | (Weeks) | (Yes/No) | | | |
| S701-IR-47 | Materials Inspection Certificate (3.1) | | Materials Inspection Certificate (3.1) | No | For Information | TBD | TBD | TBD | No | | No | Document to be retained with Supplier. Document shall be reviewed during FAT, as required. |
| S701-IR-48 | Packing List | | Packing List | No | For Information | TBD | TBD | TBD | No | | No | |
| **Purchase Order Specific Information Requirements** | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

# S-701L Information Requirements for AC Uninterruptible Power Systems (UPS) (IEC 62040-3)

## Definitions

| Column | Heading - Details and requirements |
|---|---|
| A | **Code** - a unique identifier for the Information Requirement assigned by IOGP JIP33 DigitalTool |
| B | **Requirement** - a short description of the Information Requirement that would typically provide the Information required, based on the description in the Parent Standard, IOGP Specification or an Industry Standard Title. |
| C | **Description** - an excerpt from the Parent Standard, IOGP Specification or Industry Standard. |
| D | **Reference** - reference to the Parent Standard, IOGP Specification or Industry Standard that the Information Deliverable is identified in. |
| E | **Format** - defines the required format of the relevant Information Requirement to be submitted by Supplier for Purchaser/Contractor for information and acceptance as shown in Table 9.1 of Instructions Tab and selected from pick list. |
| F | **CFIHOS Discipline Document Type Code** - the CFIHOS discipline document type that could be used to classify the document having this IRS content. |

| Col A | Col B | Col C | Col D | Col E | Col F |
|---|---|---|---|---|---|
| **Code** | **Requirement** | **Description** | **Reference** | **Format** | **CFIHOS Discipline Document Type Code** |
| | | **Contract Management Information Deliverables** | | | |
| S701-IR-1 | Supplier master information schedule | Schedule of specific information deliverables developed by the [Vendor] and accepted by the [Purchaser] to meet the information requirements defined in the agreed Information Requirements Specification (IRS).<br>The schedule typically defines;<br>a. information deliverable type, title/description<br>b. unique identification (code/number) in the format as agreed in the contract.<br>c. planned submission arrangements including; purpose, formats, timing, frequency<br>Arrangements for managing submissions, tracking progress and updating the schedule during the execution of the contract scope will be in accordance with contractual agreements. | | Native | CFIHOS-70000099 |
| S701-IR-2 | Delivery schedule | Schedule depicting, as applicable to the service or product scope, design, supply, manufacture, inspection, testing and delivery activities to be executed by [vendor/sub-vendors].<br>Schedule details typically** include;<br>a) Contractual milestones<br>b. activity early/late start/completion dates, durations, dependencies (Calendar Dates)<br>c. critical path and float<br>d. outsourced services and equipment (cross referenced to purchase order and sub-vendor)<br>e. information deliverable submission dates identifying any execution activity dependencies<br>Once agreed, changes to planned dates are subject to agreement by [purchaser].<br><br>Progress against planned dates is measured and the schedule updated and reported to the [purchaser] in accordance with contract reporting agreements.<br>** Schedule development tools, formats and submission protocols follow the [vendor's] standard practice as agreed in the contract. | | PDF | CFIHOS-70000298 |
| S701-IR-3 | Progress report | Report detailing activities completed in the period, percent complete against planned, activities planned for the next period, risks/areas of concern, cause of any delays and proposed recovery plans, concessions, internal and outsourced inspection and audit activities..<br>Note: may also include actionable items such as Health, Safety, Security & Environment (HSSE) incidents & status if required under the Contract. | | PDF | CFIHOS-70000300 |
| S701-IR-4 | Quality plan | Plan specifying the actions, responsibilities and associated resources to be applied by the [vendor], and when applicable [sub-vendors] or [manufacturers], to deliver the services or procured item(s) in conformance with the agreed requirements.<br>ISO 9001 Clause 8.1 and ISO 10005 may be used to inform the development of quality plans for specific applications, processes or products. | | PDF | |
| S701-IR-5 | Sub-vendor delivery schedule | Definition of processes, products or services that will be externally provided and the controls to be applied by the [vendor] to ensure conformance with agreed requirements. The schedule includes evidence of the basis of capability assessment , quality management system certification (or equivalent), process or product qualification for proposed major sub-suppliers/sub-vendors of outsourced products and services when nominated in the Contract or Quality Requirements Specification (QRS) .<br>Note: ISO 9001 define requirements for assessing risks and establishing controls for outsourced products and services. | | Native | |
| S701-IR-6 | Inspection and test plan for complete package | Tabular presentation of a quality plan typically used for process or product applications to define the specific sequence of operational activities, instructions, acceptance criteria records and associated [vendor], [purchaser] and independent conformity assessment activities. ISO 9001 Clause 8.1 and ISO 10005 may be used to inform the development of inspection and test plans for specific processes and products. | | PDF | CFIHOS-70000180 |
| S701-IR-7 | Handling, shipping, storage and preservation procedure | Definition of practices to be followed during the; storage, transport, lifting and preservation of the equipment and materials included in the scope of supply to maintain their functionality and guarantees.<br>Procedures typically define:<br>a. packaging requirements; contents, identification, size, weight and number of packages/container (s),<br>b. special packing/unpacking/handling requirements<br>c. storage location and requirements,<br>d. preservation requirements detailing inspection periods and required maintenance, materials required etc., both prior to installation and post installation, but prior to commissioning. | | PDF | CFIHOS-70000154 |
| S701-IR-8 | Non-conformance records | Details of non-conformances raised by or to the [vendor/sub-vendors] against technical requirements prior to or during the delivery of the products or services. Non-conformance is managed by the [vendor] in accordance with ISO 9001 Clause 8.7 and associated records typically include; description of non-conformance, analysis and disposition, correction implemented and details of any retesting or inspection taken to demonstrate subsequent conformance. Note: Instances where the proposed disposition is to accept a non-conforming condition are subject to agreement by the [purchaser] in accordance with the concession management protocols defined in the Contract. | | PDF | CFIHOS-70000226 |
| S701-IR-9 | Concession requests | Formal submission seeking [purchaser] agreement to accept deviations from the contracted scope or technical requirements. Requests may be raised as a result of, as examples, material or service availability, obsolescence, innovation, non-conformance.<br>Requests are typically raised as required during execution with a summary report detailing concessions raised, [purchaser] directions, agreed action status provided with progress reports and at contract closeout | | PDF | CFIHOS-70000389 |

# S-701L Information Requirements for AC Uninterruptible Power Systems (UPS) (IEC 62040-3)

## Definitions

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| Col A | Col B | Col C | Col D | Col E | Col F |
|---|---|---|---|---|---|
| **Code** | **Requirement** | **Description** | **Reference** | **Format** | **CFIHOS Discipline Document Type Code** |
| | | **Technical Information Deliverables** | | | |
| S701-IR-19 | General Arrangement Drawing | A drawing showing overall dimensions, critical interface dimensions, major components and sub-assemblies and weight of assemblies, equipment and components.<br>For equipment / components the drawing may include cross sectional views.<br>Document may contain the following information:<br>• Main dimensions<br>• Weight<br>• Centre of gravity<br>• Withdrawal/installation and maintenance space.<br>• Installation and mounting details<br>• Lifting arrangement | 6.1.2, 7.2.1, 7.2.4, 7.3.2, 7.3.4, 7.3.5, 7.3.6, 7.3.7, 7.3.8, 7.4.14, 7.9.1, 7.9.2, 7.9.6, 7.9.7 | PDF | CFIHOS-70000153 |
| S701-IR-20 | Battery Cable Size Calculation | Calculations related to sizing of battery cables shall be submitted by Supplier. | 5.4.2.2, 7.9.6 | PDF | CFIHOS-70000034 |
| S701-IR-21 | UPS Sizing Calculation | Document providing information about data, and basic conditions and assumptions used for selection of appropriate system solutions, parts or material, as well as the way these data have been processed and evaluated<br>Required information:<br>– Calculation methods used;<br>– Input data;<br>– Results;<br>– Analysis of the results.<br>Optional content of information:<br>– Case studies;<br>– Verification of different technical solutions.<br>Calculations to verify correct selection of rectifier and inverter capacity (UPS Sizing calculations). | 5.2.2, 5.3.2 | PDF | CFIHOS-70000086 |
| S701-IR-49 | Battery sizing calculation | Document providing information about data, and basic conditions and assumptions used for selection of appropriate system solutions, parts or material, as well as the way these data have been processed and evaluated<br>Mandatory content of information:<br>– Calculation methods used;<br>– Input data;<br>– Results;<br>– Analysis of the results.<br>Optional content of information:<br>– Case studies;<br>– Verification of different technical solutions. | 5.4.2.2 | PDF | |
| S701-IR-22 | Heat Dissipation Summary | This document contains the calculation by the manufacturer to arrive at the heat load produced by the equipment to enable HVAC sizing. | 5.2.2 | PDF | |
| S701-IR-23 | Reliability, Availability, Safety Integrity Level Calculation | Demonstrates starting and operating reliability / availability of purchased equipment (e.g. mean time between failure data) & Safety Integrity Level (SIL) calculations, where specifically requested. | 5.1.7 | PDF | CFIHOS-70000312 |
| S701-IR-24 | Equipment Datasheet | Document providing information on technical data and characteristics about material, products or systems and their environment for proper implementation. This document provides structured data form containing part number/model, design information, operational data and limitations of the equipment.<br>Document shall provide information on technical data and characteristics about material, products or systems and their environment for proper implementation.<br>The proposal submission of this data sheet should be based on IOGP S-701D. | 5.1.2, 5.2.1, 5.6, 4.2.1.1, 5.1.1, 5.1.4, 5.1.8.1, 5.1.8.2, 5.1.8.3, 5.2.1 Para 1, 5.3.2, 5.3.4, 5.4.2.2, 5.4.2.3, 6.1.2, 7.2.2, 7.2.3, 7.3.1, 7.9.1, 7.9.4, 7.9.6, C.3, C.5 | PDF | CFIHOS-70000416 |
| S701-IR-26 | Single Line Diagram | A diagram depicting the main equipment items (rectifier, inverter, static bypass, etc.), their relationships within the UPS system and the power flow path. | A.1, B.1 | PDF | CFIHOS-70000371 |
| S701-IR-27 | Termination Diagram | A diagram for equipment, panels, junction boxes, etc. identifies all connections and cable terminations at input/output rails. Required for removal/hook up purposes and modifications. To include vendor interfaces. | 6.1.2, 7.3.8, 7.5.3, 8.4.4.4 | PDF | CFIHOS-70000330 |

# S-701L Information Requirements for AC Uninterruptible Power Systems (UPS) (IEC 62040-3)

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|---|---|---|---|---|---|
| **Code** | **Requirement** | **Description** | **Reference** | **Format** | **CFIHOS Discipline Document Type Code** |
| S701-IR-28 | Wiring Diagram | Description:<br>Diagram providing information on the circuitry of an object.<br>Mandatory content of information:<br>– Graphical symbols representing the objects;<br>– Graphical symbols representing the connections among objects;<br>– Reference designations;<br>– Terminal designations;<br>– Signal level conventions (applicable to logic signals).<br>– Information necessary to trace paths and circuits (signal designations, location references)<br>– Supplementary information necessary for the understanding of functions<br>Optional content of information:<br>– Technical data;<br>– Reference to other documents;<br>– Information about wiring performance;<br>– Cable and cable core identification. | 6.1.2, 7.3.2, 7.5.2, 7.7.3, 7.9.10, 7.9.9, 8.1.2.9, 8.3.6, 8.4.1.1, 8.4.1.2, 8.4.1.3, 8.4.2.10, 8.4.4.4 | PDF | CFIHOS-70000268 |
| S701-IR-29 | Bill Of Materials | A list of parts, components and sub-assemblies for equipment with part numbers, item numbers, quantities, material designations and technical description.<br>Note When agreed includes details of sub-suppliers & associated PO's. | 6.1.2, 7.1.3, 7.3.2, 7.4.10, 7.4.13, 7.4.2, 7.4.3, 7.4.4, 7.4.5, 7.4.6, 7.4.7, 7.9.7, 7.9.8, 7.9.9, 8.1.1.2, 8.3.1 | PDF | CFIHOS-70000028 |
| S701-IR-30 | Consolidated Spare Parts List | A consolidated spare parts list generated to support execution of project purchasing for the purpose of commissioning, start-up, maintenance support, etc, also widely known as Spare Part List and Interchangeability Record (SPIR) | 7.1.3 | PDF | CFIHOS-70000420 |
| S701-IR-31 | Commissioning Instruction | Instruction providing information on the commissioning of the product. Instructions for commissioning are provided especially for large and highly complex products and for large industrial installations. The purpose of such instructions is to provide the user with the information needed for initial setting-up of the product, also known as the commissioning procedure. | 6.1.3 | PDF | |
| S701-IR-32 | Installation Manual | Description of methods of installing a piece of equipment. Installation refers to the mounting, setting, erection, etc.<br>NOTE: When agreed, can be delivered as part of manufacturer's standard Installation, operation and maintenance manual or as a stand alone document. | 7.1.5 | PDF | CFIHOS-70000181 |
| S701-IR-33 | Maintenance Manual | Description of methods of maintaining a specific piece of equipment. Typically originates from the equipment or package supplier.<br>NOTE: When agreed, can be delivered as part of manufacturer's standard Installation, operation and maintenance manual or as a stand alone document. | 7.1.5 | PDF | CFIHOS-70000206 |
| S701-IR-34 | Operating Manual | Description of methods of operating the specific engineered system, including but not limited to instructions, procedures, drawings, tables, etc. for the operation - stop, start, emergency shutdown, black start, ESD override, etc.. Including operational limits, function testing, possible interruptions, corrective actions, hazards and corrective measures to be taken.<br>NOTE: When agreed, can be delivered as part of manufacturer's standard Installation, operation and maintenance manual or as a stand alone document. | 7.1.5 | PDF | CFIHOS-70000228 |
| S701-IR-35 | Factory Acceptance Test (FAT) Procedure | The FAT procedure will be used to ensure a common understanding of performed testing and acceptance criteria. This document shall include all testing activities and their acceptance criteria according to applicable standards, specifications and requirements, to document the condition of the equipment as tested from factory. Test set-up and test equipment is shall be defined.<br><br>Suppliers standard (routine) test procedures should be used as far as possible | 6.1.2, 6.1.4, 6.1.5 | PDF | |
| S701-IR-36 | Site Acceptance Test (SAT) Procedure | Procedure documenting the manufacturers recommended site tests including discrete functional unit and overall system, interlocks (electrical, mechanical), interfaces, protection and communications. | 6.1.3 | PDF | |
| S701-IR-37 | Factory Acceptance Test (FAT) Records | The FAT report will be used to verify that the equipment has been tested according to FAT procedure.<br>The FAT report will be used for acceptance of the equipment delivery This document shall include all testing activities and their acceptance criteria according, , in accordance with the FAT procedure, to applicable standards, specifications and requirements,. to document the condition of the equipment as tested from factory. Test set-up and test equipment is shall be defined. | 5.1.1, 6.1.2, 6.1.4, 6.1.5 | PDF | |
| S701-IR-38 | Site Acceptance Test (SAT) Records | Records demonstrating results of site tests including discrete functional unit and overall system, interlocks (electrical, mechanical), interfaces, protection and communications. | 6.1.3 | PDF | |

# S-701L Information Requirements for AC Uninterruptible Power Systems (UPS) (IEC 62040-3)

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|---|---|---|---|---|---|
| **Code** | **Requirement** | **Description** | **Reference** | **Format** | **CFIHOS Discipline Document Type Code** |
| S701-IR-39 | Manufacturer Record Book (MRB) | Detailed information/description for the documents to be included in MRB as agreed between Purchaser and Vendor: Shall include but not be limited to documents Recording Compliance With Statutory and/or Local Regulations, and inspection and testing results / reports for all the testing carried out at Vendor/Sub-Vendor shop. | 7.1.5 | PDF | |
| S701-IR-40 | Inspection Report | Any inspection report/certificate shall include all of the following:<br>a) identification of issuing body<br>b) unique identification and date of issue<br>c) date(s) of inspection<br>d) identification of the item(s) inspected<br>e) signature or other indication of approval, by authorized personnel<br>f) a statement of conformity where applicable<br>g) the inspection results, except when the inspection body can also produce an inspection report containing the inspection results, and when both the inspection certificate and inspection report are traceable to each other.<br><br>NOTE: Optional elements that can be included in inspection reports or certificates are listed in Annex B, ISO17020:2012 | 6.1.2, 6.1.4, 6.1.5, 7.5.1 | PDF | CFIHOS-70000245 |
| S701-IR-41 | Type Test Report | The results of test performed to provide evidence that the design meets the requirements of the functional specification (See ISO 13880:1999). Also a type test certificate shall be provided. | 4.2.1.1, 5.1.3, 5.1.4, 6.1.5, 7.1.1, 7.9.3, 7.9.4, 7.9.5, 8.3.2, 8.3.3 | PDF | |
| S701-IR-43 | Obsolescence management plan | Plan defining the manufacturer's co-ordinated activities to direct and control the strategies for the identification and mitigation of the effects of obsolescence to the user, through all stages of the life of all components within the UPS System. An example of the principles of this plan is defined within IEC 62402, Obsolescence management – Application guide. | 7.1.4 | PDF | |
| S701-IR-44 | I/O data address mapping list | A document showing list of memory address of the data communication and signalling circuits to be co-related with the upper level network protocol. This document provides a structured data exchange path from the device to upper level network. | 5,6 | PDF | |
| S701-IR-45 | Input data for Harmonic Analysis | This document shall provide complete harmonic data (spectrum) of the connected device so as to enable power system engineer analyse the impact of total harmonic on the overall power system. | 5.2.2 | PDF | |
| S701-IR-46 | Calibration Certificate | A Calibration certificate is a statement of the results of a calibration of the test and measuring instruments. It also contains information about the laboratory which carried out the calibration, and about the calibration method used. A calibration certificate proves that an instrument has been checked and verified against these critical points of measurement, and will list any errors the instrument has, giving the supplier a confidence to demonstrate to an auditor or purchaser that the instrument reading is within the specified accuracy, and is fit for the desired application. | 6.1.1.2 | Hard Copy | CFIHOS-70000415 |
| S701-IR-47 | Materials Inspection Certificate (3.1) | A document with test results based on specific inspection and testing, issued by the Manufacturer and validated by the Manufacturer's authorised inspection representative independent of the manufacturing department.<br>NOTE: see ISO/IEC 17000, clause 5.5 and ISO 10474 / EN 10204. | 5.1.6, Table 5 | Hard Copy | CFIHOS-70000412 |
| S701-IR-48 | Packing List | A list describing the contents of a shipment received. Synonyms: Inventory, packing slip, bill of landing. | Clause 9 | PDF | CFIHOS-70000269 |
| **Purchase Order Specific Information Requirements** | | | | | |
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