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IOGP S-734, Supplementary Specification to PIP ELSAP04 for AC Uninterruptible Power Supply (UPS) System and Associated Batteries, Second Edition, March 2024

ADDENDUM 1

This addendum (Version 2.01) replaces Edition 2.0 published in March 2024.

NOTE: In addition to the updates listed below, minor editorial/typographical amendments may have been made.

List of updates

Section	Update
4.13.3.1	Addition to section amended to include "dead-front (dead-top) design" in the list of examples (within brackets)
4.18.7.2	Second requirement added to section replacement

International Association of Oil & Gas Producers

SPECIFICATION
IOGP S-734

July 2025
Version 2.01

ADDENDUM 1 TO SECOND EDITION (MARCH 2024)

Supplementary Specification to PIP ELSAP04 for AC Uninterruptible Power Supply (UPS) System and Associated Batteries

JIP33
JOINT INDUSTRY PROGRAMME

Revision history

VERSION	DATE	PURPOSE
2.01	July 2025	Addendum 1
2.0	March 2024	Second Edition
1.0	November 2020	First Edition

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).

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 2020).

This second edition cancels and replaces the first edition published in November 2020. Due to technical writing requirements leading to extensive changes, this second edition should be treated as a new document.

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Introduction

The purpose of the IOGP S-734 specification documents is to define a minimum common set of requirements for procurement of AC uninterruptible power supply (UPS) systems and associated batteries for North American projects in accordance with PIP ELSAP04, Complete Revision September 2020, Technical Correction September 2021, Uninterruptable Power Supply (UPS) System Specification, for application in the petroleum and natural gas industries.

The IOGP S-734 specification documents follow a common structure (as shown below) comprising a specification, also known as a technical requirements specification (TRS), a procurement data sheet (PDS), an information requirements specification (IRS) and a quality requirements specification (QRS). These four specification documents, together with the purchase order, define the overall technical specification for procurement.

JIP33 Specification for Procurement Documents
Supplementary Technical Requirements Specification (TRS)

This specification is to be applied in conjunction with the supporting PDS, IRS and QRS as follows.

IOGP S-734: Supplementary Specification to PIP ELSAP04 for AC Uninterruptible Power Supply (UPS) System and Associated Batteries

This specification defines technical requirements for the supply of the equipment and is written as an overlay to PIP ELSAP04, following the PIP ELSAP04 clause structure. Clauses from PIP ELSAP04 not amended by this specification apply as written. Modifications to PIP ELSAP04 defined in this specification are introduced by a description that includes the type of modification (i.e. *Add*, *Replace* or *Delete*) and the position of the modification within the clause.

NOTE Lists, notes, tables, figures, equations, examples and warnings are not counted as paragraphs.

IOGP S-734D: Procurement Data Sheet for AC Uninterruptible Power Supply (UPS) System and Associated Batteries (PIP)

The PDS defines application-specific requirements. The PDS is applied during the procurement cycle only and does not replace the equipment data sheet. The PDS may also include fields for supplier-provided information required as part of the purchaser's technical evaluation. Additional purchaser-supplied documents may also be incorporated or referenced in the PDS to define scope and technical requirements for enquiry and purchase of the equipment.

IOGP S-734L: Information Requirements for AC Uninterruptible Power Supply (UPS) System and Associated Batteries (PIP)

The IRS defines information requirements for the scope of supply. The IRS includes information content, format, timing and purpose to be provided by the supplier, and may also define specific conditions that invoke the information requirements.

IOGP S-734Q: Quality Requirements for AC Uninterruptible Power Supply (UPS) System and Associated Batteries (PIP)

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 PDS or in the purchase order.

The specification documents follow the editorial format of PIP ELSAP04 and, where appropriate, the drafting principles and rules of ISO/IEC Directives Part 2.

The PDS and IRS are published as editable documents for the purchaser to specify application-specific requirements. The TRS and QRS are fixed documents.

The order of precedence of documents applicable to the supply of the equipment, with the highest authority listed first, shall be as follows:

a) regulatory requirements;

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

c) purchaser-defined requirements (e.g. PDS, IRS and QRS);

d) this specification;

e) PIP ELSAP04.

1 Scope

Replace all instances of "PIP ELSAP04-D Data Sheet" with

IOGP S-734D

2 References

Add to first paragraph

The following publications are referred to in this document, the PDS (IOGP S-734D) or the IRS (IOGP S-734L) in such a way that some or all of their content constitutes requirements of this specification.

2.1 Process Industry Practices (PIP)

Delete from section

PIP ELSAP11, *Design and Fabrication of Flooded-Cell Lead-Acid Batteries*

PIP ELSAP12, *Design and Fabrication of Valve-Regulated Lead-Acid Batteries*

2.2 Industry Codes and Standards

Add to section

46 CFR 111, *Title 46—Shipping, Chapter I—Department of Coast Guard, Subchapter J—Electrical Engineering, Part 111—Electrical Systems—General Requirements.*

ABS MODU, *Publication Number 6 Part 4*

API Recommended Practice 500, *Recommended Practice for Classification of Locations for Electrical Installations at Petroleum Facilities Classified as Class I, Division 1 and Division 2*

API Recommended Practice 505, *Recommended Practice for Classification of Locations for Electrical Installations at Petroleum Facilities Classified as Class I, Zone 0, Zone 1, and Zone 2*

ASCE/SEI 7-16, *Minimum Design Loads and Associated Criteria for Buildings and Other Structures*

CSA C22.1, *Canadian Electrical Code, Part I, Safety Standard for Electrical Installations*

CSA C22.2 No. 29, *Panelboards and enclosed panelboards*

CSA C22.2 No. 107.3, *Uninterruptible power systems*

ANSI/IEC 60529, *Degrees of protection provided by enclosures (IP Code)*

IEC 60623, *Secondary cells and batteries containing alkaline or other non-acid electrolytes – Vented nickel-cadmium prismatic rechargeable single cells*

IEC 60896-11, *Stationary lead-acid batteries – Part 11: Vented types – General requirements and methods of tests*

IEC 60896-22, *Stationary lead-acid batteries – Part 22: Valve regulated types – Requirements*

IEC 61439-1, *Low-voltage switchgear and controlgear assemblies – Part 1: General rules*

IEC 62040-2, *Uninterruptible power systems (UPS) – Part 2: Electromagnetic compatibility (EMC) requirements*

IEC 62259, *Secondary cells and batteries containing alkaline or other non-acid electrolytes – Nickel-cadmium prismatic secondary single cells with partial gas recombination*

IEC 62620, *Secondary cells and batteries containing alkaline or other non-acid electrolytes – Secondary lithium cells and batteries for use in industrial applications*

IEEE 519, *IEEE Recommended Practice and Requirements for Harmonic Control in Electric Power Systems*

IEEE 1184, *IEEE Guide for Batteries for Uninterruptible Power Supply Systems*

NFPA 70, *National Electrical Code*

Replace Section 3 title with

3 Definitions and Abbreviated Terms

Add new section heading 3.1 before first definition

3.1 Definitions

Add new definition

touch safe (finger safe): Protected from inadvertent contact by a finger using covers, recessing of terminals or the size of openings.

Note: "Touch-safe" and similar terms such as "finger safe" are widely used to describe products but are not defined by industry standards. "Touch safe" is generally equivalent to IP 2X or IPXXB as per ANSI/IEC 60529 and IEC 61439-1.

Add new definition

e*lectrical control and management system (ECMS)*: A system that automatically controls the power system through instrumentation and control devices.

Add new definition

emergency shutdown (ESD): An automatic protection system that acts to shut down the plant if it enters a potentially dangerous state.

Add new definition

fire and gas system (FGS): A system that monitors for fire, gas, smoke and heat, and initiates actions to suppress and isolate the detected threats while simultaneously generating audio and visual alarms.

Add new definition

process control system (PCS): An overall site-integrated process automation, control and/or monitoring system.

Add new definition

safety instrumented system (SIS): A system that is an independent protection layer that shuts down a system or a part of it if a hazardous condition is detected.

Add new section

3.2 Abbreviated Terms

For the purposes of this document, the abbreviated terms given in PIP ELSAP04 and the following apply.

ABS	American Bureau of Shipping
ACO	accredited certification organization
BMS	battery management system
ECMS	electrical control and management system
ESD	emergency shutdown
FGS	fire and gas system
IRS	information requirements specification
MBS	internal manual bypass switch
NRTL	nationally recognized testing laboratory
PCS	process control system
PDS	procurement data sheet
PWM	pulse-width modulated
QRS	quality requirements specification
RMBS	remote maintenance bypass switch
SIS	safety instrumented system
THDv	total harmonic distortion of the voltage
TRS	technical requirements specification
UPS	uninterruptable power system
USCG	United States Coast Guard

4 Requirements

4.1 General

4.1.3

Replace section with

The UPS shall be listed or certified by a nationally recognized testing laboratory (NRTL) for the United States or an accredited certification organization (ACO) for Canada.

Note: Applications for this equipment in other countries may have additional requirements for certification.

4.1.4

Add new section

4.1.4.1

The operational life of the UPS and its components at the rated load shall be in accordance with Table 3.

Add new Table 3

Table 3. Operational Life of the UPS and its Components

Components	Minimum Operational Life (Years)
Rectifier unit, inverter unit and static switch unit	20
Cooling fans	5
AC and DC capacitors	7
Input and output isolation transformer	20
Bypass transformer	20

Add new section

4.1.4.2

The UPS shall have a minimum UPS efficiency in accordance with the overall weighted efficiency as per IEC 62040-3:2021, I.3.

Add new section

4.1.4.3

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

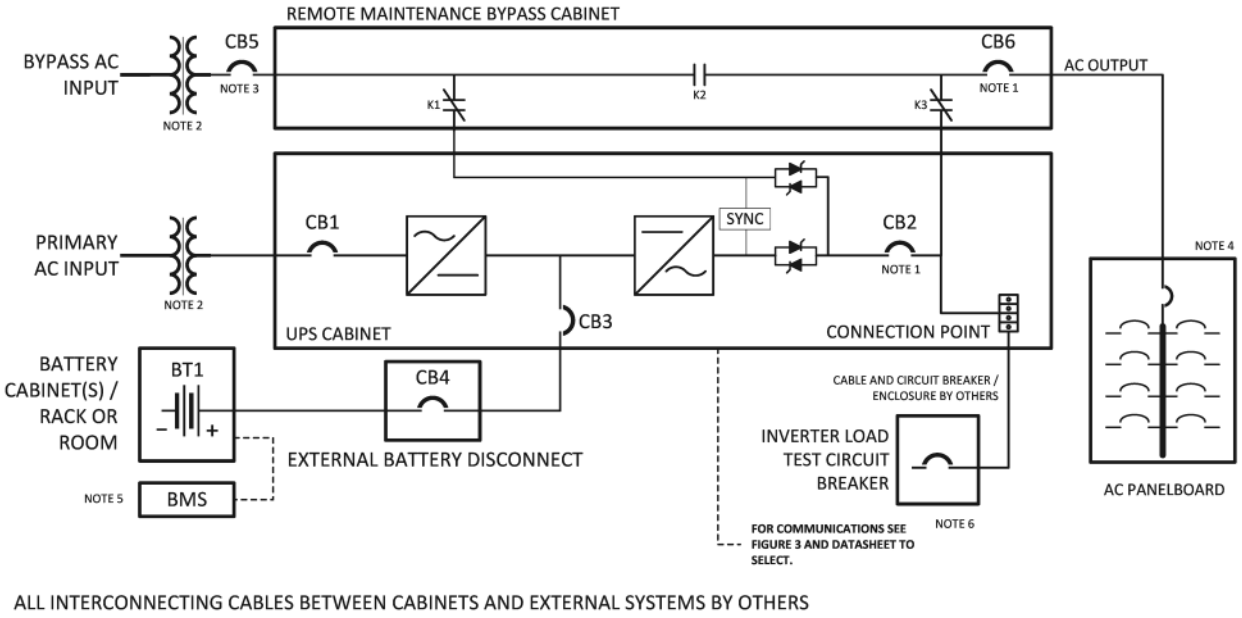
4.1.5

In first sentence, add after "Figure 1"

and Figure 2

4.1.7

Replace Figure 1 with



NOTE This figure is used to assist with the specification of the UPS and associated equipment. Refer to the manufacturer's documentation for specific components and configuration.

NOTE 1 Circuit breaker located in the UPS (CB2) and/or the bypass cabinet (CB6).

NOTE 2 Optional isolation transformer(s) located external or internal to the associated cabinet.

NOTE 3 CB5 located external or internal to the bypass cabinet.

NOTE 4 The AC panelboard, inverter load test CB and external battery disconnect (CB4) are optional items (see the PDS).

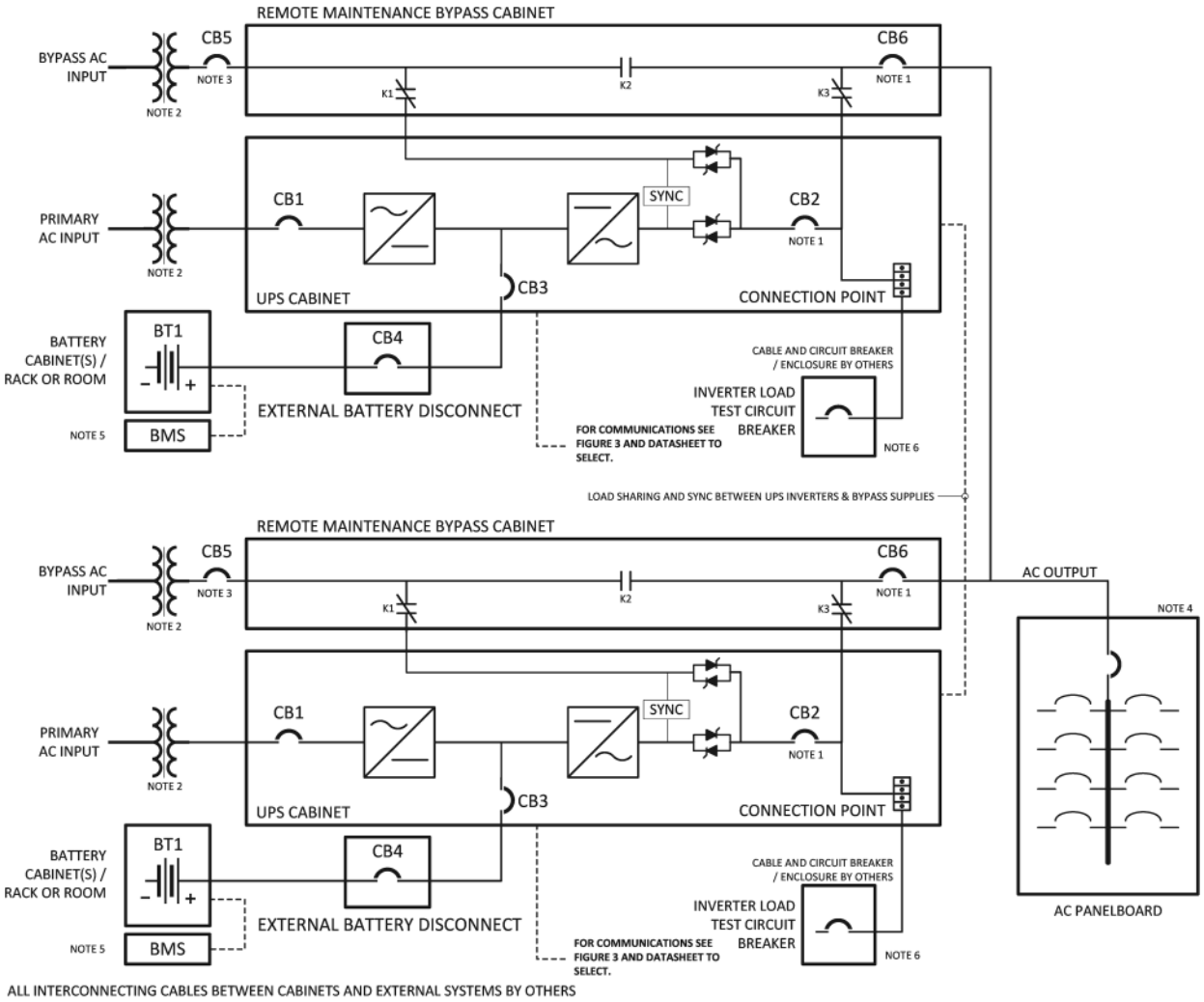
NOTE 5 See Figure 3 for BMS details.

NOTE 6 Test CB is supplied and installed by others and is external to the UPS. Terminals to land test cable(s) are provided by the supplier and located in the UPS cabinet.

Replace Figure 1 title with

Figure 1. Single UPS

Add new Figure 2



NOTE This figure is used to assist with the specification of the UPS and associated equipment. Refer to the manufacturer's literature for specific components and configuration.

NOTE 1 Circuit breaker located in the UPS (CB2) and/or the bypass cabinet (CB6).

NOTE 2 Optional isolation transformer(s) located external or internal to the associated cabinet.

NOTE 3 CB5 located external or internal to the bypass cabinet.

NOTE 4 The AC panelboard, inverter load test CB and external battery disconnect (CB4) are optional items (see the PDS).

NOTE 5 See Figure 3 for BMS details.

NOTE 6 Test CB is located and supplied by others and external to the UPS. Terminals to land test cable(s) are provided by the supplier and located in the UPS cabinet.

NOTE 7 Generally, AC input supplies for remote bypass units are considered from the same source of supply. However, separate AC input supplies for the bypass can be used subject to compatibility requirements including synchronization, if any, to be discussed with the supplier.

Figure 2. Duplicate (Paralleled) UPS

4.1.20

Delete "Unless otherwise specified on the purchaser's PIP ELSAP04-D Data Sheet, tin plated copper" from first sentence

Add new section

4.1.24

If an AC panelboard is specified, the UPS and panelboard protective devices shall be selectively coordinated with the UPS inverter and bypass sources.

Add new section

4.1.25

Equipment and wiring methods that form part of the AC UPS package scope of supply and that are located external to the AC UPS enclosure shall be in accordance with the applicable installation codes and regulations.

Add new section

4.1.26

If specified, UPS assemblies on floating offshore installations in United States Coast Guard (USCG) and American Bureau of Shipping (ABS) jurisdictions shall comply with 46 CFR 111 and ABS MODU Publication Number 6 Part 4, respectively.

Note: Additional guidance and information on USCG and ABS requirements for UPS installed on floating facilities in US territorial waters can be found in API RP 14F / API RP 14FZ.

4.2 Site Conditions

4.2.5

Replace section with

The UPS shall be suitable for electrically unclassified (i.e., non-hazardous) areas.

Add new section

4.2.6

If a seismic design is specified, the UPS shall comply with ASCE/SEI 7-16.

4.3 Electrical Characteristics

Table 1. Electrical Characteristics

Add row 6. to section A.

	Ferroresonant	Pulse-Width Modulated (PWM)
A. Input 6. AC input supply voltage total harmonic distortion (THDv)	≤ 8% as per IEEE 519	≤ 8% as per IEEE 519

In section D, replace rows 9. and 10. with

	Ferroresonant	Pulse-Width Modulated (PWM)
D. Output		
9. Overload (inverter only, without transfer to bypass)	a. 100% continuously b. 125% for 10 minutes c. 150% for 1 minute d. 200% for 100 milliseconds	a. 100% continuously b. 125% for 10 minutes c. 150% for 1 minute d. 200% for 100 milliseconds
10. Overload/fault-clearing current capability on bypass source, including static transfer switch	a. 100% continuously b. 125% for 10 minutes c. 150% for 1 minute d. 200% for 100 milliseconds e. 1000% for 50 milliseconds	a. 100% continuously b. 125% for 10 minutes c. 150% for 1 minute d. 200% for 100 milliseconds e. 1000% for 50 milliseconds

4.5 Input Isolation and Bypass Isolation Transformers

4.5.6

Delete section 4.5.6

4.6 Rectifier/Charger

4.6.1 General

In first sentence of list section 4., replace "absolute short circuit continuously" with

overload capability of 125% for 10 minutes

In list section 4., replace second sentence with

The overload current limit setting shall be:

Replace list section 12. with

12. The AC UPS shall conform to the electromagnetic emission and immunity levels set out in IEC 62040-2 for category C3.

4.9 Internal Manual Bypass Switch (MBS)

Delete section 4.9

4.10 Remote Maintenance Bypass Switch (RMBS)

4.10.1

Replace first sentence with

The UPS shall be provided with a remote maintenance bypass switch.

Add new section

4.10.5

The RMBS shall have a three-position switch to select between normal, test and bypass modes.

Add new section

4.10.6

The RMBS three-position switch shall have the capability to be locked in the bypass position.

4.11 Inverter Test Load Connection

4.11.1

Replace section with

If test load terminals are specified, they shall be rated for the full load rating of the UPS and readily accessible for user connection at the inverter output.

4.11.2

Delete section 4.11.2

4.11.3

Delete section 4.11.3

4.11.4

Replace section with

Terminals used for the test load connection shall be clearly identified inside the UPS enclosure.

Replace section 4.12 title with

4.12 Internal Battery Disconnect

Add new section

4.12.4

If battery under-voltage protection is provided in the external battery disconnect, the auxiliary supply for the external battery disconnect (CB4) control element shall be derived from CB4 terminals connected to AC UPS.

4.13 Batteries

4.13.1

Delete section 4.13.1

4.13.2

Delete section 4.13.2

Add new section

4.13.3

4.13.3.1

If batteries are specified, hardware and accessories applicable to the battery technology selected shall be provided (e.g., insulated inter-cell connectors, dead-front (dead-top) design, flame arrestor type vent plugs with dust caps and racks with provisions for grounding).

4.13.3.2

Battery terminal connectors and interconnecting straps shall be covered for protection against inadvertent contact with energized components.

Add new section

4.13.4

Battery racks shall be electrically bonded and provided with provisions for grounding.

4.14 Enclosures

4.14.3

Delete section 4.14.3

4.14.12

Replace "to less than 2% by volume in accordance with IEEE 484" with

to less than 1% in accordance with API RP 500 and API RP 505

4.15 Circuit Breakers and Switches

4.15.1

In first sentence, replace "the one-line diagram" with

Figure 1, Figure 2 or the purchaser's diagram

4.16 Fuses

4.16.1

Replace "finger safe, with an open fuse indication light" with

touch safe (finger safe)

4.16.3

Replace section with

Exposed energized terminals of low-voltage components (e.g., fuse holders and fuse blocks) with a line-to-ground voltage greater than or equal to 50 V shall be provided as touch safe (finger safe) or covered by an insulating barrier.

4.17 Wiring and Terminals

4.17.1

Replace section with

Exposed energized terminals of low-voltage components (e.g., relays, power terminal blocks and alarm terminal blocks) with a line-to-ground voltage greater than or equal to 50 V shall be provided as touch safe (finger safe) or covered by an insulating barrier.

4.18 UPS Controls, Monitoring, and Communications

4.18.3 Measurement

4.18.3.3

Delete list item c.

Delete list item e.

Delete list item f.

Replace list item g. with

g. DC bus voltage

4.18.4 Protection and Alarms

4.18.4.6

Delete list item 3. from list section j.

4.18.4.7

Delete section 4.18.4.7

4.18.7 Communications

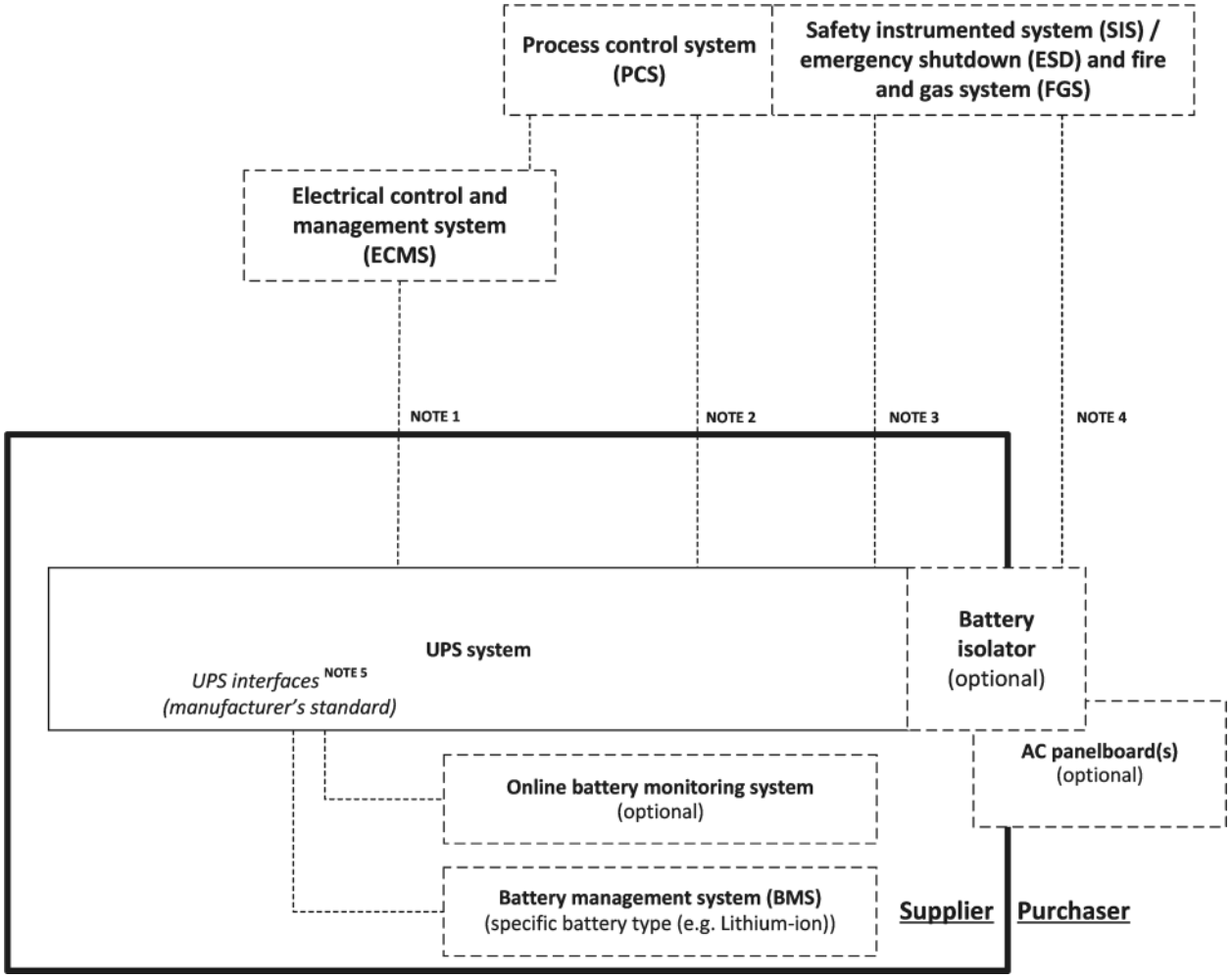
4.18.7.2

Replace section with

UPS interfaces and interconnections shall be in accordance with Figure 3.

The AC UPS shall interface with the BMS to continuously monitor, control and protect the battery bank for the functional safety of the specific battery type (e.g. lithium-ion, sodium metal chloride).

Add new Figure 3



NOTE 1 Network connectivity interface for time synchronization, remote access and configuration.

NOTE 2 Direct interface for critical / safety critical status and alarms to PCS where ECMS is not present. Independent to ESD system trip.

NOTE 3 Direct interface for ESD trip and FGS function (e.g., boost charge inhibit) / trip.

NOTE 4 Direct interface for ESD and FGS trips.

NOTE 5 Supplier's standard interface for synchronization and load sharing between UPSs (applicable for parallel systems), UPS battery monitoring system and battery management system where applicable.

Figure 3. Typical Communications Block Diagram

4.18.7.3

Delete section 4.20.7.3

4.19 Tagging and Nameplates

4.19.3

4.19.3.4

Delete section 4.19.3.4

4.19.3.7

Delete section 4.19.3.7

Add new section

4.19.8

Compartments with an external voltage source shall have a caution label fitted on the doors.

4.20 Inspection and Testing

4.20.2

Delete section 4.20.2

4.20.3

Replace section with

Type testing shall be performed in accordance with IEC 62040-3:2021, Table 5.

4.20.4

Delete section 4.20.4

4.20.5

Delete section 4.20.5

4.20.6

Delete section 4.20.6

4.20.7

Delete section 4.20.7

4.20.8

Delete section 4.20.8

Add new section

4.20.9

Routine testing shall be performed in accordance with IEC 62040-3:2021, Table 5.

Add new section

4.20.10

Where a burn-in test is specified, the test shall be a continuous operation at full rated capacity.

Add new section

4.20.11

Communication interfaces shall be tested to verify physical hardware media and associated software protocols.

Add new section

4.20.12

For duplicate (paralleled) UPS systems, equal load sharing shall be verified in accordance with IEC 62040-3:2021, 6.4.2.6.

4.22 Documentation

4.22.3

Delete section 4.22.3

4.22.4

Delete section 4.22.4

4.22.5

Delete section 4.22.5

4.22.6

Delete Section 4.22.6

4.22.7

Delete section 4.22.7

Table 2. Documentation Requirements

Delete Table 2

4.23 Conflict Resolution

Delete section 4.23

Add Bibliography

Bibliography

The following documents are informatively cited in the text of this document, PIP ELSAP04, the PDS (IOGP S-734D) or the IRS (IOGP S-734L).

[1] API Recommended Practice 14F, *Recommended Practice for Design, Installation, and Maintenance of Electrical Systems for Fixed and Floating Offshore Petroleum Facilities for Unclassified and Class I, Division 1, and Division 2 Locations*

[2] API Recommended Practice 14FZ, *Recommended Practice for Design, Installation and Maintenance of Electrical Systems for Fixed and Floating Offshore Petroleum Facilities for Unclassified and Class I, Zone 0, Zone 1, and Zone 2 Locations*

[3] IEC 62402, *Obsolescence management*

[4] IEEE 485, *IEEE Recommended Practice for Sizing Lead-Acid Batteries for Stationary Applications*

[5] IEEE 1115, *IEEE Recommended Practice for Sizing Nickel-Cadmium Batteries for Stationary Applications*

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

[7] ISO/IEC 17000, *Conformity assessment — Vocabulary and general principles*

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