



GS 112-11

Guidance for Specification GS 112-11

DC POWER SUPPLIES

August 1993

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BP GROUP RECOMMENDED PRACTICES AND SPECIFICATIONS FOR ENGINEERING											
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SCOPE AND PURPOSE This Specification gives BP requirements for d.c. power supply systems comprising battery charger, batteries and d.c. distribution board. Its purpose is to enable a purchaser and a vendor to establish those characteristics of equipment, which are required and which will be provided in order to meet a particular application in an entirely satisfactory manner.											
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FOREWORD

Introduction to BP Group Recommended Practices and Specifications for Engineering

The Introductory Volume contains a series of documents that provide an introduction to the BP Group Recommended Practices and Specifications for Engineering (RPSEs). In particular, the 'General Foreword' sets out the philosophy of the RPSEs. Other documents in the Introductory Volume provide general guidance on using the RPSEs and background information to Engineering Standards in BP. There are also recommendations for specific definitions and requirements.

Value of this Guidance for Specification

BP is increasingly seeking to purchase equipment which is to a manufacturer's normal standard whilst being entirely suitable for the application which BP has in mind. This document seeks to allow a dialogue to be set up between the purchaser and the supplier so that both are fully aware of the others requirements and capabilities and an entirely suitable equipment will result by the use of this Specification. It therefore supplies guidance, based upon past experience, as to those characteristics which require careful thought if an optimum arrangement is to result.

Application

This Guidance for Specification is intended to guide the purchaser in the use or creation of a fit-for-purpose specification for enquiry or purchasing activity.

Text in italics is Commentary. Commentary provides background information which supports the requirements of the Specification, and may discuss alternative options. It also gives guidance on the implementation of any 'Specification' or 'Approval' actions; specific actions are indicated by an asterisk (*) preceding a paragraph number.

This document may refer to certain local, national or international regulations but the responsibility to ensure compliance with legislation and any other statutory requirements lies with the user. The user should adapt or supplement this document to ensure compliance for the specific application.

Specification Ready for Application

A Specification (BP Spec 112-11) is available which may be suitable for enquiry or purchasing without modification. It is derived from this BP Group Guidance for Specification by retaining the technical body unaltered but omitting all commentary, omitting the data page and inserting a modified Foreword.



Principal Changes from Previous Edition

The previous edition of this document prescribed the means by which various application facilities were to be achieved. This edition retains all of the application requirements previously specified but largely leaves the means to implement these requirements to the equipment supplier. It should therefore permit equipment to be offered from a suppliers standard range and also permit technical developments to be incorporated into new designs without affecting compliance with the Specification.

This document replaces BP Engineering Standard 228, entitled DC Power Supplies, which was last issued in May 1983.

Feedback and Further Information

Users are invited to feed back any comments and to detail experiences in the application of BP RPSE's, to assist in the process of their continuous improvement.

For feedback and further information, please contact Standards Group, BP International or the Custodian. See Quarterly Status List for contacts.



1. SCOPE

This Specification gives BP requirements for d.c. power supply systems comprising battery charger, batteries and d.c. distribution board.

This Specification does not apply to stabilised d.c. power supply systems which do not incorporate rechargeable battery systems.

2. DUTY REQUIREMENTS

2.1 Service Life

All components, excluding batteries, used in the d.c. power supplies system shall be designed for a 20 year life under the specified operating conditions.

A specified 20 year service life is standard industry practice and manufacturers equipment will be designed to achieve this. However, thought should be given to any operator specified deviation.

2.2 Ambient Conditions

The equipment, which will be located indoors, shall be suitable for continuous rated duty under the ambient conditions specified.

The ambient conditions must be defined on the data sheets.

Any special conditions must be identified and manufacturers consulted to ascertain if any special features need to be included to cater for such special conditions.

Batteries should normally be rated such that the specified duties can be met under all defined conditions. However, if very low ambient conditions are specified then in order to meet the necessary discharge duty very large batteries may be required. Careful thought and specification are required in defining the load and ambient conditions which will actually be encountered.

2.3 Quality Assurance

Verification of the vendor's quality system is normally part of the pre-qualification procedure, and is therefore not specified in the core text of this specification. If this is not the case, clauses should be inserted to require the vendor to operate and be prepared to demonstrate the quality system to the purchaser. The quality system should ensure that the technical and QA requirements specified in the enquiry and purchase documents are applied to all materials, equipment and services provided by sub-contractors and to any free issue materials.

Further suggestions may be found in the BP Group RPSEs Introductory Volume



3. ELECTRICAL REQUIREMENTS

3.1 AC Power Supplies

Unless otherwise specified on the Data Sheet incoming power supplies will be fuse protected 3 phase, 4 wire with a solidly earthed neutral.

Consultations with manufacturers should be held at an early stage to ascertain the standard power input parameters for the apparatus and these should be specified whenever practicable so that a standard design results.

Full tolerance limits of the supply should be included on the data sheets including any transient variations caused by frequent motor starting or similar system switching duties.

3.2 DC Output Voltage

- 3.2.1 The d.c. output voltage of the system, measured at the d.c. distribution board, shall be within the limits specified on the Data Sheets for all conditions of d.c. load, battery charge and discharge.

Early consultations with the users of the d.c. supply should be held to ascertain the voltage tolerance required. This is especially critical for 24 V systems where a small undervoltage tolerance will lead to extremely large battery capacity. Tolerance limits of +10% -20% will provide a reasonably economic system.

- 3.2.2 The d.c. output voltage ripple shall be less than 5% rms. total harmonic distortion.
- 3.2.3 Radio interference of the d.c. power supplies system shall be within the limits specified in [BS 800](#) or similar local standard.

3.3 Rating and Duty

- 3.3.1 The rated load, with the exception of that for switchgear duty, shall be taken as 110% of the continuous load plus a due allowance for intermittent load.

It is useful to produce a load profile in block form to enable the manufacturer to more accurately size the batteries for the system.

- 3.3.2 The rated load and duty for switchgear application shall be determined from the switchgear manufacturers requirements.

The items required from the switchgear manufacturer are standing loads (due account being taken of loads associated with protection relays), trip coil consumption and closing coil/closing motor requirements.

A load profile should be compiled for the worst anticipated sequences of closing and tripping assuming that the charger is not working. Such a profile should take

into account the operating experience obtained at the site where the equipment is to be installed.

A typical profile would be standing load supplied at all times for a 4 hour period during which there is a simultaneous trip of all breakers, sequential closing of each circuit breaker with inter-sequence pauses no greater than 2 seconds until all circuit breakers are closed, simultaneous trip of 50% of breakers and then a simultaneous trip of the remaining breakers.

3.4 Battery

3.4.1 Each battery shall have sufficient capacity to supply 100% of the design load for the full specified standby time with no charger available, whilst maintaining the d.c. voltage measured at the distribution switchboard, within the tolerances specified.

3.4.2 Where duplicate 100% batteries are specified, they shall be identical in all respects.

3.4.3 Where a reduced rate parallel connected high security battery is specified, its capacity shall be rated for the high security duty only and circuit arrangements shall prevent its discharge into the remaining load.

3.4.4 Batteries shall be capable of meeting their specified duty after normal charge, within that period specified on the Data Sheet, following standby discharge duty.

Consideration should be given to the length of time that can be allocated to recharge a totally discharged battery up to its capacity to fulfil its specified duty. A period of 12 hours can be used but longer times are preferable to avoid investing in excess battery capacity.

3.5 Battery Charger

3.5.1 Each battery charger shall be continuously rated to supply 100% of the rated load, in addition to battery charge requirements, under the most severe variation of a.c.supply input.

Consideration should be given to the rating requirements of battery chargers for switchgear duty. If a single charger and battery are used it would be preferable to rate the charger for full design load duty to enable the battery to be taken off line for maintenance/repair. If duplicate chargers are provided it would only be necessary to rate the charger for standing load and battery charge duty.

3.5.2 Battery chargers shall be of the constant voltage type with a current limiting feature to match battery characteristics.

3.5.3 Normal charging shall be arranged such as to maintain the full battery capacity without undue loss of electrolyte. Such charging shall be

within the period specified in the Data Sheet taking into account the specified electrolyte topping up interval.

Consideration should be given to the time period over which the normal charge rate provides sufficient battery capacity for the required duty. This should be chosen to provide an acceptable balance between operational requirements and excessive battery capacity. A period of 12 hours will normally produce an oversized battery. A longer period is recommended.

When necessary the manufacturer may provide two levels of normal charging, to achieve the required performance:-

Float: To maintain battery charge within the specified water loss.

Recharge: To provide sufficient battery charge in the required time for the duty requirement, from an end-of-standby discharge.

Where recharging is employed, the period shall be automatically controlled and shall be automatically initiated following battery discharge.

3.5.4 Where sealed batteries are specified the charger shall be provided with automatic charge variation to compensate for changes in the batteries ambient temperature.

3.5.5 Fast charging shall be provided for battery types that are suitable.

Fast charging is not required for sealed batteries.

Fast charging should be undertaken off line if possible. On line fast charging is not recommended as it requires devices to be built in to maintain output voltage tolerances during fast charge.

Where fast charging is specified it should be capable of providing full battery capacity in 7 hours from an end-of-standby discharge state.

Where off-line fast charging is specified for systems employing two or more battery/charger sets in parallel, the equipment under fast charge shall be automatically reconnected to the d.c.distribution board at the completion of charge, or if any failure to the on-line equipment occurs. When automatically reconnected, the battery shall revert to the 'normal' charge.

4. EQUIPMENT ARRANGEMENT AND OPERATION

4.1 Configuration

The system configuration shall comply with the Schematic Diagram shown on the Data Sheets. Where cable interconnections are required between component parts of the system these shall be specified and supplied by the manufacturer, complete with all associated installation materials.



Where battery and charger are not a continuous suite the cable route lengths must be shown on the schematic diagram. The equipment manufacturer is then required to provide the inter-connecting cables so as to ensure that the overall system complies fully with the specification, especially in connection with output voltage tolerances.

4.2 Parallel Operation

Where more than one identical battery/charger system is specified, it shall be arranged that each battery/charger system equally shares the load on the distribution switchboard.

Each charger and its associated battery shall be capable of operating as a separate unit in any charging mode.

When chargers are specified to be capable of supplying the design load with the battery disconnected they shall maintain the output voltage within the tolerances specified.

4.3 Isolation

Equipment and components shall be arranged in compartments, such that discrete parts of the system can be isolated under full load conditions and made safe for maintenance work to be undertaken with the remainder of the apparatus in service.

The recommended minimum requirement is isolation of all poles, including any neutrals, of:-

- (a) Incoming power supplies to each charger.*
- (b) Each charger with its associated battery remaining in service.*
- (c) Each battery with its associated charger remaining in service (where specified as a separate operation).*
- (d) The complete charger and associated battery from the d.c.distribution switchboard.*
- (e) Any control system supplies.*

4.4 Protection

Protection systems shall be arranged to provide perfect discrimination throughout the system including the source of supply.

Fuse protection throughout is the preferred method of protection.

Where charger short-circuit current is limited below the fuse or other protection device operating point, by a charger current limit feature, the manufacturer shall ensure that the equipment is undamaged by continuous operation in this mode and that an alarm is given.

4.5 System Earth

The d.c. supply system shall be earthed as specified on the Data Sheets.

Where an earth fault monitoring system is specified (unearthed d.c. systems) it shall circulate 1 mA or less through an earth fault unless the detection circuit disconnects the earth current flow directly after detection.

Consideration should be given to providing a test facility (where earth fault monitoring is specified) in order to locate the fault to an individual circuit. Provision of a fully rated duplicate busbar for this in order to avoid disruption to operation is not recommended.

4.6 Alarms

4.6.1 Alarms shall be provided for failures that affect the integrity of the battery/charger/distribution board system. Such alarms shall not be initiated because of transient conditions.

The minimum recommended local alarms to be provided are:-

- (a) Mains supply failure.*
- (b) Failure to charge battery.*
- (c) Direct current distribution busbar voltage low/high.*
- (d) Earth fault (where applicable).*
- (e) Ventilation fan failure (where applicable).*

4.6.2 Alarm initiating devices shall automatically reset but the indicating device shall remain until manually reset

4.6.3 Facilities shall be provided to enable alarms to be indicated remotely, either individually or, preferably, by means of a common alarm system. Remote alarms shall be automatically reset when the local alarm indication is manually reset.

The preferred method of providing remote alarm facilities is by means of volt free changeover contacts rated appropriately to the receiving circuit operating parameters.

4.7 Instrumentation

Means shall be provided to give indication of the main electrical input and output parameters.

It is recommended that incoming supply volts and amps are metered and that selector switches are fitted to permit readings in all phases. Battery charge/discharge should be indicated by a centre zero ammeter. Output current and busbar voltage meters should be fitted.



Minimum requirements recommended for indication are:-

- (a) Mains supply healthy - green*
- (b) Fast charge condition - blue*
- (c) Normal charge condition - white*

Lamp colours should be in accordance with IEC 73. Lamp test facilities to allow testing of all lamps during normal operation are recommended.

Consideration should be given to including a control/indication mimic with LED indication or liquid crystal display, in place of the standard type of indicating lamp arrangement.

4.8 Maintenance

- 4.8.1 The system and its component parts, with the exception of batteries and ventilation air filters, shall be designed such that they can operate, without maintenance, for at least 104 weeks continuously.

Where manning levels are restricted, consideration should be given to including a battery cell monitoring system.

Where air filters or batteries require maintenance the system shall be so designed that they can be serviced in safety with no effect on the system other than disconnection of the batteries.

- 4.8.2 The manufacturer shall provide adequate test facilities within the equipment, backed up by comprehensive maintenance manuals, to enable rapid fault finding and repair to be effected.

Test links should be provided as necessary to facilitate testing of plug-in units.

- 4.8.3 The manufacturer shall provide all items necessary to enable efficient maintenance of the battery to be undertaken (i.e. hydrometer, filling bottle, spanners, etc.).

Cells shall be dispatched in the condition specified on the data sheet. Care must be taken to ensure correct storage of sealed cells together with the provision of charging facilities to avoid cell damage.

5. CONSTRUCTION

5.1 Enclosures

- 5.1.1 Sheet steel enclosures shall be provided for all component parts of the system, other than batteries, and these should form a uniform matching suite. The overall degree of protection of the suite shall be a minimum of IP 22 to IEC 529. The degree of protection between cubicles installed as a suite shall be to a minimum of IP 20 to IEC 529.



A minimum thickness of 1.5 mm is preferred for sheet steel.

- 5.1.2 Batteries shall be supplied either stand mounted or cubicle mounted as specified on the Data Sheet. In either case the mounting arrangement shall allow easy and unrestricted access for routine maintenance.

The location and space available for batteries should be used to determine if sheet steel enclosures or wooden battery stands are more appropriate. Stands are preferred where space permits and frequent battery maintenance is required. The manufacturer is to arrange battery layout in cubicle or on stands. The arrangement shall allow easy maintenance without the need for equipment removal or disconnection.

Consideration should be given to the arrangement of batteries, such that individual cells can be manhandled by personnel in a proper lifting posture.

- 5.1.3 Gland plates shall be provided for cables of the types and sizes specified on the Data Sheets, entering from the direction specified. Where cables enter from below, the gland plate shall be at least 400 mm above floor level.

Where a cubicle containing sealed batteries forms part of a suite advice should be taken on the necessity of making through connections from the battery cubicle to the charger cubicle and/or distribution board cubicle, gas tight.

5.2 **Forced Ventilation**

Power supplies for ventilation equipment shall be derived from the main incoming power supply, not an auxiliary supply.

5.3 **Components**

- 5.3.1 The charger transformer shall be double wound, air cooled and constructed with an earthed metal screen between primary and secondary windings. Transformers and reactors shall be continuously rated and conform generally to [IEC 76 and 289](#) respectively. They shall meet the additional requirements detailed in [IEC 146-1-3](#).
- 5.3.2 All electronic components shall comply fully with the relevant document in the [BS 9000](#) series or other equivalent standard.
- 5.3.3 Fuses shall comply with [IEC 269-1 and 2](#). Fuse holders shall be self-coloured black. Link holders shall be self-coloured white. All unearthed poles of supplies shall be fused. Earthed poles shall be connected by a link holder.
- 5.3.4 Contactors shall comply with [IEC 947-4](#).

- 5.3.5 Indicating instruments shall be flush mounting and shall comply with [IEC 51](#).
- 5.3.6 Indicating lamps shall be flush mounting and shall have a life of not less than 10,000 hours with the operating voltage at its maximum tolerance.
- 5.3.7 Isolating devices shall comply with the requirements of [IEC 947-3](#). Devices in the main power circuits shall have utilisation category AC-23 for a.c. devices and DC-23 for d.c. devices.
- 5.3.8 Direct current distribution board busbars shall be of copper and shall be insulated. The insulation shall extend to the load circuit connections. The board shall include protective devices for all d.c. load circuits provided.
- 5.3.9 No component mounted on the exterior of the enclosure shall be less than 750 mm, or more than 1800 mm from the base.
- 5.3.10 All wiring shall be multistrand and, if exceeding 100 mm in length, shall carry indelible identification ferrules at each end.

The distribution board should be configured with sufficient spare ways unless it is known the system will not be required for other feeds.

The board should preferably be in its own cubicle but where systems are small they may be included in a cubicle with other components provided the distribution board is in its own separate compartment having an IP 20 classification.

The manufacturers standard wiring cable should be used. Some guidance would be cables up to 2.5 mm² to comply with type BK to [BS 6231](#) with conductors to [IEC 228 Table III Class 5](#). Cables above 2.5 mm² to comply with type BK to [BS 6231](#) with conductors to [IEC 28 Table I Class 1 or Table II Class 2](#). Flexed cables, for example those carried over door hinges, to comply with type BK 40 [BS 6231](#) with conductors to [IEC 228 Table III Class 5](#).

Insulation should preferably be non toxic, low smoke when burnt.

Traditionally the following colours have been adopted to allow maintenance staff to distinguish the different classes of cable. If no undue cost penalties are incurred then some operational advantage is derived by continuing this practice.

Type of Wiring	Insulation Colour	Identification Ferrule Colour
a.c.	Black	Phases-Red, Yellow, Blue Neutral - None
d.c.	Grey	None
Earth	Green/Yellow	None
Circuits energised from outside the suite	Orange	None

Size of internal wiring should be based on the duty. Minimum preferred size is 1.0 mm² but smaller sizes can be utilised for electronic/PC type applications.

Wiring across door hinges should be protected against mechanical damage preferably by the use of flexible conduit.

It is advisable to keep wires operating at different voltages physically separated, input cables to an enclosure should not be run in close proximity to internal or output cables.

The method of connecting internal wiring to components should be in accordance with the recommendations made by the component manufacturers.

- 5.3.11 Terminal blocks provided for external connections shall have separate terminals for internal and external connections. Not more than two conductors shall be connected to a terminal and terminal block links shall be provided if more than two should require connection. All terminals shall incorporate a pressure plate such that screws or nuts do not bear directly onto wires.

Each and every terminal block shall be uniquely identified (such identification preferably corresponding to the associated wiring identification).

Terminals remaining live when a unit is isolated shall be fitted with a label stating the voltage as follows:-

"Danger Volts", and shall be suitably shrouded.

It is preferred that terminals for external connections exceeding 6 mm² are suitable for straight shanked lug type cable connectors. Where terminals for external connections require the use of other than straight shanked compression lugs they should be supplied and fitted by the manufacturer. Terminals for lug type cable terminations shall be provided with locking arrangements.

- 5.3.12 Battery terminals should be shrouded with insulating material.

The purpose of this is to ensure that cells cannot be shorted when being maintained, installed etc. due to uninsulated tools.

5.4 Earthing

All metal work, cable gland plates and component or sub-assembly chassis shall be bonded to the earth bar.

The earth bar shall be marked green/yellow and of minimum cross section 70 mm². It shall extend the length of the suite. Joints shall be provided between each transport section. At each end of the earth bar, a size M12 brass terminal shall be provided fitted with a lug or a 70 mm² copper external protective conductor.

5.5 Nameplate, Labels and Marking

5.5.1 In addition to that information required by [IEC 146-1-1](#) the following additional information shall be detailed on a nameplate:-

Order Number	Item Number	Cooling Method
Date of Order	Order Placed By	Site Equipment Number.

Nameplates shall be stainless steel.

5.5.2 Danger labels shall have black lettering on a yellow background and shall comply with [IEC 417](#).

It is preferred that information labels should have black letters on a white background. The labels should be engraved, embossed or otherwise formed so as to be permanent. The use of adhesive should be considered as non-permanent and therefore avoided.

It is recommended that a label should be attached to each transport unit detailing its dimensions (in mm) and its weight (in kg).

It is also recommended that as a minimum labels should be permanently fitted to identify the following:-

- (a) The function of the total assembly of equipment.
- (b) Each control switch or push button.
- (c) Each indication lamp.
- (d) Each component part of the equipment.
- (e) Each fuse.
- (f) Each position of a selector switch.
- (g) Each instrument

6. TESTING

6.1 Type and routine testing of components and the complete apparatus, shall be carried out in accordance with [IEC 146-1-1](#).

Tests shall normally be carried out on the complete apparatus at the manufacturer's works under electrical conditions equivalent to service conditions. The latest approved issue of all drawings shall be available at the manufacturers works for the tests.

It is recommended that tests should be witnessed by the purchaser/BP. Five working days notice should be provided of intention to test.

Where it is impractical to perform tests under electrical conditions equivalent to service conditions the apparatus should be tested under conditions which allow the specified performance to be proved under service conditions.

It is not usual to perform the tests with the order battery and this is not recommended.

It is recommended that tests should be carried out covering all modes of operation and should demonstrate that the equipment performs in accordance with the specification.

A schedule of tests should be submitted with the tender for approval by the purchaser.

6.2 Type Tests

Type tests as detailed in [IEC 146-1-1](#) clause 4.1.4 shall be applied to at least one complete apparatus of each type or design. Additionally, the following type tests shall be included:-

- (a) Output Voltage Tolerance (as [IEC 146-1-1](#), clause 4.2.8, the voltage regulation for maximum d.c. voltage no load to minimum d.c. voltage minimum load shall be taken).
- (b) Load Tests

The load test shall allow for the gradual increase of load from no load to full load, followed by in sequence:-

- application of 150% design load for 2 minutes
- application of 100% design load for 8 hours or until such time as monitored temperatures stabilise, whichever is the longer
- application of 150% design load for 2 minutes.

Load tests shall be carried out with all enclosure covers replaced and doors closed.

- (c) Checking the Co-ordination of Protective Devices (as [IEC 146-1-1](#), clause 4.2.10)

Short circuit faults shall be simulated at the following points of the complete system:-

- (i) beyond the largest d.c. fuse on the d.c. distribution apparatus,
- (ii) on the output of one rectifier/charger.

Special attention shall be paid to checking that protective devices function when the apparatus is operating under current limiting conditions, and that there will be co-ordination between

protective devices within the apparatus and those of the primary power supply.

*

Subject to BP approval, all type tests shall be carried out on the same complete apparatus. Evidence of type tests on identical apparatus may be accepted in lieu of tests on the subject apparatus.

6.3 Routine Tests

The following routine tests shall be applied on each complete apparatus:-

- (a) Tests in accordance with [IEC 146-1-1](#), clause 4.1.4.
- (b) Soak test under full rated load for 100 hours.

This shall be carried out on each rectifier/charger apparatus and associated blocking diodes and counter EMF diodes. The test shall be carried out with all enclosure covers replaced and doors closed.

6.4 Test Certificates

The manufacturer shall provide certificates for all tests undertaken whether or not witnessed by a purchaser's representative. The certificates shall state values for all test results where appropriate. Certificates for tests witnessed by the manufacturer's representative shall be available for signature by the representative on the day of the test.

7. ADDITIONAL REQUIREMENTS

7.1 Any special tools required for maintenance shall be supplied, by the manufacturer, in a suitable container for wall mounting and these shall be clearly labelled to indicate the purposes for which each item is required.

7.2 Drawing symbols shall comply with [IEC 617](#). Each drawing supplied by the manufacturer shall incorporate the following information:-

Manufacturer's name and address
Drawing title
Name of project
Manufacturer's order or contract number
Purchaser's order number
Manufacturer's drawing number and revision number
Date of original issue and dates of any revisions with details.



- 7.3 The manufacturer shall supply manuals detailing operating and maintenance instructions.

The manuals should be submitted prior to the equipment being offered for test.

- 7.4 The maintenance instructions shall include a detailed list of recommended spare parts and torque loadings of all bolts used in busbar joints.

- 7.5 All instructions for the safe installation of the equipment shall be packed with the equipment. Labels stating the location of these instructions shall be prominently displayed on the equipment.

A complete set of operating and maintenance manuals shall be packed with the equipment in addition to those called for under the order.

- 7.6 The manufacturer shall forward to the purchaser, within the time specified, a full list of recommended spares, based on the first 5 years of service.

- 7.7 Unless specified otherwise by the purchaser all documents shall be in the English language.



INDENT/ PURCHASE ORDER NUMBER			
TO BE COMPLETED IN BLOCK CAPITALS			
PART 1 - TO BE COMPLETED BY PURCHASER			
A. CONTRACTUAL INFORMATION			
1.	Installation Site		
2.	Job name/Job No		
3.	Equipment name		
4.	Order No		
5.	Item No		
B. SUPPLY			
6.	Operating voltage and frequency	V	Hz
7.	Power supply	pH	Wire
8.	Voltage tolerance	+ %	-
9.	Frequency tolerance	+ %	-
10.	Supply Cables:	Power	Control
	Type		
	No of cores		
	Conductor Cu/A1		
	Core size mm ²		
11.	Fault level of supply switchboard		
C. ENVIRONMENT			
12.	Peak ambient temperature in equipment room	°C	
13.	Minimum ambient temperature in equipment room	°C	
14.	Design relative humidity	°C	
15.	Altitude	Under 1000 m	
16.	Special conditions		
REMARKS			
No	Date	Remarks	By App



TO BE COMPLETED IN BLOCK CAPITALS				
D. PERFORMANCE				
17.	Nominal d.c. output voltage at distribution switchboard			V
18.	d.c. output voltage tolerance			+ % - %
19.	d.c. output voltage ripple tolerance			%
20.	Separate operation: charger rated for load duty without battery		Required	Not required
21.	Battery standby time			mins
E. ARRANGEMENT				
22.	Battery system		Duplicate 100% capacity batteries	Reduced rate parallel connected high security battery Single battery
23.	Fast charging required		No	On-line Off-line
24.	Normal charging	Theoretical max period between electrolyte top-ups	52 weeks	
		Time to reach sufficient capacity from end-of-stand-by discharge	12 hours	
		Two rate method	Allowed Not allowed	
25.	System earth		Unearthed	Positive pole Mid-point
26.	Earth fault monitoring system		No	Yes
27.	Additional local alarms		(a) Battery electrolyte low	
			(b) Ventilation equipment fail	
			(c) Normal/standby supply fail	
			(d) d.c. output circuit fail	
28.	Remote alarm initiation		No	Yes
	Alarm groupings	Group 1		
		Group 2		
29.	Protection system		Fuses	
REMARKS				
No	Date	Remarks	By	App



TO BE COMPLETED IN BLOCK CAPITALS							
F. CONSTRUCTION							
30.	Battery type		Vented		Sealed		
31.	Battery construction		Lead acid	Tubular	Plante		
			Nickel cadmium	Pocket plate	Sintered		
32.	Cable entry:	Supply cables	Top		Bottom		
		d.c. cables	Top		Bottom		
33.	Cubicle access		Front only		Front and rear		
34.	Batteries to be housed cubicles		Yes		No		
35.	Battery room layout drawing						
36.	Drip trays		Required		Not required		
37.	Language for labels						
38.	Cell condition for despatch		Charged		Uncharged (Ni/Cd only)		
			Dry		Filled		
G. DESIGN LOADS							
39.	Standing loads						
40.	Intermittent loads/switchgear closing loads		Starting		Running	Cycles/ hour	
			A	Secs	A		Secs
41.	Switchgear trip/high security loads						
	Ccts	A	for	secs			
	Ccts	A	for	secs			
REMARKS							
No	Date	Remarks		By	App		



TO BE COMPLETED IN BLOCK CAPITALS	
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H. CIRCUITS

42.	d.c. circuits
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Cct No	Cct Name	Max load A	Cable type	Cable size mm ²

43.	Spare d.c. circuits space required		Not equipped
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Cct No	Cct Name	Max load A

REMARKS	
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No	Date	Remarks	By	App



TO BE COMPLETED IN BLOCK CAPITALS				
I. SCHEMATIC DIAGRAM (For a non-continuous suite, cable route lengths between items of equipment should be indicated).				
REMARKS				
No	Date	Remarks	By	App



TO BE COMPLETED IN BLOCK CAPITALS						
PART 2 - TO BE COMPLETED BY MANUFACTURER						
44.	Manufacturer	Charger				
		Battery				
45.	Manufacturers tender ref.					
46.	Manufacturers works order no					
47.	No of cells per battery					
48.	Cell capacity					
49.	Total battery internal resistance		ohms at	°C at	hour rate	
50.	Battery capacity prior to duty specified		%			
51.	Battery terminal voltage following duty specified		V			
52.	Charger rating/Duty Class (IEC 146-1-1 clause 3.10.3.5)		A. D.C/duty class			
53.	Current cut-off level		A D.C.			
54.	Manufacturers recommended supply fuse rating (to IEC 269) (Fuse to be supplied by purchaser)		A			
55.	Normal output voltage (Float/Recharge)		V D.C.			
56.	Fast charge voltage		V D.C.			
57.	Max heat dissipation of equipment		watts			
58.	Estimated max temperature in: Charger/d.c. distribution/battery		°C	°C	°C	
59.	Maximum a.c. supply current	Fundamental	A			
Harmonic						
Value % of fundamental						
REMARKS						
No	Date	Remarks	By	App		



DEFINITIONS

Definitions

Standardised definitions may be found in the BP Group RPSEs Introductory Volume.



APPENDIX B

LIST OF REFERENCED DOCUMENTS

A reference invokes the latest published issue or amendment unless stated otherwise.

Referenced standards may be replaced by equivalent standards that are internationally or otherwise recognised provided that it can be shown to the satisfaction of the purchaser's professional engineer that they meet or exceed the requirements of the referenced standards.

Where a British Standard only is listed, no corresponding IEC Standard exists.

IEC 51	Direct acting indicating electrical measuring instruments and their accessories.
IEC 73	Colours of indicator lights and push buttons.
IEC 76	Power transformers.
IEC 146	Semiconductor convertors.
IEC 228	Conductors of insulated cables.
IEC 269	Low-voltage fuses.
IEC 289	Reactors.
IEC 408	Low-voltage airbreak switches, airbreak disconnectors and fuse-combination units.
IEC 417	Graphical symbols for use on equipment.
IEC 529	Classification of degrees of protection provided by enclosures.
IEC 617	Graphical symbols.
IEC 947	Low voltage switchgear and controlgear

British Standards

BS 800	Specification for radio interference limits and measurements for equipment embodying small motors, contacts, control and other devices causing similar interference.
BS 6231	PVC-insulated cables for switchgear and control-gear wiring.



BS 9000

General requirements for electronic components of assessed quality.
Part 1 General description and basic rules.

