NPS/003/002 – Technical Specification for 30V Distribution Tripping Battery and Charger Systems

1. Purpose

This document is to detail the technical requirements for 30V battery and charger systems for use by Northern Powergrid (the Company).

This document supersedes the following documents, all copies of which should be destroyed;

Document Reference	Document Title	Version	Published Date
NPS/003/002	Technical Specification for 30V Distribution Tripping Battery and Charger Systems	2.1	July 2016

2. Scope

This specification details the technical requirement for 30V batteries and chargers for use in 11kV or 20kV distribution substations where DC supplies are required for the operation of protection relays or for a remote tripping supply. It specifies primary cells for use where there is no standing load, and battery/charger systems where a standing load up to 1A needs to be supported. It includes a requirement for suppliers to provide periodic inspection and maintenance information.

It will also be necessary to consider and include any project specific requirements as detailed in Appendix 5: Addendum to Supplier Requirements.

The following appendices form part of this technical specification:

- Appendix 1: Technical Specification Sheet - 30V Non-Standing Load tripping battery without battery charger.
- Appendix 2: Technical Specification Sheets - 30V Standing Load battery and battery-charger systems
- Appendix 3: Self Certification Conformance Declaration ENATS 50-18
- Appendix 4: Schedule of Requirements
- Appendix 5: Addendum to Supplier Requirements
- Appendix 6: Pre-Commission Testing, Routine Inspection and Maintenance Requirements
- Appendix 7: Technical Information Check List

2.1. Table of Contents

3. Technical Requirements

3.1. Compliance with other Specifications and Standards

Where reference is made within this specification to any International Standard, British Standard, Energy Networks Association Technical Specification (ENA TS) or any other standard, this shall be to the latest version of that standard current at the time of supply.

3.2. General

There is a requirement for the following types of products.

- Switch Tripping Primary Cell Battery complete with a monitoring/alarm facility. This unit will not have the facility to recharge the battery cells and therefore will not be connected to an external AC Power source within the operating environment. Northern Powergrid currently uses Lithium-Ion battery cells for this application with a 7.5Ah capacity.
- Standard Switch Tripping Unit for STANDING LOAD applications consisting of Sealed Secondary Battery cells complete with a suitable charging/monitoring/alarm facility. This unit will have the facility to recharge the battery cells and therefore will be connected to an external AC Power source within the operating environment. Northern Powergrid currently uses Vented Lead Acid battery cells for this application with a minimum 10Ah capacity.
- Enhanced Switch Tripping Unit for customer and special STANDING LOAD applications consisting of Secondary Battery cells complete with a suitable charging/monitoring/alarm facility. This unit will have the facility to recharge the battery cells and therefore will be connected to an external AC Power source within the operating environment. The Battery technology shall be Low Maintenance Nickel Cadmium battery cells for this application with a 24Ah capacity.

All Battery cells shall be low maintenance sealed types.

The equipment shall comply with the current editions of BS EN 60086, BS EN 60622, BS EN 60896-21, BS EN 60896-22 and ENATS 50-18 except where varied by this specification, and with Appendices 1 and 2 of this specification.

Equipment supplied for applications where there is no standing load shall comply with the characteristics specified in Table 1 of Appendix 1.

Equipment supplied for applications where there is standing load shall comply with the specifications of Appendix 2.

Equipment supplied in compliance with Appendix 1 shall be entirely maintenance free but shall be provided with an inbuilt test facility as described.

The technical specification of any and all systems must be declared using the table in Appendix 3.

3.3. Cubicle

3.3.1. Equipment shall be housed in lockable, sheet steel cubicle complying generally with the requirements of ENATS 50-18 "Application of Ancillary Electrical Equipment". The cells and battery charger, where provided shall be contained in separate compartments. Wherever possible, with consideration given to size and weight, the cubicle shall be wall mountable.

3.3.2. The cubicle shall be so designed and constructed as to provide minimum ingress protection to classification IP32 in accordance with BS EN60529.

3.3.3. The cubicle shall house the cells and where supplied, the charging unit within separate compartments in such a way that they can be maintained, removed and replaced individually without having to remove the

cabinet from the wall. In all cases the battery cell arrangement shall not exceed a formation of two rows in order that individual cells can easily be accessed for removal and replacement. Access to individual cell terminations and vents shall be sufficient to facilitate checking of the battery condition whilst in service. Any sheet steel cabinet panels shall be attached in such a way that they can be removed from the outside with no possibility of any fastenings falling inside the cabinet.

3.3.4. The cubicle door shall be fitted with a handle which can be secured in the closed position by means of a padlock having a nominal hasp diameter of 8 mm.

3.3.5. Internal wiring shall be ENATS 50-18 compliant and where this is taken through steel panels shall be suitably and sufficiently protected.

3.3.6. Two 20 mm access holes shall be provided in the side of the cubicle to facilitate external input and output wiring connections.

3.3.7. Suitable provision shall be made for earthing of the unit with the cubicle earthing boss provided being suitable for the connection of a copper earth cable that will be within a range of 16²mm up to and including 95²mm cross sectional area.

3.3.8. Adequate and suitable ventilation shall be provided: -

a) to limit any temperature rise within the cubicle to a level which will not be detrimental to either the life or performance of the cells or any other components of the equipment, and

b) to prevent the build-up of any gases which may be produced within the unit under fault conditions.

3.3.9. The preferred finish is a polyester powder coating externally and internally with a light grey or similar external colour and white on internal surfaces. Alternative finishes may be used with the prior approval of Northern Powergrid.

3.4. Battery Charger - Applicable to STANDING LOAD and ENHANCED items 2 & 3 in Appendix 4

3.4.1. Battery Chargers will be operated from a 230V single phase 50 Hz AC supply from a dedicated output from the substation LVAC distribution board or Customers LVAC supply.

3.4.2. Chargers shall be suited to the battery cell technology being provided or in use. Typically, this will be a 2 rate constant voltage float type with a facility to set both Boost and Float levels in line with the battery manufacturers recommendations to maximise battery life. A facility shall also be provided to enable this level to be adjusted under maintenance and test conditions. The charging level and range shall be designed to suit the battery.

3.4.3. Chargers shall be automatically temperature compensated to provide the required performance over the expected temperature range (0°C - 40°C).

3.4.4. Battery Chargers shall be rated to supply the required standing load on the system plus an allowance as recommended by the battery supplier to provide a suitable charge rate for all conditions.

3.4.5. The charger control design shall have current limiting facilities to suit its rating. This limit should not allow damage to the battery due to fast charge rates. The current limit performance of the charger shall be 2% of nominal setting over the voltage range of the cells.

3.4.6. The charging voltage will not vary by more than 2% over 0 – 10% of charging load, and 1% over 10-100% of charging load despite variations in input voltage of +10% -6%.

3.4.7. A voltmeter with an accuracy Class 0.2 to BS EN 60051-1, IEC 60051-1 shall be used for setting up.

3.4.8. The charger shall be capable of meeting its output requirements when it is fed from an A.C. main of low impedance with a frequency between 47 Hz and 52 Hz.

3.4.9. The charger output superimposed ripple shall not exceed the battery supplier's recommendations.

3.4.10. Charger transformers shall comply with ENATS 50-18 for the required duty and temperature limits under all conditions.

3.4.11. The insulation between each winding, screen, core and frame and all other circuits on the system directly connected to the 230V A.C. shall withstand 2 kV A.C. (RMS) at 50 Hz for one minute between the appropriate terminal and earth and between all terminals of electricity separate circuits. The resistance measured at 500V DC after this test shall not be less than 20 mΩ between any terminal and earth or between terminals of electrically separate circuits.

3.4.12. The charger shall not produce interference on the A.C. input in excess of that specified in EA Engineering Recommendation G5 "Planning levels for harmonic voltage distortion & the connection of non-linear equipment to transmission systems & distribution networks in the United Kingdom"

3.4.13. Switched Mode Power Supplies are acceptable where they conform to applicable standards under the Electromagnetic Compatibility (EMC) Regulations 2005 and such evidence is provided.

3.4.14. The AC input to the charger shall be suitably fused and also provided with a double pole isolating switch. The fuse should be of sufficient rating to avoid operation by the magnetising inrush of the transformer.

3.5. System Monitoring - Applicable to all Items in Appendix 4

3.5.1. A voltmeter shall be provided to measure the battery output voltage with the charger disconnected. This shall be operated by a switch with an auto return to the off position

3.5.2. A battery discharge test facility shall be provided. NON-STANDING LOAD Switch Tripping units shall incorporate a return to off position on/off switch and discharge resistor (with associated contactor if required). The resistor value shall be selected to give a discharge test at the 1-hour rate. A label shall be fitted adjacent to the test switch to indicate that the switch should not be operated for longer than 10 seconds.

3.6. System Monitoring - Applicable to STANDING LOAD and ENHANCED Items 2 & 3 in Appendix 4

3.6.1. An ammeter shall be provided to measure the charger output. These instruments shall be to EATS 50-18 and BS EN 60051-1, IEC 60051-1 Class 1.

3.6.2. An alarm module shall be provided to monitor the DC system and shall provide the following local alarms with a corresponding No-volt contact for remote purposes:

Alarm Module Local Indication	Setting	Remote Indication Group
High voltage alarm	38V	Urgent
Low voltage alarm	28V	Urgent
Charger fail alarm		Urgent
Battery high resistance or open circuit		Urgent
Battery earth fault alarm	50 kΩ	Non urgent

3.6.3. The settings and range of the above shall take account of hysteresis, maximum and minimum conditions and situations when systems are coupled.

3.6.4. The battery earth fault detector shall provide an alarm when the insulation resistance of the substation wiring connected to either pole of the system falls to 50 kΩ. This shall apply at all voltages over the

working range. With one pole of the battery system connected to earth, the fault current shall not exceed 5 mA at the maximum voltage.

3.6.5. An Auto battery disconnect feature shall be provided on the ENHANCED product to prevent unrecoverable deep discharge on the battery cells.

3.6.6. The ENHANCED product Auto battery disconnect feature must have a temporary bypass arrangement that allows battery charging to occur from a Low voltage state; for example, during initial start-up, after cell replacement, or after an AC mains fail event that has initiated the disconnect feature due to cell depletion. This arrangement shall not rely on temporary jumpers or links that can be inadvertently left in place. The control(s) for this feature shall be mounted internally so as not to be available when the cubicle is closed and in normal service and will preferably enable the temporary state only when a healthy AC mains supply is available and for a period of time required to charge the batteries above the Low voltage threshold whereafter it shall either automatically disengage or can be de-selected manually.

4. References

4.1. External Documentation

Reference	Title
BS EN 60051-1:2017, IEC 60051-1:2017	Direct acting indicating analogue electrical measuring instruments and their accessories. Definitions and general requirements common to all parts
BS EN 60086	Primary Batteries
BS EN 60086-4	Primary batteries. Safety of lithium batteries
BS EN 60529	Degrees of protection provided by enclosures (IP code)
BS EN 60622	Secondary cells and batteries containing alkaline or other non-acid electrolytes – sealed nickel cadmium prismatic rechargeable single cells
BS EN 60896-21	Stationary lead-acid batteries Part 21: Valve regulated types – Methods of test
BS EN 60896-22	Stationary lead-acid batteries Part 22: Valve regulated types – Requirements
BS EN 60898-1	Electrical accessories. Circuit breakers for overcurrent protection for household and similar installations. Circuit-breakers for a.c. operation
BS EN 60898-2	Electrical accessories. Circuit-breakers for overcurrent protection for household and similar installations. Circuit-breakers for a.c and d.c. operation
ENATS 50-18	Design and application of ancillary equipment
HD 60269-2	Low-voltage fuses. Supplementary requirements for fuses for use by authorized persons (fuses mainly for industrial application). Examples of standardized systems of fuses A to K

4.2. Internal Documentation

Reference	Title
None	None

4.3. Amendments from Previous Version

Reference	Description
3.2	Removal of requirement to provide Battery cells only as an added option.
3.3.1	Reworded for clarity without changing the requirement.
3.3.9	Reworded for clarity without changing the requirement.
3.4	Title – specified items for clarity
3.5	Altered section to only include requirements for ALL items with more specific standing load items being cut and moved into a new clause 3.6
3.6	New clause specific to standing load items created from sub-clauses previously in 3.5
3.6.6	Expanded on requirements for DC Low volts disconnect to have an over-ride / bypass facility for start-up / recovery
Appendices	Updated tables to reflect above amendments

5. Definitions

Term	Definition
NON-STANDING LOAD	Where there is no constant drain on the battery from a current demanding device or instrument.
Primary Cell	Source of electrical energy obtained by direct conversion of chemical energy, not designed to be charged by any other electrical source
STANDING LOAD	STANDING LOADS are those constant loads that remain steady and present in normal operation, such as protection relays and monitoring equipment
The Company	Northern Powergrid

6. Authority for Issue

6.1. CDS Assurance

I sign to confirm that I have completed and checked this document and I am satisfied with its content and submit it for approval and authorisation.

		Date
Liz Beat	Governance Administrator	20/07/2022

6.2. Author

I sign to confirm that I have completed and checked this document and I am satisfied with its content and submit it for approval and authorisation.

Review Period - This document should be reviewed within the following time period:

Standard CDS review of 3 years?	Non-Standard Review Period & Reason	
No	**Period: 5 Years**	**Reason:** Update will be dictated by contract renewal date or any significant changes in the specification or documents referenced
Should this document be displayed on the Northern Powergrid external website?		Yes

		Date
Alan MacDonald	Policy & Standards Engineer	21/07/2022

6.3. Technical Assurance

I sign to confirm that I am satisfied with all aspects of the content and preparation of this document and submit it for approval and authorisation.

		Date
Michael Crowe	Technical Services Manager	22/07/2022
Andrew Scott	Technical Services Manager	29/07/2022
Joseph Helm	Policy & Standards Manager	21/07/2022

6.4. Authorisation

Authorisation is granted for publication of this document.

		Date
Paul Black	System Engineering Manager	29/07/2022

Appendix 1 - Technical Specification for 30V Non-Standing Load Tripping Battery without Battery Charger

Battery Output Voltages	
Nominal voltage	30v
Minimum voltage after specified load duty	24V
Maximum open circuit voltage	42V
Load and Test duties	
Load pulse	6 amps for a duration of 150ms
Test pulse	Duration of 600ms to 1.2 seconds through a 5 ohm resistive load to produce a current pulse no less than 4.2A.
Load duty	Ten test pulses during commissioning. An average of three tripping operations and one test operation per year over the service life of the battery. No more than 10 operating pulses in any one year after commissioning.
Other Battery Design Factors	
Minimum service life (Cubicle and Test Function)	20 years
Minimum service life (Battery Cell pack)	7 Years
Standing load	None
Maintenance requirement	Maintenance free
Rated temperature	15°C
Temperature range	- 5°C, +40°C
Type	Lithium Ion
Other Requirements	
Test facility	An inbuilt test facility shall be provided to apply the test pulse specified above. The output shall be easily read and the test facility shall automatically reset to prevent excessive discharge of the battery. Where more than one Test Pulse is required to achieve an acceptable Test result, this shall be stated and instructed in a clear and unambiguous way by means of an Instruction Label affixed to the unit. A maximum of 3 test pulses shall be allowed to achieve an acceptable and reliable result.
Housing	Wall mountable cabinet with external pre-drilled brackets and lockable doors. Approx. dimensions:- 600(H) x 500(W) x 200(D) mm.
Cabinet earthing lug	Phosphor bronze or high tensile brass earthing stud suitable for range of 16²mm - 95²mm cable
DC output terminals and connectors	Shrouded, to accept 2.5 mm^2 ring tongue terminals, for example types A, E in ENATS 50-18.
DC output fuses	1 x 6A fuse shall be provided for DC output and be mounted within the cabinet.
Secondary wiring	ENATS 50-18. Not less than 2.5 sq. mm 7/ 0.67mm for battery circuits and 1.5 sq. mm 30/0.25 for other circuits.
Battery earthing	The battery shall be unearthed.
Battery disposal	An approved method must be provided.
Supporting documentation	Circuit diagram. General arrangement drawing. Descriptive details of cells and unit. Detailed description of Testing and Calibration procedures including any specific tools or equipment requirements.
Other Requirements (continued)	
Labels	Fuselinks, instruments and switches shall be adequately labelled to indicate their

	function. A label is required on the facia to enable recording of commissioning and subsequent annual tests (to year 10). Labels shall be black on white. Clear concise and unambiguous Test Pulse operating Instructions shall be provided on the unit to ensure a consistent and reliable interpretation of the result by untrained persons.

Appendix 2a – Technical Specification for STANDARD 30V STANDING LOAD Battery and Battery-Charger System

Battery Output Voltages and Load Duty	
Nominal voltage	30V
Maximum Float voltage	34V
Minimum voltage after specified discharge profile	28V
Maximum voltage under all conditions	37.2V
Battery standing load (where applicable)	1A
Battery discharge profile	1A / 10hr
Other Battery Design Factors	
Standard	
Type	Lead Acid
Minimum Service life	5years
Number of cells	
Battery Capacity	10Ah
Ageing factor	1.25 Lead Acid
Rated temperature	15°C
Temperature range	-5°C,+ 40°C
Mounting	Cubicle
Connectors	Shrouded
Isolation facilities required	From charger and distribution board
Battery earthing	The battery shall be unearthed
Automatic Battery Disconnect	Automatic battery disconnect facility shall be provided / available for use (if required, depending on battery type to prevent damage). Battery to be reconnected on restoration of charger supply.
Charger Supply	
AC Supply	230v AC single phase
Nominal supply frequency	50Hz
Supply frequency range	47-52Hz
Charger	
Type	Optimised for Cell Technology. Typically Constant voltage, two-stage, temperature compensated.
Ambient temperature range	-5°C, + 40°C
Maximum Float Voltage	34V
Maximum voltage under all conditions	37.2V
Voltage adjustment facility	Float voltage should be adjustable however such controls should **not** be on the front facia.
Rated charging current	To cover standing load as specified plus adequate charging current
Normal float charge	50% rated load at rated input voltage.
Variation in charging voltage as input voltage varies over range of -10% + 6% of rated value: Across load range 0 – 10% Across load range 10% - Full Load	 Maximum 2% variation in output voltage Maximum 1% variation in output voltage
Variation in current limit over the specified voltage range of the battery.	Maximum 2% of the nominal setting
Charger (continued)	
Frequency range over which charger performance should be met.	47-52Hz
Max earth current with one pole of	5mA

battery earthed (at maximum battery voltage)	
Transformer screening	Earth metal screen between primary and secondary windings.
Secondary wiring	ENATS 50-18 Not less than 2.5 sq. mm 7/0.67mm for battery circuits and 1.5 sq. mm 30/0.25 for other circuits.
System Monitoring	
High voltage alarm	Local indication plus spare contact
Low voltage alarm	Local indication plus spare contact
Charger fail alarm	Local indication plus spare contact
Battery earth fault alarm	Local indication plus spare contact
Battery high resistance or open circuit	Local indication plus spare contact
Battery Disconnect alarm	Local indication plus spare contact
Monitoring alarm protection	State rating and type
Battery earth fault alarm test facility	
Test resistor value	10% below sensitivity of the earth fault relay
Operating switch	A “return-to-off” on/off switch
Discharge Test Facility	
Discharge resistor	To give one hour discharge rate
Operating method	Via a “return-to-off” on/off switch, and contactor.
Warning label	“This switch shall not be operated for longer than 10 seconds”
Operating Instruction Label	Clear, concise unambiguous instructions attached to the unit.
Instruments	
Battery output voltmeter	Push-button or self-return-switch operated
Charger output ammeter	
Optional DC output ammeter	0-100mV/A output
Cubicles and Battery Stands	
General arrangement	Charger to be housed in a cabinet with lockable hinged facia. Batteries to be housed on tiered shelves in the same cabinet behind lockable doors. Approx. dimensions: - 800(H) x 600(W) x 300(D) mm.
Design life	20years
Cubicle cable entry	Bottom
Cubicle Colour	EXTERNAL -light colour, preferably grey, INTERNAL - white
Cabinet earthing lug	Phosphor bronze or high tensile brass earthing stud suitable for range of 16²mm - 95²mm cable
Exposed conductors	Shrouded
Doors	Lockable
Distribution Board	
Number of ways	Min 2
Rating of ways	16A
Labels	
Output Protection and Isolation	
Type	Cartridge type: HD 60269-2 Fuse or BS EN 60898- Part 1 & 2 MCB

Appendix 2b – Technical Specification for ENHANCED 30V STANDING LOAD Battery and Battery-Charger System

System Output Characteristics	
Nominal voltage	30V
Float voltage (max acceptable)	34V
Minimum voltage after specified discharge profile	28V
Maximum charger voltage under all conditions	37.5V
Battery	
Standard	BS EN 60623 / BS EN 60622 / BS EN 60896 21 & 22
Type	Low maintenance Nickel Cadmium
Design life	20 years
Battery size	24Ah
Ageing factor	NiCd 1.1
Minimum topping-up period	10 years
Minimum number of cells in battery	
Maximum float voltage per cell	
Rated temperature	15°C
Temperature range	0°C – 40°C
Mounting	Cubicle
Connectors	Shrouded
Isolation facilities required	From charger and distribution board
Battery earthing	The battery shall be unearthed
Charger Supply	
AC Supply	230V AC single phase or 415V AC 3 phase.
Nominal supply frequency	50Hz
Supply frequency range	47-52Hz
Charger	
EMC Compatibility	Electromagnetic Compatibility (EMC) Regulations 2005
Type	Constant voltage, two-stage, temperature compensated
Ambient temperature range	0°C - 40°C
Maximum Float Voltage	
Maximum voltage under all conditions	
Voltage adjustment facility	Float and boost voltages should be adjustable however such controls should **not** be on the front facia.
Rated charging current	To cover standing load as specified in Appendix 3 plus adequate charging current
Normal float charge	50% rated load at rated input voltage.
Variation in charging voltage as input voltage varies over range of +10% - 6% of rated value: Across load range 0 – 10% Across load range 10% - Full Load	 Maximum 2% variation in output voltage Maximum 1% variation in output voltage
Variation in current limit over the specified voltage range of the battery.	Maximum 2% of the nominal setting
Charger (continued)	
Frequency range over which charger performance should be met.	47-52Hz
Max earth current with one pole of	5mA

battery earthed (at maximum battery voltage)	
Transformer screening	Earth metal screen between primary and secondary windings.
System Monitoring	
High voltage alarm	Local indication plus spare contact
Low voltage alarm	Local indication plus spare contact
Charger fail alarm	Local indication plus spare contact
Battery earth fault alarm	Local indication plus spare contact
Battery high resistance or open circuit	Local indication plus spare contact
Monitoring alarm protection	State rating and type
Battery earth fault alarm test facility	
Test resistor value	10% below sensitivity of the earth fault relay
Operating switch	A “return-to-off” on/off switch
Discharge Test Facility	
Discharge resistor	To give one hour discharge rate
Operating method	Via a “return-to-off” on/off switch, and contactor.
Warning label	“This switch shall not be operated for longer than 10 seconds”
Instruments	
Battery output voltmeter	Push-button or self-return-switch operated
Charger output ammeter	
Optional DC output ammeter	0-100mV/A output
Cubicles and Battery Stands	
Design	Supplier to provide drawings
Design life	40 years
Cubicle cable entry	Bottom
Cubicle Colour	EXTERNAL -light colour, preferably grey, INTERNAL - white
Cubicle Earthing	Phosphor bronze or high tensile brass earthing stud suitable for range of 16^2mm - 95^2mm cable
Exposed conductors	Shrouded
Doors	Lockable
Distribution Board	
General arrangement	To be specified in supplied drawings
Number of ways	As specified in Appendix 3
Rating of ways	16A or 32A as specified in Appendix 3
Labels	To be specified in supplied drawings
Distribution Output Isolation	
Fuse	Cartridge type: HD60269-2

Appendix 3 – SELF CERTIFICATION CONFORMANCE DECLARATION

30V Battery and Charger Systems required to be supplied against this specification shall comply with the latest issues of the relevant ENATS, British and International Standards specified. The following tables are intended to amplify and/or clarify the requirements of elements of these Standards but do not preclude meeting all requirements of the standards. .

The manufacturer shall declare conformance or otherwise, clause by clause, using the following levels of conformance declaration codes. Complete one Header sheet (this one) for each and every Declaration of Conformity Table.

Conformance declaration codes
N/A = Clause is not applicable/ appropriate to the product
Cs1 = The product conforms fully with the requirements of this clause
Cs2 = The product conforms partially with the requirements of this clause
Cs3 = The product does not conform to the requirements of this clause
Cs4 = The product does not currently conform to the requirements of this clause, but the manufacturer proposes to modify and test the product in order to conform.

Instructions for completion

- When Cs1 code is entered no remark is necessary.
- When any other code is entered the reason for non-conformance shall be entered.
- Prefix each remark with the relevant 'BS EN' 'IEC' or 'ENATS' as appropriate.

Manufacturer:

Product Reference:

Details of the product

Name:

Signature:

Date:

NOTE:

TECHNICAL SPECIFICATION FOR 30V NON STANDING LOAD PRIMARY TRIPPING BATTERY			
	Clause / Requirements	Conformance Code	Remarks / Comments
System Output Characteristics			
Nominal voltage	30V		
Minimum voltage after specified discharge profile	24V		
Maximum open circuit voltage	42V		
Battery			
Standard	State (BS/IEC?)		
Type of cells	State		
Service life	7Years		
Aging factor applied	State		
Number of cells in battery	State		
Rated temperature	15 °C		
Temperature range	-5 / +40 °C		
Cell mounting: Cubicle? Tiered?	State		
Connectors	Shrouded		
Isolatable from dist. board	Required		
Battery Earthing	Unearthed		
Test Facility	Required		

TECHNICAL SPECIFICATION FOR 30V NON STANDING LOAD PRIMARY TRIPPING BATTERY			
	Clause / Requirements	Conformance Code	Remarks / Comments
Discharge Test Facility			
Indication	1h d/charge rate		
Operating Method	"return to off" type switch		
Warning & Instruction labels	Required		
Cubicles and Battery Stands			
Design life	20 Years		
Cubicle cable entry position	Bottom		
Cubicle Colour	Light / Grey		
Exposed Conductors	Shrouded		
Cubicle Earthing	Range 16²mm to 95²mm connection		
Doors	Lockable		
Dimensions (approx. 600 x 500 x 200mm)			
Distribution Board			
Number of ways	1		
Rating of ways	6 A		
Output Protection and Isolation			
Type	HD 60269-2 Fuse or BS EN 60898-Part 1 & 2 MCB		

TECHNICAL SPECIFICATION FOR STANDARD 30V STANDING LOAD BATTERY AND CHARGER SYSTEMS			
	Clause / Requirements	Conformance Code	Remarks / Comments
System Output Characteristics			
Nominal voltage	30V		
Float voltage (max acceptable)	34V		
Minimum voltage after specified discharge profile	28V		
Maximum charger voltage under all conditions	37.2V		
Maximum open circuit voltage	State		
Battery			
Standard	State (BS/IEC?)		
Type of cells	State		
Service life	Minimum 5Years		
Aging factor applied	1.25 lead acid		
Number of cells in battery	State		
Float voltage per cell	State (V)		
Rated temperature	15 °C		
Temperature range	/ +40 °C		
Cell mounting: Cubicle? Tiered?	State		
Connectors	Shrouded		
Isolatable from both dist. board and charger	Required		
Battery Earthing	Unearthed		
Test Facility	Required		
Auto Battery Disconnect	State		

TECHNICAL SPECIFICATION FOR STANDARD 30V STANDING LOAD BATTERY AND CHARGER SYSTEMS			
	Clause / Requirements	Conformance Code	Remarks / Comments
Charger Supply			
AC Supply	230V / 1 Phase		
Nominal supply frequency	50Hz		
Supply frequency range	47-52Hz		
Charger			
Type	Optimised. State		
Ambient temperature range	-5 / +40 °C		
Maximum Float Voltage	34 V		
Maximum Voltage	37.2V		
Rated charging current	Charging current + 1A		
Normal float charge	0.5A at rated input voltage		
Variation in charging voltage as input voltage varies over range of -10% + 6% of rated value: Across load range 0 – 10% Across load range 10% - Full Load	 Max 2 % Max 1%		
Variation in current limit over the specified voltage range of the battery.	Max 2% of nominal		
Frequency range over which charger performance should be met.	47-52Hz		
Max earth current with one pole of battery earthed (at maximum battery voltage)	5 mA		
Transformer screened as per specification	Required		
Secondary Wiring	ENATS 50-18		

TECHNICAL SPECIFICATION FOR STANDARD 30V STANDING LOAD BATTERY AND CHARGER SYSTEMS			
	Clause / Requirements	Conformance Code	Remarks / Comments
System Monitoring			
High voltage alarm setting (adjustable)	Local+Contact *		
Low voltage alarm setting (adjustable)	Local+Contact *		
Charger fail alarm	Local+Contact *		
Battery earth fault alarm	Local+Contact *		
Battery high resistance or open circuit	Local+Contact *		
Facility for remote alarm common alarm	Local+Contact *		
Alarm circuit fuse rating	State rating and type		
Battery Damage (Auto Disconnect / Restore)	Auto Disconnect		
Battery earth fault alarm test facility			
Operating Method	"return to off" type switch		
Test Resistor (% below sensitivity of E/F relay)	10%		
Instruments			
Battery output voltmeter	Push or self-reset switch		
Charger output ammeter	Required		
Optional DC output ammeter	Required Option (0-100mV/A)		

* - Local indication + "spare" NO-VOLT contact available for remote alarm

TECHNICAL SPECIFICATION FOR STANDARD 30V STANDING LOAD BATTERY AND CHARGER SYSTEMS				
	Cubicles and Battery Stands			
	Design life	40 Years		
	Cubicle cable entry position	Bottom		
	Cubicle Colour	Light / Grey		
	Cubicle Earthing	Range 16²mm to 95²mm connection		
	Exposed Conductors	Shrouded		
	Doors	Lockable		
	Dimensions (approx. 800 x 600 x 300mm)			
	Distribution Board			
	Number of ways	Minimum 2		
	Rating of ways	16 A		
	Output Protection and Isolation			
	Type	HD 60269-2 Fuse or BS EN 60898-Part 1 & 2 MCB		

TECHNICAL SPECIFICATION FOR ENHANCED 30V STANDING LOAD BATTERY AND CHARGER SYSTEMS			
	Clause / Requirements	Conformance Code	Remarks / Comments
System Output Characteristics			
Nominal voltage	30V		
Float voltage (max acceptable)	34V		
Minimum voltage after specified discharge profile	28V		
Maximum charger voltage under all conditions	37.2V		
Maximum open circuit voltage	State		
Battery			
Standard	State (BS/IEC?)		
Type of cells	State		
Service life	20Years		
Aging factor applied	1.25 lead acid 1.1 Ni-cad		
Minimum topping-up period	N/A		
Number of cells in battery	State		
Float voltage per cell	State (V)		
Rated temperature	15 ^{o}C		
Temperature range	/ +40 ^{o}C		
Cell mounting: Cubicle? Tiered?	State		
Connectors	Shrouded		
Isolatable from both dist. board and charger	Required		
Battery Earthing	Unearthed		
Test Facility	Required		
Auto Battery Disconnect	Required with Override / Bypass		

TECHNICAL SPECIFICATION FOR ENHANCED 30V STANDING LOAD BATTERY AND CHARGER SYSTEMS			
	Clause / Requirements	Conformance Code	Remarks / Comments
Charger Supply			
AC Supply	230V / 1 Phase		
Nominal supply frequency	50Hz		
Supply frequency range	47-52Hz		
Charger			
Type	Constant Voltage		
Ambient temperature range	-5 / +40 °C		
Maximum Float Voltage	34 V		
Maximum Voltage	37.2V		
Voltage adjustment facility (float and boost - located behind facia).	Required		
Rated charging current	Charging current + 1A		
Normal float charge	0.5A at rated input voltage		
Variation in charging voltage as input voltage varies over range of -10% + 6% of rated value: Across load range 0 – 10% Across load range 10% - Full Load	 Max 2 % Max 1%		
Variation in current limit over the specified voltage range of the battery.	Max 2% of nominal		
Frequency range over which charger performance should be met.	47-52Hz		
Max earth current with one pole of battery earthed (at maximum battery voltage)	5 mA		
Transformer screened as per specification	Required		
Secondary Wiring	ENATS 50-18		

TECHNICAL SPECIFICATION FOR ENHANCED 30V STANDING LOAD BATTERY AND CHARGER SYSTEMS			
	Clause / Requirements	Conformance Code	Remarks / Comments
System Monitoring			
High voltage alarm setting (adjustable)	Local+Contact *		
Low voltage alarm setting (adjustable)	Local+Contact *		
Charger fail alarm	Local+Contact *		
Battery earth fault alarm	Local+Contact *		
Battery high resistance or open circuit	Local+Contact *		
Facility for remote alarm common alarm	Local+Contact *		
Alarm circuit fuse rating	2 A		
Battery Damage (Auto Disconnect / Restore)	Auto Disconnect		
Battery earth fault alarm test facility			
Operating Method	"return to off" type switch		
Test Resistor (% below sensitivity of E/F relay)	10%		
Instruments			
Battery output voltmeter	Push or self-reset switch		
Charger output ammeter	Required		
Optional DC output ammeter	Required Option (0-100mV/A)		

* - Local indication + "spare" NO-VOLT contact available for remote alarm

TECHNICAL SPECIFICATION FOR ENHANCED 30V STANDING LOAD BATTERY AND CHARGER SYSTEMS			
Cubicles and Battery Stands			
Design life	40 Years		
Cubicle cable entry position	Bottom		
Cubicle Colour	EXTERNAL -light colour, preferably grey, INTERNAL - white		
Cubicle Earthing	Range 16²mm to 95²mm connection		
Exposed Conductors	Shrouded		
Doors	Lockable		
Dimensions (approx. 1400 x 600 x 300mm)			
Distribution Board			
Number of ways	Minimum 2		
Rating of ways	16 or 32A depending on site requirements		
Output Protection and Isolation			
Type	HD 60269-2 Fuse		

Appendix 4 – Schedule of Requirements

Item	Commodity #	Product Description
1	290296	7.5Ah 30V Switch Tripping Primary Cell Lithium-Ion Battery Unit complete with a monitoring/alarm facility in accordance with Northern Powergrid NSP003002
2	215989	10Ah, STANDARD 30V STANDING LOAD Switch Tripping Unit consisting of Sealed Secondary Lead Acid Battery cells complete with a suitable charging/monitoring/alarm facility in accordance with Northern Powergrid NSP003002
3	N/A	24Ah, ENHANCED 30V Switch Tripping Unit consisting of Low Maintenance Secondary Nickel Cadmium Battery cells complete with a suitable charging/monitoring/alarm facility in accordance with Northern Powergrid NSP003002

Appendix 5 – Addendum to Suppliers Requirements

None

Appendix 6 – Pre-Commission Testing, Routine Inspection, Test and Maintenance Requirements

Tenderers shall provide details of the recommended pre-commission testing and inspection required.
Details of the Test Voltage Levels, duration, pass/fail criteria, etc. shall be provided.
Tenderers shall state any maximum voltage that may be applied or any other limitations that may apply.

Tenderers shall provide information regarding detailed and periodic inspection and maintenance requirements to be undertaken during the lifetime of their product. This shall include detailed instruction and guidance on any specific testing requirements, equipment and/or procedures to reliably ascertain the products service condition and suitability during the expected lifetime.

Appendix 7 – Technical Information Check List

Provided (Y/N)	Requirement
	Full product descriptions and part number/reference
	Complete set of drawings for each variant
	Appendix 3 – completed self-certification conformance declaration against applicable BS EN standards, ENA TS 50-18 and NPS/003/002
	Appendix 6 - Recommended periodical inspection, test and maintenance requirements
	Appendix 7 – This table
	Type test & special test listing and/or evidence
	Routine test plan (example)
	Packaging/transport/delivery/handling/storage information