NPS/003/027 – Technical Specification of 24volt Battery and Charger Systems for SCADA and Telecontrol

1. Purpose

This document is the technical specification for 24volt DC SCADA and Telecontrol batteries 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/003/027	Technical Specification of 24volt Battery and Charger Systems for SCADA and Telecontrol	2.1	May 2016

2. Scope

This document establishes the requirements for 24volt DC SCADA and Telecontrol batteries and charger systems for use at the Company's substations where DC supplies are required for the remote operation and monitoring of plant and equipment via SCADA.

Northern Powergrid own and operate a Private Corporate Network (PCN) which provides a transmission medium for data, Private Mobile Radio (PMR), operational telephony, SCADA systems and electricity network protection signalling throughout the licensed areas.

There is 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
- Appendix 2: Declaration of Technical Specification Sheet
- 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 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

This specification covers batteries, charger units and complete installations with integral charging facilities. Units with or without charging equipment will be considered depending on specific site requirements.

Battery cells shall be low maintenance sealed types. Wet cells are not acceptable.

It is understood, and an important consideration, that development in stored energy research and improvements in new and existing technologies in the areas of efficiency, capacity and lifespan may lead to the opportunity to offer alternatives to battery technologies currently accepted and in use. Such innovation is encouraged but will require a formal proposal stating the benefits and a detailed plan of testing, assessment and evaluation before being considered.

In accordance with ENA ER-G91 – *Substation Black Start Resilience*, core electricity transmission and distribution substations designated as *Local Joint Restoration Plan* (LJRP) sites are to be designed so that they are resilient for a minimum period of 72 hours. This means that substation protection, control and SCADA functions shall be available such that the site can be safely energised within 72 hours of the inception of a Black Start event. To achieve the required resilience, SCADA batteries are required to operate and meet demand for a minimum of 72 hours on LJRP Sites.

LJRP Sites are defined as Grid Supply Point (GSP), Bulk Supply Point (BSP) or Primary Substations.

LJRP sites require a battery unit with a resilience of 72 hours with a standing load of 8A.

Non-LJRP sites require a resilience of 6 hours with a standing load of 8A.

The voltage characteristics shall be as follows:

Nominal voltage	24V
Equipment normal working voltage	24V
Minimum voltage at distribution board	23V
Maximum charger voltage under all conditions	30V
Minimum voltage at terminals of equipment supplied by the distribution board	21V

Equipment energised from these supplies will be capable of operating over the range 20.4V to 30V.

Where site conditions impose a constraint on available space, a popular solution adopted has been to install a system in a parallel format, thereby achieving the required capacity with a larger number of cells with smaller physical size. This is NOT a preferred arrangement, and all other options shall be evaluated and considered before choosing this as a solution. Where this becomes absolutely necessary, then the system shall be supplied with an ADVANCED monitoring system fully capable of detecting and identifying individual cell failures.

The equipment shall comply with the current editions of BS EN 60896-21, BS EN 60896-22, ENATS 50-18 and BS EN 60622, except where varied by this specification, and with Appendices 1, 2 and 4 of this specification.

Equipment supplied shall comply with the specification in Appendix 1.

The technical specification of any system must be declared using the table in Appendix 3.

3.3. Charger

3.3.1. Chargers shall be operated from a 230V single phase 50Hz AC supply from a dedicated output on the substation LVAC distribution board.

3.3.2. Where chargers are supplied as a component within a full system, its characteristics shall be matched and optimised for the battery technology and cells provided. Historically, constant voltage single or two stage types have been provided to suit the battery. The charging level and range shall be set to suit the battery and manufacturer's recommendations to maximise battery life. A facility shall be provided to enable this level to be adjusted under maintenance and test conditions.

3.3.3. Chargers shall be automatically temperature compensated if necessary to provide the required performance over the expected temperature range.

3.3.4. The charger shall be rated to supply the required standing load on the system plus the battery supplier recommended charging current for all conditions.

3.3.5. For Lead Acid cells, the output voltage should be maintained at the load terminals at 27.36V over the rated load range for changes in input mains voltage of + 10% -6% and changes in frequency of ±5%. Output voltage ripple shall be less than 2mV (RMS). Alternative cell technologies should have a float voltage optimised for that particular type.

3.3.6. No voltage transients should occur on the application or restoration of mains supply to the charger.

3.3.7. Charger transformers shall comply with ENA TS 50-18 for the required duty and temperature limits under all conditions. The insulation between each winding, screen, core and frame and all other circuits on the system directly connected to the 230V A.C. system 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.

3.3.8. The charger shall not produce interference on the A.C. input in excess of that specified in the current version of EA Engineering Recommendation G5 at the time of manufacture.

3.3.9. 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. Cubicle

3.4.1. Equipment shall be housed in lockable, site suitable, 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.

3.4.2. The cubicle shall be so designed and constructed as to provide minimum ingress protection to classification IP32 in accordance with BS EN 60529. Cover panels shall be removable without the use of hand tools.

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

3.4.4. 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. All exposed terminals on the rear of the front door, shall be adequately shrouded.

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

3.4.6. As a minimum, two 20 mm access holes shall be provided in the side of the cubicle to facilitate external input and output wiring connections. Where these main connections are via a steel gland plate within the floor of the cubicle, this gland plate shall be a split design so that they can be removed without disturbing glanded cables.

3.4.7. Suitable provision shall be made for earthing of the unit.

3.4.8. Connecting links and terminations to and from and between battery cells shall be suitably shrouded to limit and reduce the amount of exposed current carrying conductor.

3.4.9. 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 gasses which may be produced within the unit under fault conditions.

The cubicle shall be polyester powder coated with a light colour, preferably grey on the outside and white on the inside.

3.4.10. Typically, Northern Powergrid state the cubical footprint dimensions as 600x600mm, however, due to the extra capacity required to meet ENA ER G91 this may not be achievable and so larger dimensions may be considered.

3.5. AC Input

3.5.1. The DC system will be supplied by a 230volt +10% / -6% AC single phase supply which shall be isolatable via a Double Pole Switch and Fuse or MCB. The fuse or MCB shall be of sufficient rating to avoid operation by the magnetising inrush of the transformer.

3.5.2. The AC input is to be connected to the system via a Surge Protection Device (SPD) to BS EN 61643-11 that will protect the AC charger and DC system against surge and prolonged overvoltage conditions on the AC supply.

3.5.3. Where the Battery Charger is being installed or replaced as part of NEW substation installation OR a FULL REFURBISHMENT of a substation, then they shall be TYPE 2 – Permanently connected, installed on the LOAD side of the Service Equipment over current device.

3.5.4. Where the Battery Charger / Battery System only is being replaced AND no TYPE 2 SPD is installed, then the SPD will be TYPE 3 – Point of utilization installed at the equipment being protected.

3.6. DC Distribution

3.6.1. The system will have a minimum of 2 built in DC outlets to provide local site distribution. These will be rated as 16A and EITHER BS EN 60898-2 MCB's or Cartridge type fuses to HD 60269-2.

3.6.2. All protection / isolation devices shall be panel mounted and clearly labelled. Fuses will be replaceable with the minimum of tools.

3.6.3. All terminations and test points that may be used for installation, maintenance and/or fault finding shall be safely and easily accessible.

3.7. System Monitoring Alarms

3.7.1. The system will be able to display current status and alarms locally and also have provision for remote monitoring purposes.

3.7.2. As a minimum, alarms / outputs as specified below will be provided. Any additional that are not specified should be listed.

System monitoring shall include on the front panel:

- Mains healthy/failed indication
- Charger healthy/failed indication
- Low voltage disconnection indication
- Battery voltage meter
- Charge output/battery current
- SPD healthy/failed indication (Applicable to TYPE 3 only)

The following remote monitoring should be provided:

- Battery voltage

The following remote alarms should be provided:

- Charger output fail
- 24v Battery Urgent
- 24v Battery Non-Urgent (Earth Fault)

4. References

4.1. External Documentation

Reference	Title
BS EN 60622	Secondary cells and batteries containing alkaline or other non-acid electrolytes – sealed nickel cadmium prismatic rechargeable single cells
BS EN 60896-22	Stationary lead-acid batteries Part 22: Valve regulated types – Requirements
BS EN 60896-21	Stationary lead-acid batteries Part 21: Valve regulated types – Methods of test
BS EN 60529	Degrees of protection provided by enclosures (IP code)
ENATS 50-18	Design and application of ancillary equipment
ENA ER G-91	Substation Black Start Resilience
ENA ER G5-3	Limits for Harmonics in the UK Electricity Supply System
BS EN 60898-2	Circuit-breakers for overcurrent protection for household and similar installations. Circuit-breakers for AC and DC operation
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
BS EN 61643-11	Surge protective devices connected to low-voltage power systems. Requirements and test methods

4.2. Internal Documentation

Reference	Title
n/a	

4.3. Amendments from Previous Version

Reference	Description
3.5.2 AC Input	SPD requirements widened to ensure prolonged overvoltage is protected against
4.2 Internal Documentation	Reference removed as document does not exist and no replacements found

5. Definitions

Term	Definition
Local Joint Restoration Plan (LJRP) Site	LJRP sites include all Primary Substations, Bulk Supply Points and Grid Supply Points **except** sites that provide a connection to generators only or sites that supply a single customer.
LVAC	Low Voltage Alternating Current
MCB	Miniature Circuit Breakers
PCN	Private Corporate Network
SCADA	Supervisory Control and Data Acquisition
SPD	Surge Protection Device
Telecontrol	The operating, regulating or managing of a piece of equipment or apparatus from a remote location to that where the equipment or apparatus being operated or managed is located.
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
Deb Dovinson	Governance Administrator	25/03/2024

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
Paul McAdoo	Lead Policy & Standards Engineer	12/04/2024

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
Alan McDonald	Policy & Standards Engineer	09/04/2024
Michael Crowe	Lead Technical Engineer	24/04/2024
Andrew Scott	Technical Services Manager	30/09/2024

6.4. Authorisation

Authorisation is granted for publication of this document.

		Date
Paul Black	Head of System Engineering	22/05/2024

Appendix 1 – Technical Specification for a SCADA and Telecontrol 24V Battery and charger system.

Battery Output Voltages and Load Duty	
Nominal voltage	24V
Float voltage	27.36V
Minimum open circuit voltage (OCV) after specified discharge profile	21V
Maximum voltage under all conditions	30V
Battery standing load	8A
Battery discharge profile for Non-LJRP site	8A/ 6 hr
Battery discharge profile for LJRP site	8A / 72 hr
Other Battery Design Factors	
Configuration	Series connection preferred, parallel discouraged
Type	Low Maintenance sealed type.
Service life	10 years
Number of cells	Dependant on technology
Battery Capacity	To meet the discharge profile indicated
Ageing factor	1.25 lead acid / 1.1 Ni-Cd
Minimum topping-up period	N/A
Rated temperature	15°C
Temperature range	0°C,+ 40°C
Mounting	Integrated Battery and Charger Wall Mounted Cubicle
Connectors	Shrouded
Isolation facilities required	From charger and distribution board
Battery earthing	The battery shall be unearthed
Low Voltage Disconnect	A load disconnect feature is required to prevent battery damage.
Charger Supply	
AC Supply	230V AC single phase
Supply Isolation	Double Pole Switch and Fuse or MCB
Supply Range	+10% / -6%
Nominal supply frequency	50Hz
Supply frequency range	47 - 52 Hz
Surge Protection	Type 2 or Type 3 depending on situation
Charger	
Type	Suited to cells, historically Constant voltage, single or multi stage, temperature compensated.
Ambient temperature range	0°C, + 40°C
Float Voltage	27.36V – Lead Acid, Optimised for other types
Maximum voltage under all conditions	30V
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
Charger voltage ripple / transient output	≤2mV (RMS) CCITT weighted No voltage transient shall occur on restoration of charger mains supply.

Battery/Charger Output Variation for: - Input voltage of 230v +10% -6% Frequency of 50Hz +/- 10% Output load between 0 – 100%	27.36V +/- 0% - Lead Acid Optimised to Manufacturers recommendation on other types (@ output terminals)
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 / Alarms	
Supply healthy / fail alarm	Local indication plus spare contact
Charger healthy / fail alarm	Local indication plus spare contact
Battery low voltage disconnect	Local indication plus spare contact
SPD healthy / fail alarm (where TYPE 3 is fitted)	Local indication plus spare contact
24v Battery Urgent Alarm	Contact for Remote
24v Battery Non-Urgent Alarm	Contact for Remote
Monitoring alarm protection	2A HRC fuse
Remote voltage indication	Battery output connected to terminals via 1.82kΩ precision resistor (+ve) for voltage monitoring or 0 to 10mA Transducer output to represent 15Vdc to 30Vdc
Instruments	
Battery output voltmeter	Local indication
Charger output ammeter	Local indication
Cubicles and Battery Stands	
General arrangement	Integrated Battery and Charger Wall Mounted Cubicle
Design life	40 years
Cubicle cable entry	Bottom
Cubicle Colour	External - Light grey, Internal - White
Exposed conductors	Shrouded
Doors	Lockable
Distribution Board	
Number of ways	Min 2
Rating of ways	16A
Labels	
Distribution Output Isolation	
Type	Cartridge Fuse: HD 60269-2 OR MCB: BS EN 60898-2

Appendix 2 – Declaration of Technical specification for a SCADA and Telecontrol 24V Battery and Charger System

	UNIT	ALL SYSTEMS
System Output Characteristics		
Nominal voltage	V	
Float voltage (max acceptable)	V	
Minimum voltage after specified discharge profile	V	
Maximum charger voltage under all conditions	V	
Battery		
Standard	BS/IEC?	
Type of cells		
Design life	Years	
Aging factor applied		
Minimum topping-up period	Years	
Number of cells in battery	No.	
Float voltage per cell	V	
Rated temperature	°C	
Temperature range	°C	
Cell mounting: Cubicle? Tiered?	State	
Connectors: Shrouded?		
Isolation from both distribution board and charger?		
Battery earthing: Unearthed?		
Charger Supply		
AC Supply	V + θ	
Nominal supply frequency	Hz	
Supply frequency range	Hz-Hz	
Surge Protection - State Type and Provide details of Device		
Charger		
Type		
Ambient temperature range	°C - °C	
Maximum Float Voltage	V	
Boost voltage	V	
Voltage adjustment facility: Float and boost	Y/N	
Rated charging current	A	
Normal float charge	A	
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	 % %	
Variation in current limit over the specified voltage range of the battery.	%	
Frequency range over which charger performance should be met.	Hz - Hz	
Max earth current with one pole of battery earthed (at maximum battery voltage)	mA	

Transformer screened as per specification?	Y/N	
System Monitoring / Alarms		
High voltage alarm setting	V	
Low voltage alarm setting	V	
Charger fail alarm	V	
Battery earth fault alarm	kΩ	
Battery high resistance or open circuit	Yes/No	
SPD fault alarm (where Type 3 is installed only)	Yes/No	
24v Battery Urgent Alarm	Yes/No	
24v Battery Non-Urgent Alarm	Yes/No	
All alarms have local indication?	Yes/No	
Contacts for remote alarm: Individual/Common?		
Alarm circuit fuse rating	A	
Battery earth fault alarm test facility		
Is this provided?	Yes/No	
% rating against E/F relay sensitivity	%	
Discharge Test Facility		
Is this provided?	Yes/No	
Discharge rate		
Operating method		
Warning label provided?	Yes/No	
Instruments		
Battery output voltmeter	Yes/No	
Charger output ammeter	Yes/No	
Cubicles and Battery Stands		
Design life	Years	
Cubicle cable entry position		
Cubicle Colour		
Exposed conductors shrouded	Yes/No	
Doors lockable	Yes/No	
Distribution Board		
Number of ways		
Rating of ways		
Distribution Output Isolation		
Type		
AC interrupting current	kA	

Appendix 3 – SELF CERTIFICATION CONFORMANCE DECLARATION

24V SCADA and Telecontrol 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.

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 a remark IS still necessary; Provide details of how/why compliance is achieved. Include references to type tests, etc.
- 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 SCADA AND TELECONTROL 24V BATTERY AND CHARGER SYSTEMS			
	Clause / Requirements	Conformance Code	Remarks / Comments
System Output Characteristics			
Nominal voltage	24V		
Float voltage (max acceptable)	27.36V – Lead Acid, Others - optimum		
Minimum open circuit voltage (OCV) after specified discharge profile	21V		
Maximum charger voltage under all conditions	30V		
Maximum open circuit voltage	State		
Battery			
Standard	State (BS/IEC?)		
Type of cells	State		
Service life	10 Years		
Aging factor applied	1.25 / 1.1 / Other (State)		
Minimum topping-up period	N/A		
Number of cells in battery	State		
Float voltage per cell	State (V)		
Rated temperature	15 °C		
Temperature range	0 / +40 °C		
Cell mounting:	State		
Connectors	Shrouded		
Isolatable from both distribution board and charger	Required		
Battery Earthing	Unearthed		
Remote Voltage Monitoring Facility	Required		
Auto Battery Disconnect	State		

TECHNICAL SPECIFICATION FOR SCADA AND TELECONTROL 24V BATTERY AND CHARGER SYSTEMS				
		Clause / Requirements	**Conformance Code**	**Remarks / Comments**
	Charger Supply			
	AC Supply	230V / 1 Phase		
	Supply Isolation	DP Switch and Fuse or MCB		
	Nominal supply frequency	50Hz		
	Supply frequency range	47-52Hz		
	Surge Protection (Type including details)	Type 2 or Type 3		
	Charger			
	Type	State		
	Ambient temperature range	0 / +40 °C		
	Float Voltage	27.36 V		
	Maximum Voltage	30V		
	Voltage adjustment facility (float - located behind facia).	Required		
	Battery/Charger Output Variation for: - Input voltage of 230v +6% / -10% Frequency of 50Hz +/- 10% Output load between 0 – 100%	27.36V +/- 0% (@ output terminals)		
	Transformer screened as per specification	Required		
	Secondary Wiring	ENATS 50-18		

TECHNICAL SPECIFICATION FOR SCADA AND TELECONTROL 24V BATTERY AND CHARGER SYSTEMS			
	Clause / Requirements	**Conformance Code**	**Remarks / Comments**
System Monitoring			
Mains input healthy / fail	Local+Contact *		
Charger output healthy / fail	Local+Contact *		
SPD healthy / fail (where Type 3 is fitted)	Local+Contact *		
24v Battery Urgent Alarm	Remote Contact		
24v Battery Non-Urgent Alarm	Remote Contact		
Alarm circuit fuse rating	2 A		
Battery Damage (Auto Disconnect / Restore)	Auto Disconnect		
Instruments			
Battery output voltmeter	Required		
Charger output ammeter	Required		
Cubicles and Battery Stands			
Design life	40 Years		
Mounting Arrangement	Wall		
Cubicle cable entry position	Bottom		
Cubicle Colour	Light Grey		
Exposed Conductors	Shrouded		
Doors	Lockable		
Dimensions (state H x W x D in mm)			
Distribution Board			
Number of ways	Minimum 2		
Rating of ways	16 A		
Distribution Output Isolation			
Type	HD60269-2 Fuse OR MCB : BS EN 60898-2		

* - Local indication + “spare” contact available for remote alarm

Appendix 4 – Schedule of Requirements

Item	Description
1	24V DC LJRP Site SCADA Battery and Charger System; 8A Standing load for 72 Hours Minimum to NPS0030027 – Equipment Supply only
2	24V DC NON-LJRP Site SCADA Battery and Charger System; 8A Standing load for 6 Hours Minimum to NPS003027 - Equipment Supply only
3	Charger / Monitoring / Alarm Unit for 24V DC LJRP Site SCADA system; 8A Standing load for 72 Hours Minimum to NPS0030027 – Equipment Supply only
4	Charger / Monitoring / Alarm Unit for 24V DC NON-LJRP Site SCADA system; 8A Standing load for 6 Hours Minimum to NPS0030027 - Equipment Supply only
5	Battery cell – Sealed monobloc type for 24V DC LJRP Site SCADA system; 8A Standing load for 72 Hours Minimum to NPS0030027 – Equipment Supply only
6	Battery cell – Sealed monobloc type for 24V DC NON-LJRP Site SCADA system; 8A Standing load for 6 Hours Minimum to NPS0030027 - Equipment Supply only

Appendix 5 – Addendum to Suppliers Requirements

Project specific installation and protection requirements will be provided by Primary Engineering Projects for inclusion in this appendix.

Appendix 6 - Pre-commission testing, Routine Inspection 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.

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 2 - completed technical information check list
	Appendix 3 – completed self-certification conformance declaration against applicable BS EN standards, ENA TS 50-18 and NPS/003/027
	Appendix 6 - Recommended periodical inspection 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