National Utilities Management and Administration

Project Number:

HO/CRES/REAM/

AGREEMENT ENTERED INTO

BY AND BETWEEN:

PRASA-CRES, a division of PRASA,

and

……..

RECORDALS

1.1 **PRASA CRES** is a division of **PRASA**, which has been mandated to manage all the property facility services to **the entire PRASA Group**;

1.2 For purposes of this agreement the **Service Provider (SP)** shall supply the Deliverables, consisting of Automated Metering Technical Services.

1.3 Against that background, **PRASA CRES** issued an open tender for the provision of Automated Metering Technical Services for stations and associated properties Nationally, including commercial developments;

1.4 The deliverables also encompasses installation of new meters and related equipment at selected PRASA stations, depots, campuses, units and commercial developments;

1.5 Following the open tender and evaluation processes the **SP** was appointed to attend to Automated Metering Technical Services, for the duration of the Agreement period.

PREAMBLE

WHEREAS, the SP and its affiliate companies are active, among other things, in the provision of Utilities Management and related services and in the installation and marketing of utility (water, electricity and gas) metering equipment and associated systems; and

WHEREAS, PRASA (hereinafter the "Customer") has issued a tender for Utilities Management and Administration Services with reference no: HO/CRES/REAM/ …….…… (the "Tender"); and

WHEREAS, after having reviewed and considered all the submitted proposals, the Customer has awarded the Tender to the SP for the supply of the Deliverables (as defined here bellow); and

WHEREAS, by the present, the Parties would like to define the Parties' mutual rights and obligation with respect to the Deliverables in one document, the Agreement (based on the Tender documents and the offer made by the SP).

NOW THEREFORE THE PARTIES AGREE AS FOLLOWS:

2. **INTERPRETATION**

The headings to the clauses are for the purpose of convenience and reference only and shall not be used in the interpretation of nor modify nor amplify the terms of this agreement nor any clause. In this agreement unless a contrary intention clearly appears:

2.1 words importing –

2.1.1 any one gender includes the other two genders;

2.1.2 the singular includes the plural and vice versa; and

2.1.3 natural persons include created entities (corporate or unincorporated) and vice versa.

2.2 when any number of days is prescribed in this agreement, same shall be reckoned exclusively of the first and inclusively of the last day unless the last day falls on a Saturday, Sunday or public holiday, in which case the last day shall be the next succeeding day which is not a Saturday, Sunday or public holiday;

2.3 Where figures are referred to in numerals and in words, if there is any conflict between the two, the words shall prevail.

3. DEFINITIONS

The following terms shall have the meanings assigned to them hereunder and cognate expressions shall have corresponding meanings, namely –

3.1 "**Affiliate**" of the SP means any and all companies from time to time directly or indirectly held or controlled by or controlling or under the same control as the SP, and the notion of control being understood as holding fifty percent (50%) or more of the nominal value of the issued share capital, or fifty percent (50%) or more of the voting power at general meetings, or the power to appoint a majority of the directors.

3.2 "**Agreement**" means the terms and conditions of this Agreement and all appendices attached hereto and incorporated herein shall mean this agreement together with appendices;

3.3 "PRASA" shall mean Passenger Rail Agency of South Africa;

3.4 "Parties" shall mean PRASA CRES and the SP;

3.5 "AMS" shall mean automated metering system;

3.6 "UMS" shall mean Utilities Management System;

3.7 "**Project Charter**" (also referred to as "**Statement of Work**") means the agreed upon deliverables, detailed description of the Professional Services to be provided by the SP to the Customer, logistics, roles and responsibilities and scheduled implementation and commissioning milestones of the above agreement (see Appendix 1); the project charter is the dynamic terms of reference for the total project and programme execution under the terms and conditions of this contract;

3.8 "**Change Order**" means a written request, signed by both Parties, for changes in scope, cost or other activities related to the SOW (scope of work).

3.9 "**Deliverable**s" mean the deliverables to be carried out by the SP under the Agreement as further described in the Project Charter framework.

3.10 "**Contract Period**" shall mean the period commencing **01 September 2022 to 31 August 2025.**

3.11 "**Fees**" means the fees to be paid by the Customer to the SP in consideration of the Deliverables in the Project Charter as further referred to in Appendix 1;

3.12 "**Product**" means the products which shall be purchased by the Customer under the Agreement as referred to in Appendix 1 and 3;

3.13 "**Professional Services**" means professional services to be provided by the SP in connection with the installation and commissioning of the Products which are more specifically described in the Statement of Work attached hereto as Appendix 1;

3.14 "**Statement of Work**" means a detailed description of the Professional Services to be provided by the SP to the Customer, including but not limited to the Deliverables, milestones and corresponding due dates, as mutually agreed upon by the Parties, which is annexed in Appendix 1.

3.15 "**Tender/RFP**" means the tender/RFP issued by the Customer and identified in the Preamble.

4. DURATION

This agreement shall be deemed to have commenced on **1 September 2022** and unless otherwise agreed in writing by both parties, shall terminate on **31 August 2025.**

5. CONTRACT PRICE

5.1 The price for the installation of the automated meters and equipment shall be R…… (Inc. VAT).

5.2 The above amount is inclusive of all capital services applicable to the project **during** its execution/construction phase.

6. PROCUREMENT OF AUTOMATED METERS AND RELATED SERVICES

6.1 The SP MAY PROCURE the automated metering equipment for power and water utilities to be installed at designated stations, depots, campuses, units, Commercial Developments and related properties from different certified original equipment manufacturers;

6.2 The equipment procured must comply with the relevant standards for the specific product and in addition be ISO / SABS approved;

6.3 All the meter devices and associated systems to be acquired and installed by the SP must in **addition** to the standards requirements be capable of:

6.3.1 To function as both Standard Transfer Specification and Automated Metering Infrastructure covering a wide range of original equipment manufacturers;

6.3.2 To ensure that the AMS provides a complete metering solution for the selected PRASA CRES stations, depots, campuses, commercial developments, units and related properties that include all facets of utilities (i.e. water, electricity and gas where applicable) metering;

6.3.3 To operate in an online environment and it must already be integrated with an existing and matured electronic and retail purchase and vending channels on a national basis, including:

6.3.3.1 Online credit card;

6.3.3.2 Bank cash deposit and Electronic Funds Transfer; and

6.3.3.3 Retails points of sale such as BP, SASOL, SPAR, 711, Caltex, Engen, TOTAL, etc.

6.3.4 Being an end-to-end solution such that transactions and vending are reflected and completed in “real-time”, without batch processing, within a single relational data base;

6.3.5 To display information using remote keypad to the consumer;

6.3.6 To operate independently and be read manually;

6.3.7 Supporting two-way communication either directly or through data concentrator or data collector devices;

6.3.8 Remote control functions such as remote reading, remote programming, remote diagnosis, remote disconnect and reconnect;

6.3.9 To detect various events and generate appropriate alerts.

6.4 An end-to-end transparency is a prerequisite, such that consumers are able to access the detail of their utility metering accounts and that authorized Prasa CRES staff must be able to access the system using any standard web browser within the Prasa ICT architecture.

7. INSTALLATION (see project charter, Appendix 1)

7.1 PRASA and the SP shall act in accordance and comply with all applicable environmental, health and safety rules in performance of the work relative to policy, procedure, regulation and standards as per the Project Charter framework, Appendix 1.

7.2 If required, the SP shall remove old and / or obsolete and / or defective meters at all the stations, depots, campuses, units and commercial developments being included in this project and substitute them for new automated pre- and post-paid meters.

7.3 The automated meters and associated equipment shall be designed in such a manner that they can be operated online.

7.4 AMS SHALL BE DESIGNED in such a manner as to ensure that it records precise usage by each PRASA customer;

7.5 Shall be able to produce prompt and reliable invoicing information.

8. APPLICABLE LAW AND JURISDICTION

8.1 Save as otherwise provided in this agreement or any of its annexures and, in particular, subject to and without limiting the application of –

8.1.1 All matters arising from or in connection with this agreement and/or its annexures including, but without any limitation whatsoever, its interpretation, validity, existence or termination for any reason shall be determined in accordance with the laws of South Africa;

8.1.2 the parties hereby consent and submit to the non-exclusive jurisdiction of the High Court of South Africa (South Gauteng) for the purpose of any action or other legal proceedings which any of them may institute with regard to any matters or claims of whatsoever nature arising out of or pursuant to this agreement or its annexures;

8.1.3 either party agrees that it will recognise any judgment or order of court, whether interim or final, granted in South Africa against it in favour of the

other which is not the subject of an appeal arising from or pursuant to this agreement or its cancellation or termination, for the purpose of the enforcement thereof in South Africa or elsewhere.

9. **GENERAL**

9.1 The provisions of this agreement shall be binding upon the successors-in-title and assigns of the parties.

9.2 No variation of this agreement, or any waiver of any of the provisions of this agreement, or any consensual cancellation of this agreement, shall be effective unless reduced to writing and signed by or on behalf of the parties.

9.3 No indulgence which either party may grant to the other shall constitute a waiver by the former of any of its rights under this agreement. Accordingly, that party shall not be precluded, as a consequence of its having granted such indulgence, from exercising any of its rights against the other which may have arisen in the past or which may arise in the future.

9.4 Either party represents and warrants to the other that it is a natural or a legal entity duly incorporated or formed and validly existing under the laws of South Africa and has all requisite powers to own property and to be bound by this agreement in the manner contemplated by this agreement and to execute, deliver and perform its obligations in terms of this agreement.

9.5 Save as set forth in this agreement, neither party may cede its rights nor delegate its obligations under this agreement to any other person or persons, company or any other entity whatsoever or to any trust, without the prior written consent of the other, which shall not be unreasonably withheld.

10. **DISPUTES**

Any dispute arising out of or in connection with this agreement or the subject matter of this agreement shall be decided by arbitration to be held under the auspices of and in terms of the rules of the Arbitration Federation of South African in Johannesburg.

11. **BREACH**

If either party breaches any material provision or term of this agreement (other than those which contain their own remedies in the event of a breach thereof) and fails to

remedy such breach within 30 (thirty) days of receipt of written notice requiring it to do so (or if it is not reasonably possible to remedy the breach within 30 (thirty) days, within such further period as may be reasonable in the circumstances) then the aggrieved party shall be entitled without notice, in addition to any other remedy available to it at law or under this agreement, including obtaining an interdict, to cancel this agreement or to claim specific performance of any obligation whether or not the due date for performance has arrived, in either event without prejudice to the aggrieved party's right to claim damages.

12. NOTICES AND DOMICILIA

12.1 ***Postal address***

12.1.1 Any written notice in connection with this agreement may be addressed:

12.1.1.1 in the case of Prasa CRES to:

telefax no :

marked for the attention of:

…….

……..

12.1.1.2 in the case of the SP to:

telefax no :

marked for the attention of:

…….

……..

12.1.2 The notice shall be rebuttable presumed to have been duly given:

12.1.2.1 14 days after posting (by airmail for addresses outside South Africa), if posted by registered post to the party's address in terms of this sub-clause;

12.1.2.2 on delivery, if delivered to the party's physical address in terms of either this sub-clause or the next sub-clause dealing with service of legal documents;

12.1.2.3 on dispatch if sent during business hours one business day or if sent at any other time, on the next following business day, if sent to the party's then telefax number and confirmed by registered letter posted no later than the next business day.

12.1.3 Either party may change its address for this purpose, by notice in writing to the other party, such address being effective on receipt by the addressee of such written notice. A notice shall be necessary in respect of a new or changed telefax number.

12.2 ***Address for service of legal documents***

12.2.1 The parties choose the following physical addresses at which documents in legal proceedings in connection with this agreement may be served (that is to say, their domicilia citandi et executandi):

12.2.1.1 Prasa CRES:

30 Wolmarans Street

Braamfontein

12.2.1.2 SP:

……..

……..

12.2.2 Either party may change its address for this purpose to another physical address in the Republic of South Africa by notice in writing to the other, such new address being effective on receipt by the addressee of such written notice.

The provisions of 12.1.2.1 and 12.1.2.2 shall apply, mutatis mutandis in respect of notices given to the parties at their respective addresses in 12.2.1.

SIGNATURE

Signed on behalf of the Parties as set out below, each signatory hereto warranting that he has due authority to do so –

SIGNED by PRASA Cres at _____ on this ____ day of_____ 2022 in the

Presence of the undersigned witnesses;

…… ……..

(name) (Signature)

Who warrants that he is duly authorised

Witnesses:

1 …….. ……..

(Name) (Signature)

2 …….. ……..

(Name) (Signature)

SIGNATURE

SIGNED by ……on this _____ day

of_____ 2022 in the presence of the undersigned witnesses:

…… ……..

(Name) (Signature)

Who warrants that he is duly authorised

Witnesses:

1 …….. ……..

(Name) (Signature) 2 ……..

……..

(Name) (Signature)

AGREEMENT BETWEEN PRASA AND THE SP

APPENDIX 1

PROJECT CHARTER FRAMEWORK (STATEMENT OF WORK)

SCOPE OF WORK

The scope of work is to source a service provider to supply Automated Metering Technical Services and skills transfer. The scope will include:

- Automated metering technical services (new installations and replacement of meters and related equipment).

AUTOMATED METERING TECHNICAL SERVICES

The service provider is expected to provide PRASA CRES with the following technical services and support:

- To supply, install/replace and commission Single-Phase Electricity Credit Smart Meters (remote readable meters) when requested.
- To supply, install/replace and commission Three Phase Electricity Credit Smart Meters (remote readable meters) on request of PRASA CRES.
- To supply, install/replace and commission Single Phase Pre-Paid Electricity Meters (PLC) when requested.
- To supply, install and commission Three Phase Pre-Paid Electricity Meters (PLC) when requested.
- To supply, install /replace Electricity Credit Meter Modems when requested.
- The installation/replacement of Electricity Credit Smart Meter Sim Cards when requested.

- Supplying, installation/replacement/commissioning of Electricity Pre-Paid Meter Keypads (customer user interfaces) (PLC) on request.
- Installation or replacement of meter antennas to ensure effective communication with the utilities management system of the service provider.
- Supplying, installation or replacement of Pre-Paid Water Meters.
- Supplying, installation, replacement and commissioning of Water Pre-Paid Meter Keypads (customer user interfaces). Also known as Water Management Devices (WMD).
- Supplying, installation or replacement of Conventional Water Meters. Supplying, installation or replacement of Conventional Water Meters.
- The installation/replacement of Electricity Credit Smart Meters Sim Cards/Modems.
- Supplying, installation/replacement and commissioning of Remote-Readable Water Smart Meters (Ultrasonic water meters).
- Supply install and commission Internet of Things (IoT) Retrofittable communicating devices for existing conventional water meters. This is to enable the remote reading and management of already installed water meters.
- Site inspection and reporting on meters when non-function on request of PRASA CRES.
- Supplying, installation or replacement of check meters (water and electricity).
- Completion of the PRASA CRES Meter Installation Certificate Templates in respect of each new meter installation for Capitalization purposes.

COMPREHENSIVE UTILITIES MANAGEMENT AND ADMINISTRATION TRAINING

- The installation and on-site testing of smart electricity credit meters and pre-paid electricity meters.
- The installation and on-site testing of pre-paid water and conventional water meters.

AGREEMENT BETWEEN PRASA AND THE SP

APPENDIX 2: BUSINESS REQUIREMENTS

- The AMS system must support the appropriate metering technologies spanning a wide range of Original Equipment Manufacturers (OEM).
- Support of meter data management and vending for electrical power and water utilities across both STS and AMI equipment (prepaid and online meters).
- The current information architecture and system integrity will not be compromised in any format; similar or better than the current systems.The system will operate in the same, auditable online environment that is already integrated with existing and matured electronic and retail purchase and vending channels on a national basis, including: Online Credit Card, Bank Cash Deposit and EFT, and retails Points of Sale such as BP, SASOL, SPAR, Pick ‘n Pay, SHOPRITE, Seven Eleven, Caltex, ENGEN, TOTAL, etc.
- An end-to-end solution is required such that transactions and vending are reflected and completed in “real-time”, without batch processing, within a single relational database.
- End-to-end transparency is a pre-requirement, such that consumers are able to access the detail of their utility metering accounts and that authorised PRASA CRES staff must be able to access the AMS system using any standard Web Browser within the PRASA ICT Architecture.
- Every effort should be made to incorporate SMME firms to enhance the economic growth in the SMME sector, job creation and the stimulation of local economic development.
- Tenderers must observe the current billing and metering management process being undertaken by an existing service provider and must take the process over; and
- In all cases the current applicable ESKOM tariffs and Local Authorities’ guidelines regarding the supply of water will apply.

APPENDIX 3

AUTOMATED METERING TECHNICAL SERVICES: METER SPECIFICATIONS

SINGLE PHASE SMART CREDIT ELECTRICITY METER (REMOTE READABLE) SPECIFICATIONS

This specification applies to single phase bulk BS (British Standard) mounting Single Phase Commercial and Industrial Meters for direct connection, measurement of alternating current electrical energy consumption at a nominal frequency of 50 Hz.

- General Specification:
    - Voltage ratings: Nominal voltage between 60V and 230VAC (Voltage Alternating Current)
    - Supply frequency**:** 50Hz.
    - Current ratings (lb): Base current – 1-10A; and
    - Max current ($_{MAX}$): 100A
- Measurement:
    - True four quadrant measurements of kilowatt-hours delivered or received as well as kilowatt-hours leading and lagging for power delivered or received.
    - Active, reactive and apparent energy in both import and export mode.
    - Phase voltage and currents in individual phases and a sum up of the same.
    - Apparent, active and reactive power.
    - Power factor.
    - Frequency; and
    - Phasor angles.
- Accuracy: Class 0.5.
- Connection Types: Direct connection.
- Tariffs: Meter shall allow for programmable TOU (Time of Use).
- Load Profiles: At least 8 channels.

- End of Billing Data**:** 18 months.
- Communication: Allow for GPRS (General Packet Radio Service) internal or external plugin module.
- Meter must be provided together with a SABS approved PVC Type quality meter box.
- The meter must be compatible for use on the utilities management system of the service provider.
- Product life: Expectancy should be at least 15 years.
- Product warranty: 12 months from date of installation.
- The following National and International specifications apply:
    - SANS 1524-1(2014): Electricity payment systems – Part 1: Payment meters.
    - SANS 1799 (2015): Watt-hour meters – AC electronic meters for active energy.
    - SANS/IEC 62053-21(2003): Electricity metering equipment (ac.) – Particular Requirements - Part 21: Static meters for active energy (class 1).
    - SANS/IEC 62055-41: 1st Ed, (2007) Electricity Metering Payment Systems, Part 41 - Standard Transfer Specification (STS) – Application Layer protocol for one-way token carrier systems.
    - SANS/IEC 62055-51: 1st Ed, (2007) Electricity Metering Payment Systems, Part 51 - Standard Transfer Specification (STS) - Physical Layer Protocol for one-way numeric and magnetic card token carriers.
    - SANS/IEC 62055-52: Ed 1, (2009) Electricity Metering Payment Systems, Part 52 - Standard Transfer Specification (STS) - Physical Layer Protocol for a two-way virtual token carrier for direct local connection.
    - SANS 473(2017): Automated meter reading for large power users; and
    - SANS 474(2009): Code of practice for electricity metering.

THREE PHASE SMART CREDIT ELECTRICITY METER (REMOTE READABLE) SPECIFICATIONS

This specification applies to three-phase bulk BS (British Standard) mounting, Three Phase Commercial and Industrial Meters for CT (current transformer), measurement of alternating current electrical energy consumption at a nominal frequency of 50 Hz.

- General Specification:
    - Voltage ratings: Nominal voltage between 60/100V and 230/400VAC (Voltage Alternating Current)
    - Supply frequency: 50Hz.
    - Current ratings (Ib): Base current – 1-10A.
    - Max current ($_{MAX}$): 100A and above.
- Measurement:
    - True four quadrant measurements of kilowatt-hours delivered or received as well as kilowatt-hours leading and lagging for power delivered or received.
    - Active, reactive and apparent energy in both import and export mode.
    - Phase voltage and currents in individual phases and a sum up of the same.
    - Apparent, active and reactive power.
    - True RMS (Route Mean Square) voltage (3 phase).
    - True RMS current (3 phase).
    - Power factor.
    - Frequency.
    - Phasor angles.
- Accuracy: Class 0.5.
- Connection Types: Direct connection. CT (Current Transformer) and VT (Voltage Transformer) connection, 3 or 4 wires.
- Tariffs: Meter shall allow for programmable TOU (Time of Use).
- Load Profiles: At least 8 channels.
- End of Billing Data: 18 months.
- Communication: Allow for GPRS (General Packet Radio Service) internal or external plugin module.
- Meter must be provided together with a SABS approved PVC Type quality meter box.
- The meter must be compatible for use on the utilities management system of the service provider.
- Product life: Expectancy should be at least 15 years.

- Product warranty: 12 months from date of installation.
- The following National and International specifications apply:
  - SANS 1524-1(2014): Electricity payment systems – Part 1: Payment meters.
  - SANS 1799 (2015): Watt-hour meters – AC electronic meters for active energy.
  - SANS/IEC 62053-21(2003): Electricity metering equipment (ac) – Particular Requirements - Part 21: Static meters for active energy (class 1).
  - SANS/IEC 62055-41: 1st Ed, (2007) Electricity Metering Payment Systems, Part 41 - Standard Transfer Specification (STS) – Application Layer protocol for one-way token carrier systems.
  - SANS/IEC 62055-51: 1st Ed, (2007) Electricity Metering Payment Systems, Part 51 - Standard Transfer Specification (STS) - Physical Layer Protocol for one-way numeric and magnetic card token carriers.
  - SANS/IEC 62055-52: Ed 1, (2009) Electricity Metering Payment Systems, Part 52 - Standard Transfer Specification (STS) - Physical Layer Protocol for a two-way virtual token carrier for direct local connection.
  - SANS 473(2017): Automated meter reading for large power users.
  - SANS 474(2009): Code of practice for electricity metering.

ELECTRICITY SINGLE PHASE SPLIT PLC (POWER LINE CARRIER) PRE-PAID METER SPECIFICATIONS

Single-phase, 100Amp, multi-frequency split prepayment meter - din rail mounting static watt-hour meters for active energy using Power Line Carrier as the medium of communication between the MCU (Meter Control Unit) and CIU (Customer Interface Unit).

- General Specification:

  This specification applies to newly manufactured, single-phase split DIN rail mounting static watt-hour prepayment meters for direct connection, for measurement of alternating current electrical energy consumption at a nominal frequency of 50 Hz. The method of credit transfer shall be through encrypted numeric tokens complying with the 20-digit STS (Standard Transfer Specification) encryption algorithms. The meters shall include a load switch for the purpose of interruption or restoration of the electricity supply to the load in accordance with the current value of the available credit maintained in the prepayment meter. The Measurement and Control Unit (MCU) shall be separated from the Customer

Interface Unit (CIU) and method of communication between them shall be over the mains Power lines.

- Voltage ratings: Nominal voltage 230VAC (Voltage Alternating Current).
- Supply frequency: 50Hz.
- Current ratings (Ib): Base current - 5A.
- Max current ($_{MAX}$): 100A.
- Min starting current: 20mA.
- Measurement: Bi-directional Active energy.
- Accuracy: Class 1.
- Trip Rating: 100 Amp.
- Status indicators: Rate LED (1000 PULSES /kWh).
- User Interface: 12-digit rubber button type keypad with audio feedback 7 character,7 segment LCD (Liquid Crystal Display) low credit warning: display flashing.
- Product life: Expectancy should be at least 15 years.
- Product warranty: 12 months from date of installation.
- Supply Group Code: Default.
- Tariff Index: 01.
- STS (Standard Transfer Specification) compliant.
- Meter must be provided together with a SABS approved PVC Type quality meter box.
- For use on the service providers vending system.
- The following National and International specifications apply:
  - SANS 1524-1(2014): Electricity payment systems – Part 1: Payment meters.
  - SANS 1799 (2015): Watt-hour meters – AC electronic meters for active energy.
  - SANS/IEC 62053-21(2003): Electricity metering equipment (ac) – Particular Requirements - Part 21: Static meters for active energy (class 1).
  - SANS/IEC 62055-41: 1st Ed, (2007) Electricity Metering Payment Systems, Part 41 - Standard Transfer Specification (STS) – Application Layer protocol for one-way token carrier systems.
  - SANS/IEC 62055-51: 1st Ed, (2007) Electricity Metering Payment Systems, Part 51 - Standard Transfer Specification (STS) - Physical Layer Protocol for one-way numeric and magnetic card token carriers.
  - SANS/IEC 62055-52: Ed 1, (2009) Electricity Metering Payment Systems, Part 52 - Standard Transfer Specification (STS) - Physical Layer Protocol for a two-way virtual token carrier for direct local connection.

- SANS 473(2017): Automated meter reading for large power users.
- SANS 474(2009): Code of practice for electricity metering.

ELECTRICITY THREE PHASE SPLIT PLC PRE-PAID METER SPECIFICATIONS

- Three-phase, 100Amp, multi-frequency split prepayment meter – BS (British Standard) mounted static watt-hour meters for active energy using Power Line Carrier as the medium of communication between MCU (Meter Control Unit) and CIU (Customer Interface Unit)
- General Specification:

  This specification applies to three-phase split BS (British standard) mounting static watt-hour prepayment meters for direct connection, for measurement of alternating current electrical energy consumption at a nominal frequency of 50 Hz. The method of credit transfer shall be through encrypted numeric tokens complying with the 20-digit STS (Standard Transfer Specification) encryption algorithms. The meters shall include a load switch for the purpose of interruption or restoration of the electricity supply to the load in accordance with the current value of the available credit maintained in the prepayment meter. The Measurement and Control Unit (MCU) shall be separated from the Customer Interface Unit (CIU) and method of communication between them shall be over the mains power lines.

- Voltage ratings: Nominal voltage 230/400VAC (Voltage Alternating Current).
- Supply frequency: 50Hz.
- Current ratings (lb): Base current - 5A.
- Max current (I_{MAX}): 100A.
- Min starting current: - 20mA.
- Measurement: Bi-directional Active energy.
- Accuracy: Class 1.
- Trip Rating: 100 Amp.
- Status indicators: Rate LED (1000 PULSES /kWh).
- User Interface: 12-digit rubber button type keypad with audio feedback 7 character,7 segment LCD (Liquid Crystal Display) low credit warning: display flashing.
- Product life: Expectancy should be at least 15 years.
- Product warranty: 12 months from date of installation.
- Supply Group Code: Default.

- Tariff Index: 01.
- STS (Standard Transfer Specification) compliant.
- Meter must be provided together with a SABS approved PVC Type quality meter box.
- For use on the service providers vending system.
- The following National and International specifications apply:
    - SANS 1524-1(2014): Electricity payment systems – Part 1: Payment meters.
    - SANS 1799 (2015): Watt-hour meters – AC electronic meters for active energy.
    - SANS/IEC 62053-21(2003): Electricity metering equipment (ac) – Particular Requirements - Part 21: Static meters for active energy (class 1).
    - SANS/IEC 62055-41: 1st Ed, (2007) Electricity Metering Payment Systems, Part 41 - Standard Transfer Specification (STS) – Application Layer protocol for one-way token carrier systems.
    - SANS/IEC 62055-51: 1st Ed, (2007) Electricity Metering Payment Systems, Part 51 - Standard Transfer Specification (STS) - Physical Layer Protocol for one-way numeric and magnetic card token carriers.
    - SANS/IEC 62055-52: Ed 1, (2009) Electricity Metering Payment Systems, Part 52 - Standard Transfer Specification (STS) - Physical Layer Protocol for a two-way virtual token carrier for direct local connection.
    - SANS 473(2017): Automated meter reading for large power users.
    - SANS 474(2009): Code of practice for electricity metering.

WATER PRE-PAID METER SPECIFICATIONS

- **Smart water metering device:**

  The smart water metering device contains an electronically control valve and microprocessor with embedded firmware and connected to a digital or analogue pulse output water meter, that enables it to perform several smart metering functions in addition to those usually associated with a Pre-Paid water metering system.

- **General Specification:**

  The Water Management Devices (WMD), when coupled to a water meter by means of a sensor cable, must have a certification of conformance in terms of the following specifications:

- SANS 1529-9:2008, published by the National Regulator for Compulsory Specifications in terms of the Trade Metrology Act (No 77 of 1973); and
- The Standard Transfer Specification (STS) Association confirming compliance with IEC 62055-41, IEC 62055-51 and Eskom Reference Q32DDTEDS/334.

- **The WMD must further support the following functions:**

  - Flow limitation.
  - Limitation must be achieved without restricting flow rate and must allow full bore flow (full pressure service).
  - Limitation must be configurable based on volume only, on duration only and a combination of volume and duration.
  - Limitation must be configurable daily with the ability to provide two allocations per day of differing volume, duration or volume and duration configuration.
  - Limitation must be configurable monthly.
  - Daily limitation from 10 litres per allocation to 50 000 litres per day.
  - A minimum flow rate of 10 litres per minute at a system pressure of 1 bar.
  - Allocation settings must be adjustable in field to higher/lower amounts without the need to replace any parts.
  - The maximum daily volume dispensed amount must be guaranteed (therefore must not be dependent on pressure fluctuations in the network).
  - Carry-over of unused daily allocation options:
    - Use it or lose it.
    - Daily carry-over within month, but not monthly carry-over.
    - Daily and monthly carry-over; and
    - Carry-over from first allocation to second with and without daily carry-over.

- **WMD Flow control:**
  - Valve to be reaffirmed daily; and
  - Valve to flush if obstructed.

- **WMD LCD display. Be equipped with an LCD (Liquid Crystal Display) that shows the following:**
  - Remaining allocation in litre.

- The total dispensed to date in m3 to a minimum resolution of 0.5 litre.
- The total dispensed to date must clearly differentiate between the multiples and sub multiples of m3.
- Visible indication of the battery status.
- Visible indication of the valve status.
- Visible warning of a potential consumer leak.
- Visible display of the product serial number on demand.
- Visible indication of Automatic Meter Reading (AMR), transmission and confirmation of data received.

- **Automated Meter Reading (AMR) capabilities:**

  - Support of Automatic Meter Reading (AMR) via Radio in the 434 MHz ISM band.
  - The WMD must have ben ICASA approval.
  - Support walk by, drive by and fixed network AMR.
  - Provide a typical line of sight Radio Frequency (RF) transmission range of more than 100m when installed more than 50cm above ground.
  - Support selective parameter updates automatically whilst remotely reading the meters via RF transmission.
  - Provide the tamper and valve status in the standard meter reading radio signal.
  - Support USB, Global System for Mobile Communication (GSM) and Wi-Fi download of meter readings.

- **WMD security features:**

  - Automatic valve closure/shut if the sensor cable is cut, removed or magnetically tampered with.
  - Serialized and unique security seals which prevent the uncoupling of the sensor cable from the meter pulse output.
  - When inspecting the valve there must not be any visible fasteners that form an integral part in the construction/integrity of the valve, the fasteners must be located behind a cover; and
  - Constructed from materials which have a very limited or no scrap value.

- **The WMD: Additional requirements:**
  - Ability to be mounted either horizontally or vertically.
  - The WMD battery must be able to be replaced with a new WMD battery as a singular interchangeable part of the WMD.
  - To facilitate infield support both the water meter and the WMD must have an Input and Output coupling of ¾ (25 millimeter) male British Standard Pipe (BSP). The water meter and WMD must fit into a 115 mm gap.
  - Compliant to an environmental rating of Ingress Protection 67 (IP) and waterproof.
  - Service life of at least 10 years inclusive of the WMD battery.
  - Data logging of at least 2,000 hourly consumption readings and maintain a 12-month record of monthly usage within the WMD data log.
  - Monitor for and indicate consumer side leaks.
  - Support reticulation system water balancing.
  - The WMD must be able to communicate with a field service terminal for in-field interrogation, data downloading and reprogramming via radio.
  - The system installed MUST have necessary National Regulator for Compulsory Specifications (NRCS), South African National Accreditation System (SANAS), Independent Communications Authority of South Africa (ICASA) and Standard Transfer Specification (STS) Association approvals.
  - The system must support credit transfer as defined by the International Electrotechnical Specification Commission (IEC 62055–41 & 51).
  - The system must support third party vending of token, and not only a proprietary vending system.
  - The system must also support bulk water supply.
  - The device must support an optional remote display which may be made available to the consumer to place inside their unit; and
  - Devices must be labelled with a serial number and bar coded.

- **Water meter requirements:**

Water meter (wet dial) for cold water must be designed and built to comply with Class “C” metering specification and must have a certification of conformance in terms of the

following South African Bureau of Standards (SABS) requirements, SANS 529-1: 2006, ISO 4064-1 approval number SA842 and must comply with the following features:

- Increased accuracy at low flow rates.
- Scratch resistant material lens.
- Enlarged measuring range.
- UV stabilized engineering plastic body.
- Lower head loss.
- High continuous flow capacity.
- All working parts in one measuring cartridge.
- Compact design.
- Non-return valve exchangeable without opening of meter or breaking the seal.
- No magnetic couplings. Prevents tampering.
- Pulse output; and
- Installed vertically or horizontally.

- **Water meter strainer:**

  A serviceable in line polymer strainer must be fitted upstream of the water meter to protect the meter from suspended solids and for ease of maintenance. The strainer should have a fine mesh stainless sieve which must be removable for cleaning without removing the meter or WMD.

- **Specific water meter specification:**
  - Supply Group Code: Default.
  - Tariff Index: 01.
  - Standard Transfer Specification (STS) compliant; and
  - For use on service provider vending system.

- **Meter boxes:**

  The meter box must be designed and built to house the water management device, water meter and strainer and must comply with the following features:

  - Polypropylene/PVC type meter box with base and blue lid. SABS approved.

- Locking mechanism, requiring a special key to open the lid.
- Unique couplings engineered to slide back facilitating meter replacement.
- Water meter assembly keyed where it passes through the meter box to prevent it from rotating during installation.
- Reading slot on meter box lid to allow the consumer to read the meter, without opening the box.
- The inlet and outlet fittings shall be 15mm/20mm/25mm BSP nylon female reinforced thread for connection to 15mm/20mm/25mm male adaptors.
- The internal fittings of the meter box to be fusion welded and
- The meter box dimensions – ±410mm (L) X ± 260mm (W) X ± 169mm (H) (Measured across the base.)

- **Water Meter Specifications:**

Meter Specifications	**Nominal Size**			
	mm	**15**	**20**	**25**
Max Flow Rate qs ±2%	m3/h	3.0	5.0	7.0
Permanent Flow Rate qp ± 2%	m3/h	1.5	2.5	3.5
(SANS Specifications)				
Transitional Flow Rate qt ± 2%	l/h	22.5	37.5	52.5
Minimum Flow Rate qmin ± 5%	l/h	15.0	25.0	35.0
(SANS Specifications)				
Starting Flow	l/h	5.7	9.5	13.2
Counter resets to zero	m3	10 000	10 000	10 000
Minimum indicated digital value	m3	0.00002	0.00002	0.00002
Pulse output (litres per pulse)	l	0.5	0.5	0.5

Maximum Working Pressure	kPa	1600	1600	1600
Maximum water temperature	˚C	50	50	50
Meter length	mm	165	165	165

BASIC CONVENTIONAL WATER METER TECHNICAL SPECIFICATIONS

The basic specification in respect of conventional water meters is indicated as the following:

- Type: The water meter must be dry dial and in-line MultiJet type (DN15 to 50mm).
- Dimensions: Only ISO lengths will be accepted.
- The meter must be approved by the SABS and the approval certificate must be attached.
- The meter must maintain Class B in horizontal minimum.
- The serial number of the meter must begin with the 2 last digits of the year of production.
- On both side of the body, there should be cast an arrow indicating the direction of flow and the maximum flow rate [m3/h].
- The calibration device of the meter should be accessible without removing the internal chamber of measurement. It should be protected against fraud.
- The body shall be painted in epoxy.
- The MultiJet shall be supplied complete with fittings (couplings and non-return valves).
- Meter must be extra dry dial with no chance of condensation.
- Meter must be provided together with a SABS approved PVC Type quality meter box; and
- **Performance:** The meter shall be approved to the following performance parameters:

DN	**Material**	**Q_p** [m^3/h]	**Q_t** [m^3/h]	**Q_{min}** [m^3/h]	**Q_{start}** [m^3/h]	**Length** [mm]
15mm	Brass or Bronze	1.5	0.0225	0.015	0.008	165

20mm	Brass or Bronze	2.5	0.0375	0.025	0.012	190
25mm	Brass or Bronze	3.5	0.280	0.070	0.025	260

REMOTE READABLE WATER SMART METER (ULTRASONIC) SPECIFICATIONS

The general requirements and specifications of this meters are stated below:

- The meters shall be of DN15 (Length 110mm) to DN20mm (Length 130mm) nominal diameter, ultrasonic cold potable water category. They must be of the ultrasonic type, fitted with sealed extra-dry dial metric counters and the meters fitted with integrated remote communication.
- Measurements by the meters shall be electronic measurements based on the ultrasonic principle.
- The flowmeter shall be capable of measuring flow total in both directions, with two independent totalizers to give flow for network management purposes.
- The flowmeter shall offer lifetime stable zero so that routine zeroing is not required.
- The flowmeter shall indicate burst, leak and empty pipe detection.
- The flowmeter shall be full IP68.
- The flowmeter shall be battery powered (internal) with a minimum of 15 years' operating time with activated daily Sigfox radio outputs.
- The flowmeter shall be certified Sigfox Ready Class 0 with end product certificate available; and
- Polypropylene/PVC type meter box. SABS approved.

Applicable Standards:

- Prescriptions of the regulation No. 49 of the O.I.M.L R49: (International Organisation of Legal Metrology).
- The meter shall have a NRCS approval 1529:9 -2008 or exemption.
- ICASA Approval Certificate.
- The Manufacturer of the water meters must hold the Quality System Certificate for the

standard ISO 9001:2000.

- Manufacturers certified according to MID – H1 or better (Measurement Instrument Directive); and
- ISO 4064-1 or its equivalent (SABS)

Materials & workmanship:

- Materials that come in contact with the water supply shall withstand 2 ppm (parts per million) of chlorine residual in the water supply and shall be resistant to internal and external abrasion/corrosion and of adequate strength to resist damage due to shock and/or vibration. The body materials shall be of high performance thermo plastic.
- The meter has to have one arrow on both sides of the body indicating the flow direction. The technology must be such that no parts of the register are in contact with the water passing through the meter. A calibration certificate must be provided showing Class C or better; and
- Meter must be able to send intelligent alarms detecting tampering attempts or reverse flows effectively.

Marking:

Each meter shall be permanently marked on the casing or the indicating device dial with the following information:

- The Manufacturer's name and commercial model name.
- Metrological class.
- The nominal working pressure (PN) in bars.
- Nominal size of the meter.
- Direction (arrow) of flow of water on both sides of the meter.
- Nominal flow rate (Qn).
- No stickers allowed for serial number marking.
- The serial number must be permanently marked in “bar code” format on the meter body. No stickers allowed; and
- All meters should have effective tamper-proof seals.

Testing:

- Each meter must be tested at the three mandatory tests (Qmin, Qt, and Qmax) in accordance with the latest SABS ISO 4064-1.
- Copies of the calibration test results/certificates must be supplied together with the water meters (for all the above eight metrological points).

- Each meter must be pressure tested and certificates attesting to such test issued by the water meter manufacturer must be provided.
- All composite water meters shall be rated up to a minimum of 1600 bar.

Data Storage:

The meter shall have an in-built storage. It shall be able to store daily readings for a period of at least 12 calendar months and month end readings for at least 3 years.

Warranty: The warranty period shall be of 1 year.

Specific requirements:

- Ultrasonic flow measurement.
- The electronic meter must have no moving parts.
- Water Meter must be resistant to any impurities in the water.
- The meter must be able to measure both water and ambient temperatures.
- Water meter must be able to detect water leakage utilising low leak limits.
- Data must be transmitted using low power long range Internet of Things (IoT) network.
- The meter must be waterproof, having an IP68 rating.
- Meter must include integrated communication (no external communication devices).
- Meter must have a 15-year battery operating life.
- Shall be designed and built for installation in outdoor water meter boxes as well as above ground with all necessary security features to prevent vandalism and/or damage as far as possible.
- Shall be housed in a single package design, designed for rugged, harsh environments and capable of complete submersion in water without damage.
- Pulse device must produce accurate pulse count with ability to distinguish forward from reverse flow.
- Shall be capable of low power, long range (IoT) communications and also able to use available networks i.e. (Sigfox).
- The AMI (Automated Meter Infrastructure) shall have the ability to receive specific meter related commands.
- AMR Devices shall have a minimum one-way communication to host software. This shall allow for obtaining meter data remotely on a daily basis.

Internet of all Things (IoT) Communicating Retrofit Device Unit Specifications:

Firmware:

- Transmission cycles: 2, 50, 100 or 140 update links per day.
- Data Encryption: AES128.

General Unit Requirements:

- Mounting Options: Screws, rivets, tie-wraps and 2-sided tape.
- Dimensions: 93 x 24 x 50 mm.
- Weight: 100 grams.
- Housing: IP68.
- Integrated Electronic reed switch for domestic applications
- Antenna: All Integrated (Internal).
- Standards: EN 300-220, EN 301-489, EN 60950, ICASA, CE.
- Operating temperature: -20°C / +65°C
- The unit must be able to measure water usage in 30 min intervals and transmit usage hourly.
- The unit must be able to detect or calculate water leakage.
- The solution must be able to notify the consumer of any leaks detected.
- The unit must be compatible with all metering devices with pulsing capabilities.
- Data must be transmitted using low power, long range IoT network,
- The Unit must be waterproof, having a minimum certified IP68 rating.
- Unit must have at least a 5-year battery operating life and replaceable in field.