

A. TECHNICAL REQUIREMENTS.

Utility Meters Specifications

Item	Specification Descriptions
Single Phase Energy Meter Technical Specification	
General Requirements	
Application	Residential, commercial, tenant metering
Mounting	Panel / DIN-rail / flush-mounted
Type	2-wire (L-N) system
Accuracy class	Class 0.2S, 0.5S (active), or 1.0 (reactive - meters with CT ratio x/1A) or 2.0 (reactive - meters with CT ratio x/5A) as per IEC 62053
Reference frequency	50 Hz
Reference voltage	230 V AC
Reference current/common CT ratios	1 A or 5 A (CT connected), up to 100A (Direct connection)
Measurement Type	True RMS, Bi-directional 4-quadrant energy measurement, Programmable CT ratios, Data logging capabilities with manual or automatic data transfer
Certification/Standard compliance	SANS 1524-1, SANS / IEC 62053-21, SANS / IEC 62053-22, SANS / IEC 62053-23, SANS / IEC 62056-21, SANS / IEC 62056-5-3, SANS / IEC 62056-6-2, NRS 057, NRS 071
Measured Parameters	
Energy	Active (kWh), Reactive (kVAh), Apparent (kVAh)
Demand	kW, kVA, kVAh, Maximum Demand (MD)
Instantaneous	V, I, Frequency, Power factor, Power (kW, kVA, kVAh)
Load Profile	Configurable/programmable integration period (15/30 min)
Harmonics	Total Harmonic Distortion (THD-V, THD-I)
Display & Indicators	
Display Type	Backlit LCD/LED
Display Parameters	Instantaneous values, energy registers, MD, PF, frequency
Indicators	Pulse LED (active/reactive), Communication status, Power ON, Phase reversal/missing, failure, tamper indication
Digits	Minimum 6 digits (integer + decimal)
Communication & Interfaces	
Communication Ports	RS-485 (Modbus RTU), RS-232, RJ45/Ethernet (Modbus TCP/IP), M-bus, equipped with wireless modules: RF Mesh, Zigbee, LoRa, Wi-Fi or GSM, compatible with AMR and as per application
Protocol supported	Modbus/DLMS/RF Mesh, Zigbee, Wi-Fi, LoRaWAN, PLC, and cellular networks (GSM/GPRS/4G), compatible with AMR and as per application
Pulse Output	Configurable (Active/Reactive energy)
Optical Port	Yes, including Optical port for local data reading
AMR/AMI/BMS Integration	Compatible with ACSA IT Server / Building Management System (BMS), fully compatible with centralised AMR/AMI systems, SCADA
Environmental	
Operating Temperature	-10 °C to +55 °C
Storage Temperature	-20 °C to +70 °C
Relative Humidity	Up to 95% non-condensing
Ingress Protection	IP51 (panel) / IP54 (flush) / IP65 for outdoor
Insulation	4 kV RMS, 50 Hz for 1 min as per IEC
Auxiliary supply	
Auxiliary Voltage	85–265 V AC or 110–300 V DC
Burden	< 5 VA
Data Logging & Memory	

Annexure

Load Profile Storage	At least 45 days (at 30 min interval)
Event Logs	Power failure, reverse current, MD reset, tamper, phase failure, (minimum of 100 events)
Storage Capacity	Minimum 12 months of hourly data, billing data
Non-volatile Memory	Minimum at least 5 years data retention, as per NRS 057:2005
Lifespan & Warranties	
Lifespan	Minimum of 10 years (≥ 10 years)
Warranty	Minimum of 12 months after commissioning and provision to extend (both for mechanical parts and electronic/communications modules)
Safety & Tamper Features	
	Reverse current detection
	Neutral disturbance / phase-missing detection
	Magnetic and terminal cover tamper detection
	Event logging for unauthorized access
Documentation & Deliverables	
	Factory calibration/test certificates (traceable to national standards)
	Configuration and communication setup records
	As-built wiring and connection diagrams
	Installation and maintenance manuals
	Integration test report demonstrating AMR/AMI/BMS or SCADA connectivity
3 – Phase Energy Meter Technical Specification	
General	
Application	Incomer/feeder/tenant metering energy measurement
Mounting	Panel / DIN-rail / flush-mounted
Type	3-Phase, 4-Wire (star) or 3-Wire (delta) system
Accuracy class	Class 0.2S, 0.5S (active), or 1.0 (reactive - meters with CT ratio x/1A) or 2.0 (reactive - meters with CT ratio x/5A) as per IEC 62053
Reference frequency	50 Hz
Reference voltage	230/400 VAC (for LV, L-N/L-L) or PT connected for HT system
Reference current/common CT ratios	1 A or 5 A (CT connected), up to 100A (Direct connection)
Measurement Type	True RMS, Bi-directional 4-quadrant energy measurement, Programmable CT ratios, Data logging capabilities with manual or automatic data transfer
Standard compliance	SANS 1524-1, SANS 62053-21, SANS 62053-22, SANS 62053-23, SANS 62056-21, SANS 62056-5-3, SANS 62056-6-2, NRS 057, NRS 071
Measured Parameters	
Energy	Active (kWh), Reactive (kVAh), Apparent (kVAh)
Demand	kW, kVA, kVAh, Maximum Demand (MD)
Instantaneous	V (per phase), I (per phase), Frequency, Power factor, Power (kW, kVA, kVAh), Phase angle
Load Profile	Configurable/programmable integration period (15/30 min)
Harmonics	Total Harmonic Distortion (THD-V, THD-I)
Display & Indicators	
Display Type	Backlit LCD/LED
Display Parameters	Instantaneous values, energy registers, MD, PF, frequency
Indicators	Pulse LED (active/reactive), Communication status, Power ON, Phase reversal/missing, failure, tamper indication
Digits	Minimum 6 digits (integer + decimal)
Communication & Interfaces	
Communication Ports	RS-485 (Modbus RTU), RS-232, RJ45/Ethernet (Modbus TCP/IP), M-bus, equipped with wireless modules: RF Mesh, Zigbee, LoRa, Wi-Fi or GSM, compatible with AMR and as per application
Protocol supported	Modbus/DLMS/RF Mesh, Zigbee, Wi-Fi, LoRaWAN, PLC, and cellular networks (GSM/GPRS/4G), compatible with AMR and as per application
Pulse Output	Configurable (Active/Reactive energy)

Annexure

Optical Port	Include Optical port for local data reading
AMR/AMI/BMS Integration	Compatible with ACSA IT Server / Building Management System (BMS), fully compatible with centralised AMR/AMI systems, SCADA
Environmental	
Operating Temperature	–10 °C to +55 °C
Storage Temperature	–20 °C to +70 °C
Relative Humidity	Up to 95% non-condensing
Ingress Protection	IP51 (panel) / IP54 (flush) / IP65 for outdoor
Insulation	4 kV RMS, 50 Hz for 1 min as per IEC
Auxiliary supply	
Auxiliary Voltage	85–265 V AC or 110–300 V DC
Burden	< 5 VA
Data Logging & Memory	
Load Profile Storage	At least 45 days (at 30 min interval)
Event Logs	Power failure, reverse current, MD reset, tamper, phase failure, (minimum of 100 events)
Storage Capacity	Minimum 12 months of hourly data, billing data
Non-volatile Memory	Minimum at least 5 years data retention, as per NRS 057:2005
Lifespan & Warranties	
Lifespan	Minimum of 10 years (≥ 10 years)
Warranty	Minimum of 12 months after commissioning and provision to extend (both for mechanical parts and electronic/communications modules)
Safety & Tamper Features	
	Reverse current detection
	Neutral disturbance / phase-missing detection
	Magnetic and terminal cover tamper detection
	Event logging for unauthorized access
Documentation & Deliverables	
	Factory calibration/test certificates (traceable to national standards)
	Configuration and communication setup records
	As-built wiring and connection diagrams
	Installation and maintenance manuals
	Integration test report demonstrating AMR/AMI/BMS or SCADA connectivity
Water Meters Technical Specification	
General Requirements	
Application	Domestic, commercial, and bulk metering of potable water consumption for billing, leak detection, and network monitoring
Mounting	Horizontal or vertical installation (as per manufacturer's guidelines)
Meter Sizes	DN15 to DN300 (or as specified by project)
Accuracy Class	Class 1 or Class 2
Measurement Type	Electronic ultrasonic or electromagnetic, bi-directional, with digital sensing, no moving parts, high-resolution flow detection, and integrated data logging.
Certification/Standard compliance	SANS 1529-1, SANS 1529-9, NRS 057
Measured Parameters	
Flow Rate Range	As per standards (e.g. SANS 10252-1)
Minimum Flow (Q1)	$\leq 0.015 \text{ m}^3/\text{h}$
Transitional Flow (Q2)	As per class
Nominal Flow (Q3)	$2.5\text{--}250 \text{ m}^3/\text{h}$ (by DN)
Overload Flow (Q4)	$1.25 \times Q3$
Measurement Direction	Bi-directional (forward & reverse)
Measured Quantities	Forward, reverse, and net volume (m^3)
Leakage / Burst Detection	Built-in electronic leak / burst event logging
Temperature Rating	As per meter model
Display & Indicators	
Display Type	LCD / electronic display with backlight (for smart/AMR meters)

Display Parameters	Total volume, instantaneous flow rate, flow direction, battery status, communication status, alarm/tamper events
Indicators	Pulse output LED (for testing/verification), Low battery warning, Communication active/linked indicator
Digits	Minimum 8 digits (6 integer + 2 decimal)
Communication & Interfaces	
Communication Ports	Pulse output (reed switch / open collector), RS-485/M-Bus/Modbus RTU / Optical port, Wireless: LoRa, RF 868 MHz, NB-IoT, GSM/GPRS, or LoRaWAN
Protocol supported	Modbus RTU, M-Bus, DLMS/COSEM, LoRaWAN, MQTT (depending on model)
AMR/AMI Integration	Compatible with ACSA IT Server / Building Management System (BMS), fully compatible with centralised AMR/AMI systems, SCADA
Local Access	Optical or magnetic key port for on-site configuration and reading
Data Transfer	Periodic (configurable) or on-demand via RF/LoRaWAN/GSM module
Environmental & Mechanical	
Operating Temperature	–10 °C to +55 °C
Storage Temperature	–20 °C to +70 °C
Relative Humidity	Up to 95% non-condensing
Ingress Protection	IP68 (for fully submersible electronic meters), IP65 (for above-ground installations)
Pressure Rating	PN 16 bar (standard), PN 25 optional
Body Materials	Brass / bronze / polymer composite (for DN ≤ 40 mm), Cast iron / ductile iron / stainless steel (for bulk DN ≥ 50 mm)
Power & Battery	
Battery Type	Lithium, long-life (≥ 10 years)
External Power (optional)	12–24 V DC (for AMI units)
Power Consumption	< 0.5 W
Data Logging & Memory	
Logging Interval	15/30/60 minutes (programmable), load profile data
Storage Capacity	Minimum 12 months of hourly data, billing data
Event Logging	Power/battery status, Reverse flow, Tamper / magnetic interference, Leak or burst event (minimum of 100 events)
Non-volatile Memory	Minimum 5 years retention without power
Lifespan & Warranties	
Lifespan/life cycle	Minimum of 8 years (≥ 8 years)
Warranty	Minimum of 12 months after commissioning and provision to extend (both for mechanical parts and electronic/communications modules)
Documentation & Deliverables	
	Factory calibration and verification certificates (traceable to national standards)
	Test reports confirming standards compliance
	Configuration and communication setup records
	Installation and maintenance manuals
	As-built wiring and connection diagrams
	Integration test report demonstrating AMR/AMI or SCADA connectivity

B. NOTES TO BIDDERS (IN-LINE WITH SPECIFICATION).

1. Site visit and local conditions.

- Tenderers are encouraged to visit the project sites before the tender closing date to familiarize themselves with local conditions that may affect the work. This includes, but is not limited to, site access, ground conditions, available working space, transport and handling facilities, and the availability of utilities such as power and water.
- Please note that no claims or adjustments will be accepted after submission of tenders on the grounds of lack of knowledge of site conditions or local circumstances.

- If prior permission is required to access the site, an official site visit will be arranged for all interested tenderers. Details of this visit will be communicated in due course.

2. Compliance with specification and resolution of discrepancies.

- The entire installation shall comply with the requirements of the specification, the accompanying notes, and the bill of quantities or schedule of works.
- Should any discrepancies, contradictions, arise between the technical specifications, and/or bill of quantities, the Contractor shall immediately notify the Airport Company South Africa (ACSA), representative – lead project manager.

3. Compliance with specification and resolution of discrepancies.

- The Contractor shall submit a detailed project implementation program outlining how the works will be executed. The program shall take into account factors such as material lead times, installation durations, system integration requirements, and any other activities that may influence progress on site.
- If any changes occur during the course of the project, the Contractor shall promptly provide a revised and updated program to the Project Manager without undue delay.
- Before commencing work on site, the Contractor shall meet with the Project Manager to review and discuss the project in detail. The purpose of this meeting is to ensure that there are no misunderstandings or misinterpretations of the Specification, Bill of Quantities (BoQ), and/or installation drawings.