ENBAYA METERS

Single Phase Split Prepaid Electricity Meter (DIN rail)

The Cashpower Power-Rail is a single-phase split prepayment meter in a DIN rail-mount housing and is ideal for new reticulation where housing is informal. The prepayment meters are mounted in a pole-top enclosure with respective customer interface units conveniently mounted in the dwellings below. Due to the small size and DIN rail housing, multiple power-rail meters can be mounted in a small enclosure thereby making installation cost-effective.

Features

- Compact meter design, with DIN rail-mount layout for high density stacking
- Optional shroud can be fitted for additional terminal protection and tamper detection feature
- Customer Interface Unit
- Galvanically isolated communication link to customer interface unit for consumer safety
- Plug-in communications connector on the meter
- Programmable operating mode - Prepayment or Credit metering modes
- Programmable software power limit
- Commissioning and decommissioning feature
- Meter state indication LED and communication diagnostic LED at the meter
- Display of last 25 credit tokens entered
- Ability to store GPS coordinates
- Supports micro generation, by means of a dedicated reverse energy register and various modes of operation
- Self-adjusting decimal point (10Wh or 100Wh resolution)
- Average consumption register over a 30 day period
- Number of days credit remaining (based on average consumption)

Functionalities

Split Metering Functionality

The Cashpower Power-Rail consists of two parts:
The Customer Interface Unit and the meter. The Customer Interface Unit is a compact unit with user-friendly display and keypad that can be installed in a convenient location inside the consumer's premises. Connection to the meter is via a pair of communications wires. The connection of these wires at the meter is achieved by means of a plug-in connector, facilitating easy installation and maintenance. The meter contains all critical metering, number decryption and load control functionality. It operates independently of the customer interface unit and is immune to tampering on the customer interface. The meter is usually installed in a secure, locked enclosure - typically a pavement kiosk or polemounted equivalent. It is outside the consumer's premises to facilitate easy inspection of the utility at any time, thus reducing the possibility of tampering.

Prepayment and Credit Mode Operation

The Cashpower Power-Rail meter is configurable and can operate both in the prepayment or credit mode, with the ability to switch between modes as required by using a meter specific 20 digit token.

User-friendly Customer Interface

Information e.g. rate of energy consumption, low credit warning and load switch status is available using the Customer Interface Unit's keypad and LCD. The customer Interface Unit makes use of clear, language-independent icons. The user interface is further enhanced by the use of audible tones. These are sounded under different conditions e.g. Low Credit Alarm and Token Accept and Reject.

Technical Specifications

Meter Status and Diagnostic Indicators

The meter includes a LED status indicator. This allows a technician to view the state of the meter without the need for specialised interrogation tools or having to gain access to the consumer's premises. Information such as tamper status, power limiting, commissioned/decommissioned status and remaining credit status are available. The meter also features a dedicated diagnostic LED for the Customer Interface. It can indicate the presence of "Open" or "Short" circuited communication lines. This is a valuable visual aid that assists the technician to validate the installation and determine probable fault types.

Micro-generation Support Features

In the event that the customer has either solar or wind generation and is intending to either generate energy for own use or possibly place net energy back into the grid, the meter provides a reverse energy register and various modes of operation to support the customer's micro-generation needs. In one of the modes, known as the "Reverse Energy Neutral" mode, the meter will permit reverse energy flow, will meter it, and will record it in the Total Reverse Energy register, but will neither increment nor decrement the meter's Remaining Credit register. The meter also features a Cumulative Total Reverse Energy register which accumulates all measured reverse energy irrespective of mode and as with the conventional Total Consumption register, this register is never cleared and will continue to accumulate all measured reverse energy for the lifetime of the meter. This register is accessible via the optical port, VTC ports (type A & type B) and via Cashpower information registers.

Tamper Detection & Prevention

The split configuration of the meter significantly reduces the risk of tampering. The meter is installed in a remote, secure location and is mechanically sealed against tampering through the use of mechanical clips and inaccessible assembly screws. A shroud can also be fitted to the meter, which not only protects and limits access to the meter terminals, but also offers an innovative tamper detection facility. Using the optical interface of the meter, the removal of the anti-tamper shroud can be detected by the meter, resulting in the meter entering a tamper condition and opening the load switch. The tamper condition can only be reset by an authorised, meter specific STS token. Utility seals can be field-fitted to secure the shroud to the meter. The use of these mechanical seals ensures that there will be visible signs of tampering if unauthorised entry to the meter is attempted.

Optical Interface

As a standard feature, the meter has an IEC 62056-21 compliant optical communications port. This allows the utility to access a variety of information stored inside the meter and additionally enables two way communications with the meter using Landis+Gyr's RS485 FLAG Interface device.

Virtual Token Carrier (VTC) Type A port and B Port

A.) Meter configuration and access to meter parameter data may be achieved via the industry standard VTC Type A port, access on the side of the meter once the VTC seal is broken.

B.) When fitted with the shroud and the Eskom DSP34-1635 type B interface, the meter offers an Eskom standard communications interface for future remote access and two way communications.

Disconnect on Power Fail

The meter includes a feature to cater for a condition where the neutral connection to the device is removed. The meter will disconnect the load if a power failure is detected, as would be the case if the neutral wire were to be removed.

Surge protection

The utility has the option of fitting an external surge arrester with a current surge rating in excess of 30kA.

Installation

The communication wires for the customer interface are non-polarised, safety isolated and are connected to the meter by a convenient plug-on connector. This simplifies the installation process for the field technician.

The communication wires may be available as separate cores in a concentric reticulation cable and provide a very robust communication interface between the meter and the customer interface over a distance of at least 130 metres.

Technical Specifications

Meter Format	Single phase, 2-wire, direct connected prepayment meter
Compatible network(s)	Single phase, 2-wire, earthed neutral
General	Credit store with decrement-on-usage
Credit entry mechanism	Keypad; encrypted numbers
Encryption algorithms	STS Compliant
Applicable STS specifications	IEC62055-41 and IEC62055-51
Nominal Voltage (Un) - Rated Voltage	230 Volts AC rms r (variants available)
Nominal frequency	50Hz
Operating voltage range	80% to 120% of Un (184V – 276V)
Maximum continuous current (Imax)	80 Amps (factory and field programmable to lower power limits)
Burden	Voltage circuit <1.8W / <10VA @ 230V Current circuit <2.5 VA @ Base Reference Current (Ib)
Measurement direction	Forward and reverse power detection and metering^2
Meter constant (LED flash rate)	1000 impulses / kWh
Basic reference current (Ib)	10A
Accurate metering range	0.05 Ib to Imax 3
Starting current	≤ 0.004 Ib (For Class 1)
Power threshold	6.5W for base 10A (approximately 28mA @ 230V and cos(Φ) = 1)4
Accuracy class index	Class 1
Maximum error – Class 1	< ± 1% over range 0.1 Ib to Imax; (with 0.5 ≤ cos(Φ) ≤ 1.0 lagging and 0.8 ≤ cos(Φ) ≤ 1.0 leading)5

Technical Specifications

Type	Single Pole latching contactor 100A
Insulation system classification	Protective Class ll (according to IEC 62052-11)
Insulation level	4kV rms for 1 minute
Over voltage withstand	440VAC for 48 hours, 600VDC for 1 minute
Surge Immunity – Voltage impulse withstand	Differential: In excess of 6kV, 1.2/50µs, with 2 source impedance (according to SABS 1524-1)
Surge Immunity – Current impulse withstand	Service rating: 5 kA 8/20µs (with optional surge arrestor populated) 6 Withstand rating: 30 kA, 4/10µs (with optional surge arrestor populated) Specification compliance: SANS 1524-1
Electromagnetic compatibility (EMC)	Electrostatic discharge: 15 kV air discharge Immunity to HF fields: 80 MHz to 2 GHz @ 10V/m with load, 80MHz to 2GHz @ 30V/m no load Immunity to fast transient bursts: 4 kV Radio interference: Complies with requirements for CISPR 22 Specification compliance: IEC 61000-4-2; IEC 61000-4-3; IEC 61000-4-4; IEC 61000-4-6, CISPR 22
Type	Galvanically isolated, non-polarised, 2-wire, half duplex. Meter function is independent of CIU function
Rated Impulse Voltage	Peak Voltage 6kV (1,2/50S) waveform (according to IEC 62052-11 Protective Class ll)
Insulation Properties	4kVrms (1 minute) according to IEC 62052-11 Protective Class ll
Communication Distance	Up to 130 metres, with a maximum total loop resistance of 40
Type	Rail mount, with locking clip compatible with 35mm DIN standard rail
Rating	Product is designed to be installed in a pole-top or street kiosk housing rated at IP51 or better

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Technical Specifications

Material	Polycarbonate, flame-retardant, glass-filled grade Resistance to heat and fire: Complies with 960°C glow-wire (IEC 60695-2-1) Resistance to spread of fire: UL94-V0 rated @1.5mm. No toxic gases emitted: 'Green Material'
Dimensions	127mm(H) x 47.7mm(W) x 87.5mm(D) 7
Mass	Approximately 280 g (excluding shroud)
Layout	Top: Live-in, Neutral-in cage terminals Bottom: Live-out cage terminal Front: Communication connector
Live Terminals	Type: Single screw (M8), moving-cage terminal Material: Mild steel, yellow passivated Maximum Cable Size: 25mm 2
Neutral Terminal	Type: Single screw (M6), moving-cage terminal Material: Mild steel, yellow passivated Maximum Cable: Size 16mm
Customer Interface Connector	Type: Plug-in, single screw cage terminal (with wire protector) Maximum Cable: Size 1.5mm 2
Type	Meter enclosure: Factory sealed with screw-seal Anti-tamper shroud: Sealed with Utility seal
Area of Application	Indoor meter (according to IEC62052-11)
Operating Temperature Range	-10°C (+14°F) to +55°C (+131°F)
Storage Temperature Change	-25°C (-13°F) to +70°C (+158°F)
Relative Humidity	Maximum ≤ 95%; Annual mean 75%
Rate of Consumption Indicator	Visible LED, 1000 pulses/kWh
Status Indication	Visible LED
CIU Operating Indication	Visible LED
Virtual Token Carrier (VTC)	Type A port with access when the VTC port plug on the side of the meter is remove

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Technical Specifications

Optical Communications Port	According to IEC 62056-21
Virtual Token Carrier (VTC) Type B Interface	Applicable when the shroud is fitted onto the meter and the Eskom DSP34-1635 type B interface pcb is fitted. Provides a standard Eskom interface according to the Eskom DSP34-1635 specification
SABS	SANS 1524-1
Eskom	Eskom DSP34-1635
STS	IEC62055-41 and IEC62055-51
Type	Isolated, non-polarised, 2-wire, half-duplex, 12Vdc from meter
Operating Range (Communication)	Up to 130 metres, with a maximum total loop resistance of 40
Operating Temperature Range	-10C (+14F) to +55C (+131F)
Storage Temperature Range	Storage Temperature Range -25C (+12F) to +70C (+158F)
Relative Humidity (IEC 6 1036)	Maximum ≤ 95%; Annual mean 75%)
Type	Slimline, wall mounted
Rating	IP 51
Material	ABS
Dimensions	77.5mm(H) x 132mm(W) x 29mm(D)
Weight	Approximately 100 g
Type	Two-way screw terminal
Maximum cable size	2.5mm2
Enclosure	Factory sealed, no user serviceable parts
Type	Language-independent

Technical Specifications

Components	Pictographic/Numeric LCD display, keypad, LED rate of consumption indicator, audio feedback
Liquid Crystal Display (LCD)	Size: 9cm2 (45mm (W) x 20mm (H)), 8 digits + 11 icons Digit size: 9.3 mm Icon information: Happy face, Sad face, Alert, Breaker status, Info, kWh, 4-segment credit wedge Numeric information: Display of various meter information such as credit levels, number entry, etc.
Keypad	12-key, international standard layout including “Information” and “Backspace” keys
Buzzer	Audio feedback on key press, encrypted number Accept and Reject melodies, Low-credit alarms as a factory-programmable option
Light Emitting Diode (LED)	Rate of consumption indicator (pulse rate proportional to current rate of consumption)
Diagnostic Information	Additional meter parameters accessible via the “Information” key