

Residential
Cashpower Power-Rail
Technical Specification



Cashpower Power-Rail is a single-phase split meter in a DIN rail-mount housing.

The meter is ideal for new reticulation where housing is informal with the prepayment meters mounted in a pole-top enclosure with respective customer interface units conveniently mounted in the dwellings below. This new variant using Landis+Gyr's version 13 meter firmware and anti-tamper shroud, further enhances the utility's revenue protection capability.

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Overview

Cashpower Power-Rail is a single-phase 60A (80A optional) split meter in a DIN rail-mount housing, 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 anti-tamper shroud can be fitted for additional cable and terminal protection
- Optically senses presence of anti-tamper shroud – if the shroud is removed, meter can be configured to enter tamper mode
- Easy to install
- Customer Interface Unit provides valuable information to help consumers effectively manage their electricity consumption
- Galvanically isolated communication link to customer interface unit for consumer safety
- Plug-in communications connector on the meter for easier utility access and maintenance
- Programmable operating mode - Prepayment or Credit metering modes
- Programmable software power limit
- Commissioning and de-commissioning feature
- Significant Reverse Energy (SRE) detection
- Meter state indication LED and communication diagnostic LED at the meter
- High surge withstand capability for areas prone to lightning or other line surges
- High temperature withstand capability
- SABS 1524 and IEC 62052-11, IEC 62053-21 compliant

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 any convenient location inside the consumer's premises. Connection to the remotely installed 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 any form of tampering on the customer interface.

The meter is usually installed in a secure, locked enclosure - typically a pavement kiosk or pole-mounted equivalent. It is outside the consumer's premises to facilitate easy inspection by the utility at any time, thus reducing the possibility of tampering.

Prepayment and Credit Mode Operation

The Cashpower Power-Rail meter is programmable and can operate both in the prepayment of credit mode, it is possible to switch between modes as required by using a 20 digit token.

User-friendly Customer Interface

User interaction with the meter and access to meter information e.g. rate of energy consumption, low credit warning and load contactor status is available using the customer Interface's keypad and large 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.

Meter Status and Diagnostic Indicators

The meter includes an 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.

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.

An anti-tamper shroud can also be fitted to the meter (refer figure 1), which not only protects and limits access to the meter terminals and cables, 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-sealed wire seals can be field-fitted to secure the anti-tamper 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.

The meter also has a feature allowing detection of Significant Reverse Energy (SRE). If the line and load wires are swapped during installation, the meter will continue to operate and decrement credit. The unit may be factory programmed to tamper and disconnect the consumer's load should SRE be detected.

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 can be personalised to disconnect the load if a power failure is detected, as would be the case if the neutral wire were to be removed

Interrogation Port

As a customer option, more detailed information and programming is achieved via the industry standard VTC interrogation port on the side of the meter.

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 to upload it to a hand-held unit.

Surge protection

The meter has been designed to have a surge voltage withstand that significantly exceeds the requirements of both SABS 1524 and IEC 62052-11.

Depending on the installation's electrical environment, the customer has the option of fitting an additional surge arrester with a current surge rating in excess of 30kA.

Installation Features

The meter is suited for connection to most metering and reticulation systems. The communication wires for the customer interface are non-polarised and safety-isolated.

This simplifies the installation process and also ensures safety within the consumer's premises.

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

Cashpower Power-Rail Technical specifications

General information	
Meter Format	Single phase, 2-wire, direct connected prepayment meter
Compatible network(s)	Single phase, 2-wire, earthed neutral ¹
Operation	
General	Credit store with decrement-on-usage
Credit entry mechanism	Keypad; encrypted numbers (prepayment mode) or automatically incremented monthly allocation (UP2 mode)

Encryption algorithms	STS Compliant ²
Applicable specifications	NRS009-1; NRS009-6-6; NRS009-6-7 ³
Electrical Ratings	
Nominal Voltage (U_n) - Rated Voltage	230 Volts AC rms (other voltages available on request)
Nominal frequency	50 Hz (60Hz option available)
Operating voltage range	80% to 120% of U_n (184V – 276V)

¹ May be compatible with other network types as well – Consult Landis+Gyr

² STS = Standard Transfer Specification (Industry Standard)

³ NRS = National Rationalized Specification (South Africa)

Maximum continuous current (I_{max})

60 or 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 (I_b)

Protective class (according to IEC 62052-11)

Class II (double insulated)

Metrological Performance**Measurement direction**

Forward and reverse power detection and metering⁴ (credit is decremented in both directions)

Meter constant (LED flash rate)

1000 impulses / kWh

Basic reference current (I_b)

10A⁵

Accurate metering range

0.05 I_b to I_{max} ⁶

Starting current

$\leq 0.005 I_b$ (For Class 2)

Power threshold

6.5W for base 10A (approx 28mA @ 230V and $\cos(\Phi) = 1$)⁷

Accuracy class index

Class 2 (Class 1 optional)

Maximum error – Class 2

$< \pm 2\%$ over range 0.1 I_b to I_{max} ; (with $0.5 \leq \cos(\Phi) \leq 1.0$ lagging and $0.8 \leq \cos(\Phi) \leq 1.0$ leading)⁸

Disconnection Device**Type**

Single Pole latching contactor 100A

Insulation, Overvoltage and Surge Protection**Insulation System Classification**

Protective Class II (according to IEC 62052-11)

Insulation Level

4kV rms for 1 minute

Overvoltage withstand

440VAC for 48 hours⁹
600VDC for 1 minute¹⁰

Surge Immunity – Voltage impulse withstand

Differential
In excess of 6kV, 1.2/50 μ s, with 2 Ω source impedance (according to SABS 1524-1)

Surge Immunity – Current impulse withstand

Service rating
5 kA 8/20 μ s (with optional surge arrestor populated)¹¹

Withstand rating

30 kA, 4/10 μ s (with optional surge arrestor populated)

Specification compliance

SABS 1524-1, IEC 62052-11

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

⁴ Accurately meters energy if line and load connections are reversed. Can also be configured to tamper on reverse energy detection (SRE).

⁵ Other Base Currents available on request.

⁶ The metering is accurate within the limits specified by IEC62053-21. Should a meter momentarily be operated outside its specified maximum current rating, it will meter accurately up to 1.2 I_{max} or 1.6 I_{max} (80A or 60A meters respectively).

⁷ The power threshold represents the minimum load power that the meter will register. This value is programmable, with the recommended level for a base 10A meter shown.

⁸ IEC 62053-21: $0.8 \leq \cos(\Phi) \leq 1.0$ Leading, $0.5 \leq \cos(\Phi) \leq 1.0$ Lagging

⁹ This higher specification (440V as opposed to 400V) has not yet formed part of the official specification

¹⁰ This higher end test is not a requirement of IEC 62052

¹¹ Surge arrestor externally fitted between Live In and Neutral

Communication Circuitry**Type**

Galvanically isolated, non-polarised, 2-wire, half-duplex. Meter function is independent of CIU function

Rated Impulse Voltage

Peak Voltage 6kV (1,2/50 μ S) waveform (according to IEC 62052-11 Protective Class II)

Insulation Properties

4kVrms (1 minute) according to IEC 62052-11 Protective Class II

Communication Distance

Up to 130 metres, with a maximum total loop resistance of 40 Ω

Main Enclosure**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

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 47.5mm(W) x 87mm(D)¹²

Mass

275 g

Terminals**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 25mm²

Neutral Terminal

Type Single screw (M6), moving-cage terminal

Material Mild steel, yellow passivated

Maximum Cable Size 16mm²

Customer Interface Connector

Type Plug-in, single screw cage terminal (with wire protector)

Maximum Cable Size 1.5mm²

Sealing**Type**

Meter enclosure Factory sealed with screw-seal

Anti-tamper shroud Utility sealed with wire and crimped ferrule

Operating Environment**Area of application**

Indoor meter (according to IEC62052-11)

Operating temperature range

-10°C (+14°F) to +55°C (+131°F)

Storage temperature range

-25°C (-13°F) to +70°C (+158°F)

Relative humidity

Maximum \leq 95%; Annual mean 75%

Man-Machine Interface**Rate of consumption indicator**

Visible LED, 1000 pulses/kWh

Status Indication

Visible LED

CIU Operating Indication

Visible LED

External Interfaces**Standard Interrogation Port**

8-pin interface according to ESKOM DISSCAA9

¹² See diagram

Optical Communications Port

According to IEC 62056-21

Proprietary Interrogation Port

Data interface for Cashpower Powerscope II

Eskom Interrogation Port

Optical to Eskom's DSP34-1635 standard

Specifications Compliance & Approvals**SABS**

SABS 1524-1

Eskom

Eskom DISSCAAA9, DSP34-1635

Cashpower Power-Rail Customer Interface Unit

Electrical**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 40Ω

Operating Environment**Operating Temperature Range**

-10°C (+14°F) to +55°C (+131°F)

Storage Temperature Range

-25°C (+12°F) to +70°C (+158°F)

Relative Humidity (IEC 6 1036)

Maximum ≤95%; Annual mean 75%

Enclosure**Type**

Slimline, wall mounted

Rating

IP 51

Material

ABS

Dimensions

69mm(H) x 134mm(W) x 25mm(D)

Weight

100 g

Terminals**Type**

Two-way screw terminal

Maximum cable size2.5mm²**Sealing****Enclosure**

Factory sealed, no user serviceable parts

Man-Machine Interface**Type**

Language-independent

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

Cashpower Power-Rail Dimensions

Meter Dimensions

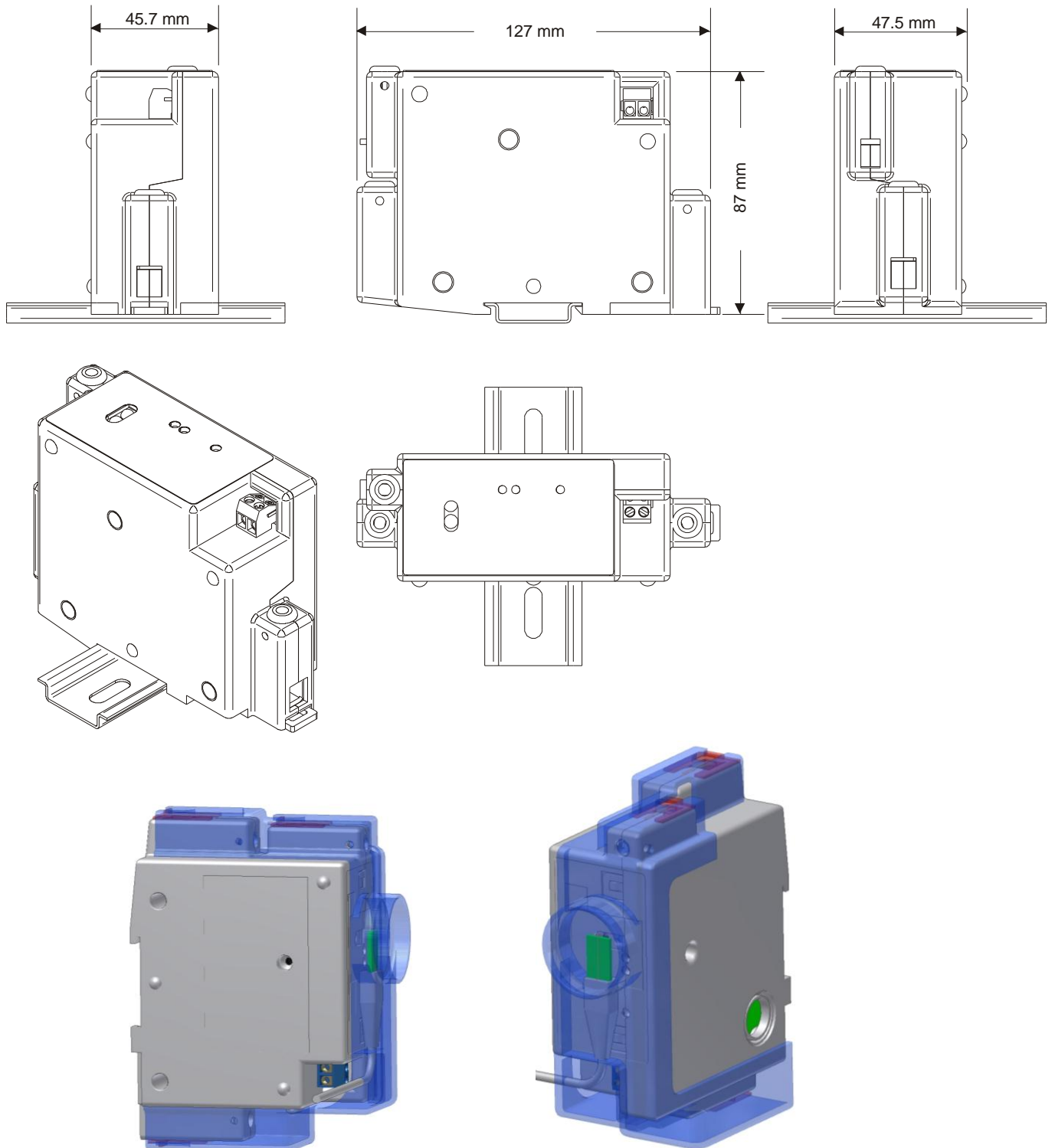
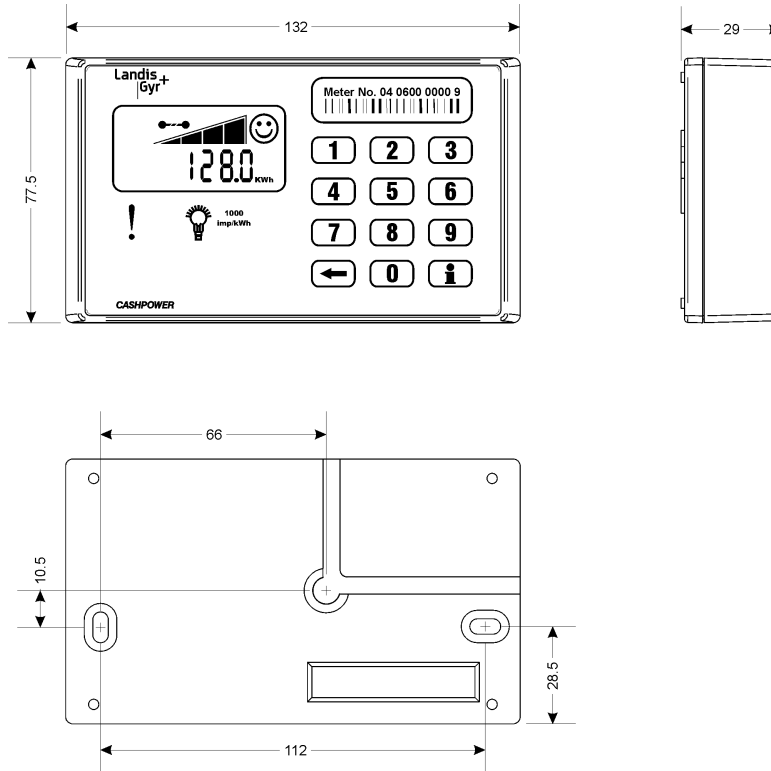


Figure 1: Power-Rail with anti-tamper shroud fitted

Customer Interface Unit Dimensions



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