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Prepayment Electricity Meters

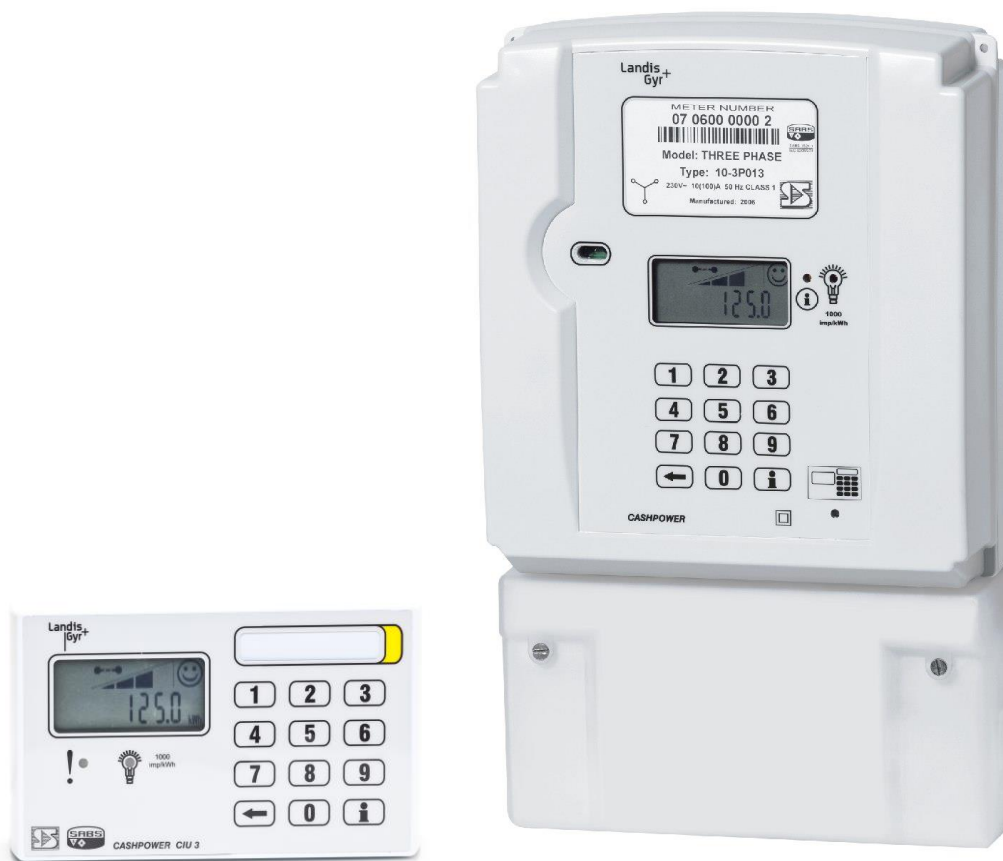
Residential & Commercial

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Residential
Cashpower Three Phase

Version 11 Meter Firmware

Technical Specification



The Cashpower Three Phase prepayment electricity meter is a four wire 100 Amp per phase, split prepayment meter in a compact BS housing. The meter is suitable for residential, commercial and light industrial environments.

Version: 0.0

Date: 3rd November 2014

Issued by Product Management: Lee Naicker

Overview

The Cashpower Three Phase meter is a four-wire 100 Amp per phase, keypad-based prepayment meter in a compact BS housing. The meter is suitable for residential, commercial and light industrial environments. An optional local keypad and display can be fitted to the meter at the time of manufacture. The meter also features a dedicated diagnostic indicator which shows the status of communication to the remote customer interface unit. The meter boasts a large custom display and also features a host of standard Cashpower software features including the ability to operate as a prepayment meter or in credit metering mode.

Features

- Maximum current of 100A per phase
- Compact meter design with British Standard layout
- Easy to install and ideal for new reticulation as well as retrofitting of credit meters with BS footprints
- Proven Cashpower keypad technology
- Meter provides valuable information to help consumers effectively manage and budget their electricity consumption
- Tamper detection
- Significant Reverse Energy (SRE) detection
- Programmable software power limit
- Advanced commissioning / decommissioning feature
- Prepayment / Credit Mode
- STS compliant
- Large display with language independent icons
- High surge withstand capability for areas prone to lightning or other line surges
- SANS 1524-1 and IEC 62055-31 compliant

Optical Interface

As a standard feature, the Three Phase meter offers 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.

Tamper Detection

The Cashpower Three Phase meter is mechanically sealed against tampering through the use of a factory sealed plugs and optional sealing wires for the electronic enclosure. In addition the terminal cover can be sealed by standard utility seals.

The Cashpower Three Phase meter is equipped with a tamper sensor that will automatically disconnect the power to the load in the event of tampering.

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.

Remote Customer Interface Unit

The meter has two parts, the prepayment meter and the customer interface unit. The meter is connected to the customer interface unit by a two core communications wire up to a distance of 130 metres. It operates independently of the customer interface unit and is usually installed in a secure, locked enclosure outside the consumer's home. The customer interface unit is compact with a user-friendly keypad and display. An optional local keypad and display can be fitted to the meter at the time of manufacture. The meter also features a dedicated diagnostic indicator which shows the status of communication to the customer interface unit.

The meter contains all critical metering, token decryption and load control functionality. It operates independently and is immune to any form of tampering on the Customer Interface Unit.

The meter is usually installed outside the home in a secure, locked enclosure which should not be accessible to the consumer. This facilitates easy inspection by the utility at any time and reduces the opportunity of fraud by tampering.

The customer interface unit is installed inside the consumer's house in a convenient location. The communications interface can withstand voltage surges of 6kV, however it is recommended that one of the communication lines be earthed at the meter for additional protection.

Cashpower Three Phase Technical specifications

General information	
Meter Format	3-phase four-wire, direct connected prepayment meter
Operation	
General	Credit store with decrement-on-usage
Credit entry mechanism	Keypad; encrypted numeric tokens
Token Encryption Method	20-Digit STS ¹
Applicable specifications	NRS009-1; NRS009-6-6; NRS009-6-7 ²
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)
Maximum continuous current (I_{max})	100 Amps (factory and field programmable to lower power limits)
Burden	
Voltage circuit	<2W / <10VA @ 230V
Current circuit	<2.5 VA @ Base Reference Current (I_b)
Protective class (according to IEC 62052-11)	Class II (double insulated)

¹ STS = Standard Transfer Specification (Industry Standard).

² NRS = National Rationalized Specification (South Africa)

Metrological Performance	
Measurement direction	Forward and reverse power detection and metering ³ (credit is decremented in both directions)
Meter constant (LED flash rate)	1000 impulses / kWh
Basic reference current (I_b)	10A ⁴
Accurate metering range	0.05 I_b to 1.2 I_{max} ⁵
Starting current	$\leq 0.005 I_b$ for Class 2
Power threshold	6.5W (approx. 28mA @ 230V and $\cos(\Phi) = 1$) ⁶
Accuracy class index	Class 2 (Class 1 on request)
Maximum error – Class 2	$< \pm 2\%$ over range 0.1 I_b to I_{max} ; $0.5 \leq \cos(\Phi) \leq 1.0$ (lead or lag) ⁷
Disconnection Device	
Type	3 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

³ Will accurately meter energy if Line and Load connections are reversed. Can also be configured to tamper on reverse energy detection.

⁴ Other Base Currents available on request.

⁵ 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} .

⁶ 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.

⁷ IEC 62053-21: $0.8 \leq \cos(\Phi) \leq 1.0$ Leading, $0.5 \leq \cos(\Phi) \leq 1.0$ Lagging.

Overvoltage withstand

440VAC for 48 hours⁸
600VDC for 1 minute⁹

Surge Immunity – Voltage impulse withstand**Differential**

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

Surge Immunity – Current impulse withstand**Service rating**

5 kA 8/20µs (with optional surge arrester populated)

Withstand rating

30 kA, 4/10µs (with optional surge arrester 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

Main Enclosure**Type**

Layout according to BS5685 footprint

Mounting

Two mounting screws bottom (spacing according to BS5685). Top mounting bracket available as an option

Rating

IP54 (IEC60529)

Material

UV Stable Polycarbonate/ABS blend with flame-retardant

Resistance to heat and fire

Complies with 960°C¹⁰ glow-wire (IEC 60695-2-1)

Resistance to spread of fire

UL94-V0 rated @1.5mm. No toxic gases emitted: 'Green Material'¹¹

Dimensions

286.8 mm(H) x 173 mm(W) x 80 mm(D) with standard terminal cover¹²

Mass

2.0 kg

Terminals**Layout**

According to BS5685

Mains Terminals

Type Double screw (M6), moving-cage terminal

Material Mild steel, yellow passivated

Maximum Cable Size 35mm²

Terminal Block Material

UV Stable Polycarbonate with flame-retardant

Resistance to heat and fire

Complies with 960°C¹³ glow-wire (IEC 60695-2-1)

Resistance to spread of fire

UL94-V0 rated @1.5mm. No toxic gases emitted: 'Green Material'¹⁴

Sealing**Type****Meter enclosure**

Factory sealed with screw-sealing plugs

Terminal cover

Utility sealed with wire and crimped ferrule

⁸ This higher specification (440V as opposed to 400V) has not yet formed part of the official specification

⁹ This higher end test is not a requirement of IEC 62052

¹⁰ Only 650°C called for by standard industry specification

¹¹ No V-rating or 'Green' material called for by industry specifications

¹² See diagram

¹³ Only 650°C called for by standard industry specification

¹⁴ No V-rating or 'Green' material called for by industry specifications

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 ≤95%; Annual mean 75%

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

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

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

External Interfaces

Standard Interrogation Port

8-pin interface according to ESKOM DISSCAA9

Optical Communications Port

According to IEC 62056-21

Proprietary Interrogation Port

Data interface for Cashpower Powerscope

Specifications Compliance & Approvals

IEC

IEC 62055-31

SABS

SANS 1524-1

ESKOM – Prepayment meters

ESKOM DISSCAA9

BS

BS 5685: 1979

Cashpower Three Phase 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

77.4mm(H) x 132.3mm(W) x 29mm(D)

Weight

100 g

Terminals

Type

Two-way screw terminal

Maximum cable size

2.5mm²

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

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)

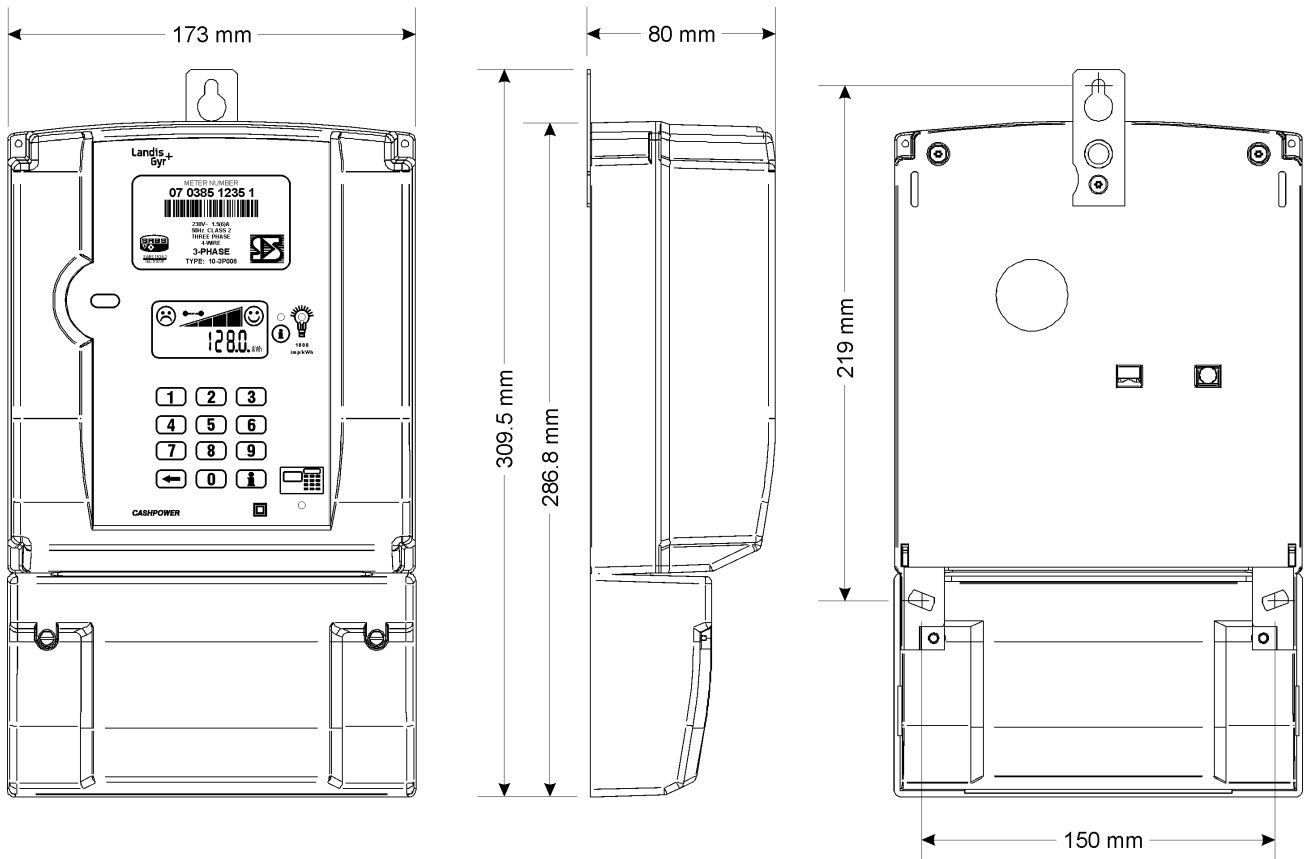
Rate of consumption indicator (pulse rate proportional to current rate of consumption)

Diagnostic Information

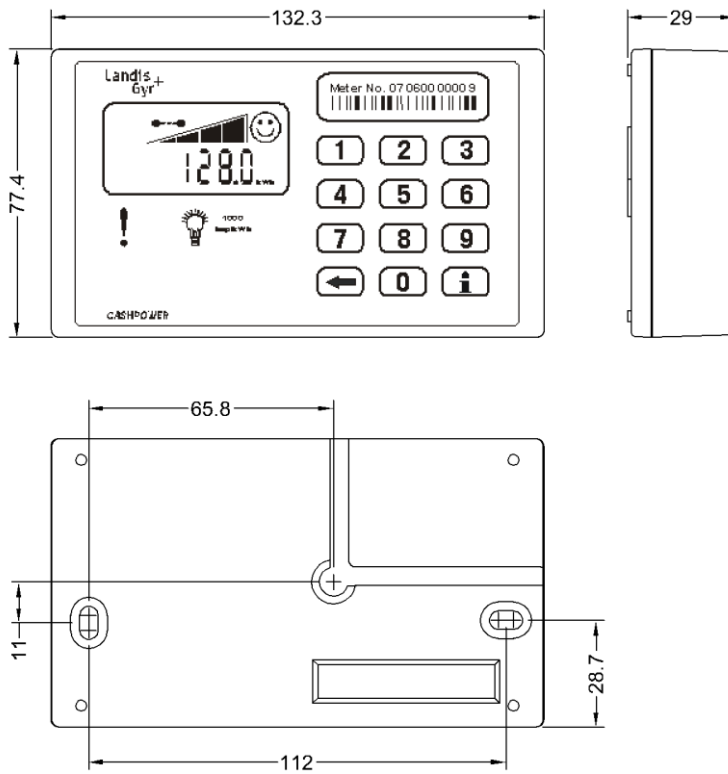
Additional meter parameters accessible via the "Information" key

Cashpower Three Phase Dimensions

Meter Dimensions



Customer Interface Unit Dimensions



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