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.

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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 ll (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
≤ 0.005 I_b for Class 2

Power threshold
6.5W (approx. 28mA @ 230V and cos(Φ) = 1)[6]

Accuracy class index
Class 2 (Class 1 on request)

Maximum error – Class 2
< ± 2% over range 0.1 I_b to I_{max}; 0.5 ≤ cos(Φ) ≤ 1.0 (lead or lag)[7]

Disconnection Device

Type
3 Pole latching contactor 100A

Insulation, Overvoltage and Surge Protection

Insulation System Classification
Protective Class ll (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 ≤ cos(Φ) ≤ 1.0 Leading, 0.5 ≤ cos(Φ) ≤ 1.0 Lagging.

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Overvoltage withstand

440VAC for 48 hours[8]
600VDC for 1 minute[9]

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 arrestor populated)
Withstand rating
30 kA, 4/10µs (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

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°C[10] 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 cover [12]

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 35mm^2

Terminal Block Material

UV Stable Polycarbonate with flame-retardant

Resistance to heat and fire
Complies with 960°C[13] 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

$9cm^2$ (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 DISSCAAA9

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 DISSCAAA9

BS
BS 5685: 1979

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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
2.5mm^2

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
9cm^2 (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

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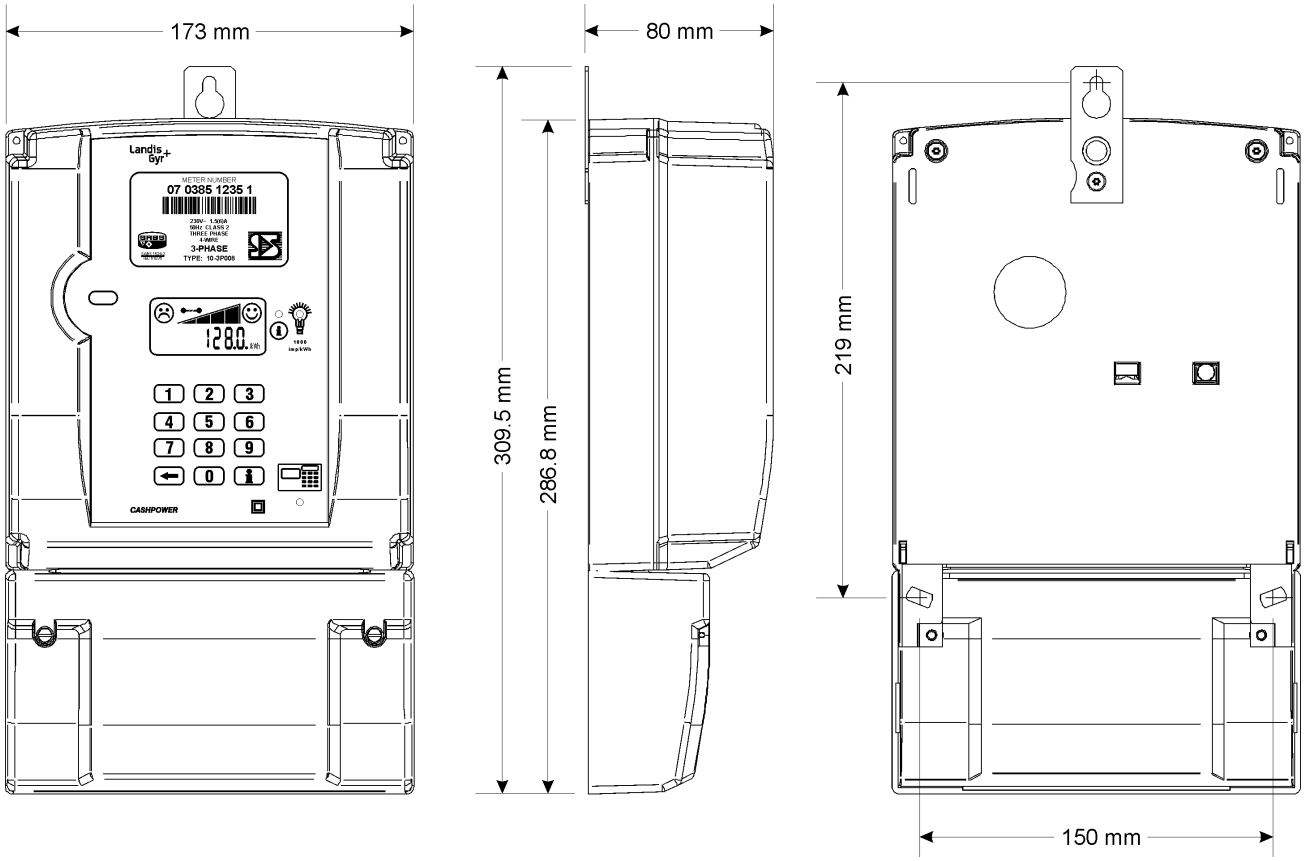
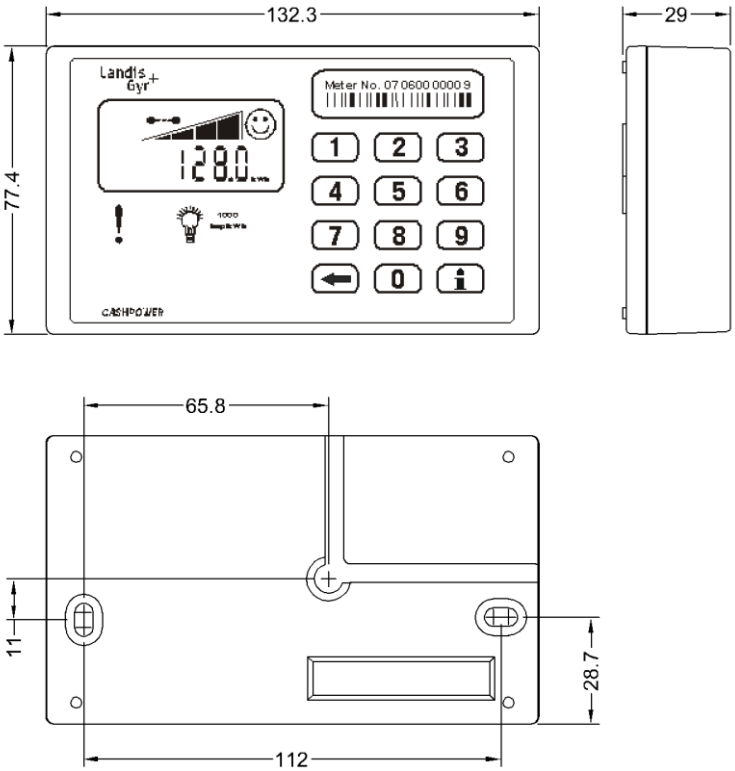
Cashpower Three Phase Dimensions

Meter Dimensions



Customer Interface Unit Dimensions



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