Three-Phase Keypad-Based Prepayment Meter

The PPL32NS three-phase meter is a four-wire 100A per phase, keypad-based prepayment meter in a compact British Standard (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 (CIU).

The meter boasts a large custom display and also features a host of standard PPL32NS 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 PPL32NS keypad technology
◎ Meter provides valuable information to help effectively manage and budget 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 SABS 1524, IEC 62052-11 and IEC 62053-21
◎ compliant

Functionalitlies

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 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 PPL32NS 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 CIU. The meter is connected to the CIU by a two core communications wire up to a distance of 130m.

It operates independently of the CIU and is usually installed in a secure, locked enclosure outside the consumer's home. The CIU 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 CIU.

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 CIU.

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 CIU 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.
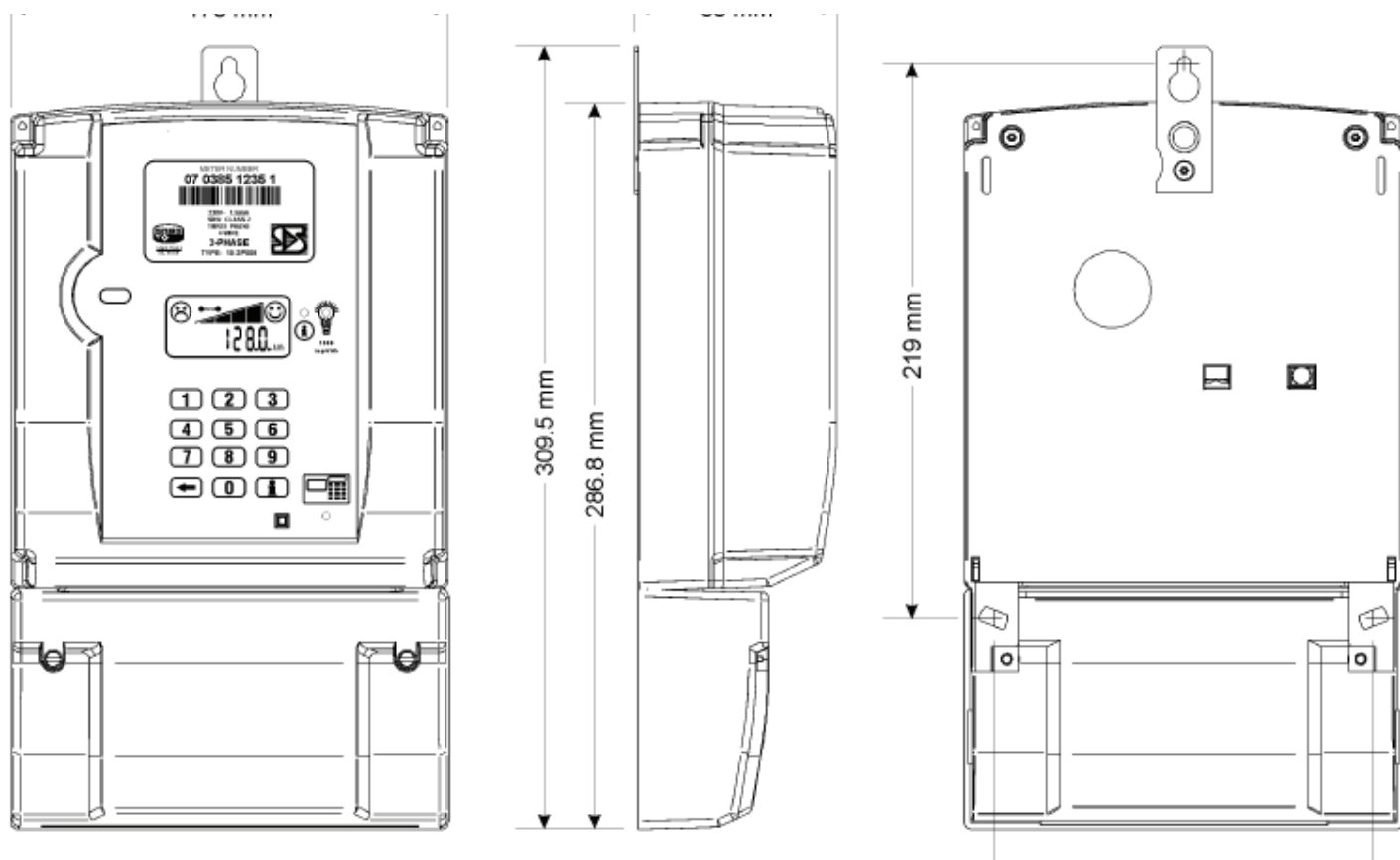
Technical Specifications - Meter

Item	Specification
Type	Three-phase four-wire, direct connected prepayment meter
General operation	Credit store with decrement-on-usage
Credit entry mechanism	Keypad; encrypted numeric tokens
Token encryption method	20-digit STS
Applicable specifications	NRS009-1, NRS009-6-6, NRS009-6-7
Nominal voltage (Un) - rated voltage	230VAC rms (other voltages available on request)
Nominal frequency	50Hz (60Hz option available)
Operating voltage range	80% to 120% of Un (184V - 276V)
Maximum continuous current (Imax)	100A (factory and field programmable to lower power limits)
Voltage circuit burden	<2W / <10VA @ 230V
Current circuit burden	<2.5VA @ base reference current (Ib)
Protective class (according to IEC 62052-11)	Class II (double insulated)
Measurement direction	Forward and reverse power detection and metering (Credit is decremented in both directions)
Meter constant (LED flash rate)	1000 impulses / kWh
Basic reference current (Ib)	10A
Accurate metering range	0.05Ib to 1.2 Imax
Starting current	≤ 0.005Ib (For Class 2)
Power threshold	6.5W (approx 28mA @ 230V and cos(∅) = 1)
Accuracy class index	Class 2, Class 1 on request
Maximum error Class 2	< ± 2% over range 0.1 Ib to Imax; 0.5 ≤ cos(∅) ≤ 1.0 (lead or lag)
Disconnection device type	3 pole latching contactor
Insulation system classification	Protective Class II (according to IEC 61036)
Insulation level	4kV rms for 1 minute
Over voltage withstand	440VAC for 48 hours, 600VDC for 1 minute
Voltage impulse withstand - differential	In excess of 6kV, 1.2/50?s, with 2W source impedance (according to SABS 1524-1)
Current impulse withstand - service rating	5kA 8/20μs (with optional surge arrestor populated)
Current impulse withstand - withstand rating	30kA, 4/10μs (with optional surge arrestor populated)
Surge compliance	SABS 1524-1, IEC 62052-11
Electrostatic discharge	15kV air discharge
Immunity to HF fields	80MHz to 2GHz @ 10V/m with load, 80MHz to 2GHz @ 30V/m no load
Immunity to fast transient bursts	4kV
Radio interference	Complies with requirements for CISPR 22
Electromagnetic 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
Main enclosure mounting	Two mounting screws bottom (spacing according to BS5685). Top mounting bracket available as an option
Main enclosure rating	IP54 (IEC60529)

Technical Specifications (continued) - Meter

Item	Specification
Material	UV stable polycarbonate / ABS blend with flame-retardant
Material resistance to heat and fire	Complies with 960°C glow-wire (IEC 60695-2-1)
Material resistance to spread of fire	UL94-V0 rated @1.5mm. No toxic gases emitted: 'Green Material'
Dimensions (h x w x d)	80 x 173 x 286.8 (mm)
Weight	2kg
Terminals layout	According to BS5685
Mains terminals type	Double screw (M6), moving-cage terminal
Mains terminals material	Mild steel, yellow passivated
Mains terminals maximum cable	35mm^2
Terminal block material	UV stable polycarbonate with flame-retardant
Terminal resistance to heat and fire	Complies with 960°C glow-wire (IEC 60695-2-1)
Terminal resistance to spread of	UL94-V0 rated @1.5mm. No toxic gases emitted: 'Green Material'
Meter enclosure	Factory sealed with screw-sealing plugs
Terminal cover	Utility sealed with wire and crimped ferrule
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
LCD size (w x h)	9cm2 (45 x 20) (mm), 8 digits + 11 icons
LCD icon information	Happy face, sad face, alert, breaker status, info, kWh, 4-segment credit wedge
LCD numeric information	Display of various meter information such as credit levels, token entry, etc.
Keypad	12-key, international standard layout including "Information" and "Backspace" keys
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
Standard interrogation port	8-pin interface according to ESKOM DISSCAAA9
Optical communications port	According to IEC 62056-21
Proprietary interrogation port	Data interface for PPL32NS/SK
IEC	IEC 62055-31
SABS	SABS 1524-1
ESKOM prepayment meters	ESKOM DISSCAAA9
BS	BS 5685: 1979

Technical Specifications - Customer interface unit

Item	Specification
Electrical type	Isolated, non-polarised, 2-wire, half-duplex, 12VDC from meter
Operating range (communication)	Up to 130m, with a maximum total loop resistance of 40Ω
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
Enclosure rating	IP 51
Enclosure material	ABS
Dimensions (h x w x d)	77.4 x 132.3 x 29 (mm)
Weight	100g
Terminal type	2-way screw terminal
Terminal	2.5mm2
Sealing enclosure and interface	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
LCD size (w x h)	9cm2 (45 x 20) (mm), 8 digits + 11 icons
LCD icon information	Happy face, sad face, alert, breaker status, info, kWh, 4-segment credit wedge
LCD 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, 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