

Single Phase Magnetic Card Electricity Meter

Model Type: 5188A



USER MANUAL

issue 1.0

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1. Introduction

1.1 Overview

This document covers the specification and operation of the CPM5188A single phase prepayment card operated electricity meter. The main features of the meter are:-

- 1) Approved to BS EN61036, Class 2
- 2) All solid state with 16 character LCD
- 3) Standing Charge + Debt collection
- 4) Emergency Credit
- 5) Up to 4 tariff rates
- 6) Internal Real Time Clock with programmable switching
- 7) Disconnection override facility
- 8) Auxiliary relay Terminals
- 9) Audible disconnect warning
- 10) Reverse power detection

2. Technical Data

The CPM5188A is an alternating Current Static Watt Hour Meter, Class 2. The unit will comply with BS EN61036 (alternating current static watt-hour meters for active energy class 2) and any relevant standards contained therein. The unit will also comply with additional tests as specified by The Office of Gas & Electricity Markets (Ofgem).

2.1 Meter Element

The red LED mounted on the front panel will pulse at a rate of 1000 pulses per kWh. Power registration is recorded in non-volatile memory under control of the microprocessor which is updated every 24 hours and in the event of a power failure. There are separate registers for each rate.

2.2 Main Contactor & Auxiliary Relay

Contactor current rating:	100 Amp
Main Terminal dimensions:	8.0mm to 8.2mm
Auxiliary relay type:	2 Amp floating
Auxiliary terminal dimensions:	3.0mm minimum

NOTE: Auxiliary terminals become inputs for the external time switch option.

2.3 Power Supply

Rated Voltage	:	240V Standard / 230V on request
Operating Voltage Range:		From 0.9 to 1.1 Rated Voltages
Current range:		20 to 100A Standard
Frequency:		50Hz Standard

2.4 Temperature Range

Operating Range: -10°C to 45°C

Limit range of operation: -20°C to 55°C

Storage Range* : -25°C to 70°C

This complies with BS EN61036: section 4.3.1

*Maximum period of 6 hours at the extremes of this temperature range.

2.5 Dimensions

Height = 172mm

Width = 126mm

Depth = 90mm

3 Normal Functional Operation

This section covers the general operation of the CPM5188A meter. For ease of explanation during the following sub sections not every combination of option is covered. For a complete list of options please refer to section 5.

3.1 Normal Operation Display

During normal operation the display on the meter will be one of those shown below.

Display	Contacto(r)s	Remarks
RY CRED £XXX.XX	Closed	The consumer has £xxx.xx of credit remaining. RY represents the current tariff
DEBT £XXX.XX	Open	The consumer has used up all credit and has accumulated a debt of £xxx.xx
£XXX.XX+£ZZZ.ZZE	Closed	The consumer has selected emergency credit while still in credit. £xxx.xx represents the amount of real credit available while £zzz.zz represents the available emergency credit. When £xxx.xx reaches 000.00 the display will change to the format below.
RY CRED £XXX.XXE	Closed	The consumer has selected emergency credit remaining. £xxx.xx represents the emergency credit remaining while RY is the current tariff.
DEBT £XXX.XXE	Open	The consumer has selected and used up all emergency credit. £xxx.xx is the total the consumer is in debt.

3.2 Additional Displayed Information

When the meter is operating normally pressing the button will allow various parameters to be displayed. A preset option determines whether the display automatically cycles through all the parameters or waits for the display button to be pressed between each parameter. If during a manual advanced cycle the display button is **not pressed within 30 seconds** the meter will revert to its normal operation.

The meter can be configured with up to 3 separate display cycles, each made up from one or more of the parameters listed below in any sequence. The 3 cycles are:

- A) The display with no card in the card meter.
- B) The display with a token card in the card reader.
- C) The display with a 'meterman' programming card in the card reader or (optionally) for 30 seconds after a valid hand-held 'Mini-programmer' communication (Meterman programming must be disabled)

The table on the next page gives some examples of additional display configuration.

NOTE: Some parameters may not be displayed if not applicable, e.g. Rate 3 & 4 parameters would not be displayed if the meter were configured for only 2 rates.

Display	Remarks
DISPLAY*TEST	Test all characters positions on the display
DEBT CLR £XXX.XX	Only displayed when emergency credit has been invoked. £xxx.xx is the amount of debt to clear to be back in credit.
TIME HH/MM	Current Time
DAY DD/MM/YYYY	Current Date
T.CREDIT £XXXXX	Total value of credit that has been inserted
T.CARDS XXXXX	Total number of cards inserted
STCH/WK £XXX.XX Optionally FXDCH/WK £XXX.XX	Standing Charge per week
T.DEBT £XXX.XX Optionally T.REPAY £XXXXX.XX	Total debt to be recovered
DEBT/WK £XXX.XX Optionally REPAY/WK £XXX.XX	Debt collection per week
FXDCH/WK £XXX.XX Optionally TOTCH/WK £XXX.XX	Fixed charge per week (Debt collection and standing charge)
KWH XXXXX RY	KWH for rates 1 to 4 (0 dp)
KWH XXXXX.XXRY	KWH for rates 1 to 4 (2 dp)
KWH XXXXX TOT	Total KWH (0 dp)
KWH XXXXX.XX TOT	Total KWH (2 dp)
RATE Y XXX.XX ppu	The tariff for rate Y is displayed (4 rates max)
E.CRED £XXX.XX	Emergency Credit
E.AVAIL £XXX.XX	If the meters pre-paid credit is above this point then emergency credit is not selectable
AREA CODE XXX	Card token area identification code

3.3 Fixed Charge Collection

The fixed charge element consists of 2 parts:

- 1) A standing charge
- 2) A debt repayment

The standing charge and debt repayment are both programmed into the meter as weekly values, which are divided internally by 100 and used to reduce the remaining credit. (Or increase the debt) every 100th of a week (1.68 hours.)

3.3.1 Standing Charge

The weekly standing charge is also collected every 1/100th of a week.

3.3.2 Debt Collection (Optional)

The debt collection operates identically to the standing charge except it is also deducted from a pre set debt outstanding. When the debt outstanding becomes zero the debt collection is stopped.

3.4 Rate Switching

The meter is configurable to have up to 4 different charge rates and is available with an internal or external time switch option.

3.5 Disconnection

3.5.1 No remaining Credit

When the prepaid credit expires and the meter has gone into debt the main and auxiliary contactors will be opened, thus disconnecting the power. To restore power, sufficient token cards must be inserted to clear the outstanding debt. An emergency credit facility is also available to reconnect power.

3.5.2 Reverse Detection (Optional)

If reverse power is detected above a pre-determined level the consumers supply can be disconnected and/or reverse running indicated by the display flashing alternately between its normal display and "RED" (Reverse Energy Detection) Reverse detection can only be reset via a hand-held 'Mini-programmer' or a reset card.

3.5.3 Gas Lighter Fraud (Optional)

Certain external influences such as a gas lighter may cause the microprocessor within the meter to reset. As these influences would never occur normally the meter can be configured so that after 4 abnormal resets within 24 hours power will be disconnected the meter shall display the message "LOCK OUT". In this condition, the meter does not function.

3.6 Disconnection Override (Optional)

The meter will not disconnect the economy rate when going from a prepaid credit into debt. In this situation disconnection is delayed until a different rate is selected and the facility is not made available again until the meter is back into pre paid credit. The economy rate number can be set via GIMX to any of the 4 rates.

3.7 Audible Disconnect Warning (Optional)

The meter will give an audible warning when the emergency credit availability point is reached. If enabled the warning will consist of a 30 second buzz followed by 10 thirty second interval pulsed buzzes.

3.8 Emergency Credit

If the prepaid credit is below a given limit or the meter has gone into debt, an emergency credit facility may be invoked by pressing the button marked emergency credit. The meter's operation whilst in emergency credit is explained in the following subsections.

3.8.1 Invocation

Emergency credit is a pre-set reserve that can be selected by pressing the 'Emergency Credit' button when the pre-paid credit has fallen below a given level or the meter has gone into debt. The display will change to XXX.XX+£ZZZ.ZZE or CRED £XXX.XXE to indicate the amount of credit / emergency credit left to the consumer. The debt is to be repaid before the meter is back into prepaid credit. (DEBT CLR £XX.XX) may be viewed by pressing the display button.

3.8.2 Reduction

The amount of emergency credit remaining (Displayed as CRED £XXX.XXE) will be reduced as electricity is consumed and the fixed charge collected. The DEBT will also be increased by the same amount.

3.8.3 Expiry

Once the emergency credit has fallen to zero the supply will be disconnected and the display will show DEBT £XXX.XXE, where XXX.XX represents the total amount owed by the customer and the 'E' signifies the emergency credit has been totally used.

3.9 Pre payment card tokens

3.9.1 Valid Cards

When a valid token card is inserted its total monetary value is credited to the meter and its acceptance is indicated by the message 'TOKEN VALUE £YY' being displayed for 5 seconds. On removal the card is erased and visibly marked. Three examples of this are given below:

Example 1:-

Display	Action
RY CRED £121.99	INSERT £5 TOKEN CARD
TOKEN VALUE £5	
RY CRED £126.99	

Example 2:-

Display	Action
DEBT £10.99	INSERT £5 TOKEN CARD
TOKEN VALUE £5	
RY DEBT £5.99	

Example 3:-

Display	Action
DEBT £2.99	INSERT £5 TOKEN CARD
TOKEN VALUE £5	
RY CRED £2.01	

3.9.2 Card Errors

The message 'CARD ERROR' may be displayed if the card was inserted too quickly, too slowly or the card was invalid, the message 'CREDIT FULL' is displayed if a token card is inserted that would cause the pre-paid credit to become greater than £999.99. If either of the above messages is displayed then on removal, the card is not erased and may be used at a later date.

3.9.3 Emergency Credit Repayment

When the preset emergency credit has expired, card tokens must be inserted that are of sufficient value to give a pre paid credit of at least **£1** above the emergency credit DEBT.

4 Push Button Programming

4.1 Programming Method

After the insertion of a valid METERMAN card the following parameters can be viewed/modified using the two push buttons on the meter.

#PROGRAMMING#	
E CRED £XXX.XX	Emergency Credit Value
E.AVAIL £XXX.XX	Emergency Credit Availability point
RATE Z XXX.XXppu	1/100 OF PENCE PER kWh for all rates
T.DEBT £XXXX.XX	Outstanding Debt
DEBT/WK £XXX.XX	Debt Collection Per Week
STCH/WK £XXX.XX	Standing Charge per Week
ZZ:ZZ RW XX YY	Displayed for up to 15 time switches
TIME HH:MM	Current Time
DAY DD/MM/YYYY	Current Date
EC&DIS TO CLEAR	Clear Meter enable request

To display/modify a particular parameter first insert a meterman card upon which the message 'REMOVE CARD' will be displayed. On removing the card the message 'PROGRAMMING' will be displayed. Next press and release the display button until the required parameter is displayed.

Each press of the emergency credit button will rotate the cursor one place right through the programmable setting of the displayed parameter. To change the setting do not release the

emergency credit button when the correct position is reached; whilst holding down the EC button, each press of the display button will then increment the value above the cursor.

To store the new value advance the display to the next parameter by pressing the display button. If no buttons are pressed within 30 seconds the display will revert to its normal operation mode without saving the new value.

EXAMPLE

If it were desired to change the value of rate1 the sequence of events would be as follows:

STEP	ACTION	DISPLAY
1	Insert a valid Meterman Card	REMOVE CARD
2	Remove Meterman Card	#PROGRAMMING#
3	Press and release the display button	E.CRED £XXX.XX
4	Press and release the display button	E.AVAIL £XXX.XX button
5	Press and release the display button	RATE 1 000.00ppu button
6	Press and HOLD the emergency credit button	RATE 1 0 <u>0</u> 0.00ppu button
7	Press and release the display button while still holding the emergency credit button until the correct value is shown	RATE 1 010.00ppu
8	Release the emergency credit button and repeat steps 7,8 & 9 until all digits are set correctly	
9	Press the display button to store the new setting and display the next parameter	RATE 2 000.00ppu

4.1.1 Reset

Display	Remarks
EC&DIS TO CLEAR	<p>If rate 1 was set to "0" then 'EC&DIS TO CLEAR' will be displayed at the end of the programming cycle. If both the emergency credit and display buttons are pressed together then the following parameters are reset to 0:-</p> <ul style="list-style-type: none"> A) Emergency Credit Value B) Emergency Credit availability Point C) Pence per kWh for all rates D) Outstanding Debt E) Debt Collection per Week F) Standing Charge per week G) Total Cards H) Total Credit I) Credit (Debt) J) Reverse running

5 'Mini-programmer'

5.1 Protocol Overview

The optical interface on the meter is provided to allow the configuration of various parameters in the meter such as pence per unit. The following sub sections detail the available programming commands.

5.1.1 Debit/Week and Total Debt

The total debt is settable in the range £0 to 9999.99. The debt repayment per week is settable in the range £0 to 99.99

5.1.2 Credit

The remaining credit is settable in the range £-99.99 to +99.9999

5.1.3 Total Credit

The total credit is settable in the range 0 to £9999

5.1.4 Standing Charge per Week

The standing charge is settable in the range £0 to 99.99 per week.

5.1.5 E Credit value and availability

The emergency credit is settable in the range £0 to 99.99

5.1.6 Pence per Unit for Rates 1 – 4

The pence per unit for each of the 4 rates are settable in the range 0 to 999.99ppu

5.1.7 System Options

The following options are also settable via the hand-held 'Mini-programmer:-

Number of rates

Determines how many rates the meter will have, selectable in the range 1-4

Push Button Program Start

Starts a programming cycle, in the same way that a Meterman card would; if enabled.

Credit Only Fixed Charge

Either the fixed charge is collected only when the meter is in pre-paid credit OR the fixed charge is collected according to the factory set options.

Disconnection Override

The meter can be configured so that whilst in a specific 24-hour period the power will not be disconnected even if credit has expired. When the disconnection override time period elapses the facility is not made available again until the meter is back in a pre-paid credit otherwise the meter will remain disconnected.

Audible Warning

Either no audible warning is given before the supply is disconnected OR an audible warning will be given at the point that the emergency credit could be invoked. The warning will consist of a 30 second beep followed by 10 x 30 second interval pulsed beeps. The warning can be stopped only by invoking emergency credit or by inserting a valid token card.

Credit Meter

The meter can be switched from normal prepayment mode to kWh credit mode for override and or conference purposes etc.

5.1.8 Area Code

The area card code register can be set in the range 0-255 (Decimal)

5.1.9 Time/Date

The following time and date parameter are settable:-

Seconds, Minutes, Hours, Day, Date, Month, Year.

6 Appendix A

6.1 Anti Creep Detection

Anti creep occurs if an average power of 12.5 watts (+20%) or less is detected for a period of 4 minutes and 48 seconds. Activation of anti-creep is indicated by the red LED being continuously lit. This function is reset as soon as the average power over 4 minutes and 48 seconds exceeds 12.5 watts (+20%); the LED then returns to pulsing as normal.

6.2 Starting Current

The meter starts to register at 100ma.

6.3 Wiring Diagram

This image shows the main + auxiliary terminal connections for the 5188A Single Phase Card Meter:-

