

# AS230 Overview

Smart AMI

Single Phase Metering

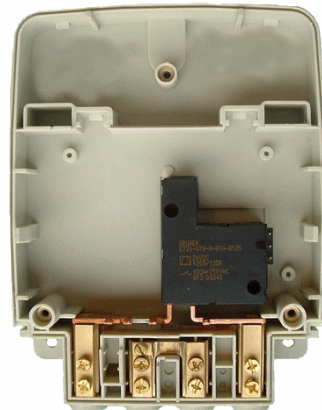


# Overview – AS230 Meter



## Flexible Platform

- Based on **Proven** A1140 & A1700 used by Eskom
- Common meter features single phase & polyphase
- Integrated disconnect switch
- Wide Area Network (WAN) based on GSM/GPRS
- Local Area Network (LAN) Low Power Radio
- Short Range Comms (HAN)
  - Wireless Wavenis 868 MHz



## Benefit

- Easy for Eskom to adopt and use !
- Communications easily changed !

# Overview – AS230 Meter



## The Solution for Residential AMI

### □ Proven, Flexible Platforms

- Single Phase
- Flexible tariff (8 TOU, 1Max Dem, and Deferred option)
- Firmware remote download
- Supply Capacity management
- Appliance control management
- Load Profiling (60 Day for 6 Channel 30 Min)
- Instrumentation and Voltage Profiling
- Comprehensive security data
- Historic Billing information (12 Sets)
- Daily Read (14 Sets)

## Benefit

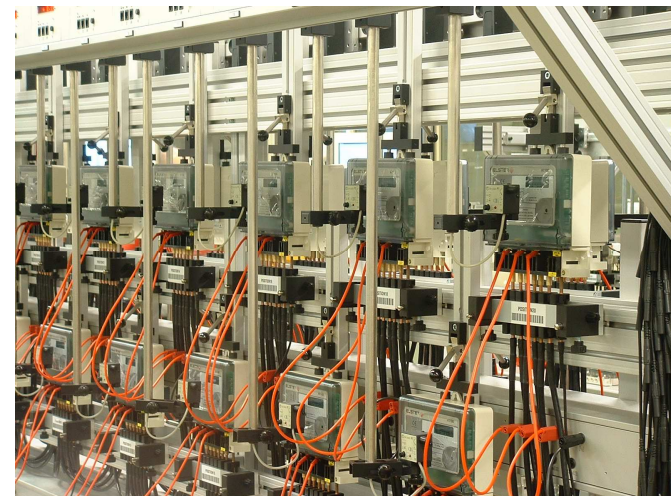
- Flexibility reduces risk of stranded assets !
- Acts like A1700 used today !

# Overview – AS230 Meter



## Measurement & Accuracy

- 1ph, 2w
- Voltage range 220 - 240V
- Whole current 10 - 100A
- 50hz
- LED for accuracy testing
- 1 kWh, 1 kvarh
- Registration of:
  - kWh Import/Export
  - Kvarh Import/Export
  - kVAh
- kWh cl 1 & 2
- kvarh cl 2 & 3
- Full Instrumentation
  - To aid installation

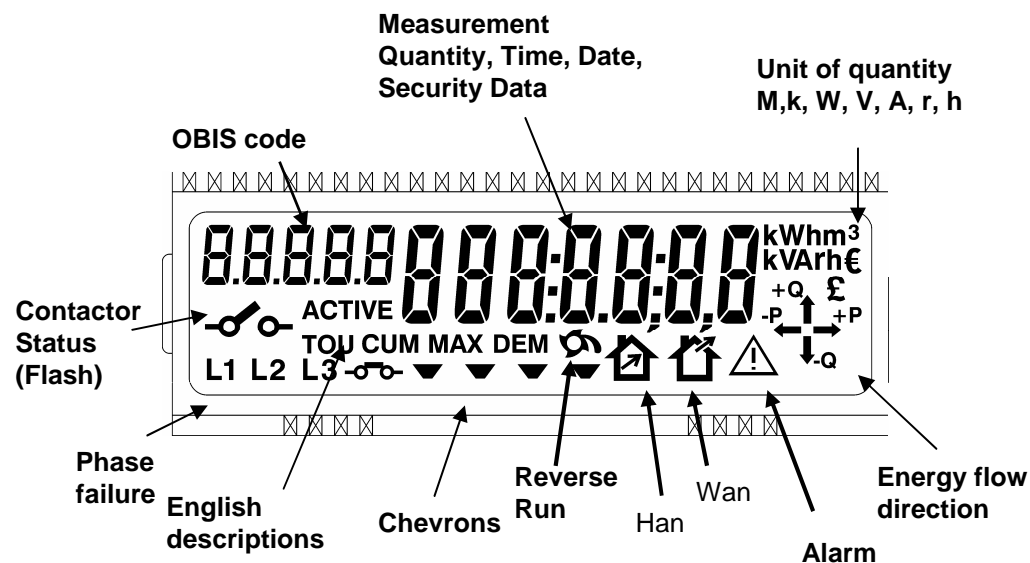


# Overview – AS230 Meter



## LCD

- 9.8mm digits
- Configurable
  - Number of digits
  - Position of decimal point
- Items to be displayed
  - Current time and date
  - Cumulative totals
  - Time of use registers
  - Billing information
  - Maximum demand registers
  - Security data
  - Segment test pattern



## Benefit

- Easy to read and Programme !

# Overview – AS230 Meter

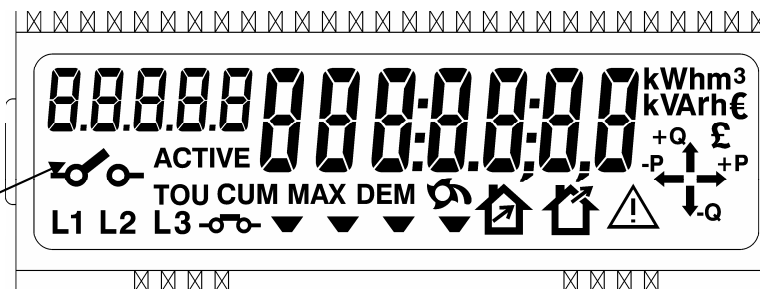


## Pushbuttons

- One
  - Display control
    - Step
    - Utility
  - Enabling Contactor
    - once armed



Flash



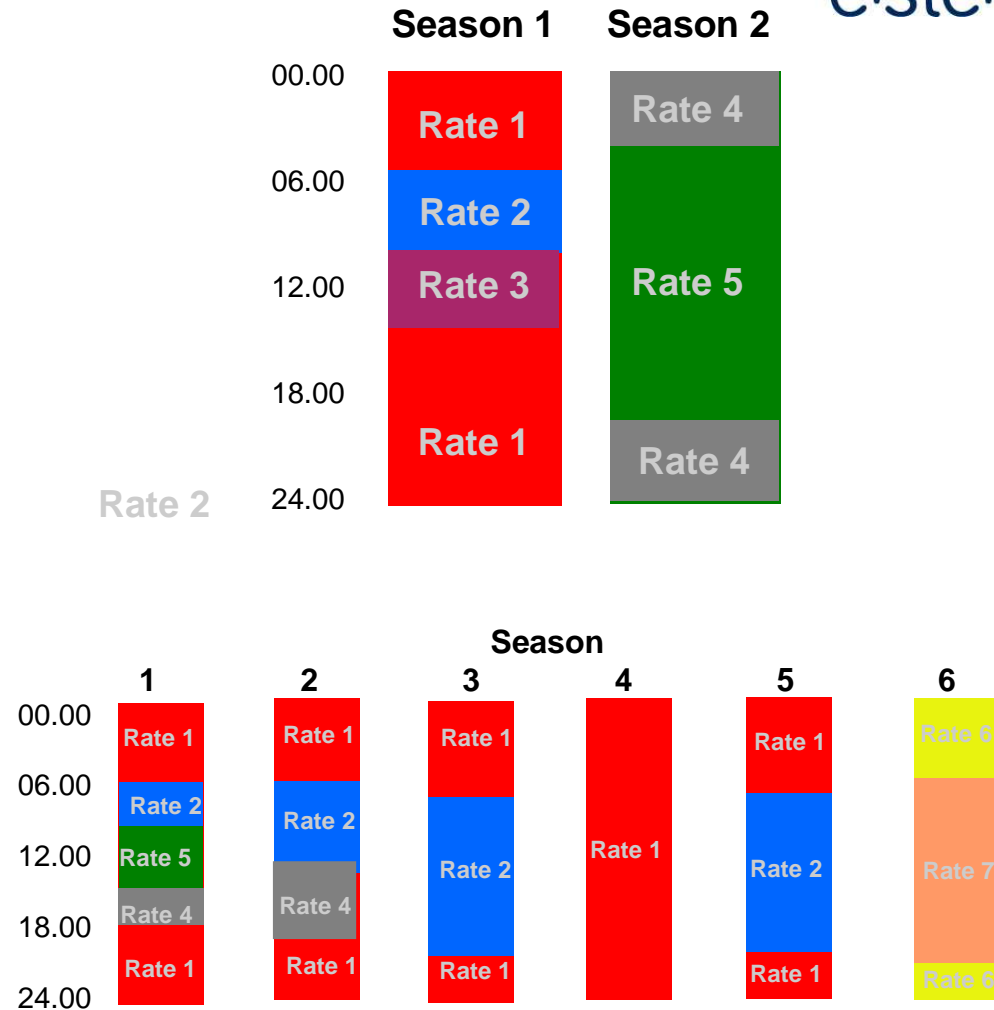
# Overview – AS230 Meter



## Tariff

- 8 Time of use
- 1 Time of use MD
- 12 Seasons
- 48 Switching points
- 32 Exclusion dates
  - Fixed every year
  - 'Last Sunday in the month'
  - Single date
- Independent day control
- Acts as A1700/A1140

## Deferred tariff program





# Overview – AS230 Meter

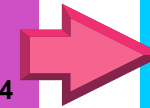


## End of Billing

- Created by:
  - Automatically - 13 dates
  - Optical communications
  - Change of season date
  - Introduction of deferred tariff
  - Battery fail at power-up
- Time, Date & Method stored

Current Period		Historic 1	
	kWh		kWh
Cumulative	000584	Cumulative	000584
Rate 1	000320	Rate 1	000320
Rate 2	000160	Rate 2	000160
Rate 3	000092	Rate 3	000092
....	...	....	...
....	....	....	....
Rate 8	000012	Rate 8	000012
Maximum Demands		Maximum Demands	
MD1	000012	MD1	000012
MD1 Time	12:21	MD 1 Time	12:21
MD1 Date	16.09.04	MD1 Date	16.09.04

EOB





# Overview – AS230 Meter



## Real time clock

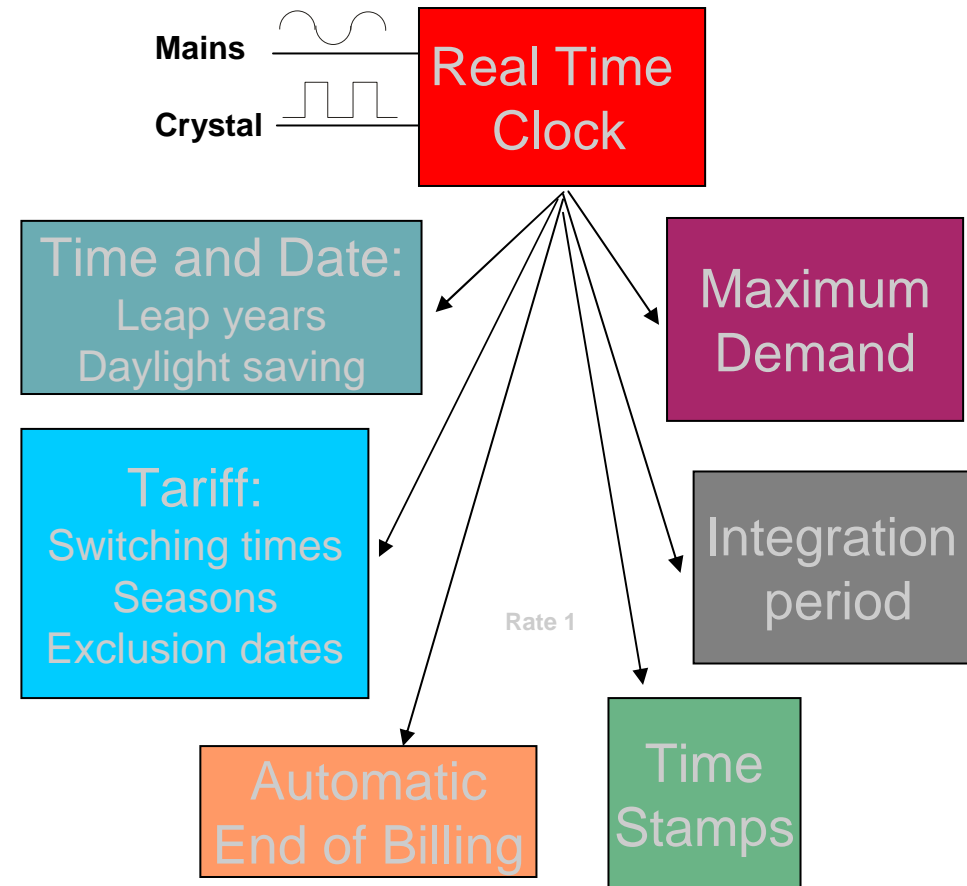
- Mains or crystal, 0.5s/day

## Day light saving

- 1 or 2 hrs
- 'Last Sunday in March'

## Synchronisation

- From Host system

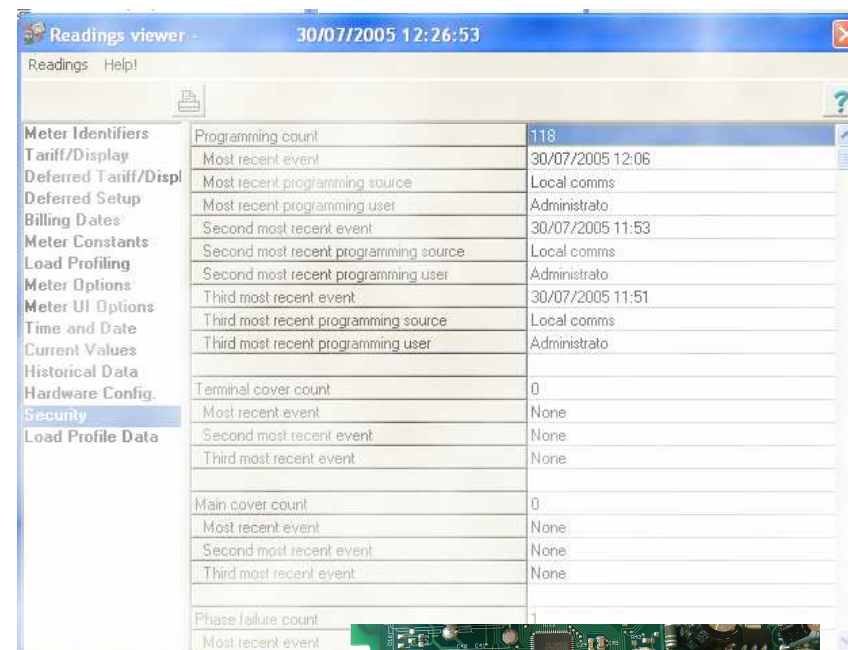


# Overview – AS230 Meter



## Security

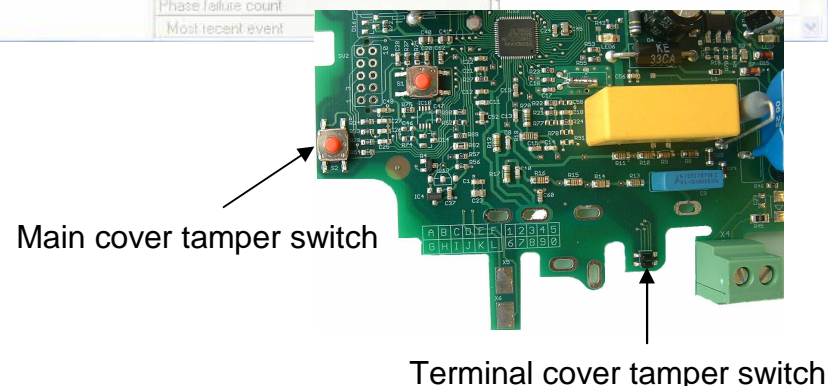
- Event counter, last 10 time & date stamp
  - Reverse run
  - Power fail (duration)
  - Over & under voltage
  - End of billing (& method)
  - Meter Constants
  - Load Profiling
  - Meter Options
  - Meter UI Options
  - Time and Date
  - Current Values
  - Historical Data
  - Hardware Config.
  - Security
  - Load Profile Data
- Meter error
- Battery fail
- Battery voltage monitoring
- Contactor status monitoring
- Appliance Load Control Device Monitoring
- Immediate alarming
- Reverse energy register
- Power on hour count
- Watchdog count
- CRC - Tariff and metrological code



Readings viewer - 30/07/2005 12:26:53

Readings Help

Meter Identifiers	Programming count	118
Tariff/Display	Most recent event	30/07/2005 12:06
Deferred Tariff/Displ	Most recent programming source	Local comms
Deferred Setup	Most recent programming user	Administrato
Billing Dates	Second most recent event	30/07/2005 11:53
Meter Constants	Second most recent programming source	Local comms
Load Profiling	Second most recent programming user	Administrato
Meter Options	Third most recent event	30/07/2005 11:51
Meter UI Options	Third most recent programming source	Local comms
Time and Date	Third most recent programming user	Administrato
Current Values		
Historical Data		
Hardware Config.	Terminal cover count	0
Security	Most recent event	None
Load Profile Data	Second most recent event	None
	Third most recent event	None
	Main cover count	0
	Most recent event	None
	Second most recent event	None
	Third most recent event	None
	Phase failure count	1
	Most recent event	



# Overview – AS230 Meter

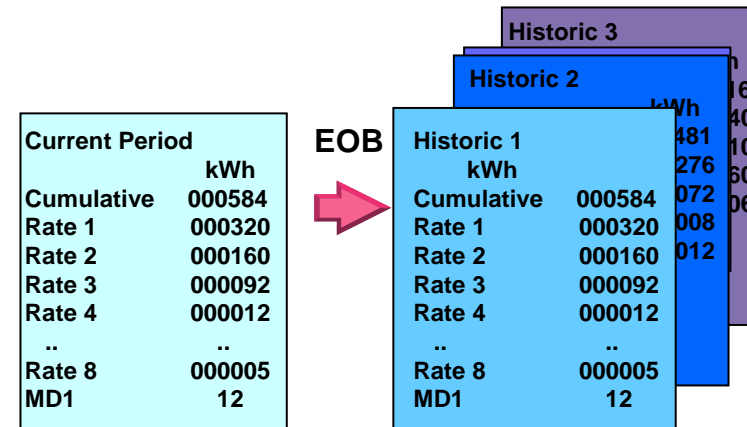


## Historic data

- 12 sets data
  - Cumulative data
  - Time of use registers
  - Max demand

## Daily Read

- 14 sets
  - Cumulative data
  - Time of use registers
  - Max demand

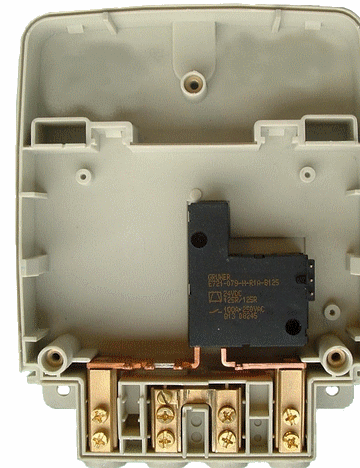


# Overview – AS230 Meter



- **Contactor**

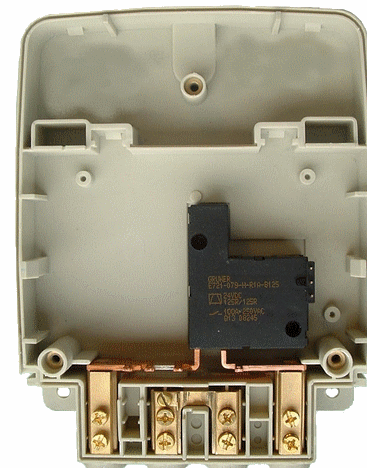
- Internal
  - Optional
- Contactor
  - 100A
  - In-line with live terminal
- Operational modes
  - From Communications network
    - Open, Arm, Close
  - Direct Close from communications
    - Detect current flow
      - Above threshold open contactor
  - Load Limiting (Supply Capacity) functionality - now
    - 2 Limits - kWh limits (0 to 75kWh)
    - Individual times to exceed the limits
    - Individual times to rearm the contactor
  - Supply Capacity Control - On demand



# Overview – AS230 Meter



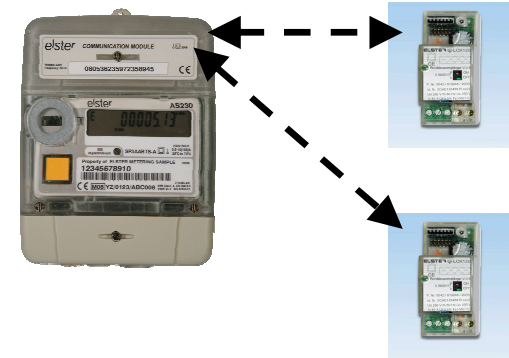
- 'On-Demand' Supply Capacity Control (Load Limiting)
  - Takes precedence over normal Supply Capacity Limits
  - Feature can be enabled or disabled
  - Function will only operate during:
    - 5 individual 'on demand' periods during any weekday
    - 5 individual 'on demand' periods during any weekend
  - Contactor open if average kW demand exceeds limit for D minutes (1 to 60)
  - kWh limit 1 to 75kWh
  - Remain open for F minutes (1 to 60)
  - Auto reclose



# Overview – AS230 Meter



- Appliance Load control
  - 2 Independent controls
  - 'On' driven by one rate schedule
  - Function will only operate during:
    - 5 individual 'on demand' periods during any weekday
    - 5 individual 'on demand' periods during any weekend
    - Require a configurable fixed time delay after 'on time'
  - Meter must receive 'on demand' request
    - Over-ride normal control for a configurable period (1 to 24hrs) then revert
  - When 'on' the meter must send signal through HAN to the application control device
  - Event monitoring of occurrence
  - Show status on display

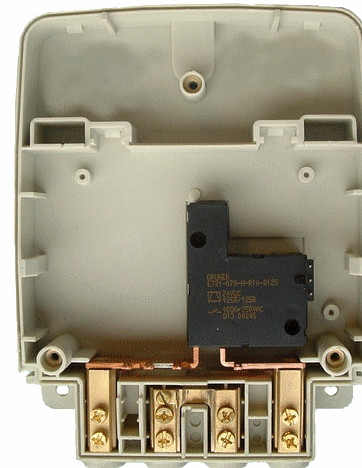


# Overview – AS230 Meter



## Outputs

- Control for Night Storage heater
  - 100mA, 230V solid state contactor
  - External load control
  - Controlled by TOU register
- Pulsed output 27V, 27mA
  - Pulse values programmed



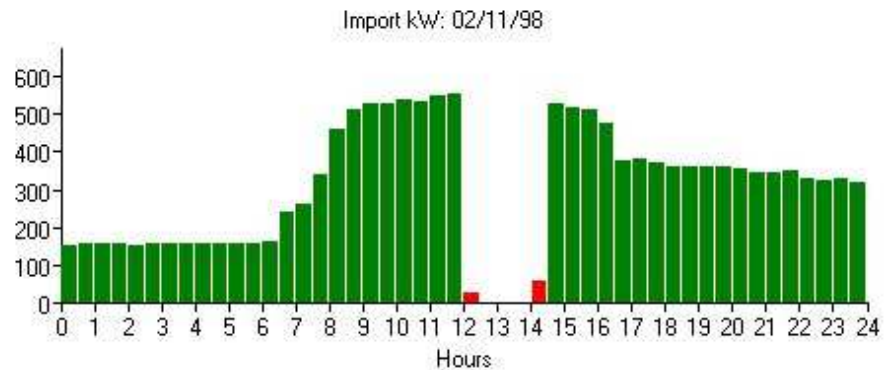


# Overview – AS230 Meter



## Load profiling

- 120 day index
  - 60 days, 6 channels, 30mins
- Up to 4 channels from:
  - Import, Export kW
  - Import, Export kvar
  - kVA
- 1, 2, 3, 5, 6, 10, 15, 20, 30, 60 min integration periods
- Status flag with each period
  - Programming
  - Reverse run
  - Change time & date
  - Battery fail
  - Meter error
  - Phase failure
- Profile format as the A1700/A1140



# Overview – AS230 Meter

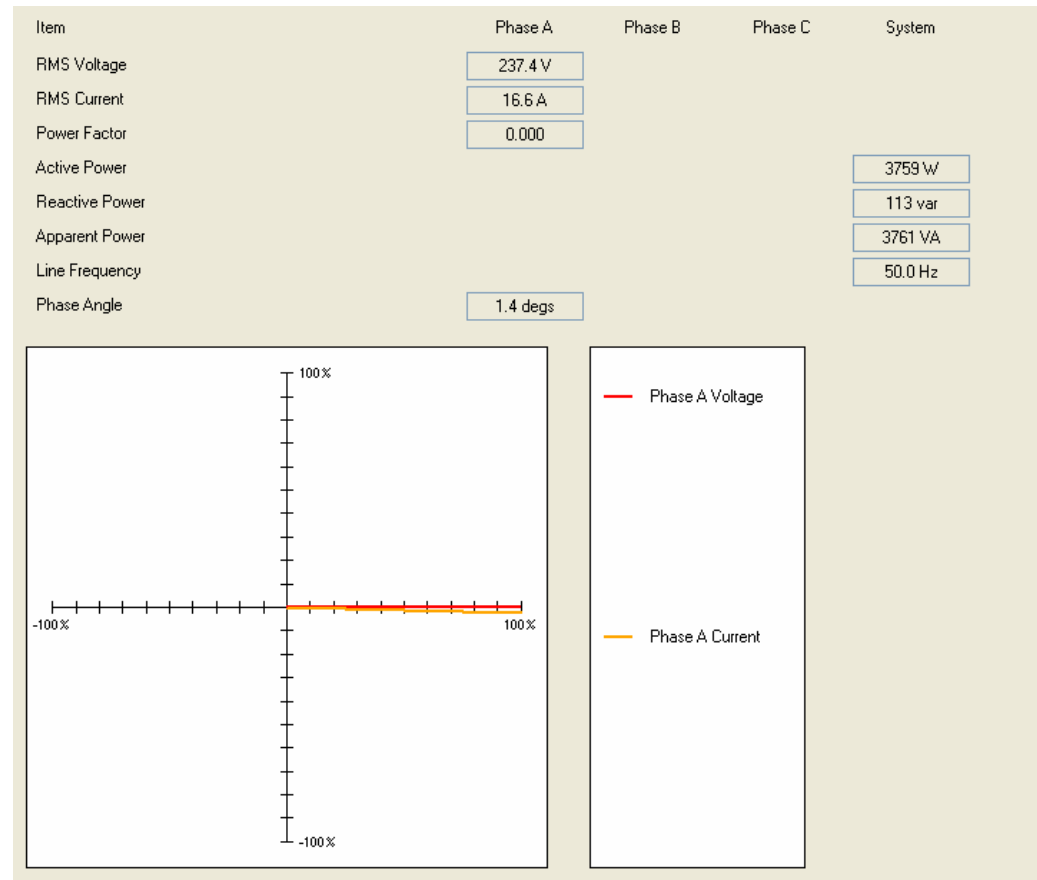


## Instrumentation

- Volts
- Current
- Watts
- System power factor
- Phase angle
- Frequency
- Phase rotation

## Instrumentation Profiling

- 8 Channels
- Separate integration period
- Store min, max, av. value

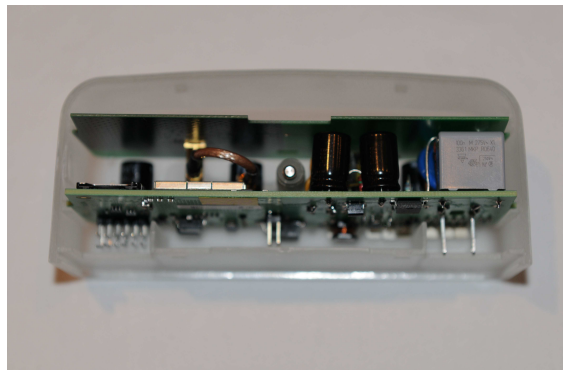


# Overview – AS230 Meter



## Communications

- Local communications
  - IEC 62056-21 (formerly IEC 61107)
  - Optical Port
- Remote communication
  - Provides any combination of:
    - HAN, LAN, WAN
- Modular
  - Future proof choice of Comms
  - HAN modular



Power for module  
230V

Serial connection  
to module



# Overview – AS230 Meter



- Longer term deliverables:
  - Open protocol
    - HAN
    - WAN
  - Disconnect in a CT operated meter
  - Prepayment functionality
    - STS Compliance
  - Frequency control of appliance control
  - New proven communication solutions such as mesh RF and PLC

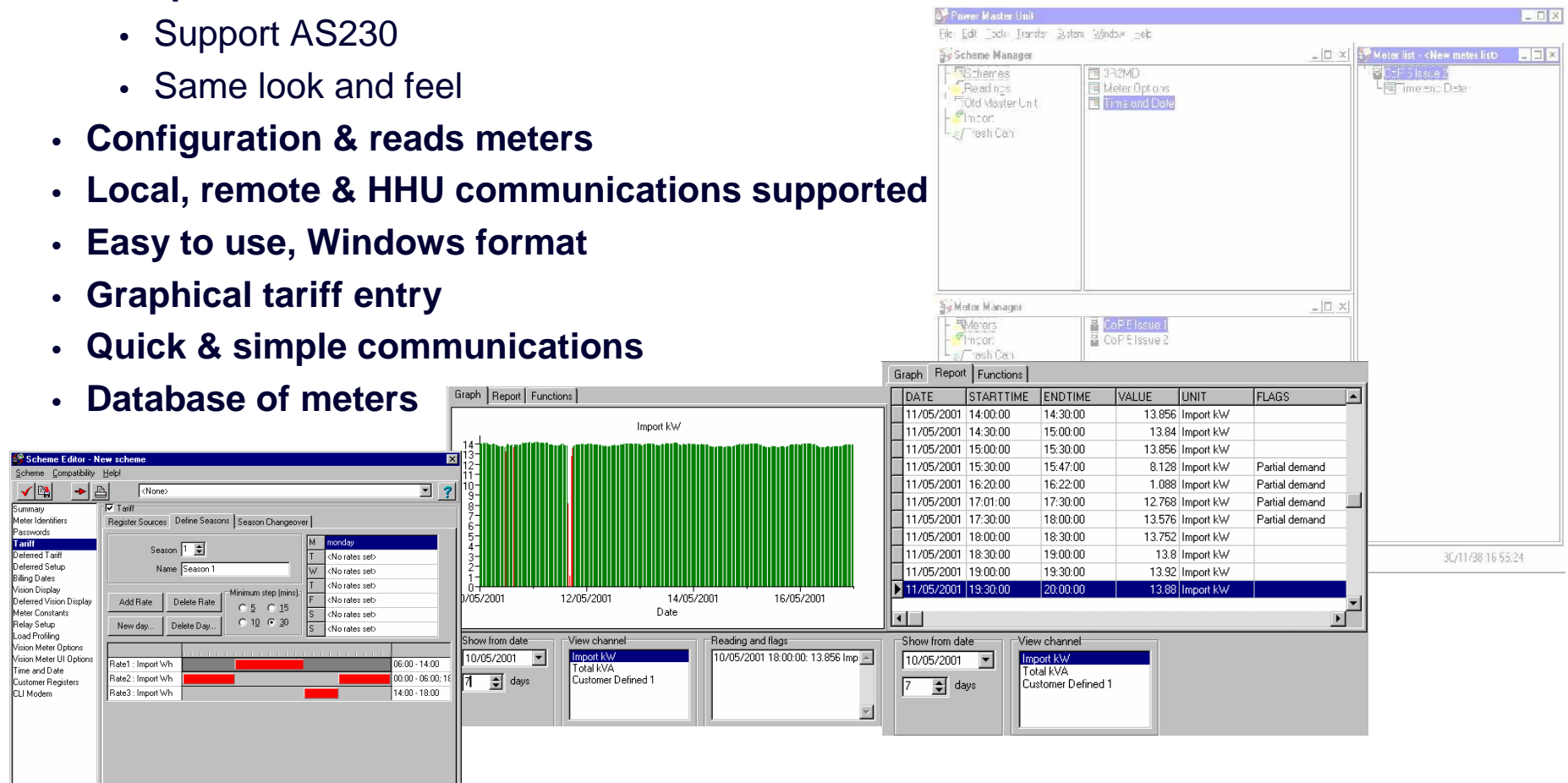
# Overview – Power Master Unit Software



## Benefit

- **Programming tool for A1700, A1140, A140, AS230**
- **New platform .NET2 \***
  - Support AS230
  - Same look and feel
- **Configuration & reads meters**
- **Local, remote & HHU communications supported**
- **Easy to use, Windows format**
- **Graphical tariff entry**
- **Quick & simple communications**
- **Database of meters**

- **Used by Eskom today !**



Thank you



elster

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in Metering Technology