

ELCOMPONENT

A blue swoosh graphic that starts under the letter 'T' and curves upwards and to the right, ending under the letter 'N'.

Products & Services Guide

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**ELCOMPONENT**  
Making sense of your energy

# 1.1 Introduction

## About Us

Elcomponent has been in the Energy Management business since 1986 and we're now a major player in sub-metering, portable energy data logging and Power Factor Correction equipment.

Based near Stansted Airport in Hertfordshire, we are a privately owned business determined to provide our customers with the best possible tools for reducing their energy bills and Climate Change Levy liabilities.

We have three full-time sales engineers, Stefan Kawalek, Chris Fackrell, and Dave Storey, backed by a team of professionals working at our purpose built offices in Bishop's Stortford.

We have a solid record of satisfied customers from a diverse cross section of industry and commerce thanks to our simple motto:

**"Make it clever, but keep it simple."**

It is this philosophy that made Elcomponent the first to use direct connect networked meters, the first to manufacture a TCP/IP addressable meter that plugs straight into a standard PC network, and the first to offer an automatic alarm feature on their systems.

## Quality Assurance

Elcomponent is proud to be quality assured to BSEN ISO9002. Certification No. 6752.



## Payment & Shipping

### Credit/Switch Cards

We accept the cards shown for both telephoned and written orders.



### Prices

Prices shown in this catalogue are nett prices, and subject to VAT at the rate ruling at time of despatch.

### Account Customers

We have on-line account check facilities and we can generally open an account for new customers within minutes (subject to status).

### Pro-Forma Invoices

If you prefer we can fax or mail you a pro-forma invoice.

### Shipping

Consignments up to 20kg to most UK destinations are despatched on a next day service at a standard charge of £8.00. All orders received by 12 noon are generally despatched same day for ex-stock product.

## Contact our team



**Debbie Burton**  
Sales Office Manager  
01279 503173  
debbie@elcomponent.co.uk



**Stef Kawalek**  
Western Area Sales Engineer  
07836 648057



**Chris Fackrell**  
Eastern Area Sales Engineer  
07802 653383  
chris@elcomponent.co.uk



**Dave Storey**  
Southern Area Sales Engineer  
07765 232618  
dave@elcomponent.co.uk



## Products

Elcomponent has the resources and experience to provide a solution to all of your energy monitoring requirements utilising both portable and fixed systems. We have supplied more portable energy analysers to UK customers since 1986 than any other single manufacturer, and since 1998 have supplied more than 200 automatic sub-metering systems to applications including MOD sites, government buildings, major supermarkets and a host of manufacturing plants.

We also supply and install automatic Power Factor Correction equipment, and provide a free power factor assessment service to our customers. PFC is a simple and effective route to GUARANTEED energy savings, and our RAM units are among the most advanced in the world. Utilising high quality AEG capacitors, they also feature sophisticated electronic control systems which provide greatly increased reliability and longer life.

All our products are designed to be simple to set up and use, and provide reliable cost-effective performance from day one, delivering fast payback with minimum operator training.



## Services

Elcomponent offers a comprehensive service and support package on all products, in addition to the specific services listed below:

### Panel Building

We operate an in-house panel building facility for both turnkey and customer installed metering systems. Panels are manufactured to the highest standards and are supplied fully fused ready for wall mounting. All connections are made to clearly marked terminal blocks for fast and easy installation.

### Installation

For sub-metering systems and Power Factor Correction, we can deliver a turnkey package using our own installation and commissioning engineers who take care of every aspect of the job including final configuration and verification. Alternatively we offer full support to those customers who choose to handle installation in-house, ensuring that the project goes smoothly.

### Maintenance Agreements

A very competitively priced Maintenance Agreement is available on all sub-metering systems which delivers free software upgrades, on-site support and a lifetime hardware warranty.

### Training

We offer training on all our products, both portable instruments and systems, with packages tailored to your requirements.

# 1.3 Introduction

## Site Surveys

- Energy Surveys
- Voltage Stability Monitoring
- Meter Testing
- Power Quality Surveys
- Power Factor Correction Surveys

We have over fifteen years experience in carrying out electrical energy and power quality surveys, and offer a range of site services for those occasions where outsourcing the job is more appropriate.

We work to a fixed price, so you get the information you need on time and within budget. Data is presented as high quality full colour graphics, plus a detailed overview report of the results obtained. All our site survey work is carried out by our own engineers, using our own instruments, backed by traceable calibration certificates where applicable.

### Energy Surveys

Electrical Energy Surveys, from simple kW profiling to detailed assessment of individual loads of all types.

### Voltage Stability Monitoring

Sags, surges, brownouts, transients and micro interruptions can all wreak havoc with sensitive equipment. If they are causing problems on your supply, we'll identify them.

### Meter Testing

On site verification of kWh meter performance accuracy using calibrated test equipment. Identify inaccurate, non-functioning or incorrectly connected/programmed meters.

### Power Quality Surveys

Today's factory and office equipment can generate significant harmonics, which in turn can cause cable heating, nuisance tripping and equipment malfunction. A power quality survey will pinpoint potentially damaging harmonics on both voltage and current in addition to numerous other possible supply problems

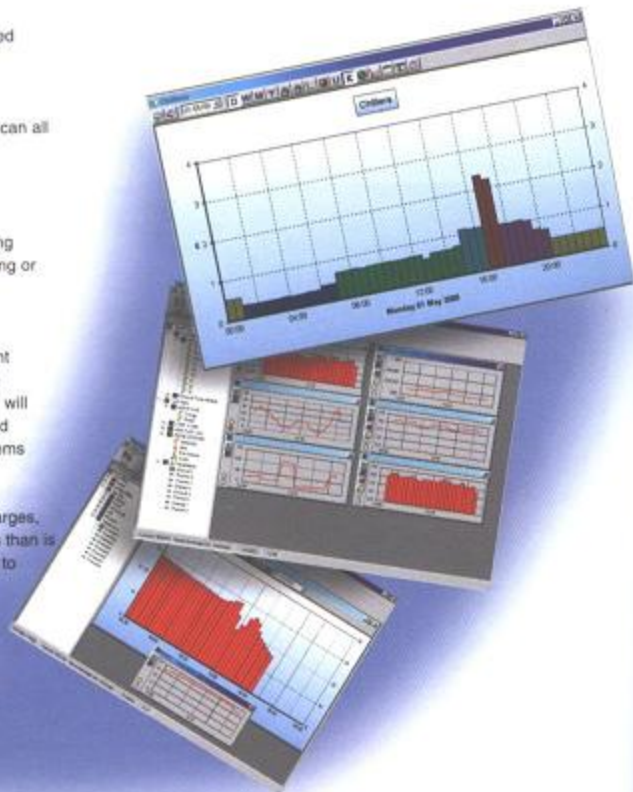
### Power Factor Assessment

Poor power factor usually results in avoidable electricity charges, and always results in higher transformer and cable loadings than is necessary. Contact us for a free-of-charge PF assessment to verify the savings available from Power Factor Correction.

## Automatic Sub-Metering

Advances in hardware and software have brought the installed cost of sub-metering systems to a lower level than ever before. Our latest TCP/IP enabled meters, interfaces and low cost radio links have dramatically reduced wiring costs in most commercial premises, making a networked system an almost 'plug-and-play' operation. When combined with more traditional networking technologies such as twisted pair cabling and dial-up modems, this provides us with a solution for every sub-metering application. Whether the requirement is for tenant billing, energy management, Climate Change Agreement verification or as part of a SCADA system, we have the capability and flexibility to provide the right system to do the job.

Our engineers have the knowledge and experience to assess your requirements and ensure you get the system you need, at the best possible price.





## High Spec Power Quality Analyser

See section 4.6

Our new PowerPro Power Quality Analyser combines rugged 'go anywhere' build quality with a performance and specification that puts it right at the top of its class. It's supplied complete with a new 'PowerView' software package that makes it easier than ever to print and plot complex power quality data.

- ✓ Measures all electrical parameters including Harmonics
  - to 64th multiple
- ✓ Flicker Option
- ✓ 32MB pluggable Flash memory for ultra-fast download



## TCP/IP (web enabled) Meters & Pulse Interfaces

See section 2.11

All you need to network our latest kWh meters and pulse loggers is an RJ45 network socket! It's that simple. Plug the meter in, and you're connected. View the meter registers directly in your web browser or via our 'MeterRing' sub-metering software.



## Sub-Metering Software

See section 2.4

- ✓ Intelligent alarms
- ✓ TCP/IP Networking
- ✓ Temperature Measurement

All you need to network our latest kWh meters and pulse loggers is an RJ45 network socket! It's that simple. Plug the meter in, and you're connected. View the meter registers directly in your web browser or via our 'MeterRing' sub-metering software.

Our **MeterRing** software continues to win plaudits for its User Friendly desktop and results oriented features. In other words it's easy to learn and use and designed to SAVE ENERGY!

New additions include a dynamic alarm capability that is guaranteed to cut out waste and leakage, plus on-board calculation channels for 'cost per item' and a bulk data import feature for seamless integration with other data acquisition systems.

We've also tailored the software to provide the data you need to support a Climate Change Agreement (CCA) or calculate Product Mix and Output ratios (PMOs).

Check for the latest upgrades at...

[www.elcomponent.co.uk/whatsnew/home.cfm](http://www.elcomponent.co.uk/whatsnew/home.cfm)

## 2.1 Automatic Sub-Metering Overview

### Product Overview

- ✓ Suitable for all Utilities (Electricity, Gas, Water etc)
- ✓ Wide Choice of Network Options including TCP/IP
- ✓ Low Cost
- ✓ Easy to Install and Use
- ✓ Maintenance Package Available

Elcomponent's sub-metering system takes care of every aspect of remote meter reading.

It's simple to install, simple to use, and remarkably cost-effective. It's a fact that energy management is difficult, if not impossible without effective energy measurement, so this system puts all the information you need right onto your Windows desktop. It automatically takes care of Climate Change Agreement verification, Climate Change Levy calculations and overload or equipment failure alarms. The Tenant Billing option not only reads all meters remotely, but also creates and prints or emails invoices automatically too.

### How It Works

**MeterRing** is a complete package, comprising all of the software and hardware you need to install a complete system, or integrate with the meters you already have. A host PC automatically reads all your meters every 30 minutes via a choice of network options to provide consumption/usage profiles for all your utilities. The system is flexible enough to allow data to be acquired on all types of utility and also monitors less obvious areas such as effluent flow, steam, temperature, production output etc. Standard features include dynamic alarm monitoring/signalling, tariff analysis, data import/export, degree-day calculation and the industry's best software interface. The optional Tenant Billing package (also available as a stand-alone product) does exactly what it says on the box!

### System Structure

Elcomponent meters and pulse data loggers can be networked via twisted pair, telephone or radio links, and most significantly via any TCP/IP based network including ethernet, intranet and web servers. In all cases, all devices can be viewed in realtime.

The system is accessed from designated host or analysis PCs and offers structured access\* via passworded security levels. The system also provides a high level of data integrity and security. Main data files are held on a backed-up PC, with additional non-volatile storage provided by the meters themselves. Easy interfacing with all types of third party meter is assured via our flexible pulse data loggers which feature sufficient memory capacity for forty years logging at maximum pulse rate.

\* Coming in 2003

### Tailored Solution

**MeterRing** is a tailored solution for Energy Management and Tenant Billing applications, designed by professionals with years of experience in the field. Unlike many systems which make much of their IT integration capabilities, but offer few networking solutions at device level, our product is completely flexible from the meter to the server. A wide choice of networking options include TCP/IP, MODBUS, Radio and dial-up. Combined with low-cost network enabled hardware this means lower costs and a simpler solution.

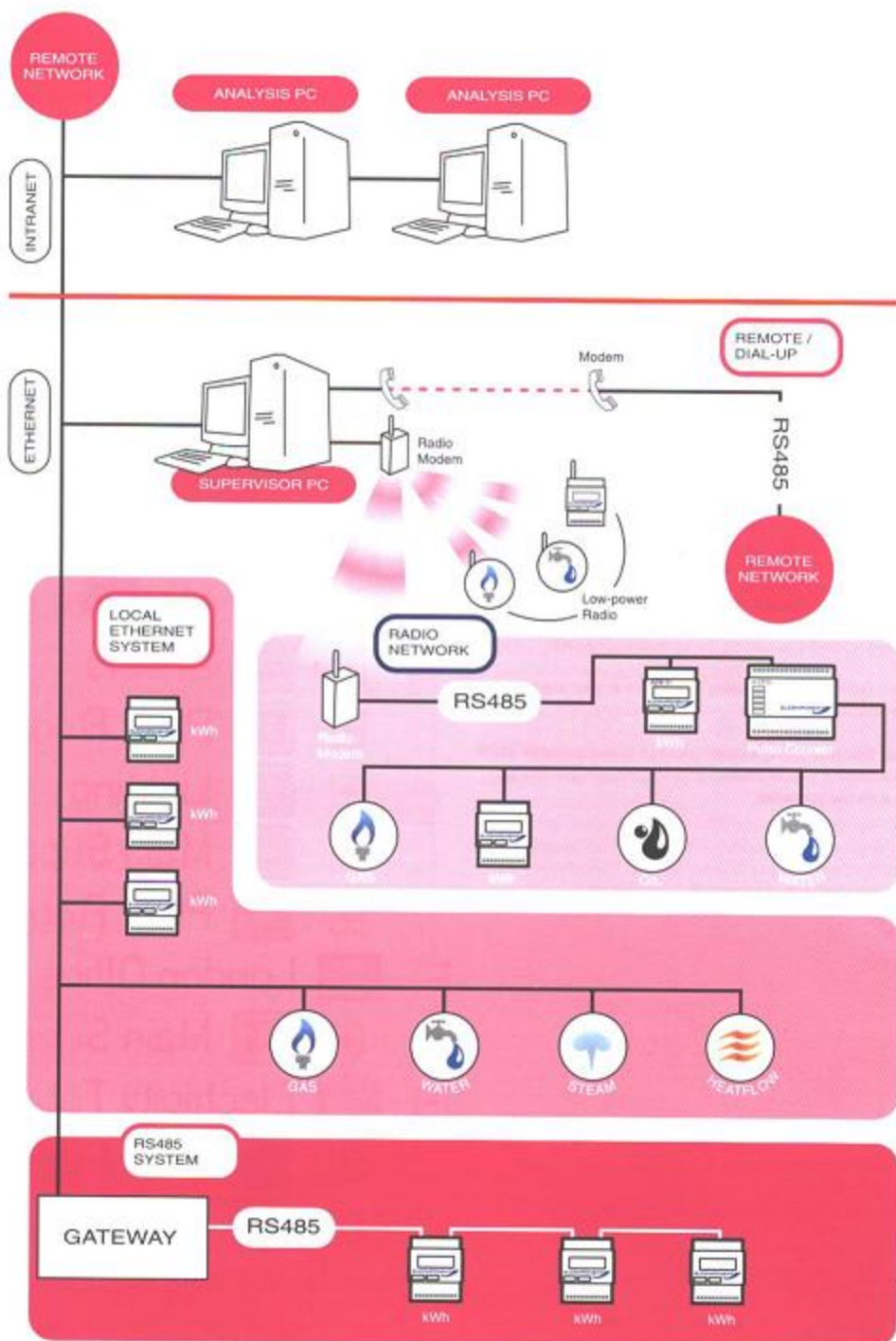
Software is based on a standard MS Access database and integrates seamlessly with your existing IT structure either locally or company wide.

### Easy to Use

The **MeterRing** user interface is so intuitive that many of our customers need no more than a basic introduction to get up and running, although full training packages are available if required.

It's very flexible and is readily tailored to specific reporting periods and the like. It's MS Access based so data import/export and integration with your other software is simple. Combined with **MeterRing's** powerful on-board calculation channels, this makes it easy to graph production costs and process efficiency as well as simple consumption. It's compatible with all Windows platforms from W98 upwards and makes full use of Windows functionality with 'right click' pop-up menus and full 'drag & drop' capability on the most user-friendly desktop in the industry.







## 2.3 Automatic Sub-Metering Overview

### Building a System

All the components needed to build a system are detailed in the following pages. A basic package can be up and running for as little as £1200 plus installation or even less, and it is normally all available from stock. Please contact our technical sales department to discuss your particular requirements in more detail.

### Installation & Commissioning

We offer a complete installation service on our systems and will be pleased to quote for a 'turnkey' package if required. We also provide full technical support to customers and installers / contractors in all cases. We commission most systems free-of-charge on the UK mainland. This means that the loading of the software and configuring of the system's performance by an Elcomponent engineer is part of the deal, so you can be absolutely confident of getting accurate information right from day one.

### Training & Support

**MeterRing** is a very friendly system and does not require high levels of operator training, and basic operator familiarisation with the software is carried out during the commissioning visit.

However if required further training is available at your site as half days or multiples thereof.

A low cost Maintenance Agreement package is also available which provides additional peace-of-mind, lifetime hardware guarantees, and free software upgrades.



MeterRing



Local



Main Feeder



Chillers



Plant Room Power



Lighting



Main Supplies



Plant Room



London Office



Main Supplies



Electricity Total



Main Feeder



Main Supplies

# Make it clever... ...keep it simple

Our **MeterRing MM** and **MeterRing 2000** software packages set new standards for ease-of use, both for initial set-up and day-to-day operation. **MeterRing 2000** is designed for applications where additional functions such as alarms and automated billing are not required. **MeterRing MM** is recommended for more demanding environments.

## High Quality Graphic User Interface

The collected data is graphed in full colour, and may be viewed by day, week, month or year. The default graph period is 30 minutes, providing accurate profiling, and 'industry standard' data presentation. Tariff periods are shown in contrasting colours for quick 'at a glance' interpretations, and consumption is automatically totalled by unit and cost for all periods. Because **MeterRing** is a genuine realtime system it also allows direct meter readings to be taken at any time, as well as realtime graphs to be created, incrementing on a one minute time frame.

## Alarms

Eicomponent's unique dynamic alarms package is included as standard, thus ensuring that the system automatically tracks usage patterns and warns of abnormal consumption without user intervention. Alarms are signalled in a variety of ways including automatic email generation.

## Tenant Billing

The Tenant Billing function is ideal for cost centre charging as well as landlord/tenant applications and allows the user to generate a bill of charges for all the meters on the network completely automatically, for subsequent printing or distribution by fax, email or as html. The program deals easily with Seasonal Time Of Day (STOD) and Maximum Demand tariffs, so that charges can be tailored accurately against consumption.

## Climate Change Levy

**MeterRing** has been carefully tailored for CCL & CCA functionality and provides all the confirmation you need on carbon content and levy liability. If you are part of a Climate Change Agreement, **MeterRing** will automatically provide the required information for discount verification. It can also be utilised to calculate Produce Mix and Output ratios (PMOs). This potentially complex area is easily handled with **MeterRing MM**.

## Prices

| Description   |          |
|---|----------|
| MeterRing MM Energy Management c/w 25 point licence | £1690.00 |
| MeterRing MM Tenant Billing c/w 25 point licence    | £1690.00 |
| Energy Management Module                            | £690.00  |
| Tenant Billing Module                               | £690.00  |
| Additional 25 point licence                         | £395.00  |
| MeterRing 2000 local                                | £795.00  |
| MeterRing 2000 Dial-up                              | £995.00  |

## 2.5 Automatic Sub-Metering Hardware Summary

### 4CPSI — Pulse Interface

#### 4CPSI Pulse Interface

Pulse loggers for twisted pair RS485 or TCP/IP Ethernet connection provide the interface for transferring the pulse output data from up to four utility meters of any kind to the network. Easy to install, and compatible with all types of pulse output (volt-free, open collector etc). Fully isolated for safe connection to all types of third party meter. Non-volatile E/PROM memory to ensure no loss of data during power outages.

The 4CPSI connects directly to an RS485 network, the 4CPSI-E is for TCP/IP applications. Fitted with a standard RJ45 socket it plugs straight into any ethernet socket or hub using a standard patch lead.



More details on page 2.12

### Star3 — Multi Parameter

#### Star3 Multi Parameter Meter

Superb digital meter from Elcontrol Energy suitable for twisted pair RS485 networks offers increased functionality including power quality measurement. Also provides fully programmable relay outputs as standard for additional flexibility for control or load shedding/alarm applications.



More details on page 6.3 & 6.12

### AEM31 — kWh Meter

#### AEM31 kWh Meter

Standard kWh meter for twisted pair RS485 or TCP/IP Ethernet connection. High quality digital meters with direct network outputs. Suitable for use on both 3 phase, 4 wire and single phase systems, the AEM31 measures both kWh consumption and kW demand, which is available on the local display and via the network.

Easy installation and set up with fully automatic CT sensing, programmable CT ratios and E/PROM non-volatile memory.



More details on page 6.7

### AEM PLUS — Multi Parameter

#### AEM PLUS Multi-Parameter Meter

3 phase meter which combines ammeter, voltmeter, wattmeter, PF meter and kWh/kVarh meter functions into one compact package. Designed for high performance, good looks and easy installation.



More details on page 6.9



## MM8 — Temperature Module

### MM8 Temperature Module

The MM8 temperature modules are available for twisted pair RS485 and TCP/IP Ethernet connection. Suitable for use with most types of thermocouple these 8 channel devices offer low-cost temperature measurement for direct degree-day information, process monitoring or measurement of water/space heating performance.



More details on  
page 2.11

## Radio Pulse Counters

These low cost modules provide an easy solution for remote data acquisition where cabling is impractical or difficult to install. Battery powered with a life of up to 10 years without maintenance, they can be installed in locations where mains power is unavailable, and into hazardous areas such as gas meter enclosures where mains voltage cannot be used. With a range of up to 300m, they are also useful in industrial and commercial buildings where they often represent a lower cost alternative to traditional networking.



## Radio Links

The Radio-Tech 'licence exempt' radio transceivers are high quality well proven units, and are recommended as a replacement for cable connections on RS485 systems where local conditions make this desirable.

They are suitable for use with most RS485 hardware, and can be included into a cable network in specific areas, or can be used to provide a 'totally radio' system.



More details on  
page 2.11

## Radio Data Logger

### Radio Data Logger

The RT Com logger provides a networked base station for up to 1000 pulse counters (see above). It links directly to the host PC via hardware or dial-up networking.



## 2.7 Automatic Sub-Metering Hardware Summary

### R-DCU — Dial-Up Collection

#### R-DCU Dial-Up Data Collection

Remote data collection unit for dial-up networks. The R-DCU replaces the PC as the network controller, and provides the modem interface for the dial-up link.

It provides data collection for up to 200 local metering points, and utilises EPROM memory to prevent loss of readings during power outages. Failsafe operation ensures automatic system restart when power returns.

The R-DCU is fully isolated for safe connection to the telephone network via a standard modem.



More details on  
page 2.12

### PC Interface

#### PC Interface

For use on twisted pair RS485 system to convert the bus to RS232 for connection to the PC.



More details on  
page 2.12

We offer a complete installation service for all our systems. However we also offer full support to customers or third party installers where required. The following notes may be helpful.

## Dimensions/Mounting

Meters/Pulse Interfaces/Remote Data Collection Units - All items use DIN rail mounting, conforming to the following dimensions:

|              |        |  |
|--------------|--------|--|
| 4CPSI        | 16 DIN |  |
| 4CPSI-E      | 16 DIN |  |
| AEM1         | 2 DIN  |  |
| AEM31 D 485  | 4 DIN  |  |
| AEM31-E      | 8 DIN  |  |
| AEM PLUS 485 | 6 DIN  |  |
| INTERFACE    | 8 DIN  |  |
| MMB          |        |  |
| R-DCU        | 8 DIN  |  |
| STAR3 DIN    | 9 DIN  |  |

Panel mounting kits are available for all 4/6/9 DIN units if it is intended to install into existing or bespoke metalwork.

For retrofit installation a suitable wall enclosure with integral 35mm DIN rail is recommended. For simplified wiring it is recommended that all units are mounted in a single enclosure (or multiple enclosures where the quantity of units dictates). This allows voltage connections to be made from a single terminal block and protected by a single 3ph MCB.

## Ethernet (TCP/IP) Systems

Ethernet based systems use industry standard 10 base T networking, and are generally compatible with existing PC networks. Connection is via standard RJ45 patch leads, directly to the system hardware.

Each device is allocated an IP address, and can then be accessed using either **MeterRing** software or a standard web browser.

## RS485 Systems

### Radio Links

Radio links can be used in a number of ways to replace cable links. The RT Com pulse counters are battery powered and can be simply connected to any standard volt-free pulse output on any meter type. They connect to the network via the RT Com logger, over distances of up to 300m. The RT Com Global Modems are used to replace cable links on the network itself and provide reliable performance over distances of up to 5KM in free air, and may also be used between floors within buildings and between buildings.

All relevant frequencies are scanned using a sophisticated PC controlled scanner, and signal paths are assessed using dedicated

test rigs. In general it is recommended that aerials are mounted as high as possible, and line of sight is maintained between them, although the system has the power to penetrate masonry walls if required.

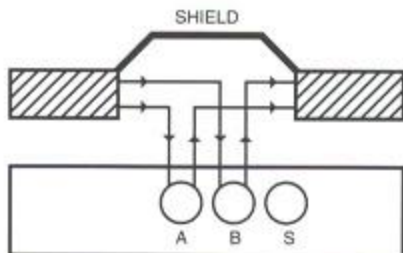
### Wiring

Meters require a suitable fused (instrument supply) TP&N voltage connection, plus connection to 3 CTs (current transformers). 4CPSIs (Pulse Interface Units) require a 240V supply, and the pulse input(s) connecting as applicable.

R-DCUs (Remote Data Collection Units) require a 240V supply, and connection to a suitable modem via the cable supplied. All units must be connected to a suitable twisted pair data cable in 'daisy chain' fashion.

Correct connection of the data network is vital for reliable operation. Each unit has a clearly marked terminal block consisting of 3 terminals A,B&S. A&B are connected to the cable pair on a line in/line out basis. The S (shield) connection is not connected except on the final instrument on the network. The length of unshielded conductor exposed at each connection point should be kept to a minimum, and shield continuity should be maintained over the entire length of the network.

Polarity must be respected. Data cables should be soldered together before clamping into the terminal block.



## Maintenance Agreement

For a small annual charge sub-metering systems can be covered by a support contract which guarantees your software will always be up to date, and the hardware covered by an extended warranty for the life of the system. Additional training requirements and system upgrades are also covered if required.

**Please see over the page for a cable selection guide**



## 2.9 Automatic Sub-Metering Installation

### Cable Selection

For cable connected networks, the choice of cable is important for reliable performance. However the specification can be adjusted to suit the application and ambient conditions. The table below provides additional information.

### Cable Selection Table

| Cable Type (Belden No) | Size (AWG) | Capacitance (between conductors) | Resistivity | Cost (approx) | Comments   |
|------------------------|------------|----------------------------------|-------------|---------------|--|
| 3107A*                 | 22AWG      | 35pF/M                           | 58 Ohm/Km   | £1.97/m       | The best cable available   |
| 3105A*                 | 22AWG      | 35pF/M                           | 58 Ohm/Km   | £1.05/m       | A slight version of the 3107A, but required except on ultra-high speed systems                           |
| 9841*                  | 24AWG      | 42pF/M                           | 79 Ohm/Km   | £0.90/m       | Recommended for most applications and 200m or longer   |
| 8641                   | 24AWG      | 42pF/M                           | 82 Ohm/Km   | £0.32/m       | Cable to EIA spec. Excellent low cost solution for standard applications. Much lighter than other cables |
| 9501**                 | 24AWG      | 130pF/M                          | 80 Ohm/Km   | £0.17/m       | Cheapest standard cable. Out of spec on capacitance, but OK for smaller networks                         |

\* EIA Recommendation  
\*\* Distributor Stock Item

### Sub-Metering FAQ's

If you've got any questions, please contact us by whatever method is most convenient, and we'll be happy to answer them, or better still visit you to demonstrate the system in action. In the meantime, here are some Frequently Asked Questions which you may find useful.

#### Q: What exactly is a Sub-Metering System?

A: It's a collection of meters situated at various key locations around a site or within a building, linked together to form a network. This allows them to be read automatically (usually by a PC connected to the same network) so that consumption data can be stored and collected over time.

#### Q: How does this relate to my main utility meters?

A: Your existing main meters normally form part of the sub-metering system. Alternatively, any data you receive from your meter operator can be imported directly into our software. This allows the system to provide a bill validation function, in addition to providing information allowing you to accurately manage the various different parts of your site or manufacturing process to reduce demand peaks and save money.

#### Q: How does sub-metering help Energy Management?

A: Metering is always useful in any energy management project, as it provides essential information which validates the policy being followed, but it is also a powerful tool in its own right. The installation of meters on key consumption points is a good first step towards cost control or cost allocation, and this has been common

practice for years, with meters read manually at the end of the week. However, if the data is collected automatically via a network, the situation changes dramatically. Readings are stored by the host PC every 30 minutes, which allows consumption profiles to be displayed for each meter. Also, our unique dynamic alarm feature is guaranteed to warn of leakage or waste even if the operator is away from the PC.

#### Q: What can I meter?

A: Absolutely anything you want. Obviously the most likely candidates are electricity, water, oil & gas, but it doesn't have to stop there. Temperature, steam, compressed air, process gases, heatflow, or even production units can all be monitored. A good system will read all kinds of meters as long as they have a pulse output.

#### Q: How easy is it to install?

A: As easy as we can make it! We handle every aspect of the installation from installing water meters to configuring the software, and for those customers doing their own installation we provide active support, plus a free commissioning service.

#### Q: I've already got a network on site can I use that?

A: Our TCP/IP hardware will plug into any 10 base T Ethernet system via standard RJ45 sockets. If your building already has a PC network, using it for your sub-metering system couldn't be simpler!

**Q: Can I use my company intranet or the web to network between sites?**

**A:** Because our TCP/IP hardware has allocated IP addresses, any of these options can be used to transfer data and/or view meters on the system.

**Q: Does the system calculate costs?**

**A:** Yes it does. All measured parameters can have multiple cost structures allocated to them, with up to six 'time of day' tariffs applied to each. This not only allows you to calculate actual consumption costs, but to factor in alternative tariffs to check projected savings on actual collected data.

**Q: Can I use MeterRing to produce bills?**

**A:** With the Tenant Billing Module, the system calculates utility costs against a user-defined tariff structure and prints the bill at the end of the period. In fact, it doesn't just print, it faxes and e-mails as well, and completely automatically.

**Q: Will the system reduce the impact of the Climate Change Levy?**

**A:** MeterRing automatically calculates carbon equivalents for energy used and computes CCL tax liability. If your business is part of a Climate Change Agreement (CCA) the system provides all the required data for proof of performance against agreed targets.

**Q: Can I use the system to calculate production efficiency and 'Cost per Widget'?**

**A:** The flexible design of MeterRing means you can create any number of calculation channels for this type of application. You can use this feature to graph production or space heating efficiency as well as 'virtual meters', all within the program itself.

**Q: Can I use the data in other programs?**

**A:** Absolutely. Data can be exported in a number of formats, into spreadsheets for example. There's also a 'cut & paste' function to copy the graphs and other key data into word processing packages etc.

**Q: Can I add meter readings together, to provide totals for a building for example?**

**A:** 'Meter Groups' can be created by a simple 'drag & drop' process to provide sub totals either by unit consumption or by cost.

**Q: What happens if there's a power loss? Will I lose data?**

**A:** No previously recorded data can ever be lost. All the hardware features EPROM memory which is 100% non-volatile. Even if the PC shuts down, the meters will continue recording so cumulative totals will still be correct.

**Q: How do I get started?**

**A:** Getting a metering system up and running is remarkably easy. You can start small and add to the network over time, or install the whole thing at once. It's up to you.

**Q: OK. How much is this going to cost?**

**A:** A simple system to read up to four existing meters can cost less than £1200 for all the necessary hardware, software and cable. As a rule of thumb, a pulse channel costs between £80 & £100, and a serial output kWh meter around £200 including current transformers (CTs). The software itself starts from just £795.

**Q: Will I actually save money?**

**A:** Definitely. Savings of up to 20% are regularly achieved through sub-metering. It's easy to apply the controls which ensure the wastage and inefficiency are eliminated once you have half hour consumption data for all parts of your business upon your PC screen, and a dynamic alarm system watching over your energy usage 24 hours a day.

**Q: What about the initial setup and commissioning of the system?**

**A:** That's normally carried out free-of-charge by an Elcomponent Engineer.

**Q: Do you have many systems already installed?**

**A:** Over 200 and counting. MeterRing is saving money for customers as diverse as manufacturing sites, shopping centres, supermarkets, museums, quarries, leisure centres and local authority buildings.



## 2.11 Automatic Sub-Metering *Dedicated Hardware*

### Radio Links

The Radio-Tech 'licence exempt' radio transceivers are high quality well proven units, and are recommended as a replacement for cable connections on RS485 systems where local conditions make this desirable.

They are suitable for use with most RS485 hardware, and can be included into a cable network in specific areas, or can be used to provide a 'totally radio' system.

The units offer communications over distances of up to 5KM depending on local conditions, and will also provide a reliable link between buildings. We also supply a range of brackets, masts and aerial mounting hardware.

#### Note

Reliable performance on radio-based systems depends on the correct use of available frequencies, and the right choice of aerial. We carry out a detailed 'radio survey' on your behalf to ensure that these important aspects are correctly specified, assuring reliable performance of the network.



### Prices

| Description                   | Frequency        | 1+              |
|-------------------------------|------------------|-----------------|
| RTCOM Global Modem IP67       | 458.5-458.875MHz | £474.50         |
| End Fed Dipole 458MHz Aerial* | -1 to 0db        | £164.00         |
| Low Loss Aerial Cable         |                  | £1.42 per metre |

\*see page 200000

### MM8 Temperature Module

| Dimensions | W  | H  | D  |
|------------|----|----|----|
|            | 40 | 78 | 78 |



### Prices

| Description               | Mount | 1+      |
|---------------------------|-------|---------|
| MM8TC                     | D     | £245.00 |
| MM8TCP8TC (Ethernet RJ45) | D     | £275.00 |

### AEM31-E

| Dimensions | W              | H  | D  | Cut-out            |
|------------|----------------|----|----|--------------------|
|            | 157.5<br>±0.05 | 90 | 73 | 46 x 180 Using kit |



in-depth spec on page 6.8

### Prices

| Description     | Mount | Output          | 1+      | 5+      | 25+     |
|-----------------|-------|-----------------|---------|---------|---------|
| AEM31-E         | D     | Ethernet (RJ45) | £395.00 | £375.25 | £355.50 |
| Panel Kit 9 DIN |       |                 | £18.25  | £17.34  | £16.42  |



## 4CPSI + 4CPSI-E

| Dimensions | W              | H  | D  | Cut-out            |
|------------|----------------|----|----|--------------------|
| 4CPSI      | 106<br>4 DIN   | 90 | 73 | 46 x 126 Using kit |
| 4CPSI-E    | 157.5<br>6 DIN | 90 | 73 | 46 x 180 Using kit |



## Prices

| Description           | Mount | 1+      | 5+      | 25+     |
|-----------------------|-------|---------|---------|---------|
| 4CPSI                 | D     | £395.00 | £355.50 | £335.75 |
| 4CPSI-E               | D     | £495.00 | £445.50 | £420.75 |
| Panel Mount Kit 6 DIN |       | £15.50  | £14.73  | £13.95  |
| Panel Mount Kit 9 DIN |       | £18.25  | £17.34  | £16.42  |

## PC Interface

| Dimensions          | W            | H  | D  | Cut-out            |
|---------------------|--------------|----|----|--------------------|
| RS232/485 Interface | 106<br>4 DIN | 90 | 73 | 46 x 126 Using kit |



## Prices

| Description           | Mount | 1+      |
|-----------------------|-------|---------|
| RS232/485 Interface   | D     | £129.00 |
| Panel Mount Kit 6 DIN |       | £15.50  |

## R-DCU Remote Data Collection Unit

| Dimensions | W              | H  | D  | Cut-out            |
|------------|----------------|----|----|--------------------|
|            | 157.5<br>6 DIN | 90 | 73 | 46 x 180 Using kit |



## Prices

| Description           | Mount | 1+      | 5+      | 25+     |
|-----------------------|-------|---------|---------|---------|
| R-DCU                 | D     | £695.00 | £625.50 | £590.75 |
| Panel Mount Kit 9 DIN |       | £18.25  | £17.34  | £16.42  |

## 3.1 Data & Profile Loggers Overview

### Product Overview

- No Live Voltage Connections
- Safe Operation
- Easy Software
- Excellent Value

The products in this section are designed to make the logging and subsequent analysis of energy consumption as quick and easy as possible. All units use ultra reliable battery or self-powered data logging to store readings to RAM for subsequent download to PC.

The electricity loggers do not need voltage connections other than a standard wall socket, and are therefore almost completely non-invasive, and being very compact can be used virtually anywhere. All units are supplied 'ready to go' in kit form.

The three phase instruments are supplied with 3 clip-on current transformers (CTs) rated at 1000 Amps.

These provide exceptional performance and accuracy over a wide operating range, and are the preferred option for most applications. However, units can be supplied with alternative CTs or additional CTs which can be ordered if required.

All are shipped complete with a powerful software package which enables the user to set the units up for storage rate, survey period etc. and also to download and process data after a survey has been completed. The software includes full consumption and cost analysis in addition to an integral graph and report production capability.

These units are ideal for applications where energy consumption and cost profiling are the primary considerations. They are all extremely easy to use and are supplied with a comprehensive user manual, to ensure that you are up and running in as short a time as possible.

Additional or alternative CTs should be chosen based on the loads to be measured, and the physical size of the cables they will be used on.

All are extremely accurate with good linearity over a wide measurement range, and may be used down to 1% of scale without significant loss of accuracy.

Please see table below for more details.



| CT              | Jaw Dim's   | Recommended Range |
|-----------------|-------------|-------------------|
| 10A             | Ø15mm       | 0.1A - 10A        |
| 200A            | Ø20mm       | 2A - 200A         |
| 1000A           | Ø52mm       | 10A - 1000A*      |
| 1000/2000/3000A | 64 x Ø150mm | 10A - 3000A       |

\* Supplied as standard with SP Max or SP Plus Kit

**SP Max Energy Profile Logger**

- ✓ Safe Voltage Connection
- ✓ Tough, Waterproof Case
- ✓ True RMS Measurement

This is the ultimate logger for 3 phase electrical energy monitoring. Housed in a rugged IP67 enclosure it can easily handle the harshest environment whilst continuing to provide reliable and dependable performance, on both single and three phase loads. Voltage is measured via a standard wall socket, so connection is safe and easy, and the unit offers a host of features for effective and accurate energy monitoring.

The unit can also be used as a battery powered device for extended survey periods of up to 3 weeks duration.

Sophisticated software provides true RMS reading for Volts, Amps, kVA, kW, kWh and Power Factor. A large on-board memory allows detailed surveys to be carried out over extended periods (e.g. 2 months at 5 minute storage rate) and allows the storage of min/max and average readings for more accurate results. The 'SP MAX' also features a pulse logging channel so any type of pulse output meter may be read directly without any additional connections being required.

The unit is compatible with a wide range of CTs and utilises the same easy-to-use Windows software as the other SP loggers, allowing instant production of kW, kVA and half-hour kWh profiles, in graph and table format. A costing feature for day/night costs, tariff comparisons and cost per period data is included as standard.

**Kit Contents**

SP Max Logger, PowerPack Software, 3 x 1000A CTs, Pulse Channel Input Cable, Custom Zip Case.

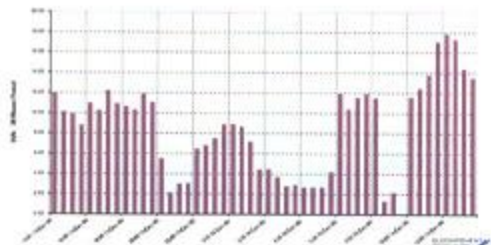
**Parameters**

Amps  
Volts  
kW  
kVA  
kWh  
PF  
Pulse

Accuracy: 1% (kWh)  
Safety: IEC 1010, 600V

**Features**

- ✓ Single/Balanced 3 Phase
- ✓ Unbalanced 3 Phase
- ✓ On-board Memory
- ✓ No Voltage Connections
- ✓ Battery/Self Powered
- ✓ Software Included
- ✓ Data Output Port

**Prices**

| Description               | Jaw Dims | 1+       |
|---------------------------|----------|----------|
| SP Max Kit c/w 1000A CT's | Ø52mm    | £1395.00 |
| CT Kit (x3) 10A           | Ø15mm    | £420.00  |
| CT Kit (x3) 200A          | Ø20mm    | £295.00  |
| CT Kit (x3) 3000A         | 64x150mm | £995.00  |
| Croc Clip Volt Lead       |          | £40.00   |



## 3.3 Data & Profile Loggers Products

### SP Plus Energy Profile Logger

- ✓ Battery Powered
- ✓ Compact Dimensions
- ✓ True RMS Measurement

#### Parameters

Amps  
kW (derived)  
kVA (derived)  
kWh (derived)

Accuracy: 0.25%  
(Amps)

Safety: IEC 1010, 450V

#### Features

- ✓ Single/Balanced  
3 Phase
- ✓ Unbalanced 3 Phase
- ✓ On-board Memory
- ✓ No Voltage  
Connections
- ✓ Battery/Self Powered
- ✓ Software Included
- ✓ Data Output Port

High accuracy hand-held battery-powered non-invasive logger for true RMS measurement of 3 phase current. This unit is ideal for applications where space is limited. Hardly any larger than a mobile phone, the SP Plus can be tucked away out of sight whilst it does the job effectively and unobtrusively.

Sophisticated data capture options include programmable storage rate and averaging period, and min/max/avg readings. No voltage connections are required making the SP PLUS simple and safe to use. The unit is compatible with a wide range of CTs for all types and levels of load.

The easy-to-use Windows software downloads data from the unit for instant production of kW, kVA and half hour kWh profiles in graph and table format. A costing feature calculates day/night costs, tariff comparisons and cost per period data automatically. 'Export' function for spreadsheet analysis of files.



#### Kit Contents

SP Plus Logger, PowerPack Software, 3 x 1000A CTs,  
Custom Zip Case.

### Prices

| Description                      | Jaw Dims | 1+      |
|----------------------------------|----------|---------|
| SP Plus 64 CT Kit c/w 1000A CT's | Ø52mm    | £995.00 |
| CT Kit (x3) 10A                  | Ø15mm    | £420.00 |
| CT Kit (x3) 200A                 | Ø20mm    | £295.00 |
| CT Kit (x3) 3000A                | 64x150mm | £995.00 |
| Mains Adaptor                    |          | £31.00  |

**SPC Energy Profile Logger**

- ✓ Low Cost
- ✓ Easy to Use
- ✓ Software Included

**Parameters**

Amps  
kW(derived)  
kVA(derived)  
kWh(derived)

Accuracy: 1%(Amps)  
Safety: IEC1010, 450V

**Features**

- ✓ Single/Balanced 3 Phase
- ✓ On-board Memory
- ✓ No Voltage Connections
- ✓ Battery/Self Powered
- ✓ Software Included
- ✓ Data Output Port

These very popular hand-held loggers are ideal for low cost non-invasive profile logging of electrical equipment. Suitable for single phase and balanced 3 phase loads, they provide a remarkable level of capability at a fraction of the cost of more sophisticated instruments.

Offered in a choice of 50A or 200A versions, the 50A version is ideal for appliance monitoring whilst the 200A version handles direct logging of buildings and machinery loads.

The range of these units may be extended by the addition of the 10:1 expander CT allowing loads of up to 1500A to be measured with the 200A units and 500A with the 50A version. No voltage connections required.

Both units feature an 8000 event memory with programmable storage rate (eg sample every 5 mins for one month).

Simple download to PC for graph of kW, kVA and kWh half-hour consumption. A powerful costing feature calculates cost per period for tariff comparisons etc.



Expander CT Jaw  
80 x 50mm



Jaw Ø18mm

**Kit Contents**

SPC Profile Logger, PowerPack Software, Zip Carry Case.

**Prices**

| Description         | 1+      |
|---------------------|---------|
| SPC Logger Kit 200A | £195.00 |
| SPC Logger Kit 50A  | £195.00 |
| 10:1 Expander CT    | £109.00 |

## 3.5 Data & Profile Loggers Software

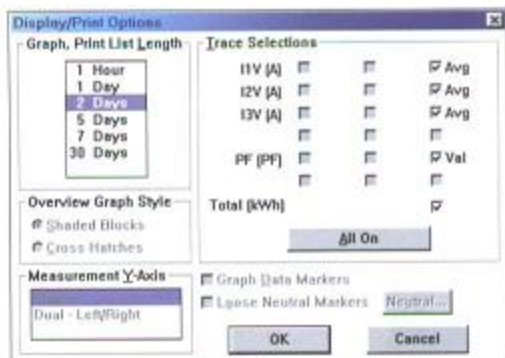
### SP Power Pack Software

- ✓ Easy to Use
- ✓ On-Board Graphing
- ✓ Data Export Function

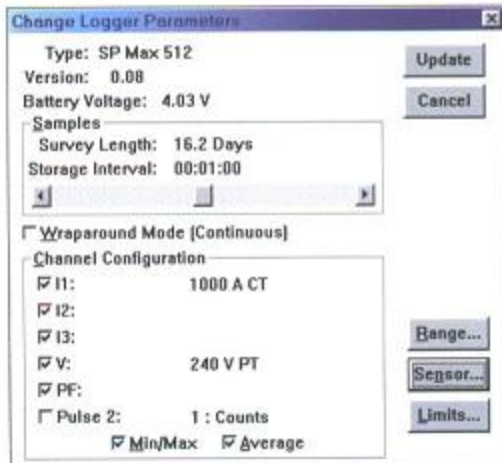
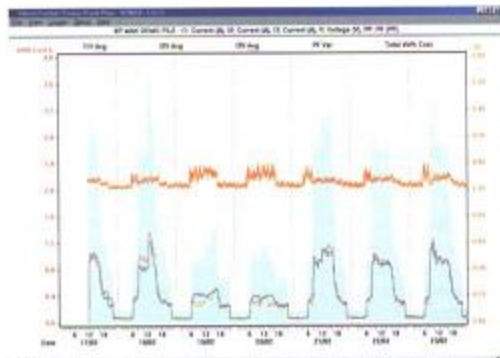
The 'Windows' software supplied with all of the units in the series is possibly the most powerful and user-friendly package of its kind, and offers superb easy-to-use graphing and costing features, to make energy consumption profiling as simple and quick as possible.

The software provides the necessary capability to program the loggers for sampling rate and memory usage options, to download survey data, and to process this data into graph and table format. All operations are via pull down menus and button bars, and a set of standard default settings ensures that even first-time users will have immediate results from their surveys. Data can be graphed over an hour/day/week/month period with full 'zoom' facility for detailed analysis.

A simple costing feature allows the user to input both day and night tariffs to create half-hour cost profiles and automatically calculate electricity costs over a period. With SP PowerPack it really is that simple! From downloading the data from the logger to producing a graph cost profile on the PC takes just a few seconds.



Display Options Screen



Logger Set-up Options Screen



## Product Overview

-  High Accuracy
-  Sophisticated Design

In today's industrial and commercial environments energy usage and power quality are major issues. Successful and cost-effective operation depends on proper control of energy demand and a supply of electrical power of good quality. For engineers working in this field the right tools have become essential if expensive and possibly dangerous power problems are to be avoided. At Elcomponent we understand the issues, and we've been supplying energy and power quality analysers since 1986. We have an unbeatable range of instruments to make sure our customers have the tools they need to keep the wheels of industry and commerce turning smoothly, and all are available from stock.

All the instruments in this section feature on-board printers and/or memory storage for logging critical parameters over extended periods. They provide the skilled engineer with a powerful ally in maintaining the integrity of electrical systems, a role in which accuracy is paramount. All instruments are therefore supplied with a traceable calibration certificate as standard.

## Training Packages

Tailored training packages are available for all of the products in this section of the catalogue. Competitively priced, these are 'hands on' sessions, carried out by our own technical sales personnel, at your site. Please contact the sales personnel for more information.

## More about Power Quality

'Power Quality' on AC supplies is a global term which encompasses stability of voltage, short term disturbance (spikes, micro interruptions etc), and waveform distortion (harmonics) among other things. These various phenomena have different causes and different effects but they all fall into the category of 'bad news'!

Voltage stability is fairly easy to measure, but disturbance and distortion are more difficult. Disturbance usually manifests itself in the malfunction of electronic equipment, and once identified using a suitable analyser such as the PowerPro, the source can be isolated and dealt with. Waveform Distortion caused by harmonics is however potentially by far the most damaging. Modern office equipment and many designs of AC motor drives generate harmonics, so the problem is common to both offices and factories. It manifests itself in the overheating of cables and transformers, the unexplained tripping of breakers and blowing of fuses, and even burnouts within the electrical distribution system. Equipment problems and premature failure of filament lamps are also symptomatic of harmonic distortion on the supply.

Fortunately it's now possible to identify the existence of this problem with a low cost hand-held instrument such as the Nanovip Plus, or carry out detailed surveys with the more sophisticated Power Quality Analysers.



3000A  
Busbar Type



1000A Type



200A Type



Flex CT's

## 4.2 Energy & Power Quality Analysers *CT Selection*

### CT Selection

All of the instruments in this section are supplied complete with a full set of clip-on current transformers (CTs) suitable for general purpose use. Additional CT sets are offered for specialised applications where current levels or conductor size may be outside the range that can be accommodated by the standard set.

Flexible CTs are also available for most of the instruments in this section. In the case of the PowerPro, this unit has been designed from the outset to use flex CTs. Accordingly, it has an on-board power supply to eliminate the need for batteries (flex CT technology requires a low voltage supply to the CTs themselves) and a neat 'one plug' connection for the CT kit.

Flex transformers are often easier to use than traditional CTs in confined spaces or on widely separated multiple conductors. They are also lightweight, and when correctly specified, highly accurate.

Please see the table below for more details.

### CT Selection Table

| CT              | Jaw Dims / Core Length | Recommended Usage |
|-----------------|------------------------|-------------------|
| 10A             | 15mm                   | 0.1 - 10A         |
| 200A            | 20mm                   | 2 - 200A          |
| 1000A           | 52mm                   | 10 - 1000A        |
| 1000/2000/3000A | 64 x 150mm             | 10 - 3000A        |
| 1000A Amplex    | 80cm                   | 10 - 1000A        |
| 3000A Amplex    | 80cm                   | 10 - 3000A        |
| 3000A Amplex    | 120cm                  | 10 - 3000A        |



## Nanovip Plus / Nanowin Software

- ✓ High Accuracy
- ✓ Low Cost
- ✓ Full Colour Windows Software

Superb true RMS energy & power quality analyser in a hand-held package. Suitable for loads up to 200A (1000A with additional CT), on single/balanced 3 phase. The amazing Nanovip Plus combines a host of measurement features including kWh and kVArh plus Harmonics on volts and amps to the 24th harmonic, THD (Total Harmonic Distortion), Crest Factor and import/export of power and energy.

Invaluable for power quality checks, generator checks and energy management and commissioning applications. The 'Nanovip Plus MEM' sets new standards of performance and affordability. With a full 1MB of internal flash memory and supplied complete with the 'Nanowin' Windows software package the instrument is a genuine power quality survey tool at a fraction of the price of the larger multi-channel units. Every aspect of the supply is stored for subsequent download and display in full colour. The instrument has a capacity of over 4000 records and is fully programmable for storage rate and memory usage.

### Kit Contents (Nanovip Plus Kit)

Nanovip Plus Analyser, 1 x 200 CT, 1 x Fused Voltage Leadset, Custom Zip Case

### Kit Contents (Nanovip Plus MEM Kit)

Nanovip Plus MEM Analyser, 1 x 200A CT, 1 x Fused Voltage Leadset, 1 x Nanowin Software, Custom Zip Case

## Prices

| Description   | Jaw Dims | T+      |
|---|----------|---------|
| Nanovip Plus Kit c/w 200A CT                        | Ø20mm    | £435.00 |
| Nanovip Plus MEM Kit c/w 200A CT & Nanowin Software | Ø20mm    | £695.00 |
| 10A CT  | Ø15mm    | £136.00 |
| 1000A CT  | Ø52mm    | £156.00 |
| Fused Voltage Leadset                               |          | £30.00  |
| Training Package Available                          |          |         |

### Parameters

|              |   |
|--------------|---|
| Amps         | ✓ |
| Volts        | ✓ |
| kW           | ✓ |
| kVA          | ✓ |
| kVAh         | ✓ |
| kWh          | ✓ |
| kVArh        | ✓ |
| PF           | ✓ |
| Hz           | ✓ |
| THD          | ✓ |
| Harmonics    | ✓ |
| Crest Factor | ✓ |

Accuracy: 0.5%  
Safety: IEC 1010, 600V

### Features

- ✓ Single/Balanced 3 Phase
- ✓ On-board Memory
- ✓ Battery/Self Powered
- ✓ Software Included
- ✓ Harmonics Analysis
- ✓ Data Output Port

'Nanowin' software is incredibly easy to use and provides a dynamic multi-window desktop for instrument set up, data download, graphic display of waveforms, harmonic bar charts and amplitude profiles, memory usage and full colour graphs of all measured parameters.

A host of user-friendly features including memory sweep and waveform scrolling ensures that important min/max data is highlighted quickly making the production of detailed reports easier than ever before. Full 'cut and paste' facilities and direct compatibility with standard Microsoft programs like Word and Excel make the full colour graphic capability of these software packages instantly accessible for combining into other documents.



Nanowin Software



## 4.4 Energy & Power Quality Analysers Products

### Microvip 3 Plus

- ✓ High Accuracy
- ✓ On Board Graphics Printer
- ✓ Full Colour Windows Software

The Microvip 3 Plus provides full 3 phase energy and power quality analysis in a cost-effective, portable and user-friendly package. The unit features a fully programmable on-board graphics printer to provide waveforms, bar chart and tabular data on all aspects of the supply including harmonics to the 24th multiple, DC component and displacement factor. The backlit LCD displays 33 parameters, and a massive 1MB of on-board memory enables the unit to be used for data storage over extended survey periods.

The Microvip 3 Plus is supplied complete with the 'Microwin' software package which integrates with the on-board memory to produce a very powerful power quality analysis capability. The software provides a dynamic multi-window desktop for instrument set up, data download, graphic display of waveforms, harmonic bar charts and amplitude profiles, memory usage and full colour graphs of all measured parameters.

A host of user-friendly features including memory sweep and waveform scrolling ensures that important min/max data is

#### Kit Contents

Microvip 3 Plus Energy Analyser, 3 x 1000A CT, 1 x Fused Voltage Leads, 1 x Microwin Software, 1 x Spare Ink Ribbon, 1 x Spare Paper Roll, Custom Zip Case

#### Prices

| Description                  | Jaw Dims    | 1+       |
|------------------------------|-------------|----------|
| Microvip 3 Plus c/w Software | Ø52mm       | £2290.00 |
| 10A CT Kit (x3)              | Ø15mm       | £420.00  |
| 200A CT Kit (x3)             | Ø20mm       | £295.00  |
| 3000A CT Kit (x3)            | 64 x 150 mm | £995.00  |
| Paper Rolls (PK 10)          |             | £11.07   |
| Ink Ribbons (PK 5)           |             | £40.22   |
| Voltage Leads                |             | £60.00   |
| Training Package Available   |             |          |

#### Parameters

|           | R | Y | B | Tot |
|-----------|---|---|---|-----|
| Amps      | ✓ | ✓ | ✓ | ✓   |
| Volts     | ✓ | ✓ | ✓ | ✓   |
| kW        | ✓ | ✓ | ✓ | ✓   |
| kVA       | ✓ | ✓ | ✓ | ✓   |
| kVAr      |   |   |   | ✓   |
| PF        | ✓ | ✓ | ✓ | ✓   |
| Hz        |   |   |   | ✓   |
| kWh       |   |   |   | ✓   |
| kVArh     |   |   |   | ✓   |
| THD V&A   | ✓ | ✓ | ✓ | ✓   |
| Harmonics | ✓ | ✓ | ✓ | ✓   |

Accuracy: 0.5%

Safety: IEC 1010, 600V

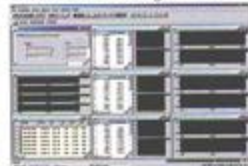


#### Features

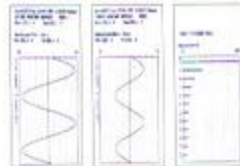
- ✓ Single/Balanced 3 Phase
- ✓ UnBalanced 3 Phase
- ✓ On-board Printer
- ✓ On-board Memory
- ✓ Battery/Self Powered
- ✓ Harmonics Analysis

highlighted quickly making the production of detailed reports easier than ever before. Full 'cut and paste' facilities and direct compatibility with standard Microsoft programs like Word and Excel make the full colour graphic capability of these software packages instantly accessible for combining into other documents.

The Microvip 3 Plus is fully programmable via the front panel for use on single/three phase (star or delta) and with any combination of current and voltage transformers.



Microwin Software



On-board Graphics Printer

**VIP System 3**

- ✓ High Accuracy
- ✓ On Board Graphics Printer
- ✓ Full Colour Windows Software

**Parameters**

|                  | R | Y | B | Tot |
|------------------|---|---|---|-----|
| Volts            | ✓ | ✓ | ✓ | ✓   |
| Amps             | ✓ | ✓ | ✓ | ✓   |
| kW               | ✓ | ✓ | ✓ | ✓   |
| KVA              | ✓ | ✓ | ✓ | ✓   |
| KVA <sub>r</sub> | ✓ | ✓ | ✓ | ✓   |
| Distortion       | ✓ | ✓ | ✓ | ✓   |
| PF               | ✓ | ✓ | ✓ | ✓   |
| Hz               | ✓ | ✓ | ✓ | ✓   |
| kWh              | ✓ | ✓ | ✓ | ✓   |
| KVARh            | ✓ | ✓ | ✓ | ✓   |

Accuracy: 0.5%  
Safety: IEC 1010, 600V

**Kit Contents**

VIP System 3 Energy Analyser, 3 x 1000A CTs, 1 x Fused Voltage Leadset, 1 x Harmonics Black Box, 1 x Mem Pack Interface, 1 x V3.0 Harmonics Software, 1 x V3.0 Utilities Software, 1 x 512K Memory Pack, 1 x Spare Ink Ribbon, 1 x Spare Paper Roll, Custom Zip Case

**Prices**

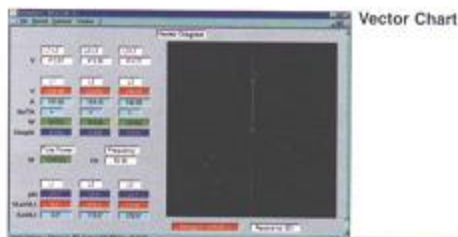
| Description                | 1+       |
|----------------------------|----------|
| VIP SYSTEM 3 Super Kit     | £3999.00 |
| Cogeneration Module        | £120.00  |
| Analogue Transducer Module | £338.00  |
| Voltage Leadset            | £60.00   |
| 10A CT Kit                 | £420.00  |
| 200A CT Kit                | £295.00  |
| 3000A CT Kit               | £995.00  |
| CT 1000/1 DC CT            | £371.83  |
| Ink Ribbons (Pk 5)         | £40.22   |
| Paper Rolls (Pk 10)        | £11.07   |

This full specification 3 phase analyser is ideal for detailed load analysis, survey and maintenance work, and has been proven over many thousands of applications worldwide. The VIP System 3 features an on-board printer/plotter plus data storage via plug-in memory modules for subsequent download to PC.

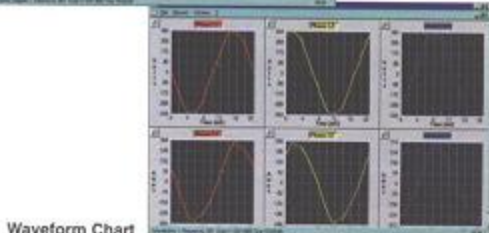
**Features**

- ✓ Unbalanced 3 Phase
- ✓ On-board Memory
- ✓ On-board Printer
- ✓ Harmonics Analysis
- ✓ Data Output Port

The unit also features full min/max alarms, menu for troubleshooting voltage problems, overloads, power quality etc. Programmable for use with any combination of voltage transformers (VTs) and current transformers (CTs) the VIP System 3 is offered as either the standard kit (which can be progressively upgraded) or a fully inclusive package (The Super Kit) complete with harmonics module, 512K memory pack, a full suite of Windows software. The harmonics module provides 'on-screen' waveform capture for current and voltage to the 25th multiple, and further modules are available for measurement of co-generation systems, earth leakage and interfacing with 4-20mA or 0-1V transducers for measuring temperature, pressure, flow etc.



Vector Chart



Waveform Chart



## 4.6 Energy & Power Quality Analysers Products

### PowerPro

- ✓ Ultra-high performance
- ✓ Flicker to IEC 868 & 61000-4
- ✓ Graphic Display

Our latest analyser has all the rugged dependability of its predecessor, the InterLogger, combined with new levels of performance and accuracy in even the most demanding applications.

Designed for professionals, this tough IP67 sealed unit is nevertheless extremely easy to use.

The PowerPro combines detailed power & power quality analysis plus flicker and transient capture in one fully integrated package. Using high-speed digital sampling, it measures and records voltage, current, power, THD, waveforms, Flicker (IEC 868, IEC 61000-4-15 PST & PLT) and transient occurrences. The on-board graphic display offers waveform and FFT barcharts in realtime, along with other data and menu functions. Data is stored to a standard format plug-in 32MB Flash card for easy download and replacement in the field. For even greater flexibility, TCP/IP (Ethernet) and dial-up download options are available\*

The instrument is compatible with any CT/VT combination and is

#### Kit Contents

PowerPro, 1000A CT (x4), PCMCIA Card Reader, Voltage Leadset, 32MB Memory Card, PowerView Software, 2 x Custom Zip Case

suitable for phase to phase voltages of up to 1000V. It may be ordered with either 'traditional' iron-cored CTs, or the latest flex type devices. Flex CT kits plug straight into the PowerPro using a single MIL-spec connector ensuring correct hook-up, and providing an integral power supply to the CTs. This means surveys are not limited by flex CT battery life.

The 'PowerView' Windows software package has been developed as an integral part of the PowerPro, and offers outstanding performance at all levels. Designed to help the user extract the important data quickly and easily, it uses a powerful graphic interface and a programmable reporting function to get you from raw data to finished report in record time. A sophisticated zoom function and user-defined graph templates allow multi-trace graphs to be tailored to your requirements, and a statistics analysis and reporting function combined with full data export, cuts the number-crunching down to size.

#### Parameters

|                      | R | Y | B | N | Tot |
|----------------------|---|---|---|---|-----|
| Volts                | ✓ | ✓ | ✓ | ✓ | ✓   |
| Amps                 | ✓ | ✓ | ✓ | ✓ | ✓   |
| kW                   | ✓ | ✓ | ✓ | ✓ | ✓   |
| kWh                  | ✓ | ✓ | ✓ | ✓ | ✓   |
| kVA                  | ✓ | ✓ | ✓ | ✓ | ✓   |
| kVArh                | ✓ | ✓ | ✓ | ✓ | ✓   |
| Hz                   | ✓ | ✓ | ✓ | ✓ | ✓   |
| PF                   | ✓ | ✓ | ✓ | ✓ | ✓   |
| THD Volts            | ✓ | ✓ | ✓ | ✓ | ✓   |
| THD Amps             | ✓ | ✓ | ✓ | ✓ | ✓   |
| Harmonic Amps 1-64   | ✓ | ✓ | ✓ | ✓ | ✓   |
| Harmonic Volts 1-64  | ✓ | ✓ | ✓ | ✓ | ✓   |
| Transient Events     | ✓ | ✓ | ✓ | ✓ | ✓   |
| Waveform Capture     | ✓ | ✓ | ✓ | ✓ | ✓   |
| Accuracy: 0.5%       |   |   |   |   |     |
| Safety: IEC, UL, CSA |   |   |   |   |     |



#### Prices

| Description                               | 1+       |
|---|----------|
| Power Pro c/w 1000A CT (x4)               | £5840.00 |
| Power Pro c/w 300/1000/3000 Flex CT (3:1) | £7220.00 |
| 1000A CT Kit (x4) Diam 52mm               | £615.00  |
| 300/1000A/3000 Flex CT Kit (3:1) 60cm     | £1995.00 |
| 10/30/100A Flex CT Kit (3:1) 60cm         | £1995.00 |
| Flicker Option                            | £895.00  |
| 400Hz Option*                             | £895.00  |

\*Please note that 400Hz USA is not available with Flicker



## Product Overview

- Free PF Surveys
- Low Installed Cost
- Fast Payback

Despite the increase in the number of electricity tariffs on offer in recent years, the majority still penalise poor Power Factor in one way or another. As well as reducing costs by improving PF, Power Factor Correction also reduces transformer and cable loadings, and is often a very cost-effective alternative to replacing an overloaded transformer. At Elcomponent we have years of experience of installing PFC equipment and offer a free PF assessment service to **accurately** establish savings and payback, as well as a full installation package.

We offer fast delivery on all sizes of automatic equipment from 50-500 kVAr.

## All of our PFC units include...

- ✓ AEG Capacitors - simply the best!
- ✓ Microprocessor Control - protects against:
  - Over Voltage
  - Over Current
  - Over Temperature
  - Harmonic Distortion
- ✓ 'Supertec' electronic switching -
  - Extends contactor life
  - Reduces capacitor stress
  - 90% reduction in heat dissipation
  - On-board system diagnostics



All units are fully fused with separate fuse protection for each capacitor bank, and door interlocked isolators are fitted as standard, providing the highest possible levels of equipment and operator safety. Component life is significantly extended by the 'SUPERTEC' switching module, and thermostatically controlled forced cooling (not RAM 3000).

The AEG capacitors utilise the highest quality construction making them extremely resilient to mains-borne harmonics and voltage disturbance. However for environments where high levels of harmonics are present, detuned equipment is recommended. These units are fitted with carefully tuned inductances to prevent damage to the capacitors or other equipment on site from harmonic currents flowing in the system. Please contact our technical department for more information on detuned equipment.



## 5.2 Power Factor Correction *Products*

### RAM 3000 Series

Compact & easy to install, these low power PFC units are ideal for light industrial or retail sites or larger installations where the PFC is spread across a number of distribution boards. Despite the low cost and compact dimensions the RAM3000 series have all the features of the larger units including the 'VARACTOR' controller and 'SUPERTEC' switching.



### Prices

Please contact our sales department for a 'fully installed' price

| Description     | kVAr    | 1+       |
|-----------------|---------|----------|
| RAM3200-50-440  | 50 kVAr | £785.62  |
| RAM3200-75-440  | 75 kVAr | £881.88  |
| RAM3300-100-440 | 100kVAr | £1240.94 |
| RAM3400-150-440 | 150kVAr | £1732.23 |
| RAM3400-200-440 | 200kVAr | £1980.64 |

**RAM 5000 Series**

The RAM5000 series units are housed in robust steel enclosures with microprocessor controlled cooling for extended capacitor life. The modular design allows easy replacement of capacitor trays in the field, ensuring servicing costs are kept to a minimum.

**Prices**

*Please contact our sales department for a 'fully installed' price*

| Description     | kVAr     | 1+       |
|-----------------|----------|----------|
| RAM5500-250-440 | 250 kVAr | £3062.24 |
| RAM5500-300-440 | 300 kVAr | £3489.90 |



## 5.4 Power Factor Correction Products

### RAM 6000 Series

The RAM6000s are designed for heavy duty environments where high power PF correction is required. All units feature forced cooling and modular design for easy servicing and component replacement in the field.



### Prices

Please contact our sales department for a 'fully installed' price

| Description     | kVAr     | 1+       |
|-----------------|----------|----------|
| RAM6500-350-440 | 350 kVAr | £4111.20 |
| RAM6500-400-440 | 400 kVAr | £4391.70 |
| RAM6500-500-440 | 500 kVAr | £5131.40 |

## How does PFC Save Money?

The principle of Power Factor Correction is almost as old as AC power itself, but still remains something of a 'black art' in the minds of many of us.

In fact, the physics of it is simple, and with very few exceptions, the installation of PFC equipment will always reduce electricity costs. The reason for this is that most industrial and commercial loads have a power factor of less than 1 (unity). This is caused by the kVA or 'wattless' component of the load which is drawn by the windings of motors and transformers etc.

The kVA component is charged by the electricity supplier in a variety of none too obvious forms, usually as a Maximum Demand and/or availability charge expressed in kVA, but sometimes as a kVAh charge or PF penalty.

$$\text{kVA} = \sqrt{\text{kW}^2 + \text{kVAr}^2}$$

Or in other words, the kVA total (Maximum Demand) is made up from the kW and the kVAr components drawn from the supply. Improving the Power Factor reduces the kVAr component until we reach the ideal PF of 1, at which point the kVAr component is reduced to zero. When this is achieved, kVA = kW, so the Maximum Demand is as low it can be, unless the kW load itself is reduced. This is easiest to show by example:

PF = 1  
kW load = 100  
kVAr load = 0

$$\text{kVA} = \sqrt{100^2 + 0}$$

So kVA = 100

PF = 0.7  
kW load = 100  
kVAr load = 100

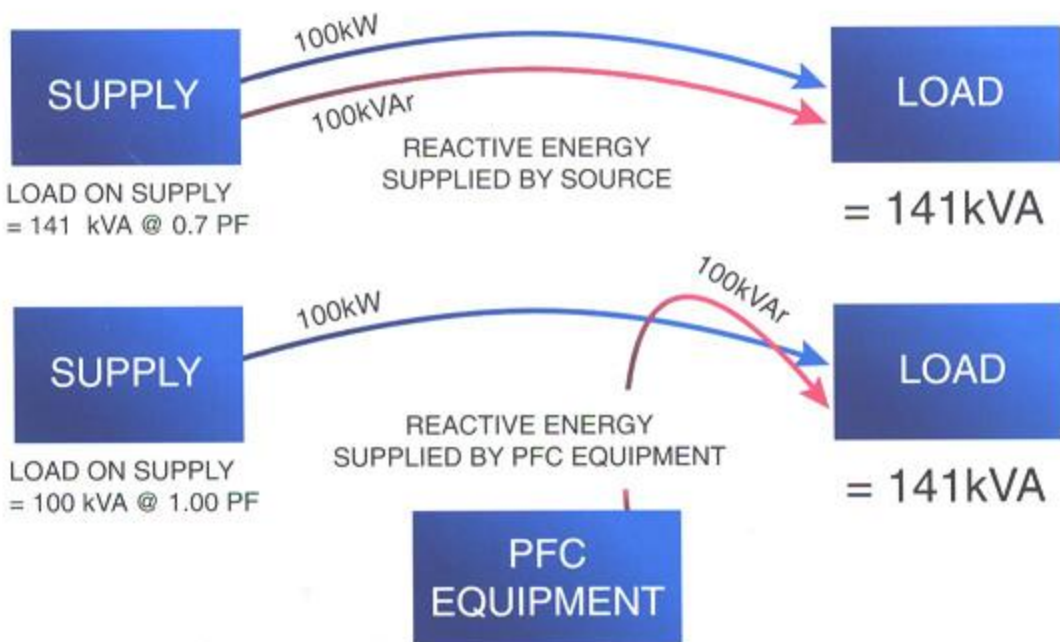
$$\text{kVA} = \sqrt{100^2 + 100^2}$$

So kVA = 141

In this instance the Maximum Demand charge will be for 143kVA where the PF is 0.7, but for only 100kVA where the PF is 1.

## 5.6 Power Factor Correction

Power Factor Correction improves the PF by using capacitors to supply the kVAr component, thus:



The load has remained unchanged at 141 kVA but the load on the supply has been reduced to 100 kVA (by improving the power factor to 1.00) and the reactive component supplied by the capacitors in the PFC equipment.

*It's simple - and it works!*

### Why 'Automatic PFC'?

In theory, PF capacitors could be sized to provide the kVAr required at maximum load, and simply connected to the supply. In practice, this is not a realistic option.

'Over-correction' would be an unavoidable result for some of the time, unless the plant ran at full load continuously, and this would result in a 'leading' power factor at less than maximum load. This has a number of undesirable effects on the supply network, which is why it is not allowed. The solution is the automatic PFC unit, which is constructed with a number (usually 4 or 5) "banks" of

capacitors which can be switched in and out as required. The PF controller senses the PF on the supply and switches the capacitors accordingly. The combination of correctly sized "banks" and intelligent microprocessor control results in an ability to keep the PF very close to the target level under all supply conditions.



## Product Overview

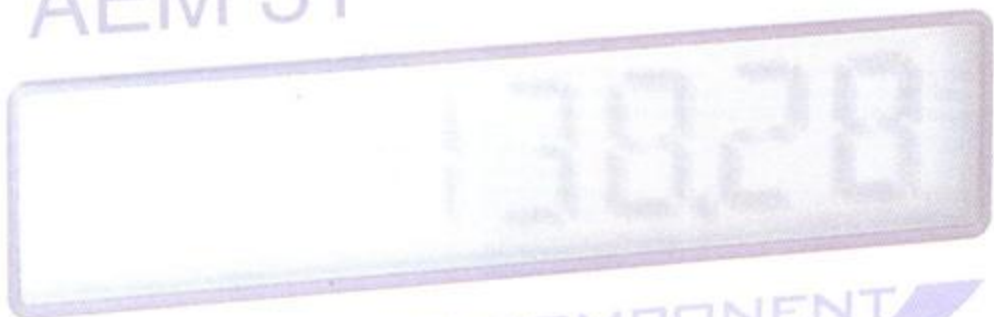
New digital meters that use the latest technology to bring costs down whilst improving performance and simplifying installation and stocking.

All units are designed for use with standard 5A secondary CTs (current transformers), and all are programmable to accommodate most standard ratios. This means ordering and stocking just one device regardless of CT rating. Where possible we offer a choice of DIN rail or direct panel mounting, but the DIN rail packages may all be panel mounted if desired using the relevant Front Mounting Kit.

For ethernet or web enabled TCP/IP systems, we offer a multi-parameter meter which connects directly to a standard LAN using an RJ45 patch lead. This can drastically reduce installation costs as the meter is compatible with most existing CAT5/CAT6 networks.

All the meters in the section are compatible with our sub-metering system, whether they are pulse, RS485 or TCP/IP output. Please contact our sales dept for further assistance on selecting the correct meter for your application.

AEM 31



ELCOMPONENT



## 6.2 kWh & Multi Parameter Meters Products

### AEM31 Panel Mounting

- ✓ Low Cost
- ✓ Large, Clear Display
- ✓ Pulse Output

High quality pulse output digital meter.

May be used on 3 phase 4 wire or single phase applications and feature large high contrast displays, programmable CT ratios to 4000/5. Auto-sensing CT connection simplifies installation and guarantees correct operation, EPROM memory dispenses with the need for back-up batteries and ensures data retention during power down.

#### Selectable CT Ratios

5/5 25/5 40/5 50/5 60/5 75/5 80/5 100/5 120/5 150/5 200/5 250/5  
300/5 320/5 400/5 500/5 600/5 750/5 800/5 1000/5 1200/5  
1250/5 1500/5 1600/5 1800/5 2000/5 2500/5 3200/5 4000/5

#### Parameters

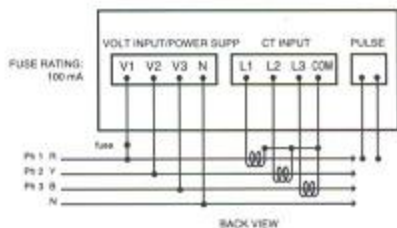
|         | R | Y | B | Tot |
|---------|---|---|---|-----|
| kWh     |   |   |   | ✓   |
| MD (kW) |   |   |   | ✓   |

Accuracy: Cl. 1 or 2 IEC1036  
Safety: IEC 1010, 450V

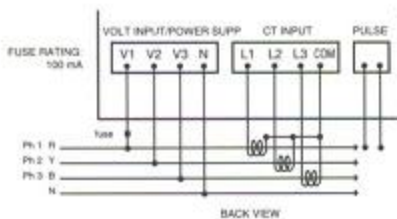


| Dimensions        | W  | H  | D  | Cut-out |
|-------------------|----|----|----|---------|
| Panel Mount Types | 86 | 48 | 92 | 45 x 92 |

#### Connection Diagram: Single Phase



#### Connection Diagram: 3 Phase



### Prices

| Description | Mount | Output | 1+      | 5+      | 25+     |
|-------------|-------|--------|---------|---------|---------|
| AEM31 P     | P     | Pulse  | £139.00 | £132.05 | £125.10 |

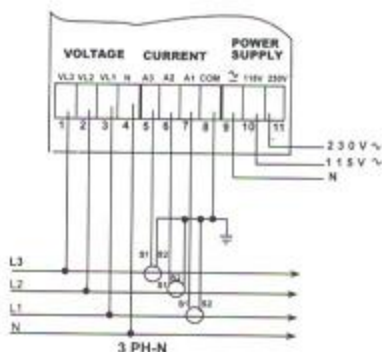
## Star3 Panel Mounting

- ✓ High accuracy
- ✓ Ultra Bright Display
- ✓ Fully Programmable
- ✓ Measures THD & Neutral Current

Elcontrol Energy's new meter offers truly outstanding specification in a simple cost-effective package. The unique bright red backlit LCD immediately sets the unit apart from its competitors, as does its performance and accuracy.

All models offer both pulse and multi-protocol RS485 MODBUS outputs as standard for seamless integration into any type of data acquisition system, along with multi-parameter measurement which includes THD (Total Harmonic Distortion). The STAR3 also displays neutral current accurately even when harmonics are present which makes it ideal for applications where power quality may be poor.

For more detailed power quality analysis the STAR3 Harmo offers full harmonic analysis to the 25th multiple (50Hz systems) at a very modest price increase over the standard product. All STAR3s are fully programmable and can be used on 3 phase or single phase systems including cogeneration applications. Dual relay outputs can be programmed as pulses, alarms or control contacts depending on the application. A 4-20mA analogue output version is also available, providing two programmable outputs. The STAR3 ALM model is fully compatible with **MeterRing** software.



### Parameters

|                    | R | Y | B | N | Tot |   |
|--------------------|---|---|---|---|-----|---|
| Volts              | ✓ | ✓ | ✓ | ✓ | ✓   | ✓ = available via <b>MeterRing</b> software |
| Amps               | ✓ | ✓ | ✓ | ✓ | ✓   |   |
| kWh                | ✓ | ✓ | ✓ | ✓ | ✓   |   |
| kVAr               | ✓ | ✓ | ✓ | ✓ | ✓   |   |
| PF                 | ✓ | ✓ | ✓ | ✓ | ✓   |   |
| Hz                 | ✓ |   |   |   | ✓   |   |
| kWh Import         |   |   |   |   | ✓   |   |
| kWh Export         |   |   |   |   | ✓   |   |
| kVArh Leading      |   |   |   |   | ✓   |   |
| kVArh Lagging      |   |   |   |   | ✓   |   |
| THD Amps           | ✓ | ✓ | ✓ | ✓ | ✓   |   |
| THD Volts          | ✓ | ✓ | ✓ | ✓ | ✓   |   |
| kWh Maximum Demand |   |   |   |   | ✓   |   |
| kVA Maximum Demand |   |   |   |   | ✓   |   |

Accuracy: 0.5%  
Safety: IEC 1010, 430V

| Dimensions | W  | H  | D     | Cut-out |
|------------|----|----|-------|---------|
|            | 96 | 96 | 115.4 | 91 x 91 |

### Selectable CT Ratios

Any Ratio to 999999:5/2.5/1

## Prices

| Description  | Mount | Output          | 1+      | 5+      | 25+     |
|--------------|-------|-----------------|---------|---------|---------|
| STAR3 ALM    | P     | Pulse (2)/RS485 | £189.00 | £179.55 | £170.10 |
| STAR3 4-20mA | P     | 4-20mA          | £269.00 | £255.55 | £242.10 |
| STAR3 HARMO  | P     | Pulse (2)/RS485 | £299.00 | £284.05 | £269.10 |



## 6.4 kWh & Multi Parameter Meters Products

### VIP396 Panel Mounting

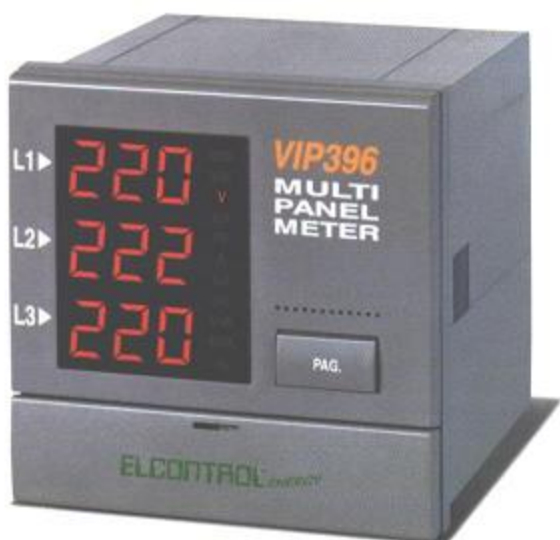
✓ Low Cost

✓ Simple Installation

Elcontrol Energy's VIP396 kWh meter provides cost-effective 3 phase multi-parameter performance in the popular DIN96 panel mounting package. The large bright display is easily visible in all lighting conditions, and the digital design ensures excellent accuracy and reliability.

Simple 'single button' selection scrolls all display pages with concealed set-up buttons behind a hinged flap. The VIP396 is available with a wide choice of output options including dual pulse output, 4-20mA and RS485 serial.

The RS485 model is fully compatible with our **MeterRing™** software.



#### Parameters

|       | R | Y | B | N | Tot |                                      |
|-------|---|---|---|---|-----|--------------------------------------|
| Volts | ✓ | ✓ | ✓ | ✓ | ✓   | ✓ = available via MeterRing software |
| Amps  | ✓ | ✓ | ✓ | ✓ | ✓   |                                      |
| kW    | ✓ | ✓ | ✓ | ✓ | ✓   |                                      |
| KVA   | ✓ | ✓ | ✓ | ✓ | ✓   |                                      |
| PF    | ✓ | ✓ | ✓ | ✓ | ✓   |                                      |
| Hz    |   |   |   |   | ✓   |                                      |
| kWh   |   |   |   |   | ✓   |                                      |
| kVArh |   |   |   |   | ✓   |                                      |
| kVAh  |   |   |   |   | ✓   |                                      |

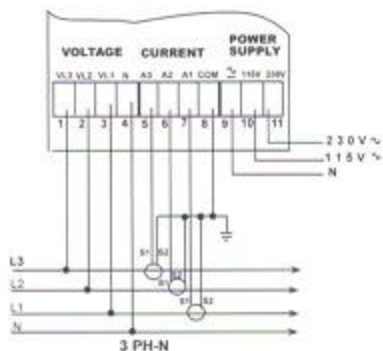
Accuracy: 1%

Safety: IEC 1010, 450V

#### Selectable CT Ratios

Any ratio to 99999.5/2.5/1

| Dimensions | W  | H  | D   | Cut-out |
|------------|----|----|-----|---------|
|            | 96 | 96 | 103 | 91 x 91 |



### Prices

| Description     | Mount | Output         | 1+      | 5+      | 25+     |
|-----------------|-------|----------------|---------|---------|---------|
| VIP396          | P     | -              | £159.00 | £151.05 | £143.10 |
| VIP396 485      | P     | RS 485         | £249.00 | £236.55 | £224.10 |
| VIP396 485 4-20 | P     | RS485 / 4-20mA | £299.00 | £284.05 | £269.10 |
| VIP396 ALM      | P     | Dual Pulse     | £289.00 | £274.55 | £260.10 |

## VIP96 PLUS Panel Mounting

✓ Low Cost

✓ Large, Clear Display

The VIP96 Plus provides a compact and easily installed solution to the problem of monitoring power quality on a permanent basis. Developed from the popular VIP96, Elcontrol's leading edge design ensures exceptional performance from this value-for-money package. Suitable for single phase and balanced 3 phase supplies the VIP96 Plus combines the functions of a power and energy meter with the ability to measure individual harmonics, THD and Crest Factor for both volts and amps up to the 24th harmonic, providing a comprehensive 'window' into the quality of the supply. The unit is available with a variety of data outputs including pulse, analogue (0-1V) and RS485.



| Dimensions | W  | H  | D   | Cut-out |
|------------|----|----|-----|---------|
|            | 96 | 96 | 130 | 92 x 92 |

### Selectable CT Ratios

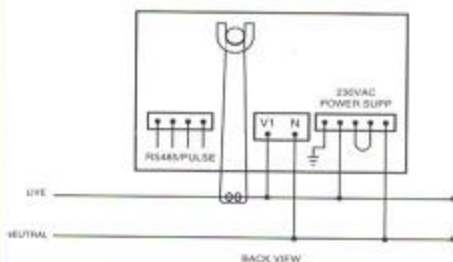
Any ratio to 99999:5

### Parameters

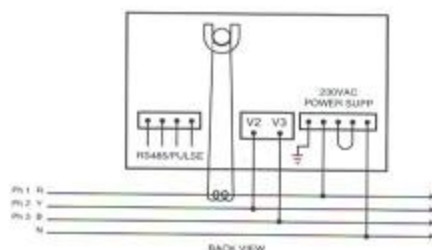
|                   |   |
|-------------------|---|
| Amps              | ✓ |
| kWh/kWh           | ✓ |
| kVA/kVArh         | ✓ |
| Hz                | ✓ |
| Volts             | ✓ |
| Harmonics to 24th | ✓ |
| kVA               | ✓ |
| PF                | ✓ |
| THD               | ✓ |
| Crest Factor      | ✓ |

Accuracy: 0.5%  
Safety: IEC 1010, 600V

Connection Diagram:  
Single Phase



Connection Diagram:  
3 Phase



## Prices

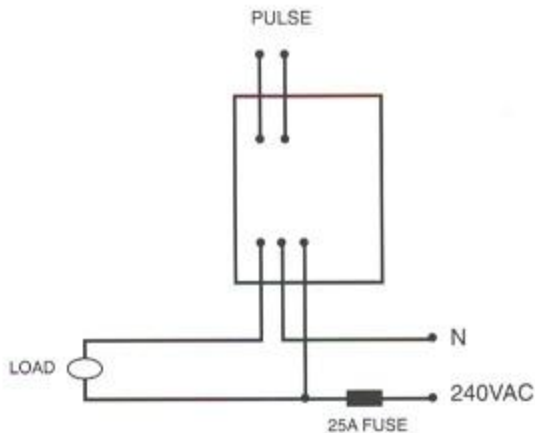
| Description         | Mount | Output        | 1+      | 5+      | 25+     |
|---------------------|-------|---------------|---------|---------|---------|
| VIP96 Plus          | P     | -             | £397.00 | £357.30 | £337.46 |
| VIP96 Plus Pulse    | P     | Pulse (2)     | £434.00 | £380.60 | £368.90 |
| VIP96 Plus Analogue | P     | Analog (0-1V) | £460.00 | £414.00 | £391.00 |
| VIP96 Plus 485      | P     | RS485         | £434.00 | £390.60 | £368.90 |

## 6.6 kWh & Multi Parameter Meters Products

### AEM1 DIN Rail Mounting

- ✓ Low Cost
- ✓ Easy Installation
- ✓ Pulse Output

The AEM1 is a simple low-cost single phase direct connect kWh meter, ideal for tenant billing or low power industrial metering applications. The compact DIN rail housing (2 DIN modules wide) is incredibly easy to install on any supply up to 26A (6kW) requiring no separate power supply or external CT. The meter provides accurate true RMS measurement to IEC 1036 Class 2 and features an isolated pulse output as standard.



| Dimensions | W        | H  | D  |
|------------|----------|----|----|
|            | 35<br>mm | 90 | 58 |

#### Selectable CT Ratios

Direct read to 26A

#### Parameters

kWh  Tot   
Accuracy: Cl.2 IEC1036  
Safety: IEC 1010, 430V

### Prices

| Description | Mount | Output | 1+     | 5+     | 25+    |
|-------------|-------|--------|--------|--------|--------|
| AEM1        | D     | Pulse  | £79.00 | £75.05 | £71.10 |



## AEM31 DIN Rail Mounting

- ✓ Low Cost
- ✓ Large, Clear Display
- ✓ Pulse Output

### Parameters

|     |   |   |   |     |
|-----|---|---|---|-----|
|     | R | Y | B | Tot |
| kWh |   |   |   | ✓   |
| kW  |   |   |   | ✓   |

Accuracy: Cl. 1 or 2 IEC1036      ✓ = available via MeterRing software  
 Safety: IEC 1010, 450V

### Selectable CT Ratios

5/5 25/5 40/5 50/5 60/5 75/5 80/5 100/5 120/5 150/5 200/5 250/5  
 300/5 320/5 400/5 500/5 600/5 750/5 800/5 1000/5 1200/5  
 1250/5 1500/5 1600/5 1800/5 2000/5 2500/5 3200/5 4000/5

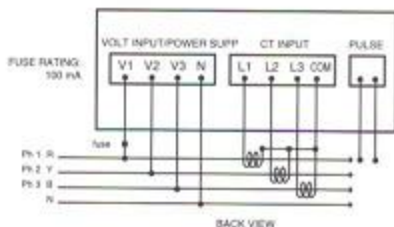
| Dimensions | W  | H  | D    | Cut-out       |
|------------|----|----|------|---------------|
|            | 70 | 90 | 57.5 | 48 x 88 (min) |

High quality digital meters offering a choice of data options. Standard units feature pulse outputs, with both RS485 MODBUS and TCP/IP (Ethernet) versions (see AEM31-E) also available from stock.

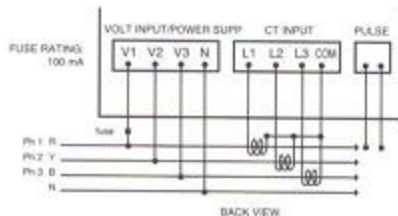
All types may be used on 3 phase 4 wire or single phase applications and feature large high contrast displays, programmable CT ratios to 4000/5. Auto-sensing CT connection simplifies installation and guarantees correct operation, E<sup>2</sup>PROM memory dispenses with the need for back-up batteries and ensures data retention during power down. Pulse and RS485 versions provide kWh and kW readings.



Connection Diagram:  
Single Phase



Connection Diagram:  
3 Phase



## Prices

| Description             | Mount | Output | 1+      | 5+      | 25+     |
|-------------------------|-------|--------|---------|---------|---------|
| AEM31 D                 | D     | Pulse  | £139.00 | £132.05 | £125.10 |
| AEM31 D 485             | D     | RS485  | £159.00 | £151.05 | £143.10 |
| AEM31 D Panel Kit 4-DIN |       |        | £11.50  | £10.93  | £10.35  |

# 6.8 kWh & Multi Parameter Meters Products

## AEM31-E DIN Rail Mounting

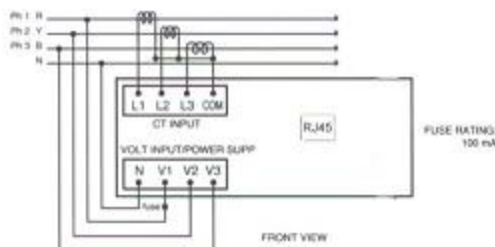
- ✓ On Board TCP/IP Comms
- ✓ Web Enabled
- ✓ Multi Parameter



The AEM31-E breaks new ground as the UK's first ethernet-connected kWh meter. This makes the installation of a sub-metering system easier than it's ever been before.

The meter is simply connected to any 10/100 ethernet system via a standard RJ45 patch lead to provide instant networking to a host PC. It's a high quality digital device, suitable for use on 3 phase 4 wire, and single phase systems. It displays both kWh and instantaneous kW demand on its front panel display, and transmits kWh, kVAh, kW, Volts, Amps & PF via its network connection. Compatible with Eicomponent's *MeterRing* software, the AEM31-E combines superb metering performance with on-board ethernet comms, for the ultimate in accurate measurement and industry-standard networking capability.

Easy installation to the electrical system is assured by fully automatic CT sensing, programmable CT ratios and E-PROM non-volatile memory.



### Selectable CT Ratios

5/5 25/5 40/5 50/5 60/5 75/5 80/5 100/5 120/5 150/5 200/5 250/5  
300/5 320/5 400/5 500/5 600/5 750/5 800/5 1000/5 1200/5  
1250/5 1500/5 1600/5 1800/5 2000/5 2500/5 3200/5 4000/5

| Dimensions | W           | H  | D  | Cut-out        |
|------------|-------------|----|----|----------------|
|            | 157.5<br>mm | 60 | 73 | 46 x 180 (min) |

### Prices

| Description     | Mount | Output          | 1+      | 5+      | 25+     |
|-----------------|-------|-----------------|---------|---------|---------|
| AEM31-E         | D     | Ethernet (RJ45) | £385.00 | £375.25 | £355.50 |
| Panel Kit 9 DIN |       |                 | £18.25  | £17.34  | £16.42  |

### Parameters

|       | R | Y | B | Tot |                      |
|-------|---|---|---|-----|----------------------|
| kWh   |   |   |   |     | ✓ = available        |
| kVAh  |   |   |   |     | via <i>MeterRing</i> |
| kW    |   |   |   |     | software             |
| Volts | ✓ | ✓ | ✓ | ✓   |                      |
| Amps  | ✓ | ✓ | ✓ | ✓   |                      |
| PF    | ✓ | ✓ | ✓ | ✓   |                      |

Accuracy: C12 IEC 1036  
Safety: IEC 1010, 450V

## AEM PLUS DIN Rail Mounting

- ✓ Easy Installation
- ✓ Simple R-Y-B Front Panel
- ✓ Choice of Outputs

3 phase meter which combines ammeter, voltmeter, wattmeter, PF meter and kWh/kVAh meter functions into one compact package. Designed for high performance, good looks and easy installation.

Simple R-Y-B button selection scrolls between phases and clearly marked embossed buttons select the parameters to be viewed. Leading edge design ensures simple CT set up for all standard ratios and provides EPROM memory for long term reliability without the need for battery replacement.

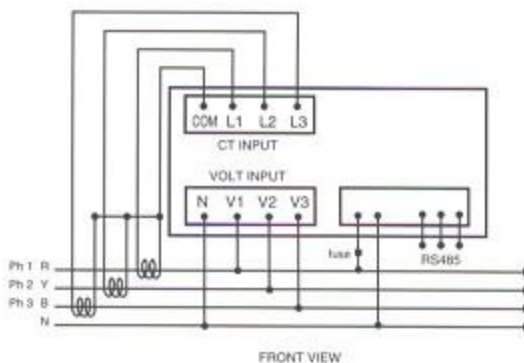
The 485 version features MODBUS RS485 output and is fully compatible with **MeterRing** software



## Parameters

|       | R | Y | B | Tot |   |
|-------|---|---|---|-----|---|
| kWh   |   |   |   | ✓   | ✓ = available via <b>MeterRing</b> software |
| kVAh  |   |   |   | ✓   |   |
| kW    | ✓ | ✓ | ✓ | ✓   |   |
| Volts | ✓ | ✓ | ✓ | ✓   |   |
| Amps  | ✓ | ✓ | ✓ | ✓   |   |
| PF    | ✓ | ✓ | ✓ | ✓   |   |

Accuracy: 1%  
Safety: IEC 1010, 450V



| Dimensions | W         | H  | D  | Cut-out             |
|------------|-----------|----|----|---------------------|
|            | 306<br>mm | 90 | 58 | 46 x 128 (Verg. 44) |

## Prices

| Description           | Mount | Output | T+      | S+      | 2S+     |
|-----------------------|-------|--------|---------|---------|---------|
| AEM Plus 485          | D     | RS485  | £229.00 | £217.55 | £206.10 |
| AEM Plus Standard     | D     |        | £189.00 | £179.55 | £170.10 |
| AEM Plus Pulse        | D     | Pulse  | £229.00 | £217.55 | £206.10 |
| Panel Mount Kit & DIN |       |        | £15.50  | £14.73  | £13.95  |



# 6.10 kWh & Multi Parameter Meters Products

## DMM3 DIN Rail Mounting

- ✓ Low Cost
- ✓ Large, Clear Display
- ✓ LONWORKS Protocol Option

The DMM3 is a 9 DIN module kWh meter offering cost-effective 3 phase multi-parameter performance. The large bright display is easily visible in all lighting conditions, and the digital design ensures excellent accuracy and reliability.

Simple 'single button' selection scrolls all display pages with concealed set-up buttons behind a hinged flap. The DMM3 is available with a wide choice of options including dual pulse output, dual 4-20mA and RS485 serial.

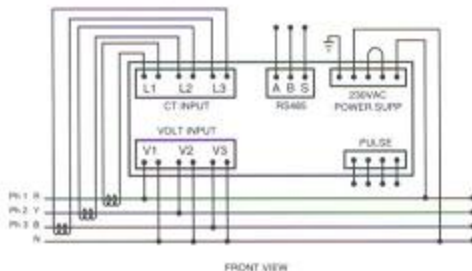
It may also be ordered with LON FFT10 or LON RS485 LONWORKS protocol output for direct compatibility with LONWORKS data acquisition systems. RS485 model compatible with **MeterRing** software.

### Parameters

|       | R | Y | B | Tot |   |
|-------|---|---|---|-----|---|
| Volts | ✓ | ✓ | ✓ | ✓   | ✓ = available via <b>MeterRing</b> software |
| Amps  | ✓ | ✓ | ✓ | ✓   |   |
| kW    | ✓ | ✓ | ✓ | ✓   |   |
| kVAr  | ✓ | ✓ | ✓ | ✓   |   |
| PF    | ✓ | ✓ | ✓ | ✓   |   |
| Hz    | ✓ | ✓ | ✓ | ✓   |   |
| kWh   |   |   |   | ✓   |   |
| kVArh |   |   |   | ✓   |   |
| kVAh  |   |   |   | ✓   |   |

Accuracy: 0.5%  
Safety: IEC 1010, 430V

### Connection Diagram



### Selectable CT Ratios

Any ratio to 999999:5/2.5/1

| Dimensions | W     | H  | D  | Cut-out           |
|------------|-------|----|----|-------------------|
|            | 157.5 | 90 | 73 | 48 x 180 (longer) |

### Prices

| Description | Mount | Output      | 1+      | 5+      | 25+     |
|-------------|-------|-------------|---------|---------|---------|
| DMM3        | D     | -           | £139.00 | £132.05 | £125.10 |
| DMM3 4-20mA | D     | 4-20/0-20mA | £189.00 | £179.55 | £170.10 |
| DMM3 485    | D     | RS485       | £189.00 | £179.55 | £170.10 |

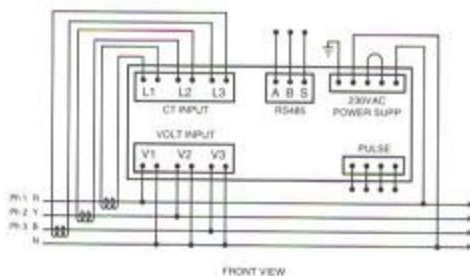
## ED39 DIN Rail Mounting

- ✓ Multi-Tariff
- ✓ 2 Pulse Input Registers
- ✓ RS485 Output

The ED39 DIN is ideal for sub-metering applications where other utilities such as water and gas are also being measured, or where multi-tariff electricity metering is required. Suitable for use on both single and three phase systems, this DIN rail mounting meter features full multi-parameter performance in addition to 4 separate kWh registers for 'time of day' tariffs. Register switching is via any external contact such as a time switch, making the product ideal for check meter applications. Alternatively the ED39 DIN can be programmed to log pulse data from 2 external meters to non-volatile memory. Data output is via a standard RS485 link, making it fully compatible with **MeterRing** software.



### Connection Diagram



### Selectable CT Ratios

Any ratio to 999999:5/2.5/1

| Dimensions | W     | H  | D  | Cut-out        |
|------------|-------|----|----|----------------|
|            | 157.5 | 90 | 73 | 46 x 180 (min) |

### Prices

| Description | Mount | Output | 1+      | 5+      | 25+     |
|-------------|-------|--------|---------|---------|---------|
| ED39 DIN    | D     | RS485  | £189.00 | £179.55 | £170.10 |

### Parameters

|                    | R | Y | B | Tot |   |
|--------------------|---|---|---|-----|---|
| Volts              | ✓ | ✓ | ✓ | ✓   | ✓ = available via <b>MeterRing</b> software |
| Amps               | ✓ | ✓ | ✓ | ✓   |   |
| kW                 | ✓ | ✓ | ✓ | ✓   |   |
| kVA                | ✓ | ✓ | ✓ | ✓   |   |
| kVAh               | ✓ | ✓ | ✓ | ✓   |   |
| THD%               | ✓ | ✓ | ✓ | ✓   |   |
| PF                 | ✓ | ✓ | ✓ | ✓   |   |
| Hz                 | ✓ | ✓ | ✓ | ✓   |   |
| kWh                |   |   |   | ✓   |   |
| kVAh               |   |   |   | ✓   |   |
| kVAh               |   |   |   | ✓   |   |
| kW Maximum Demand  |   |   |   | ✓   |   |
| kVA Maximum Demand |   |   |   | ✓   |   |
| Pulse Input 1      |   |   |   | ✓   |   |
| Pulse Input 2      |   |   |   | ✓   |   |
| kWh 1              |   |   |   | ✓   |   |
| kWh 2              |   |   |   | ✓   |   |
| kWh 3              |   |   |   | ✓   |   |
| kWh 4              |   |   |   | ✓   |   |
| kWh                |   |   |   | ✓   |   |

Accuracy: 0.5%  
Safety: IEC 1010, 430V

# 6.12 kWh & Multi Parameter Meters Products

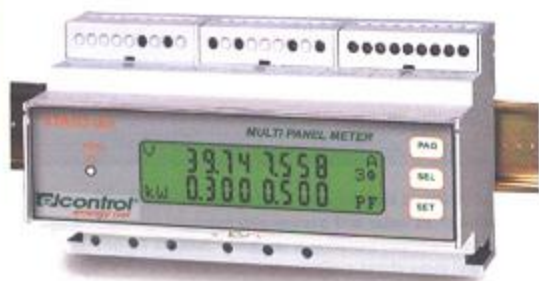
## Star3 DIN Mount

- ✓ High accuracy
- ✓ Ultra Bright Display
- ✓ Fully Programmable
- ✓ Measures THD & Neutral Current

Elcontrol Energy's new meter offers truly outstanding specification in a simple cost-effective package. The unique dot matrix backlit LCD immediately sets the unit apart from its competitors, as does its performance and accuracy.

All models offer both pulse and multi-protocol RS485 MODBUS outputs as standard for seamless integration into any type of data acquisition system, along with multi-parameter measurement which includes THD (Total Harmonic Distortion). The STAR3 also displays neutral current accurately even when harmonics are present which makes it ideal for applications where power quality may be poor.

For more detailed power quality analysis the STAR3 Harmo offers full harmonic analysis to the 25th multiple (50Hz systems) at a very modest price increase over the standard product. All STAR3s are fully programmable and can be used on 3 phase or single phase systems including cogeneration applications. Dual relay outputs can be programmed as pulses, alarms or control contacts depending on the application. A 4-20mA analogue output version is also available, providing two programmable outputs. The STAR3 ALM model is fully compatible with **MeterRing** software



### Parameters

|                    | R | Y | B | Tot |   |
|--------------------|---|---|---|-----|---|
| Volts              | ✓ | ✓ | ✓ | ✓   | ✓ = available via <b>MeterRing</b> software |
| Amps               | ✓ | ✓ | ✓ | ✓   |   |
| kW                 | ✓ | ✓ | ✓ | ✓   |   |
| kVAR               | ✓ | ✓ | ✓ | ✓   |   |
| PF                 | ✓ | ✓ | ✓ | ✓   |   |
| Hz                 | ✓ |   |   |     |   |
| kWh Import         |   |   |   | ✓   |   |
| kWh Export         |   |   |   | ✓   |   |
| kVARh Leading      |   |   |   | ✓   |   |
| kVARh Lagging      |   |   |   | ✓   |   |
| THD Amps           | ✓ | ✓ | ✓ | ✓   |   |
| THD Volts          | ✓ | ✓ | ✓ | ✓   |   |
| kW Maximum Demand  |   |   |   | ✓   |   |
| kVA Maximum Demand |   |   |   | ✓   |   |

Accuracy: 0.5%  
Safety: IEC 1010, 430V

| Dimensions | W           | H  | D  | Cut-out            |
|------------|-------------|----|----|--------------------|
|            | 157.5<br>mm | 90 | 73 | 46 x 180 (typical) |

### Selectable CT Ratios

Any Ratio to 999999:5/2.5/1

## Prices

| Description      | Mount | Output          | 1+      | 5+      | 25+     |
|------------------|-------|-----------------|---------|---------|---------|
| STAR3 ALM DIN    | D     | Pulse (2)/RS485 | £189.00 | £179.55 | £170.10 |
| STAR3 4-20mA DIN | D     | 4-20mA          | £269.00 | £255.55 | £242.10 |
| STAR3 HARMO DIN  | D     | Pulse (2)/RS485 | £299.00 | £284.05 | £289.10 |



## Current Transformers

Metering quality UK manufactured Class 1\* CTs in ring, moulded case and split core types. Recommended for use with all our instruments. Resin coated types are supplied in base mounting form with terminals suitable for M5 bolts. MC types are provided with 6.3mm tags with terminal covers. Mountings are included for bar fixing or base mounting via feet or captive M5 nuts. All the CTs listed are stock items. Other sizes are available on request.

**Note:** We only stock the best. Inferior CTs can seriously damage your accuracy!

\*except 50/5 Ring MC, 100/5 Split.

## Resin Coated Ring Types

Lightweight high quality ring CTs with integral mounting feet. Resin coated CTs are the least bulky CTs and are recommended for applications where space is at a premium.



## Prices & Dimensions

| Ratio  | Rating       | Int Ø | Ext Ø | Depth | 1+     | 15+    | 30+    |
|--------|--------------|-------|-------|-------|--------|--------|--------|
| 50/5   | 2.5VA (Cl 3) | 32    | 70    | 73    | £13.52 | £12.17 | £10.82 |
| 100/5  | 5VA          | 32    | 70    | 40    | £14.60 | £13.14 | £11.68 |
| 200/5  | 5VA          | 32    | 70    | 35    | £13.54 | £12.19 | £10.83 |
| 400/5  | 5VA          | 45    | 80    | 18    | £13.54 | £12.19 | £10.83 |
| 800/5  | 15VA         | 56    | 100   | 18    | £18.16 | £16.34 | £14.53 |
| 1600/5 | 15VA         | 93    | 140   | 22    | £22.72 | £20.45 | £18.18 |

# 6.14 kWh & Multi Parameter Meters Products

## Ring Split CTs

A new design of low cost split core CT featuring stainless steel worm drive clamps for foolproof assembly. Fully insulated windings.

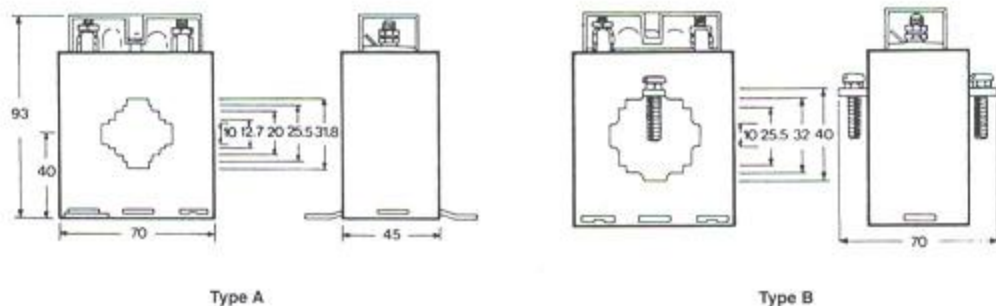


### Prices & Dimensions

| Ratio | Rating | Int Ø | Ext Ø | Depth | 1+     | 15+    | 30+    |
|-------|--------|-------|-------|-------|--------|--------|--------|
| 100/5 | 1.5VA  | 32    | 88    | 35    | £39.08 | £35.18 | £31.27 |
| 500/5 | 5VA    | 32    | 88    | 35    | £39.08 | £35.18 | £31.27 |
| 400/5 | 5VA    | 45    | 95    | 30    | £39.08 | £35.18 | £31.27 |
| 800/5 | 5VA    | 65    | 115   | 25    | £39.08 | £35.18 | £31.27 |

## Moulded Case Types (Class 1)

Moulded case CTs offer lowest cost and a choice of mounting utilising push in mounting feet (supplied) or attachment direct to the cable. Suitable for cable or bar primaries. Secondary terminals are M5 Studs with washers, lockwashers and nuts.



Type A

Type B

### Prices

| Ratio | Rating       | Type | 1+     | 15+    | 30+    |
|-------|--------------|------|--------|--------|--------|
| 50/5  | 2.5VA (Cl 3) | A    | £11.50 | £10.35 | £9.20  |
| 100/5 | 5VA          | A    | £13.84 | £12.46 | £11.07 |
| 200/5 | 5VA          | A    | £14.08 | £12.67 | £11.26 |
| 400/5 | 5VA          | B    | £12.82 | £11.54 | £10.26 |
| 800/5 | 5VA          | B    | £15.16 | £13.64 | £12.13 |

## Gas Meters

- ✓ Low-cost Diaphragm Type
- ✓ Pulse Output

These all steel diaphragm meters are suitable for a wide range of commercial and industrial applications. All are fitted with low frequency reed switch pulse outputs, and are supplied with fixing kits for easy installation.



## Water Meters

- ✓ Low Cost
- ✓ High Accuracy
- ✓ Pulse Output

The V100 (PSM) cold water meters offer dependable high accuracy performance, and a long trouble-free life. Available in sizes from 15mm to 40mm, all are fitted with volt-free pulse outputs. These meters utilise a rotary-piston measurement technique ensuring high levels of accuracy even at low flow rates. They can be mounted in any position with no loss of performance.



## Prices

| Model  | Min/Max Flow (m <sup>3</sup> /hr) | Connection  | Price   |
|--------|-----------------------------------|-------------|---------|
| BK-G4  | 0.04/6                            | 8" BSPT     | £84.58  |
| BK-G6  | 0.6/10                            | 1" BSPT     | £130.29 |
| BK-G10 | 0.1/16                            | 1 1/2" BSPT | £310.86 |
| BK-G16 | 0.16/25                           | 2" BSPT     | £333.71 |
| BK-G25 | 0.25/40                           | 2" BSPT     | £499.43 |

## Prices

| Model<br>Pulse Output | Meter<br>Size | Min Flow Rate<br>(L/h) | Max Flow Rate<br>(m <sup>3</sup> /hr) | Price   |
|-----------------------|---------------|------------------------|---------------------------------------|---------|
| V100                  | 15mm          | 15                     | 15                                    | 95.74   |
| V100                  | 20mm          | 25                     | 25                                    | £112.09 |
| V100                  | 25mm          | 35                     | 35                                    | £158.14 |
| V100                  | 30mm          | 60                     | 60                                    | £327.60 |
| V100                  | 40mm          | 100                    | 100                                   | £417.60 |



**NEW PRODUCTS**
**EnergyPro – Profile Logger**

The EnergyPro is a new concept in electricity data loggers and is so easy and safe to use – even on three-phase supplies – that costly connection errors are all but eliminated. The icon-based menu is accessed via a clear backlit LCD display which also includes an interactive connection diagram to show hook-up details as well as simple symbols to show the instrument set up. The EnergyPro can detect a wrong connection and corrects this automatically in software, showing the connection status via the interactive display.



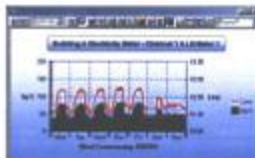
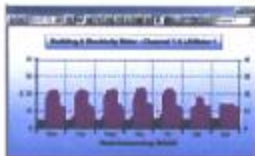
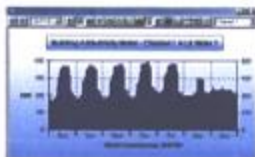
EnergyPro Logger, EnergyView software, 300/1000/3000 A Flex CTs, Voltage Leadset, 32MB Flash Card, USB Flashcard downloader, Custom Zip Case

| Description                                    | Diameter | 1+       |
|--|----------|----------|
| EnergyPro Kit c/w :<br>300/1000/3000A Flex CTs | 200mm    | £2495.00 |
| EnergyPro Kit c/w 1000A CTs                    | 52mm     | £2295.00 |

**MeterRing Express – Automatic Meter Reading Starter Kit**

MeterRing Express is a price breakthrough in Automatic Meter Reading. The starter package includes everything you need to remotely read up to 4 pulse output meters direct to a host PC.

The software provides a full graphics package for data browsing, as well as taking care of all data collection of half-hourly meter readings. The system can be expanded to read up to 200 meters by the addition of further pulse interface modules, and is fully compatible with our pulse radio units (page 2.6) and optical meter readers (see overleaf).



| Description                     | 1+      |
|---------------------------------|---------|
| MeterRing Express – Starter Kit | £595.00 |

## Willow Optical Meter Reader

Need a pulse output?

The well proven Willow Optical Meter Reader forms the basis of this new product from Elcomponent following the acquisition of Willow Electronics in 2004. The compact DIN rail design and led power meter makes the unit easy to install & set-up, and the patented optical reader is suitable for most gas, water or electricity meters, converting them into 'pulse output' types suitable for remote reading and datalogging.



| Description                     | 1+      |
|---------------------------------|---------|
| Willow Optical Reader – Mains   | £195.00 |
| Willow Optical Reader - Battery | £220.00 |

## FLASH Multi-Parameter kWh Meter

The new Flash 96 x 96 panel meter sets new standards for low cost and high performance in this highly competitive area. It features an ultra-clear high contrast display that is both simple to use and easy to read. There's a button for each function, so there's no time consuming scrolling through pages of data to get the information you want, and the kWh or 'hours run' reading is always displayed at the bottom of the screen.

The unit is fully programmable for all VT/CT combinations and 3 phase systems, and also has fully isolated inputs for maximum safety. Power supply is 85-265VAC/120-375VDC. The standard units have a single pulse output for kWh, with the ET offering more functions and dual programmable pulses. The ET485 adds a MODBUS RS485 output. All FLASH units can be upgraded in the field using simple plug-in modules so ET and 485 options can be added even after the panel has been delivered to site and commissioned.

| Dims | W  | H  | D   | Cut-Out |
|------|----|----|-----|---------|
|      | 96 | 96 | 110 | 91 x 91 |



| Parameters   | R | Y | B | N | TOT |
|--------------|---|---|---|---|-----|
| Volts        | ✓ | ✓ | ✓ |   | ✓   |
| Amps         | ✓ | ✓ | ✓ | ✓ |     |
| kW           | ✓ | ✓ | ✓ |   | ✓   |
| kVAr         | ✓ | ✓ | ✓ |   | ✓   |
| PF           | ✓ | ✓ | ✓ |   | ✓   |
| Hz           | ✓ |   |   |   |     |
| kWh          |   |   |   |   | ✓   |
| kVArh*       |   |   |   |   | ✓   |
| THD Amps*    | ✓ | ✓ | ✓ |   |     |
| THD Volts*   | ✓ | ✓ | ✓ |   |     |
| kW MD/AVG*   |   |   |   |   | ✓   |
| kVA MD/AVG*  |   |   |   |   | ✓   |
| kVAr MD/AVG* |   |   |   |   | ✓   |
| Hours Run*   |   |   |   |   | ✓   |

Selectable CT Ratios:  
Any ratio to 999999:5 / 1  
\* ET Version Only

| Description  | 1+                      |
|--------------|-------------------------|
| FLASH        | Pulse (1) £159.00       |
| FLASH ET     | Pulse (2) £179.00       |
| FLASH ET 485 | Pulse (2)/RS485 £199.00 |
| UPGRADE ET   | Pulse (2) £30.00        |
| UPGRADE 485  | RS485 £30.00            |

### Sirio Multi-Parameter Meter

The new Sirio is a low cost 4 DIN module multi-functional kWh meter.

The unit is fully programmable for all VT/CT combinations and is suitable for use on 3 phase and single phase systems. Available with both pulse and RS485 serial output, the Sirio combines compact dimensions and highly accurate performance with low cost.



| Dims | W  | H  | D  | Cut-Out              |
|------|----|----|----|----------------------|
|      | 70 | 58 | 90 | 48 x 88<br>Using Kit |

| Parameters   | R | Y | B | N | TOT |
|--|---|---|---|---|-----|
| Volts  |   |   |   |   | ✓   |
| Amps   |   |   |   |   | ✓   |
| kW   |   |   |   |   | ✓   |
| kWh  |   |   |   |   | ✓   |
| kVAr   |   |   |   |   | ✓   |
| PF   |   |   |   |   | ✓   |
| Selectable CT Ratios:<br>Any ratio to 999999:5 / 2.5 / 1 |   |   |   |   |     |

| Description     |             | 1+      |
|-----------------|-------------|---------|
| Sirio           | -           | £129.00 |
| Sirio 485       | 485 / Pulse | £149.00 |
| Panel Mount Kit |             | £11.50  |

### SP MAX Profile Logger

The market leading SP MAX Energy Data Logger is now available with high accuracy flex CTs. These new current transducers offer significant advantage of the previously standard 1000A Clip-on CTs. They are far lighter, and being flexible, much easier to use in restricted space, or where conductors are closely spaced. They are also excellent value, offering dual range (200 & 1000A) capability as standard. The SP MAX has become the UK's favourite logger for energy management, now it's even better!



| Description                        | Page | 1+       |
|------------------------------------|------|----------|
| SP MAX Profile Logger c/w Flex CTs | 3.2  | £1495.00 |
| 200/1000A Flex CT Kit              | 3.2  | £495.00  |





We are pleased to announce that due to reduced production costs the following kWh / Multi-parameter Meters have been reduced in price.

| <i>Description</i> | <i>Page</i> | <i>1+</i> |
|--------------------|-------------|-----------|
| AEM31 P (96 x 48)  | 6.2         | £89.00    |
| AEM31 P (96 x 96)  | <b>NEW</b>  | £96.00    |
| AEM1               | 6.6         | £59.00    |
| AEM31 D            | 6.7         | £99.00    |
| AEM31 D 485        | 6.7         | £129.00   |
| AEM PLUS Pulse     | 6.9         | £139.00   |
| AEM PLUS 485       | 6.9         | £159.00   |

#### PRICE INCREASES

We regret to announce that we have been compelled to increase prices on the following kWh / Multi-parameter Meters.

| <i>Description</i> | <i>Page</i> | <i>1+</i> |
|--------------------|-------------|-----------|
| STAR 3 ALM         | 6.3         | £259.00   |
| STAR 3 ALM DIN     | 6.12        | £329.00   |
| STAR 3 HARMO DIN   | 6.12        | £379.00   |

#### OBSOLETE PRODUCT

We regret that the following products are no longer available:

| <i>Description</i>             | <i>Page</i> |
|--------------------------------|-------------|
| MeterRing 2000 Remote Software | 2.4         |
| SP PLUS Energy Profile Logger  | 3.3         |
| SPC Energy Profile Logger      | 3.4         |
| VIP96 (no output)              | 6.5         |
| AEM PLUS Standard (no output)  | 6.9         |
| Star 3 4-20mA                  | 6.12        |