eclipse

multi-function meters

eclipse 2

eclipse 7

installation and operating manual

AUTOMETERS

FIRST CHECK THE CONTENTS OF YOUR PACKAGE

It should contain:

1. Meter
2. Fixing brackets with screws inserted (Quantity 2)
3. Installation and operation manual

1 DESCRIPTION

OVERVIEW OF THE UNITS

Eclipse Series multi-function meters are designed to display various types of power measurement information.

Eclipse meters are fitted with one factory programmable relay, volt-free normally open contacts. All the connections are captive screw terminals at the back of the meter.

The Eclipse 2 front panel has a single line, 16 character display and a set of readout selection buttons. The Eclipse 7 has a 20 character, 4 line display and a set of readout selection buttons.

Standard meters are factory programmed and provide a small range of functions which are programmable by the user. They are also supplied with CT Ratio Setting and CT Polarity Check available for user programming.

PULSE OUTPUTS

One voltage free output is factory fitted in the meter. The relay in Eclipse 2 is set to indicate kWh only. The Eclipse 7 can be programmed to indicate kWh, kVARh* or kVAh* on request. The standard setting for the Eclipse 7 is kWh. Pulse value and duration are factory set at 1kWh per pulse 100ms duration. Function 60 enables the user to alter the value to suit individual requirements. The pulse status cycle (code 53) provides a visual indication for testing the meter from the front panel.

*Eclipse 7 meters only

Fully complies to European Electromagnetic Compatibility

Conforms to IEC 1036 Section 4.6.1. Accuracy Class 1.0

NQA ISO9002 REGISTERED COMPANY

NATIONAL ACCREDITATION OF CERTIFICATION BODIES

Certificate No. 0275

INSTALLATION – ECLIPSE 2/7

INSTALLATION OF THE METER

Eclipse meters should be mounted so that the front panel is vertical. A typical panel would be a switchgear cabinet door. The meter requires a depth behind the panel of 100mm.
A single square aperture 92mm wide x 92mm high should be prepared.

LOCATION

Meters should be mounted in a dry, dirt free environment, away from heat sources and very high electric fields. Temperatures should not exceed 70^{o} C or fall below -20^{o} C.

POWER SUPPLY

Standard 3 phase 4 wire Eclipse meters are powered by 230 volts AC (50 Hz) at 0.2 amps. The units can be powered from a dedicated fused feed, or they may be powered by the voltage source which they are monitoring provided that it is a 230 volt system. A removable protection fuse for the electronic power supply is fitted in the rear of the meter.

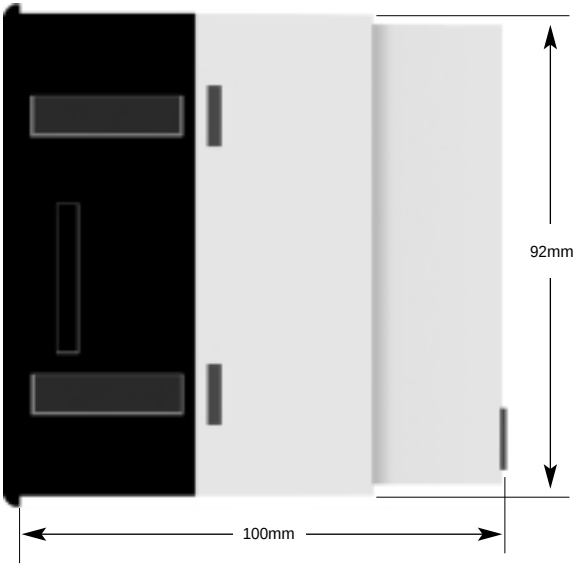
ELECTRICAL CONNECTIONS

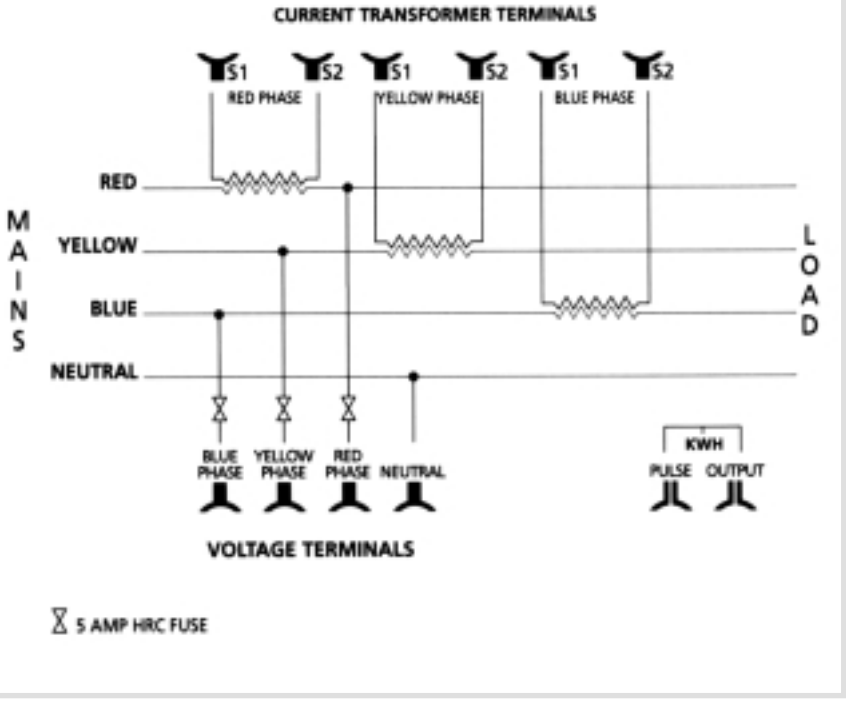
2.5 sq.mm wire is recommended for all electrical connections, subject to the distance between the meter and the current transformer.

Phasing and polarity of the AC current and voltage inputs, and their relationship is critical to the correct operation of the unit.

WIRING

Electrical connections are made directly to the back of the meter. See diagram opposite.





ATTENTION:

- Never link the Secondary of the current transformers to earth
- Never create a common point between the current transformer
- Never place in series with other instruments
- Do not meggar test

2 ECLIPSE 2 METERS

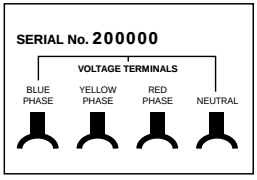
2.1 ECLIPSE 2 PROGRAMMING

PROGRAMME THE CT RATIO CODE 013

The Current Transformer Ratio must be programmed into this meter.
Please follow these instructions precisely.

1. Press Function. Enter the code 013 where the asterisks are indicated. Three asterisks indicates it requires three numbers to be entered.

2. Enter Password. This is the serial number on the reverse side of the meter - six digits starting from the left hand side.



←Password

3. Enter the CT Ratio
Key in the number with the first digit on the left e.g. 2500/5. Key 2 followed by 5 then 00. If the CT Ratio is required with less than four digits (e.g. 300/5 amp), start the sequence with 0, e.g 0300.

2.2 Eclipse 2 Information

CHECK CT POLARITY

1. Press function.
Enter the code where the asterisk indicated.
Three asterisks indicates it requires three numbers entering.

2. Enter code '050'
Display will show -
The Plus mark '+' indicates the CT is correctly connected.
If a negative mark '-' sign is displayed, this indicates the CT connection is incorrect.

N.B. This is only available if power is flowing

RESET MAXIMUM DEMANDS

1. Press function.
Enter the code where the asterisk is indicated.
Three asterisks indicates it requires three numbers entering.

2. Enter Code. '012'.
Display will show -

3. Press enter to reset Maximum Demand.

PULSE STATUS CHECK

1. Press function.
Enter the code where the asterisk is indicated. Three asterisks indicates it requires three numbers entering.

2. Enter Code '053'.

3. Display will show

Please note this display is common for all Eclipse 2 Meters.
Three digits equal the relay count (resets to zero after 999)

2.3 ECLIPSE 2 OPERATION

Once the meter is installed and the functions have been set, the only operation required is to take the readings from the front panel readout.

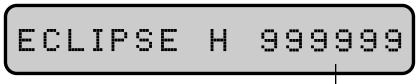
INFORMATION

When the information button is pressed, the display cycles through a sequence giving information about the meter as shown below.

SEQUENCE OF INFORMATION READOUTS

First Readout

Second Readout



meter number

Third Readout

system configuration

Fourth Readout

voltage setting

Fifth Readout

current ratio setting

Sixth Readout

pulse value setting

Seventh Readout

pulse relay closure time

Eighth Readout

maximum demand reset code

Ninth Readout

current transformer polarity code

2.4 ECLIPSE 2 FUNCTION DISPLAYS

FRONT PANEL

The display is of the standard LCD reflective type 16 x 1 characters. Dimensions of the characters are 3-15mm wide x 5.5mm hig (5x7 dots). Expected lifetime under normal operating conditions is a minimum of 100,000 hours.

SEQUENCE

The Eclipse 2 is a two key operation device; to obtain information e.g. volts, press the VOLTS key.

VOLTS

By pressing one of the keys under the arrows it will display one of the following phase details e.g. By pressing the RED key the following is displayed.

This gives a readout between Red Phase and Neutral and Red Phase to Yellow Phase. To obtain information on Yellow Phase or Blue Phase, press VOLTS and the appropriate (Yellow or Blue key). If a phase has been selected, then only the phase colour key need be pressed.

FREQUENCY

Press the key marked Hz. The display will be as shown below. It should be noted that the display will show only the system frequency.

Numbers displayed above are for indication only.

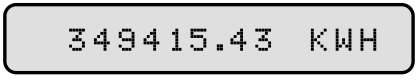
AMPS

To obtain current values, press the AMPS key. The display will indicate three downward facing arrows as shown below.
To select individual phase current press one of the keys marked RED, YELLOW or BLUE.

For total current in all three phases press TOTAL

KWH IMPORT

To obtain kWh, press the key marked KWH.
The information displayed is the combined total energy of all three phases.



POWER FACTOR

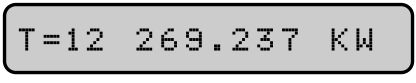
POWER WATTS

To obtain instantaneous power, press the key marked POWER WATTS.

2.5 ECLIPSE 2 MAXIMUM DEMAND

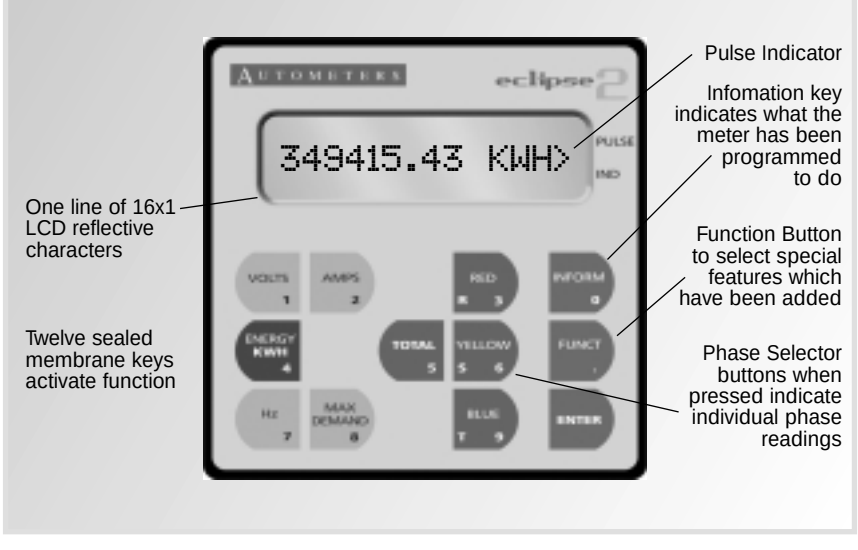
To obtain maximum demand or actual demand, press the key marked MAX DEMAND.
This information is displayed over two screens. The first shows peak maximum demand as illustrated below.

The second screen displays time into period and actual demand as shown below.



FUNCTION KEY

The Function key allows for resetting and checking of the various parameters as indicated by pressing the information key. To enter values which will define the meter parameters it will be necessary to enter a password. When entered and validated, the meter can then be programmed.



3 ECLIPSE 7 METERS

3.1 ECLIPSE 7 PROGRAMMING

PROGRAMME THE CT RATIO CODE 013

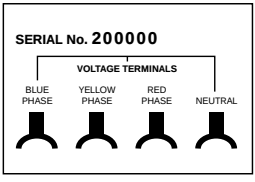
The Current Transformer Ratio must be programmed into this meter. Please follow these instructions precisely.

1. Press Function. Enter the code 013 where the asterisks are indicated. Three asterisks indicates it requires three numbers to be entered.

```
ENTER THE NUMBER OF
    THE REQUIRED
      FUNCTION
        ***
```

2. Enter Password.
This is the serial number on the reverse side of the meter - six digits starting from the left hand side.

```
   ENTER PASSWORD
     ******
```



←Password

3. Enter the CT Ratio
Key in the number with the first digit on the left e.g. 2500/5. Key 2 followed by 5 then 00. If the CT Ratio is required with less than four digits (e.g. 300/5 amp), start the sequence with 0, e.g 0300.

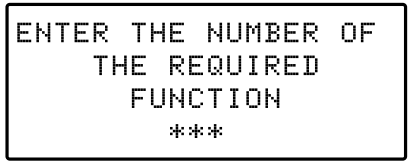
```
 ENTER NEW CT RATIO
OLD RATIO 0005:5
NEW RATIO 0300
```

```
   MEMORY UPDATED
```

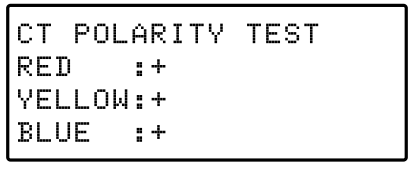
3.2 ECLIPSE 7 INFORMATION

CHECK CT POLARITY

1. Press function.
Enter the code 050 where the asterisks are indicated. Three asterisks indicates it requires three numbers to be entered

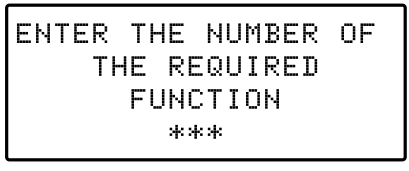


2. The display will show + to indicate the CT is connected correctly. If a - sign is displayed, this indicates that the CT connection is incorrect.
N.B. This is only available if power is flowing.



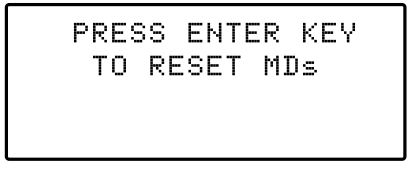
RESET MAXIMUM DEMANDS

1. Press Function. Enter the code 012 where the asterisks are indicated. Three asterisks indicates it requires three numbers to be entered.



2. The display will show 'PRESS ENTER TO RESET MDs'

3. Press enter to reset Maximum Demand. The display will show 'MEMORY UPDATED'



3.3 Eclipse 7 Operation

Once the meter is installed and the functions have been set, the only operation required is to take the readings from the front panel readout.

INFORMATION

When the information button is pressed, the display cycles through a sequence giving information about the meter as shown below.

SEQUENCE OF INFORMATION READOUTS

```
   AUTOMETERS LTD
      ECLIPSE H
  METER NO: 000000
```

```
     PULSE DETAILS

VALUE = 1.0000 KWH
TIME  = 100ms
```

```
  METER DESCRIPTION

 3PHASE 4WIRE
 230/400v 50HZ
```

```
   FUNCTION NUMBERS
RESET MD     FUNC-012
CT TEST      FUNC-050
PULSE TEST   FUNC-190
```

```
        RATIOS
CT 200:5
VT 230:230.0
```

3.4 ECLIPSE 7 FUNCTION DISPLAYS

DISPLAY

The Eclipse 7 is fitted with a display of 20 characters in a 4 line configuration. Dimensions of the characters are 2.3mm wide by 4.03mm high (5 x 8 dots). Expected lifetime under normal operating conditions is a minimum of 100,000 hours.

SEQUENCE

The Eclipse 7 is a single key operation device, to obtain information press appropriate key.

Note: Numbers in displays are for example only.

VOLTS

```
      VOLTAGE
R-N 230 V  R-Y 400 V
Y-N 230 V  Y-B 400 V
B-N 230 V  B-R 400 V
```

AMPS

```
        AMPS
R 800.06
Y 800.06    T 2400: A
B 800.06
```

POWER FACTOR

```
   POWER FACTOR
R 0.000
Y 0.000    T 0.000
B 0.000
```

INST kW

```
   REAL POWER KW
R 184.00
Y 184.00    T 552.000
B 184.00
```

INST kVA

```
 APPARENT POWER KVA
R 190.000
Y 190.000    T570.000
B 190.000
```

INST kVAR

```
REACTIVE POWER KVAR
R 215.111
Y 40.1415  T263.406
B 8.15421
```

ENERGY IMPORT

```
   IMPORT ENERGY
KWH   = 1108.4125 >>
KVAH  = 1154.5011
KVARH = 88.9088
```

ENERGY EXPORT

```
    EXPORT ENERGY

KWH    = 5001.4111
kVARH  = 90.4511
```

Hz

```
     FREQUENCY

     50.00 Hz
```

3.5 ECLIPSE 7 MAXIMUM DEMAND

To obtain the peak maximum demand or actual demand, press the corresponding key.

ACT DEMAND

```
KW    = 120.000
KVA   = 140.001
KVAR  = 80.1429
A     = 521.73 MIN=19
```

MAX DEMAND

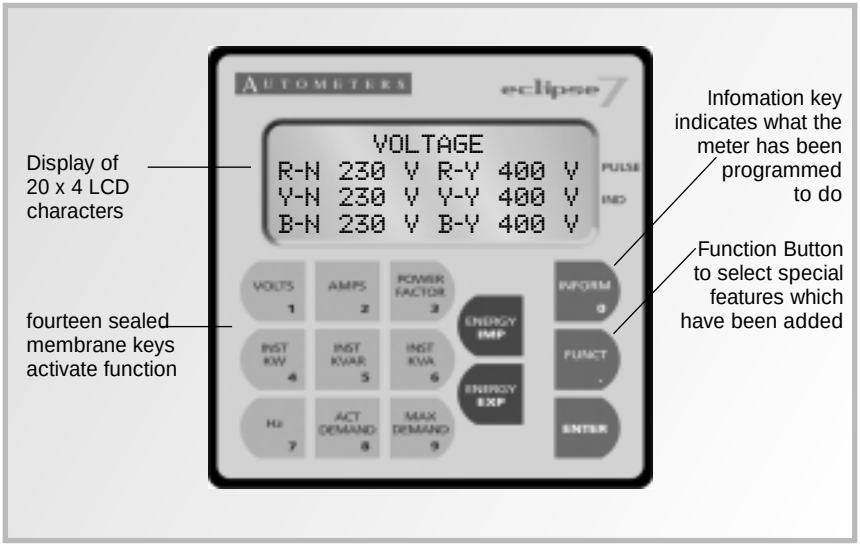
```
PEAK KWH  = 0.0000
PEAK KVA  = 0.0000
PEAK KVAR = 0.0000
PEAK AMPS = 0.0000
```

Pulse Indicator

Display of pulse output is indicated by double chevron flashing on Import Energy display.

FUNCTION KEY

The Function key allows for resetting and checking of the various parameters as indicated by pressing the information key. To enter values which will define the meter parameters it will be necessary to enter a password. When entered and validated, the meter can then be programmed.



4 TRANSFORMER SELECTION

CURRENT TRANSFORMER SELECTION

For accurate monitoring, correct selection of CTs is critical. The following paragraphs provide the information required to choose the correct CT.

CT SELECTION

Eclipse Series Meters use current transformers (CTs) to sense the current in each phase of the power feed. The selection of the CTs is important because it directly affects accuracy.

The CT secondary rating depends on the current input option installed. The current input rating is 5 amps for the standard Eclipse Series meters

The CT primary rating is normally selected to be equal to the current rating of the power feed protection device. However, if the peak anticipated load is much less than the rated system capacity, improved accuracy and resolution can be obtained by selecting a lower rated CT. In this case the CT should be the maximum expected peak current + 25%, rounded up to the nearest standard CT size.

Other factors may affect CT accuracy. The length of the CT cabling should be minimised because long cabling will contribute to inaccuracies. Also, the CT burden rating must exceed the combined burden of the Eclipse Series meter, plus cabling, together with any other connected devices.

Overall accuracy is dependent on the combined accuracies of the Eclipse Series meter and the CTs.

5 TECHNICAL

5.1 PERFORMANCE AND DATA

MEASUREMENT RANGES

The unit is designed for measuring 3 phase in a 4 wire star/DELTA configuration

Volts

± 10% nominal voltage

Accuracy

All energy measurements comply with EC 1036 section 4.6.1 Class 1.0

Burden

Current burden less than 1VA

Drift

Negligible, self-compensating circuit

Display

(Eclipse 7)

LCD display, 4 lines x 20 characters, wide temperature band

(Eclipse 2)

LCD display, single line x 16 characters, reflective image

Operating temp	-20°C to +70°C
Storage temp	-30°C to +80°C

Membrane switch Operating force 100 - 500 crs. Switch life 8 - 10 million operations. IP65 sealed

OUTPUTS

Eclipse 2 One volt free relay, factory set to kWh

Eclipse 7 One volt free relay, factory set to kWh,

Can be factory programmable kVARh or kVAh output

Pulse width Programmable, factory set to 100ms

Pulse value Programmable, factory set to 1kWh

Relay contacts:

Maximum switching voltage 600 volt AC/DC

Maximum switching current 100mA

Resistance 50 ohms

Optically isolated MOSFET switch

FUNCTIONS

Supplied as standard

Function 012 -	Peak maximum demand reset
Function 013 -	Programmes CT setting
Function 050 -	CT polarity check
Function 053 -	Pulse status check
Function 060 -	Programmed details of pulse value
Function 061 -	Programme details of pulse time

PHYSICAL

Dimensions (mm) W96 x H96 x D100

Cutout: 92 x 92mm

Weight: 1.25kg excluding any external transformers

5.2 MAINTENANCE

Eclipse Series meters incorporates E2 PROM for memory back-up. Eclipse Series meters do not require any regular maintenance.

5.3 FIELD SERVICE CONSIDERATIONS

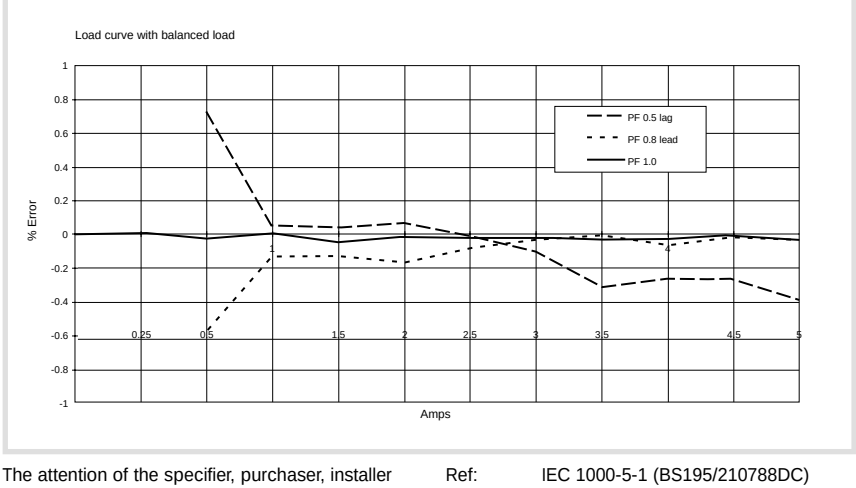
In the unlikely event that a unit should fail, it will normally be serviced by exchanging the faulty unit with a replacement unit. The initial installation should be done in such a way which makes the replacement procedure as convenient as possible.

1. A Current Transformer shorting block should be provided so that the meter current inputs can be disconnected without open circuiting the CTs. The shorting block should be wired so that protective relays are not affected.

2. All wiring should be routed to allow easy removal of the connections to the terminals.

5.4 PERFORMANCE CHARACTERISTICS

CURVE WITH BALANCED LOAD AT 50 HZ



The attention of the specifier, purchaser, installer and/or user is drawn to special measures and limitations or use which must be observed when these products are taken into service to maintain compliance with the CE Directives.
Details of these special measures and limitations of use are shown in the following publications available from HMSO.

Ref: IEC 1000-5-1 (BS195/210788DC)
IEC 1000-5-2 (BS195/214642DC)
IEC 1000-5-6 (BS195/210789DC)

NOTES

DEDICATED CUSTOMER SERVICE

Customer care is the cornerstone of Autometers' success with a positive service policy observed throughout every specialist area of operation. The direct involvement of the directors at every level, a fully trained and highly motivated workforce and in-depth stock holding combine to provide a level of service and quality which has earned the appreciation of customers throughout the UK and overseas markets.
Computerised distribution systems are programmed to provide consistent 24 hour despatch of products. In response to exceptionally urgent demand for small orders, it is possible to process the order and despatch product within 20 minutes.

PRODUCT RANGE

Metering and monitoring equipment ranges from single and three phase kWh electro-mechanical meters to a range of sophisticated, fully programmable information centres.
The product range also includes:
Electronic meters
Panel mounted meters
Maximum demand meters
DIN rail meters
Current transformers

Product development is continuous and Autometers Ltd reserves the right to make alterations in specifications and manufacture without notice. Products as delivered may therefore differ from the description and illustrations in this publication.

AUTOMETERS

THE METERING AND MONITORING SPECIALIST

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