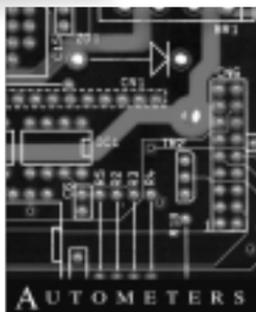




INFORMATION  
CENTRES  
IC800 SERIES



INSTALLATION  
AND OPERATING  
MANUAL



IC 815



IC 820



IC 850

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**FIRST  
CHECK THE  
CONTENTS  
OF YOUR  
PACKAGE**

It should contain:

1. Meter
2. Fixing brackets with screws inserted (Quantity 2)
3. Communications cassette if specified
4. Installation and operation manual

# 1 DESCRIPTION

## OVERVIEW OF THE UNIT

The IC 800 series of Multi-Function meters is a range of meters designed to display various types of power measurement information. An optional data communication module can be fitted to any of the meters in the 800 series. The modules can be fitted to the meters without being removed from site.

The IC 800 series meters are all fitted with one relay, volt free normally open contacts.

All the connections, including the communications when fitted, are screw terminals at the back of the meter. All the screws in the terminals are captive.

The front panel consists of a 16 character 1-line display and a set of readout selection buttons.

Generally speaking, the meter is factory programmed and provides a small range of functions which are programmable by the user.

The standard meter is supplied with CT Ratio Setting and CT Polarity Check available for user programming. It is also available with additional controllability

(i.e. a greater range of programmable functions) to special order.

The standard functions are described in Function 12, 13, 14 and 50. An addendum carrying the same number as the function number will be issued with every additional function which is ordered.

## PULSE OUTPUTS

1 voltage free output relay is fitted in the meter for kWh. Pulse value and duration are factory set at 1kWh and 100mS. Function 60 enables the user to alter the settings to suit individual requirements. The pulse status cycle (code 53) provides a visual indication for testing the meter from the front panel.

## COMMUNICATION MODULE

An optional communication module is available for the IC800 Series of Information Centres, enabling different methods of transferring data to computer systems.

Listed below are the four modules available:

1. 485 Module
2. Modbus Module
3. Volt free relay module (available 1999)
4. 4-20mA Module (available 1999)

Fully complies to  
European  
Electromagnetic  
Compatibility



Conforms to IEC 1036  
Section 4.6.1.  
Accuracy Class 1.0



Certificate No. 0275

## 2 INSTALLATION

### INSTALLATION OF THE METER

Mount the meter so that the front panel is vertical. A typical panel would be a switchgear cabinet door. The meter requires depth behind the panel of 100mm excluding wiring for a standard meter and 150mm excluding wiring if fitted with a communications module. Prepare a single square hole 92mm wide and 92mm high.

### LOCATION

The IC800 meter should be mounted in a dry dirt free environment away from heat sources and very high electric fields. Temperatures should not exceed 70°C or fall below -20°C.

#### MOUNTING METER WITH A CASSETTE MODULE

For the IC 800 with a communication cassette; after cutting the clearance aperture, remove the terminal cover from the meter.

Engage the cassette module if supplied as a separate item by plugging the module directly into the back of the meter. (See communication instructions publication 800 CI.1 98.)

Enter the meter into the aperture and secure using the two fixing clamps provided.

Connect the current terminals first numbered 1-8 followed by the voltage terminals numbered 9-11, the neutral terminal number 12 and finally the volt free relay terminals numbered 13 and 14.

When connecting wires to the communication module ensure that you first thread the cable through the hole in the terminal cover.

See connection diagram for the communication module. (Communication instructions publication 800 CI.1 98.)

Re-fit the terminal cover.

The terminal cover can be sealed for extra security.

External dimensions 91 x 91  
Clearance aperture required 92 x 92 mm

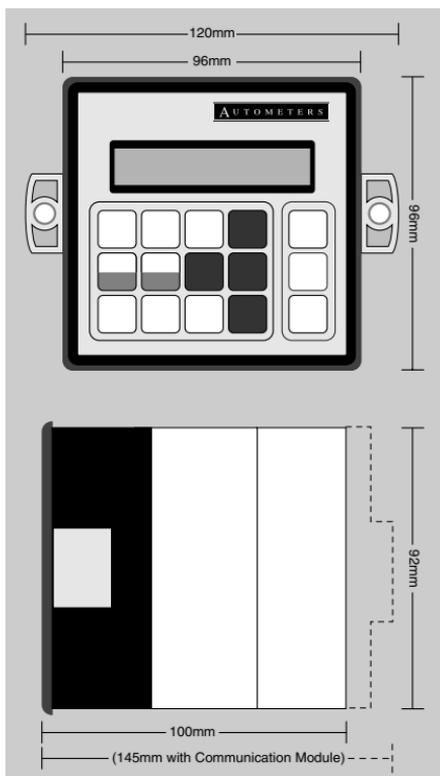


Figure 1. Installation details

# 3 WIRING INFORMATION

## POWER SUPPLY

The standard 3 phase 4 wire IC800 meter is powered by 230 Volts AC (47 to 66 Hz) at 0.2 Amps. The units can be powered from a dedicated fused feed, or may be powered by the voltage source which they are monitoring, as long as it is a 230 volt system. A removable protection fuse for the electronic power supply is fitted in the rear of the meter.

## WIRING

Electrical and communications connections are made directly to the back of the meter. Electrical connections are made to terminals 1-12,

pulse output relays numbered 13-14, and the RS485 communications directly to the communications cassette (optional extra).

## ELECTRICAL CONNECTIONS

2.5 sq.mm wire is recommended for all electrical connections.

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

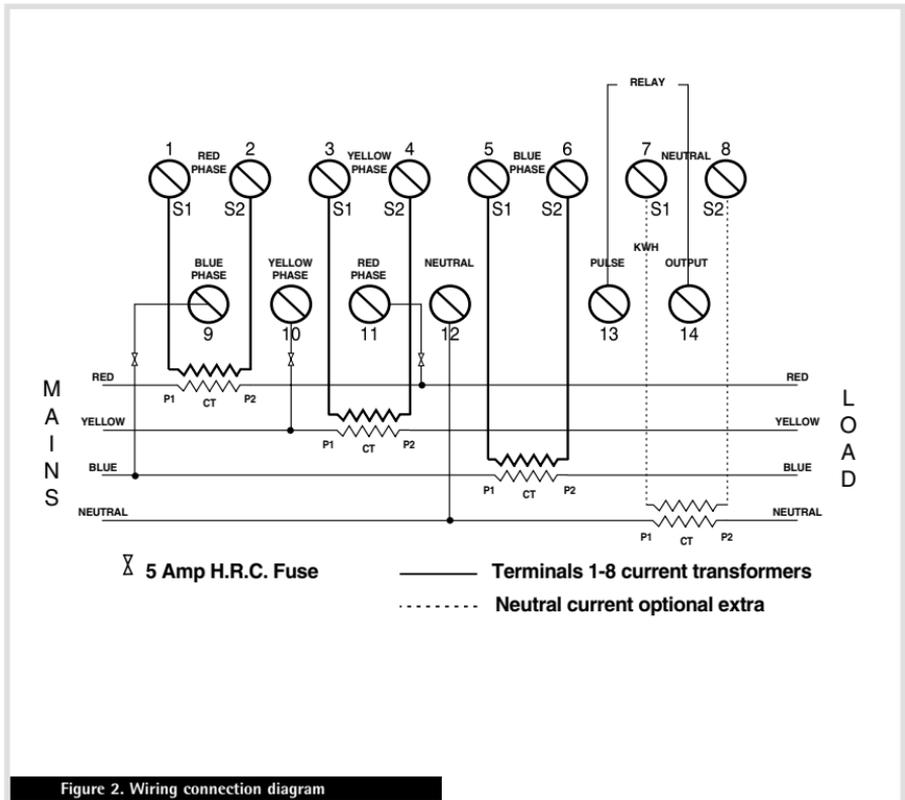


Figure 2. Wiring connection diagram

## 4 PROGRAMMING THE METER

## PROGRAMME THE CT RATIO CODE 013

Your Current Transformer Ratio requires to be programmed into this meter. Please follow these instructions precisely.

1. Press function, then 0, then 1, then 3. Enter the code where the asterisk is indicated, three asterisks indicates it requires three numbers entering.

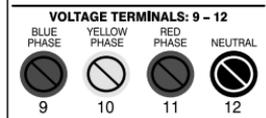


2. Enter Password.  
(The Serial Number is on the reverse side of your meter) - six digits, starting from the left hand side.



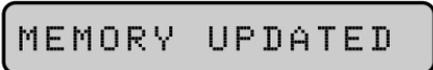
**Serial Number 800001**

← Password



3. Enter the CT Ratio  
Type in the number with the first digit on the left e.g. 2500/5. Type 2 then 5 then 0 then 0.  
If the CT Ratio is required with less than four digits (e.g. 300/5 Amp), start first left hand digit with 0 e.g. enter CT ratio- 0300/5.





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## PROGRAMME THE NEUTRAL CURRENT RATIO CODE 015

Your Neutral Current Transformer Ratio requires to be programmed into this meter. Please follow these instructions precisely.

1. Press function then 0, then 1, then 3.  
Enter the code where the asterisk is indicated, three asterisks indicates it requires three numbers entering.

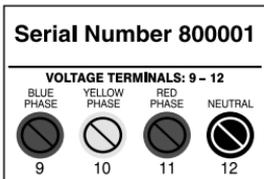


ENTER CODE \*\*\*

2. Enter Password.  
(The Serial Number is on the reverse side of your meter) - six digits, starting from the left hand side.



PASSWORD \*\*\*\*



← Password

3. Enter the NT Ratio  
Type in the number with the first digit on the left e.g. 2500/5. Type 2 then 5 then 0 then 0.  
If the NT Ratio is required with less than four digits (e.g. 300/5 Amp), start first left hand digit with 0 e.g. enter NT ratio- 0300/5.



NT RATIO 0005:5



NT VALUE 0300:5



MEMORY UPDATED

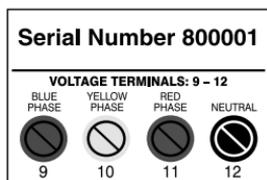
## PROGRAMMING THE PULSE VALUE CODE 060

1. Press function, then 0, then 6, then 0.  
Enter the code where the asterisk is indicated, three asterisks indicates it requires three numbers entering.

ENTER CODE \*\*\*

2. Enter Password.  
(The Serial Number is on the reverse side of your meter) - six digits, starting from the left hand side.

PASSWORD \*\*\*\*\*



← Password

3. The display will show the factory setting.  
Type in the new required value using the function button as the decimal point.

PUL VAL:1,000KWH

If for example the Pulse Value is required to be programmed to 10 kWh per pulse, enter 1, then 0, then decimal point, (function), then 0, then 0. important. There are 6 digits available to programme the Pulse Value. It is imperative that the decimal point is inserted into the new value e.g. 1.0000 kWh, 10.000 kWh and 100.00 kWh.

4. When last digit entered, screen displays

MEMORY UPDATED

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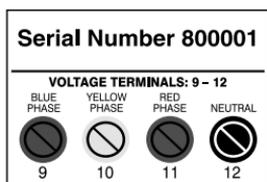
## PROGRAMMING THE PULSE DURATION (TIME) CODE 061

1. Press the function 0, then 6, then 1. Enter the code where the asterisk is indicated. Three asterisks indicates it requires a three numbers entering.

ENTER CODE \*\*\*

2. Enter Password (the serial number is on the reverse side of your meter) - 6 digits starting from the left hand side.

PASSWORD \*\*\*\*



← Password

3. The display will show the factory setting (100ms). Type in the new required value using the function button as the decimal point. If for example the pulse duration is required to be programed to 200ms, enter 0, 2, 00

PUL DUR : 100 MS

4. When last digit entered, screen display

MEMORY UPDATED

## 5 INFORMATION

**CHECK CT POLARITY**

1. Press function.

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



ENTER CODE \*\*\*

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



CT TEST R+ Y+ B+

**RESET MAXIMUM DEMANDS**

1. Press function.

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



ENTER CODE \*\*\*

2. Enter Code. '012'.

Display will show -

3. Press enter to reset Maximum Demand.



ENTER RESETS MD



ENTER

**PULSE STATUS CHECK**

1. Press function.

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



ENTER CODE \*\*\*

2. Enter Code '053'.

3. Display will show

Please note this display is common for all IC800 Meters.

Three digits equal the relay count (resets to zero after 999)



RELAY CNT = 000

## 6 OPERATION

Once the meter is installed and the functions have been set (see below) the only operation is that of taking readings from the front panel readout. If the data is collected using the RS485 network, no operation is required at all.

### INFORMATION

When you press the information button the display cycles through a sequence giving information about the meter as shown below.

### SEQUENCE OF INFORMATION READOUTS

First Readout

AUTOMETERS LTD

Seventh Readout \*

NT 0400/5

neutral current ratio setting

Second Readout

IC800AP 999999

type  
number

meter  
number

software version Letter A

Eighth Readout \*

PUL = 1.000 KWH

pulse value setting

Third Readout

3 PHASE 4 WIRE

system configuration

Ninth Readout \*

PUL TIME 100MS

pulse relay closure time

Fourth Readout

230/400V 50HZ

voltage setting

Tenth Readout

RESET MD F012

maximum demand reset code

Fifth Readout

CT 0400/5

current ratio setting

Eleventh Readout

CT TEST F050

current transformer polarity code

Sixth Readout \*

VT 11000/110V

voltage ratio setting

\* Screen displays marked with asterisk are available only if the meter has the feature installed

## 7 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 high (5x7 dots). Expected lifetime under normal operating conditions is a minimum of 100,000 hours.

## SEQUENCE

The IC800 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 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, display will show as below. Please note the display will show only system frequency.



*Numbers displayed above are for indication only.*

## AMPS



To obtain current values press the Amps key. The display will indicate as below

select (Three downward facing arrows)

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/EXPORT

To obtain kWh press the key marked kWh. The information displayed is the combined total energy of all three phases. Indicator denotes import or export.

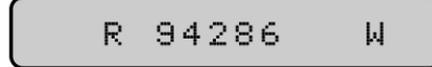


## POWER FACTOR



## POWER WATTS

To obtain instantaneous power press key marked Power Watts.



# 8 MAXIMUM DEMAND

To obtain the peak maximum demand or actual demand press Maximum Demand this is displayed over two screens.

The first screen displays peak maximum demand.



The second screen displays time into period and actual demand.



## FUNCTION KEY

Function 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.

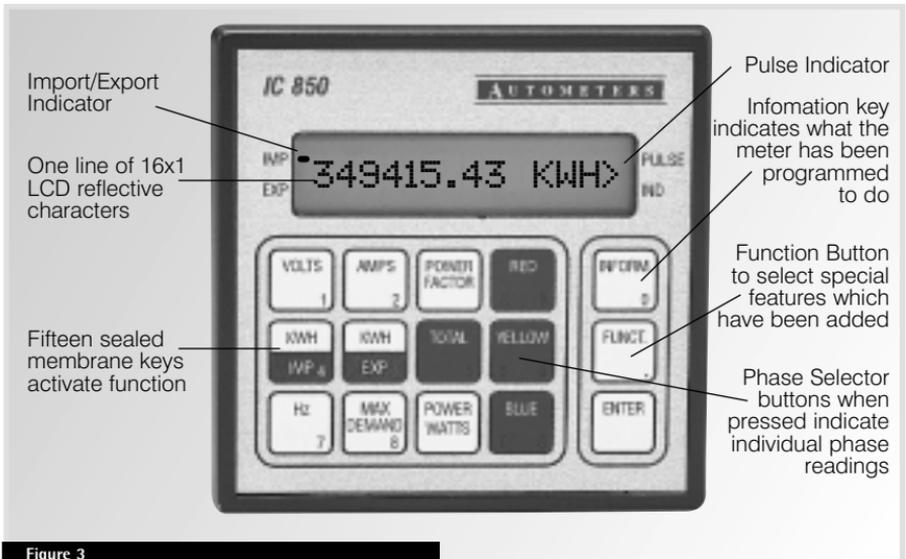


Figure 3

## 9 TRANSFORMER SELECTION

### CURRENT TRANSFORMER SELECTION

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

#### CT SELECTION

IC800 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 standard IC800 current input rating is 5 Amps, a 1 Amp input option is also available.

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 then improved accuracy and resolution can be obtained by selecting a lower rated CT. In this case the CT size 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 inaccuracy. Also, the CT burden rating must exceed the combined burden of the IC800, plus cabling, together with any other connected devices.

Overall accuracy is dependent on the combined accuracies of the IC800 meter and the CTs.

# 10 PERFORMANCE AND DATA

## MEASUREMENTS

### Measurement ranges

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

### Volts

+ 10% nominal voltage.

### Accuracy

All energy measurements comply to IEC 1036 section 4.6.1 Class 1.0.

### Burden

Current burden less than 1 VA.

### Drift

Negligible, self-compensating circuit.

### Display

IC800 -

Standard LCD reflective type 16 x 1 characters

### Temperatures

Operating temperatures: -20°C to +70°C

Storage temperatures: - 30°C to + 80°C

### Membrane switch

Operating force 100-500 crs. Switch life 8-10 million operations (IP65 sealed).

## OUTPUTS

1 Volt free relay is available factory set to KWH output.

### Pulse Width:

programmable, default 100ms

### Pulse value:

programmable, default 1KWH (3 phase 4 wire)

default 10KWH (3 phase 3 wire)

### Relay contacts

Maximum switching voltage 350 V DC or Peak AC.

Maximum switching current 0.75 Amp (Switching Power 30 VA).

RS485 communications port (if fitted)

high speed: Factory programmable from 9,600-38,400/sec using a dedicated communication processor.

## FUNCTIONS

Supplied as Standard

Function 012 - Peak maximum demand reset

Function 013 - Programmes CT setting

Function 015 - Programmes N.T. setting

Function 050 - CT polarity check

Function 053 - Pulse status check

Function 060 - Programme details of pulse value

Function 061 - Programme details of pulse time

## PHYSICAL

Dimensions (mm): W96 x H96 x D100 Panel

Cutout: 92 x 92mm

Weight: 1.25kg, excluding any external transformers.

## 11 MAINTENANCE AND SERVICE

## MAINTENANCE

The IC 800 Series Meters contain E<sup>2</sup> PROM for memory back up. The minimum life expectancy is 10 years. The IC 800 Series does not require any regular maintenance.

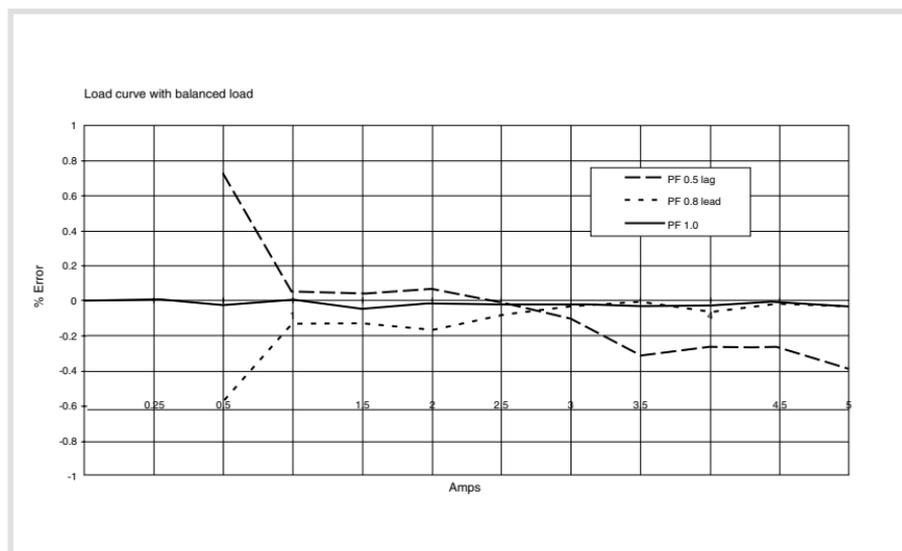
## FIELD SERVICE CONSIDERATIONS

In the unlikely event that a unit should fail, it will generally be serviced by exchanging the unit for a replacement unit. The initial installation should be done in a way which makes this as convenient as possible:

1. A CT 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.

## PERFORMANCE CHARACTERISTICS

## TYPICAL LOAD CURVE WITH BALANCED LOAD AT 50 HZ



## IMPORTANT

The attention of the specifier, purchaser, installer or user is drawn to special measures and limitations to 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 available from HMSO

Ref: IEC1000-5-1(BS195/210788DC) IEC1000-5-2(BS195/214642DC) IEC1000-5-6(BS195/210789DC).

## **DEDICATED CUSTOMER SERVICE**

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Customer care is the cornerstone of the company's success. A positive service policy is observed throughout every specialist area of operation.

The personal involvement of the directors at every level, a highly trained and motivated staff, fully computerised systems and in-depth stockholding combine to provide a level of service which has earned the appreciation of customers across the spectrum of the UK and overseas markets.

Computerised distribution systems are geared to a consistent 24 hour despatch of products, with 20 minute despatch being possible in response to urgent demand for small orders.

## **PRODUCT RANGE**

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Metering and monitoring equipment ranges from single and polyphase kWh electromechanical meters to a sophisticated range of fully programmable information centres. Also available are Electronic Meters, Panel Mounted Meters, Maximum Demand Meters, DIN Rail Meters and 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 illustration in this publication.*

**AUTOMETERS**

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