data: the power to take control

intelligent
measurement
monitoring
accuracy

IC 995

Electrical Network Analyser

MEASURE
HARMONIC
QUALITY
ENERGY
D.RELAYS
SOE
SETTING

MENU

Installation and Operating Manual

1. Overview

The IC 995 is the latest in the developing range of IC 900 Series Information Centres. In addition to the standard measured features of its predecessors, the IC 995 breaks new ground. Its large graphic display enables tabulated, bar and line graphs of Harmonic content, making the IC 995 a true engineering network analyser.

Built-in Modbus Communication, Voltfree Pulsed output, programmable Digital inputs and outputs ensure simple, accurate, remote monitoring of data, particularly when used in conjunction with the Autometers Horizon Monitoring System.

User-friendly installation, programming and operation make the IC 995 the choice of installers, operators and engineers alike. This, combined with Protocol compatibility across the Autometers Range, ensures that network communication remains one of the key strengths of the Information Centre Range.

Autometers Information Centres - Simple, Reliable, Accurate.

AUTOMETERS SYSTEMS

AUTOMETERS SYSTEMS

visit us at www.autometers.co.uk

2. Functionality

1. Multi-function: accurately measures phase voltages, line voltages, line currents, active, reactive and apparent power, phase and total power factors, frequency and maximum demand.

2. Harmonics: the IC995 measures component harmonics up to the 31st inst and THD for both current and voltage.

3. Network analysis: displays 4-quadrant energies, including active capacitive energy, active inductive energy, reactive capacitive energy and reactive inductive energy. Also measures current "K" factor, voltage crest factor, waveform factor and degree of voltage and current imbalance.

4. Inputs/Outputs: the IC995 is provided with 4 digital inputs, 2 digital relay outputs, 1 volt-free pulse output (set at 10kWh/pulse) and 1 RS485 (Modbus protocol) output in order to satisfy remote meter reading and system control monitoring.

3. Technical features

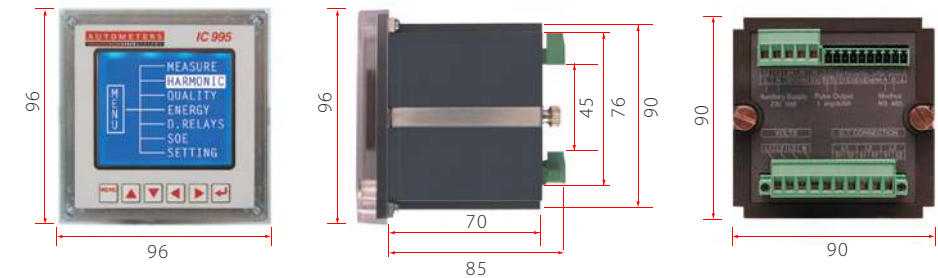| FEATURE		VALUES
	Network	1PH2W; 3P3W, 3P4W
	Frequency	45~65Hz
	Voltage	Normal: AC 100V, 400V
INPUT		Overloading: 600V (continuous); 1000V / 30s
		Consumption: < 0.2VA
	Current	Normal: AC 1A, 5A
		Overloading: 6A(continuous); 50A /1s
		Consumption: < 0.2VA
Pulse output		Mode: Optocoupler pulse output, volt free
Communication		RS485 (Modbus-RTU)
Digital input (DI)		4 drying contact inputs, with +5V power
Digital output (DO)		Mode: 2 NO contacts (AC 250V/3A, DC 30V/3A)
Accuracy		Frequency 0.01Hz, reactive energy 1 class, others 0.5 class
Display		LCD with backlight
Power supply		AC/DC 85~270V; consumation: ≤4VA
Isolation		Power / current input / voltage input: AC2kV/1min;
		Power / Digital inputs / RS485: AC1.5kV/1min;
		Inputs / outputs / housing >5M_
Environment		Working T: -10C~+45C; Storing T: -20C~+70C
		Relative humidity: 5%~95% Non-Condensing; Altitude: ≤2500m
Material used		Polycarbonate v.0 rated

The IC 995 meter is manufactured in compliance to:

EN 62052-11: 2004 (AC) General requirements
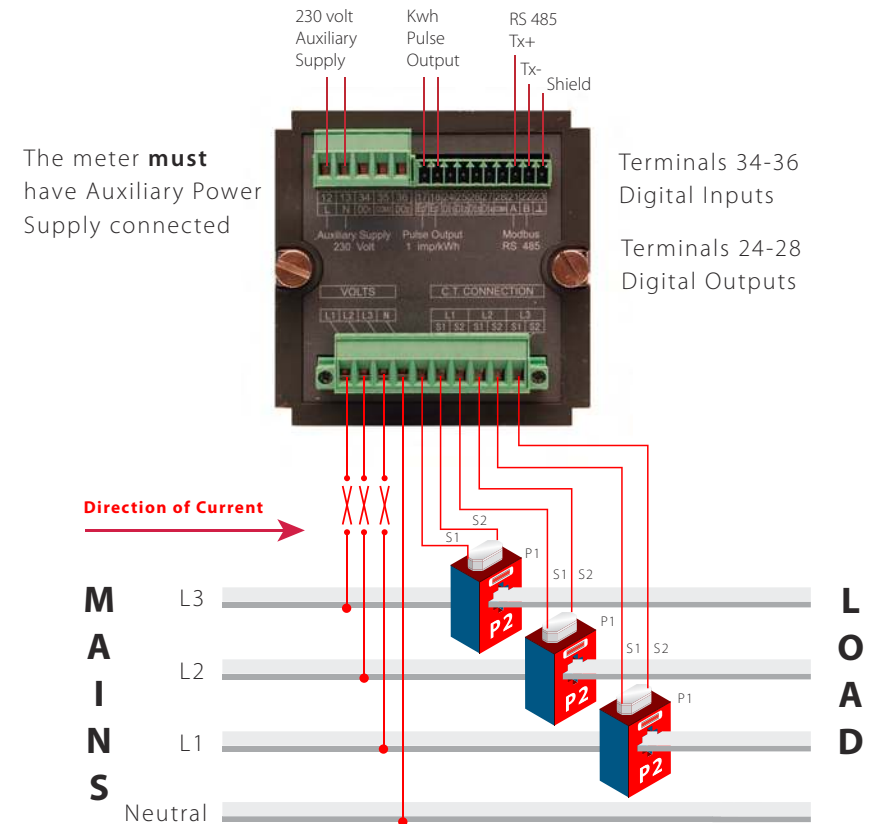**EN 62053-21: 2003** (Particular requirements part 21 static meters)

EN61010:2001 LVD approval

Dimensions

96 · 96 · 96 · 70 · 85 · 45 · 76 · 90 · 90 · 90

Connection Diagram 3 phase 4 wire, 230/400v 50Hz

230 volt Auxiliary Supply
Kwh Pulse Output
RS 485 Tx+
Tx-
Shield

The meter **must** have Auxiliary Power Supply connected

Terminals 34-36 Digital Inputs

Terminals 24-28 Digital Outputs

Direction of Current

M A I N S
L3
L2
L1
Neutral

L O A D

* it is important P2 faces the Load side

4. Installation and wiring requirements

4.1 Installation

IC995 is a 96mm square panel mounted meter and is installed by inserting the back of the meter through a hole in the front cover plate and locking it in position by two metal fixing clips which can be adjusted on the back. *See diagram below.*

4.2 Installing the IC 995

1. Create an opening on the switchboard of 92 x 92 mm.
2. Remove the IC 995 from the box, undo and remove the two metal fixing clamps on the back.
3. Taking the meter in your hand. Insert the meter through the hole in the front plate, slide the two metal fixing clamps down the side and screw the fixing screws tightly. This should now have secured the meter into the panel.

Power Supply
Power supply auxiliary terminals (12 + 13) AC/DC 85-270v

Wiring
Electrical and communication connections are made directly to the back of the meter. *See diagram to right.*

There are three blocks of green connectors, the two at the top can be unplugged, the one at the bottom is screwed into position. This connector terminates the current transformers into the meter and should not be unplugged unless necessary.

This connector can only be removed if the current transformers have been shorted out. These connectors should not be removed with power still on the meter. Choosing the correct cable to be used for the wiring of the current transformers to the meter depends on the rating of the current transformers used and the distance the current transformers are from the meter.

E.g. if the current transformers are minimum 2.5 va and are within 2 metres of the IC 995 then we recommend 1.5 multi stranded cable (Autometers Part number 995CH).
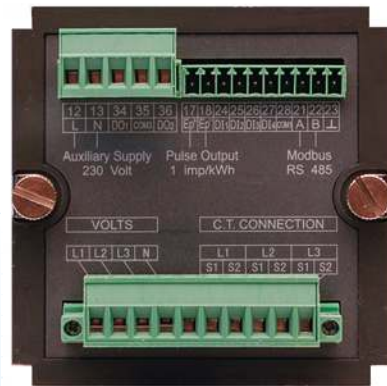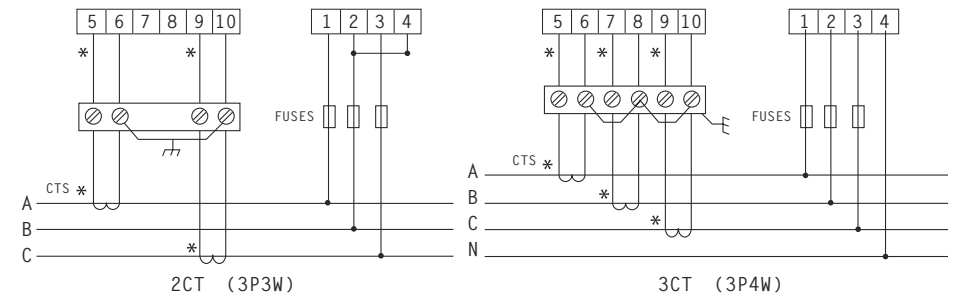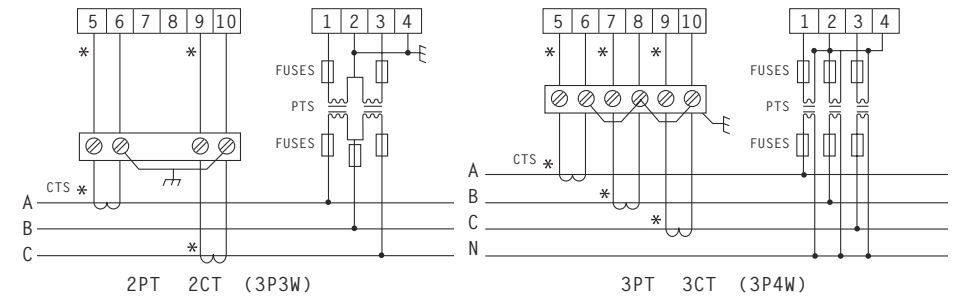
Picture showing the back of the IC 995 indicating the terminal numbers and the connectors.

Please note that one of the top terminal connector blocks has been removed.

4.3.1 Upper Connectors

4.3.2 Lower Connections

2PT 2CT (3P3W)

3PT 3CT (3P4W)

2CT (3P3W)

3CT (3P4W)
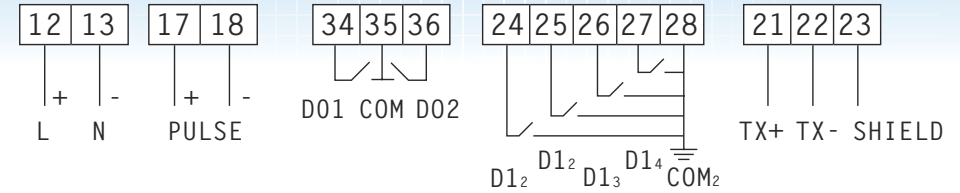
5. Package

The meter comes boxed. Inside the box there should be the IC995 meter, 3 sets of green connectors and two fixing brackets. An installation manual is supplied separately with the box.

On opening the package, please check it carefully. If there is any damage, please contact Autometers directly, or our dealers, as soon as possible and keep the damaged package intact.

6. Installation

6.1 Voltage Input

Voltage input should be less than 120% normal voltage (100V or 400V), otherwise please use PT. On the voltage input, please use a 1Amp fuse. The wiring should be as our diagrams on page 5.

Mode of wiring

1 element	1P2W
2 element	3P3W
3 element	3P4W

Match the voltage input with current input, and match the phase and phase sequence (otherwise the values or signals will be incorrect).

6.2 Current Input

Normal current input is 5A, for more than 5A you must use Current transformers. Make sure that you follow the connection details carefully when connecting the voltage and current circuits to the meter.

6.3 Installation of Current Transformer

It is good practice to use a test shorting block where the external current transformers can be linked out should the meter ever need replacing.
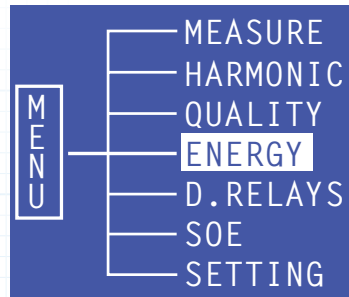
6.4 RS485 Modbus Wiring

The IC 995 is fitted with an RS 485 Modbus output. It has been designed to work with Autometers protocol version V6.2.17, which enables up to 128 meters to be connected on one Lan circuit. We advise using Beldon cable 9841 or 9842.

7. Features available

7.1 Main menu:

When the meter has voltage applied to the auxiliary terminals (12 and 13) the meter will go through a set up routine. Firstly the display will show Autometers' front page then it will go to the first screen (01), the line voltage screen.

Press Menu to view the various optional parameters.

```
         ┌── MEASURE
         ├── HARMONIC
M ┐      ├── QUALITY
E │      ├── ENERGY
N ├──────┤
U │      ├── D.RELAYS
         ├── SOE
         └── SETTING
```

1 **MEASURE**: displays Line voltage, Phase to Phase, Line Current, Instantaneous power, Power factor, Total power and Max demand

2 **HARMONIC**: displays Current and Voltage harmonic data to the 31st inst, wave form showing comparison of voltage and current and bar graph comparing voltage and current

3 **QUALITY**: displays Crest factor, THFF, K Factor, Unbalanced factor Voltage peak, Voltage vector, Current vector

4 **ENERGY**: displays Import and Export of Kwh, Kvarh and import of Kvah

5 **D.RELAYS**: indicates status of digital relays

6 **SOE**: displays time and date of relays which have been activated

7 **SETTING**: programming of meter parameters

Selecting Individual parameters

Select Menu: Move the highlighted feature up or down by pressing the arrows marked ▲ ▼ to the parameters you want to view.

7.2 MEASURE: Press the return key ↵ this will take you to the Line voltage screen. Press the down key ▼ to view individual parameters.

01. Phase to Neutral volts
02. Phase to Phase voltage
03. Phase and Total current
04. Instantaneous Kw
05. Instantaneous Kvar
06. Instantaneous Kva
07. Individual phase Power factor and Total Power factor
08. Total Instantaneous power Kw, Kvar, kva and Total Power factor
09. Maximum Demand

```
Volts              01
L1   220.0    V
L2   220.0    V
L3   220.0    V
F    50.00    Hz
08- 14- 2009      17:45:55
```
01. Phase to Neutral volts

```
Volts              02
L1-2  381.0   V
L2-3  381.5   V
L3-1  381.5   V
F     50.00   Hz
08- 14- 2009      17:46:15
```
02. Phase to Phase voltage

```
AMPS               03
L1   04.99    A
L2   04.99    A
L3   04.99    A
TTL  14.99    A
08- 14- 2009      17:56:11
```
03. Phase and Total current

```
Inst Power      04
L1  1.100   Kw
L2  1.100   Kw
L3  1.100   Kw
TTL 3.300   Kw
08-14-2009    17:56:26
```

04. Instantaneous Kw


```
Inst Power      05
L1  0.001  Kvar
L2  0.001  Kvar
L3  0.000  Kvar
TTL 0.003  Kvar
08-14-2009    17:56:37
```

05. Instantaneous Kvar


```
Inst Power      06
L1  1.099  Kva
L2  1.099  Kva
L3  1.098  Kva
TTL 3.297  Kva
08-14-2009    17:56:37
```

06. Instantaneous Kva


```
Power Factor    07
L1  1.000
L2  1.000
L3  1.000
TTL 1.000
08-14-2009    17:56:57
```

07. Individual Phase Power Factor and Total Power Factor


```
Total Power     08
   3.300 Kw
   0.003 Kvar
   3.297 Kva
PF 1.000
08-14-2009    17:57:06
```

08. Total Instantaneous Power Kw, Kvar, kva and Total Power Factor


```
Max Demand      09
PEAK Kw   = 3.266
        09-15 12:02
PEAK Kvar = 3.038
        09-15 12:01
PEAK Kva  = 3.270
        09-15 12:02
08-14-2009    17:57:16
```

09. Max Demand with Date & Time

HARMONIC: Press the key with the arrow facing down ▼ to move the cursor down and highlight harmonic. Press return ↵ to view individual parameters.

Here you will have a selection:

VALUE   (diagram 1)
WAVEFORM   (diagram 2)
BAR   (diagram 3)

VALUE: To select "VALUE" move the cursor over the word "Value" by pressing the key with the arrow facing down and then press return ↵. Here you will be able to view the individual line voltages to the 31st Inst. By continually pressing the ▼ you will be able to view the individual current to the 31st Inst and THD of both voltage and current.

WAVEFORM: To select "WAVE FORM" move the cursor over the word "Waveform" by pressing the key with the arrow facing down ▼ and then press return ↵. Here you will be able to view the individual line voltages to the 31st Inst. By continually pressing the ▼ you will be able to view the individual current to the 31st Inst and THD of both voltage and current.

%	VL1	VL2	VL3
03	00.00	00.00	00.00
05	00.00	00.00	00.00
07	00.00	00.00	00.00
09	00.00	00.00	00.00
11	00.00	00.00	00.00
13	00.00	00.00	00.00

diagram 1

BAR: To select "BAR" move the cursor over the word "Bar" by pressing the key with the arrow facing down ▼ and then press return ↵. Here you will be able to view the individual line voltages to the 31st Inst. By continually pressing the ▼ you will be able to view the individual current to the 31st Inst and THD of both voltage and current.

7.4 QUALITY (Quality of network)

Select Menu: Move the highlighted feature up or down by pressing the arrows marked ▲▼ to the "Quality" line.

Quality: Press the return key ↵ this will take you to the Crest factor (01). Press the down key ▼ to view individual parameters available.

01. Crest Factor
02. THFF
03. K. Factor
04. Unbalanced Factor
05. V. Peak
06. V. Vector
07. I. Vector

CREST FACTOR: The Crest Factor is equal to the peak amplitude of a waveform divided by the RMS value. The purpose of the crest factor calculation is to give an analyst a quick idea of how much impacting is occurring in a waveform.
The screen displays: V1, V2,V3.

THFF (Telephone Harmonic Form Factor):
The harmonic interference may cause noise in the system and influence the quality of communication; our hearing and the telephone cannot respond well to the 50Hz current and voltage but can respond better to about 1KHz current and voltage. In Europe, CCITT detects harmonic interference to telecom with Pn, then figures it with THFF. It is 0 with no harmonic.
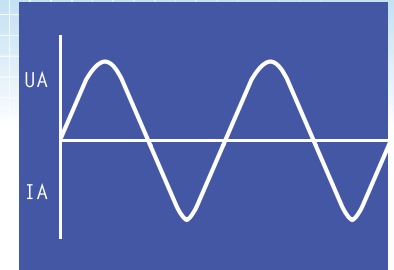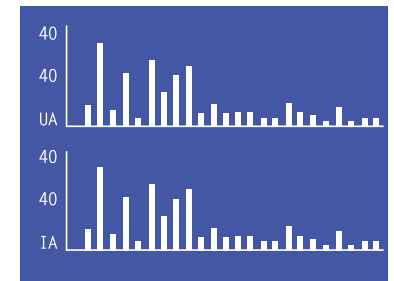**The Screen displays: V1,V2,V3.**


diagram 2

diagram 3


```
CREST FACTOR    01
V1   1.628
V2   1.621
V3   1.636
08-14-2009    17:56 57
```



```
THFF            02
V1   00.80   %
V2   00.74   %
V3   00.72   %
08-14-2009    17:56 57
```

K FACTOR: (Current K Factor)
K-factor is a weighting of the harmonic load currents according to their effects on transformer heating, as derived from ANSI/IEEE C57.110. A K-factor of 1.0 indicates a linear load (no harmonics). The higher the K-factor, the greater the harmonic heating effects.
**The screen displays: I1, I2, I3.**

```
K FACTOR            03

I1   00.00
I2   00.00
I3   00.00

08-14-2009      17:56:11
```
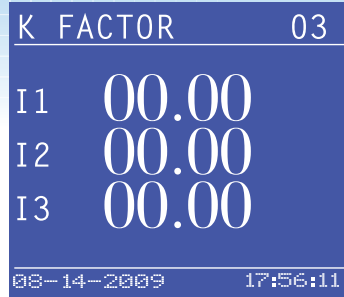
UNBAL FACTOR: (Unbalance Factor)
To look at the current and voltage unbalance factor. In a 3-phase distribution, if the current or voltage RMS are not the same or the difference between a 3 phase angle is not 120 degrees, we call the phase voltages or current 'unbalance'. The unbalance voltage or current of 3-phase can be divided into positive component, negative component and zero component.
The screen displays:
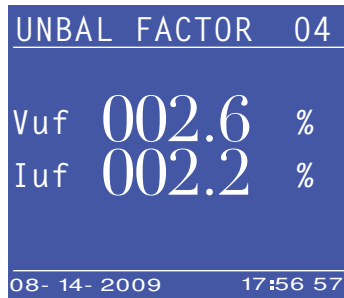
Vu f % (Voltage unbalanced factor),
Iuf % (Current unbalanced factor)

```
UNBAL FACTOR    04

Vuf   002.6   %
Iuf   002.2   %

08- 14- 2009      17:56 57
```

V PEAK: (The Peak Voltage)
Peak voltage is the highest level of volts from an alternating current. For example, in the UK the mains supply to a house is 230RMS. 230 volts is the average (simplified) you will get from the AC supply. But in reality the AC wave switches between -320 and 320 volts. So 320 is the peak voltage.

To find out the peak voltage of an alternating current you must multiply the RMS voltage by root2 or 0.707 (this works only when the AC signal is a sine wave).
The screen displays: V1,V2,V3.

```
V PEAK            05

L1   335.5
L2   334.8
L3   331.4

08- 14- 2009      17:56 57
```
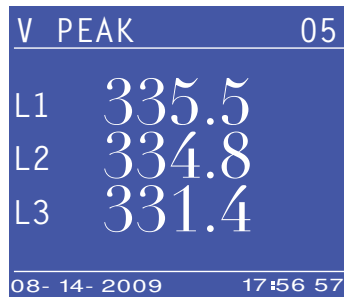
V VECTOR: (The Voltage Vector)
Widely-used in European standards, the first definition originates from the theory of Symmetrical Components which mathematically breaks down an unbalanced system into three balanced systems as shown.

```
V VECTOR            06

+   230.2
-   059.6
N   030.0

08- 14- 2009      17:56 57
```


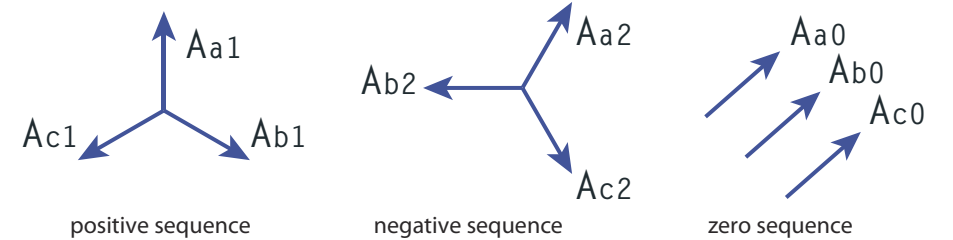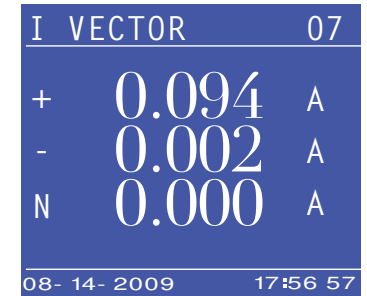positive sequence   negative sequence   zero sequence
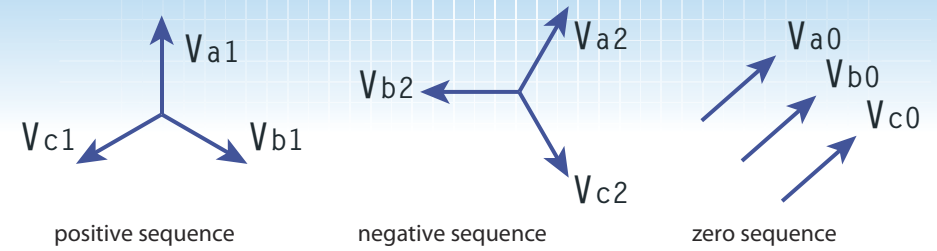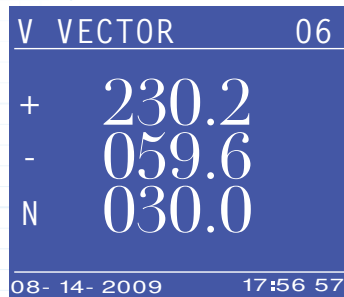
These three are called positive sequence, negative and zero sequence systems. For a perfectly balanced system both negative and zero sequence systems would be absent.
The screen displays: +V1, -V2, N.

I VECTOR: (The current vector)
To look at the positive component, negative component and zero component.
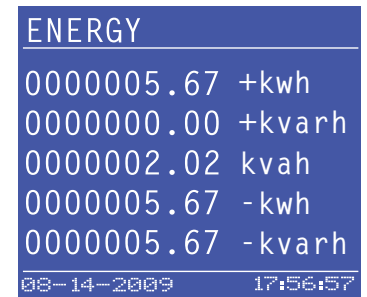**The Screen displays: +I1, -I2, N.**

```
I VECTOR            07

+   0.094   A
-   0.002   A
N   0.000   A

08- 14- 2009      17:56 57
```


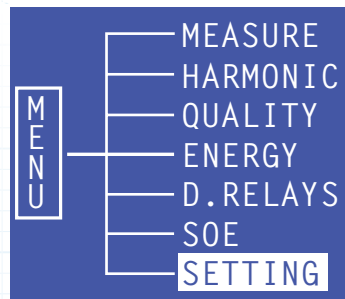positive sequence   negative sequence   zero sequence

7.5: Energy

Select Menu: Move the highlighted feature up or down by pressing the arrows marked ▲▼ to the "Energy" line.

Energy: Press the return key ↵ this will take you to the Energy screen (only one screen).
The screen displays: Import and Export Kwh, Kvarh and Import Kvah.

```
ENERGY

0000005.67 +kwh
0000000.00 +kvarh
0000002.02 kvah
0000005.67 -kwh
0000005.67 -kvarh
08-14-2009      17:56:57
```

7.6 D.RELAYS (Digital relay output)

This screen shows the status of the digital inputs and outputs relays.
The digital input is powered by +5V, and digital output is a pair of non-powered contacts. If programmed, the status will change to "ON". these relays are mainly used in building management systems.

7.7 SOE (SEQUENCE OF EVENTS)

Select Menu: Move the highlighted feature up or down by pressing the arrows marked ▲▼ to the "SOE" line.

Press the return key ↵, this will take you to the S.O.E. screen (only one screen).

SOE: Captures the time the digital relays have been activated.

The picture shows three events which have occurred, but by scrolling down using the key with the arrow facing down ▼ up to 16 events can be captured.

The top two lines are the last activation of the relay.

This indicates: Digital Output 1 was activated 22nd October 2009 at 12 hours, 20 minutes, 55 seconds. This was returning to normal status.

The second event shows:
Digital Output 1 was first activated on 22nd October 2009 at 12 hours, 12 minutes, 20 seconds (sounding the alarm).

01	DO1	2009-10-22
	NO	12-20-55

02	DO1	2009-10-22
	NC	12-12-20

Select Menu: Move the highlighted feature up or down by pressing the arrows marked ▲▼ to the "SOE".

S.O.E. Press the return key ↵.

This indicates the time and date of any relay which has been activated.

7.8 SETTING (User Setting)

This is used for programming the meter, great care should be taken here to ensure you enter the correct details.

```
M E N U ── MEASURE
        ── HARMONIC
        ── QUALITY
        ── ENERGY
        ── D.RELAYS
        ── SOE
        ── SETTING
```

Select MENU: Move the highlighted feature up or down by pressing the arrows marked ▲▼ to "SETTING".

SETTING: Press the return key ↵this will take you to the Code "0000".

There is a security level here which must be entered to allow you to program the meter. The default password is "0001"

```
M E N U ── MEASURE
        ── HARMONIC
     CODE     ALITY
     0000     RGY
              D.RELAYS
        ── SOE
        ── SETTING
```
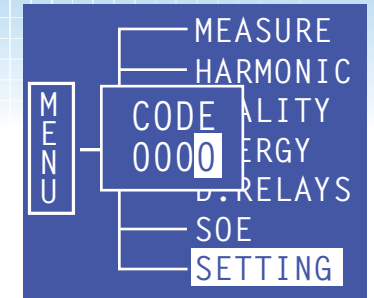
Enter the PASSWORD 0001 by pressing the keys with the four arrows on ▲▼◄►.

The two keys which have the arrows pointing up and down ▲▼ move the cursor along for you to enter your number in the correct sequence. The two keys with arrows pointing left and right ◄► increment the number up or down. When you have selected the correct number press the return key ↵.

This will now take you to the "CONFIG SCREEN".

Here is listed a small menu.

CONFIG (programmes the vt and ct ratio)
RS485
PASSWORD
TIME
D.Relays

Select Menu: Move the highlighted feature up or down by pressing the arrows marked ▲▼ to the "CONFIG" line.

CONFIG. Press the return key ↵ this will take you to the Configuration screen.

A. Network: This can be set to, 1 phase 2 wire, 3 phase 3 wire, 3 phase 4 wire.
B. V Range: This can be set at 100 volt or 400 volt
C. I Range: This can be set at 1 amp or 5 amp
D. PT: This can be set at Voltage ratio range
E. CT: This can be set at any current transformer ratio.

E.g. programming the meter to be on a 3 phase 4 wire network 230/400 volt , 50 Hz, 200/5 amp.

```
CONFIG
NETWORK    3P4W
U RANGE    400V
I RANGE    5A
PT      0400/0400
CT      4000/0005
SN      429496
08-14-2009    17:57:16
```

Network:
Move the highlighted feature up or down by pressing the arrows marked ▲▼ to the "Network" line. The cursor will move over the "3p4w" symbol to alter this press the key with the arrows facing the right ▶ this will switch from 1p2w to 3p3w to 3p4w. Select the value you want then press the key with the arrow facing down ▼, this moves the cursor to the line below.

V. Range:
You will notice that the 400 v is now highlighted. To change this press the arrow key marked with the arrow pointing to the right ▶ the number will change to 100V. select the voltage range you require and then press the key with the arrow marked down ▼. You will notice the 5A is now highlighted.

I. Range:
To change I range press the arrow key marked with the arrow pointing to the right ▶, the number will change to IA. Select the setting you require and then press the key with the arrow marked down ▼. You will notice the 0400/0400 is now highlighted.

VT: To change this you will need to operate four keys ▲▼◀▶.

The two keys which have the arrows pointing up and down ▲▼ move the cursor along for you to enter your number in the correct sequence.

The two keys with arrows pointing left and right ◀▶ increment the number up or down.

E.g. The cursor will move down over the first number to your left, to move this across to the next cursor press the key with the arrow facing down ▼ the cursor has now moved one space to the right. To increment the number at any point press the key with the arrow marked to the right. Continue until you have entered the correct numbers.

0400/0400 select the voltage range you require and then press the key with the arrow marked down ▼. You will notice the 0005/0005 is now highlighted.

C.T. (current transformer ratio): To change this you will need to operate four keys ▲▼◀▶

The two keys which have the arrows pointing up and down ▲▼ move the cursor along for you to enter your number in the correct sequence.

The two keys with arrows pointing left and right ◀▶ increment the number up or down.

E.g. The cursor will move down over the first number to your left, to move this across to the next cursor press the key with the arrow facing down ▼ the cursor has now moved one space to the right. To increment the number at any point press the key with the arrow marked to the right. Continue until you have entered the correct numbers: 0200/0005.

You must now press the return key ↵ this will set all the parameters you have chosen in the meter. a box will appear with yes/no in it YES NO . Press the key with the arrow facing left ◀ the cursor has now moved over the "YES". Press return ↵ this has now programmed the ct ratio.

IMPORTANT *: You will receive the meter in the factory default mode which is suitable for 3 phase 4 wire network, 230/400 volt, 50 hz 0005/0005 amp.*

YOU SHOULD ONLY NEED TO PROGRAM THE CT RATIO AND THE TIME INTO THE METER
E.g: 0200/0005 (the date and time)

Select Menu: You should now be back at the Config Menu:
Move the highlighted feature up or down by pressing the arrows marked up or down ▲▼ to the "RS 485" line.

RS 485: Press the return key ↵ this will take you to the RS 485 screen. Here you have two features you can alter.

a. Address (meter's unique Modbus number)
b. Baud Rate

a. Address
Please note the meter is factory-set to match Autometers protocol.

Baude Rate:	9600	Data Format:	Floating point
Parity Type:	Even	Modbus Type:	RTU
Wire Mode:	2 wire	F.P. High word first	

When using RS 485 Modbus it is vital that you understand what management system the meters will be connected to. Normally every meter must have a unique address and must not be duplicated.

However, when connecting to Autometers Intelligent Termination Point then all meters must have the address set at "001".

To change this you will need to operate four keys ▲▼◀▶

The two keys which have the arrows pointing up and down ▲▼ move the cursor along from left to right so you can enter your number in the correct sequence.

The two keys with arrows pointing left and right ◀ ▶ increment the number up or down.

E.g. The address number is highlighted with the first number on the left "001", to change this to "015" read below.

First press the key with the arrow pointing down ▼ this will move the cursor one stop to the right. Now press the key with the arrow pointing to the right ▶ this will increment the number stop when you reach 1, now press the key with the arrow pointing down ▼ this will move the cursor one stop to the right. Now press the key with the arrow facing to the right, this will increment the number stop when you get to number 5 now the numbers should look like "015" press the key marked with the arrow facing down, The cursor has now dropped to the level below.

b. Baude Rate:

This is normally defaulted to 9600 and works with almost all management systems. If, however, you want to change this you have five choices 2400, 4800, 9600, 19200 and 38400.

To alter to the new settings press the key with the arrow marked facing the right ▶ this will scroll through your choices, stop at the correct one.

Now you have set the address and baud rate. To program into the meter you must press the return key ↵ you will notice that a box appears which has "YES" "NO". Press the key with the arrow facing to the left ◀, you have now highlighted the "YES" press return ↵, you have now set the parameters. Press "Menu" to return to Config list.

PASSWORD: To alter the password.

The meter has been designed for customers or companies to have their own individual password protection. To alter the password first take the steps of writing down your chosen password and keeping it in a secure place.

Press the key with the arrow facing down ▼, this should now highlight the word "PASSWORD" press return ↵.

You will notice on the display screen "old 0001" and on the line below "New". You will notice that the cursor is already positioned on the first "0" for you to alter the number. Press the key with the arrow facing down ▼ to move the cursor to the right and the key with the arrow to the right ▶ to increment the number.

```
  Password

 OLD = 0001
 NEW = 0001
```
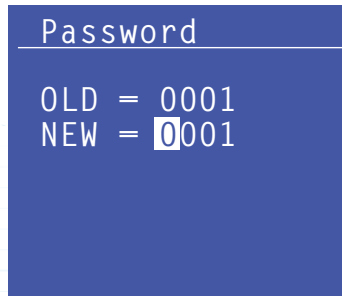
When you have entered your new number in press return ↵. A box will appear with "YES NO" YES NO . Move the cursor over the the left by pressing the key with the arrow facing left ◀. Press Menu to return you to Config screen.

TARRIF: Please note this is NOT activated in this meter.

TIME:

Press the key with the arrow facing down ▼ until the Time is highlighted. Press return ↵, this takes you into Time screen. The cursor will now be over the first digit to the left (the date). Using the key with the arrow facing the right ▶ this will increment the number. Press the key with the arrow facing down ▼ to move the cursor one step to the right and again press the key with the arrow facing the right ▶ to increment. Repeat this until the date is complete. When the last digit to the right has been entered press the key with the arrow facing down ▼ this will drop the cursor down to the time. Repeat using the keys as above until the time has been entered. When the time has been completed press return ↵.

```
 TIME


   10-22-2009
   11: 03: 28
```
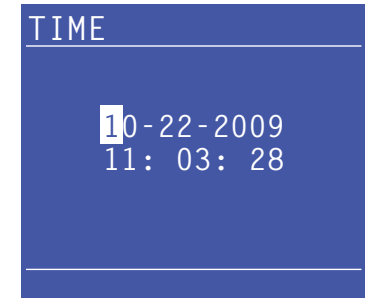
A box will appear with "YES" and "No" in it YES NO , press the key with the arrow facing left ◀ the cursor has now moved over the "YES". Press return ↵ this has now programmed the time.

Press Menu. This returns you to config screen.

D.RELAYS: SETTING

Press the key with the arrow facing down ▼. This now moves you down and has highlighted Switching. Press return ↵.

This takes you to the "D RELAYS" programming section, you will notice on the display that there are numbers 1 and 2. This is because there are two output relays.

```
 D.RELAYS

 1 DO1= ⎍ 0000ms
 2 DO2= ⎍ 0000ms

      ⎍    LEV
      ⎍⎍   PULSE
      ⌂    ALARM
```
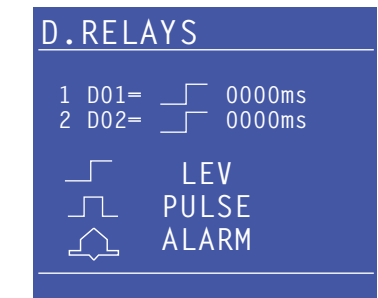
Digital output 1: Can be configured to 3 positions: Level, Pulse or Alarm.
Digital output 2: Can be configured to only 2 positions: Level and Pulse.

Level means: the internal relay of the ic 995 is operated by an external pc enabling a contactor or breaker to be switched open circuit.

Pulse: digital input signal from an external contactor/breaker to the meter, this is normally read by a building management system via Modbus.

ALARM: The alarm is seen as a bell on the display and can be programmed to Over Voltage, Under Voltage, Over Current, the Unbalance of currents and Voltage alarms. Opens and closes a relay for a set time.

Programming the switching configuration on DO1 and DO2. The cursor will be over the "level" indicator, to alter this to pulse or alarm press the key with the arrow to the right ▶ this will scroll through the options. When you have selected your option, press the key with the arrow facing down ▼ this will move the cursor to the four digits on the left. "0000" this is the time the relay will stay open or closed and is based in milli seconds. Use the key with the arrow facing right ▶ to increment the numbers. Use the key with the arrow facing down   to move the cursor to the right.

When you have reached the last position in the digits on line 1 press the key with the arrow facing right ▶ this will move the cursor down to the 2nd line. This line represents Digital output 2. Repeat above to program this output.

When you have programmed the digital outputs press Return ↵. A box will appear on the screen with "YES" and "NO" YES NO press the cursor with the arrow facing left ◀ so the "YES" is highlighted. Press return ↵.

Press Menu.

ALARM: This is used for setting the value you want the alarm to be activated.

You will see on the screen 5 options where you can input values to set an alarm. When this value has been reached a relay will close or open.

V	> 000.0	**Over Voltage**
V	**< 000.0**	**Under Voltage**
I	**> 0.000**	**Over Current**
Vuf	**< 000.0**	**Unbalance of Current**
Iuf	**< 000.0**	**Unbalance of Voltage**

The cursor will be positioned on the first "0" on the top line (Over voltage) press the key with the arrow facing right ▶to increment or press key with arrow facing down to ▼ move the cursor one step to the right. Repeat until you have completed your programming.

Repeat above to program the other values as listed on the display.

```
ALARM

  U   <   000.0
  U   >   000.0
  I   >   0.000

  VUF >   000.0
  IUF >   000.0
```

When you have programmed the alarm outputs press return ↵ . A box will appear on the screen with "YES" and "NO" YES NO press the cursor with the arrow facing left ◀ so the "YES" is highlighted. Press return ↵ .

Press Menu.

Press the key with the arrow facing down ▼. This now moves you down and has highlighted "OTHERS". Press return ↵.

OTHERS: This is used for resetting registers back to zero.

You will see on the display a small menu.

CLR.E:	OFF	**YES - resets the energy registers to zero**
CLR.S:	**OFF**	**YES - resets the time stamps in the S.O.E.**
CLR.MD:	**OFF**	**YES - resets the maximum demand back to zero**
BACKLIGHT:	**OFF**	**YES - turns backlight permanently on**
CONTRAST:	**50**	**This allows adjustment on the contrast of the display 0-55**

```
OTHERS

  CLR.E      NO
  CLR.S      YES
  CLR.MD     OFF
  BACKLIGHT  OFF
  CONTRAST   45
```

You will notice that the cursor has highlighted the "OFF " position on the CLR.E on the display. To change this to "YES" press return key ↵ this brings up a box with "YES" "NO" YES NO . Move the cursor to "YES" by pressing the key with the arrow marked on the left ◀ then press return ↵ this takes you back to "OTHERS" screen.

Repeat above to adjust other options.

Press Menu to return to CONFIG screen.

Press Menu again to return to main menu.

NOTE: When in the OFF position, the backlight allows a view time of 40 seconds before switching off. Continually pressing the return key ↵ when you are operating the meter will keep on extending the illumination of the display by 40 seconds.

If you switch the backlight permanently ON then please be aware this will shorten the life of the display.