ENERGY MONITOR

Operating Instructions

ATTENTION!
PLEASE READ INSTRUCTIONS BEFORE USE!
KEEP INSTRUCTIONS IN A SAFE PLACE!
ONLY TO BE USED INDOORS.
KEEP AWAY FROM CHILDREN. THIS PRODUCT IS NOT A TOY!

Technical Data

Model Number:	9149
Supply:	220-240 V ~ 50 Hz
Current:	13 A max.
Battery:	2 x 1.5 V (Type LR44 A 76 V13 or RW82)
Mains voltage display:	from 190 V-276 V
Current consumption display:	from 0.02 A-13 A
Power consumption display:	from 7 W-3588 W
kWh display:	from 0.00 kWh-9999,99 kWh
Energy cost:	from 0.000 to 9999

Accuracy:

Voltage:	+/- 3% of value measured
Current:	+/- 3% of the value measured +/- 0.03 A
Power:	+/- 5% of the valve measured +/- 10 VA
kWh:	+/- 5% of the value measured +/- 0.1 kWh

Accuracy figures based on:
- a frequency of 45-65 Hz
- use of the unit under normal room temperature conditions
- harmonic distortion of the voltage/current (<15 %)
- power factor > 0.2

IMPORTANT SAFETY INSTRUCTIONS

- Before using the energy monitor, make sure the mains voltage is compliant with the monitor voltage requirement (220-240 V ~).
- Before each use, check monitor for damage. The monitor must be discarded if damaged.
- Before replacing the batteries, the energy monitor must be disconnected from the AC power supply.
- Use only the battery types recommended.
- Do not mix old and new batteries.
- Ensure batteries are inserted with the correct polarity.
- Dispose of old batteries carefully.
- Battery supply terminals must not be short circuited.
- Make sure the monitor is not placed near dampness or dirt.
- To prevent electric shock, never open the monitor or place anything in it.
- If you pass the monitor on to another person, also give these instructions.
- Please pay attention to the environmental conditions during storage and usage:
  Temperature min. 0 °C, max. 25 °C
  Relative humidity: max. 75 %

DISPLAY (SEE FIGURE 1):

- The EM (Energy Monitor) helps to save energy and costs at home and in the workplace. The EM will inform you in a simple way of the energy usage and cost of running any connected equipment such as: Lights, Radio, Machines etc...

ATTENTION:

If you remove the unit from the power supply, the display switches off after approximately 1 minute. However, the data is retained. If you press the SELECT, SET or FUNCTION-button, the display will be activated again. To extend the lifetime of the batteries, we recommend removing the batteries from the unit if you keep the unit unplugged from the power supply for more than 12 hours.

RE-SETTING:

If you press the button R (RESET), all data held in the memory will be deleted and the unit must be re-programmed. Use the RESET if the display shows abnormal characters or the unit doesn't react when you press a button.

FIRST TIME USE:

Remove the isolating strip, which is protruding from the battery compartment at the back of the unit, and use a pen tip to press the R-button. The unit is now ready for programming.

SETTING THE TIME (SEE FIGURE 2):

- Press the SET-button. In the display you will see CLOCK SET. The sign for the day will flash. To set the required day, press the SELECT-button. Each time the SELECT-button is pressed again, another day will be flash up, in the upper line of the display. Press the SET-button, to save the selected day.
- Now the sign for the hours will flash up. To set the required hour, press the SELECT-button. Then press the SET-button again to save the selected figure. Now the sign for the minutes will flash up. To change to the required minutes, press the SELECT-button, and then the SET-button again to save the selected figure.

To change the hour format from 12 to 24 hour-display press the "SELECT" button.

PROGRAMMING THE LOCAL ELECTRICTY TARIFF:

To get the cost of the consumption for one unit, you have to programme in the local electricity tariff. You will find the cost for one unit (kWh), on an invoice from your electricity supply company.
NOTE: If you don't key in a figure for about a minute during the programming process, your display will go back automatically to the voltage display screen (base mode). See FIGURE 4.

1. Press and hold down the FUNCTION-button for approximately 3 seconds in the voltage display mode. The COST/kWh appears in the display, (see FIGURE 3).
2. Press the SET-button and the first digit of the display will flash. An additional sign "SET" will appear on the display.
3. Now use the SELECT-button to enter the first digit of the tariff.
4. Press the SET-button again, the first digit will be saved and the second digit will flash up on the display.
5. Now use the SELECT-button to enter the second digit of the tariff.
6. To enter further digits, repeat steps 4. and 5.
7. After you key in the last digit and press the SET-button, the decimal point indicator will flash.
8. Use the SELECT-button to move the position of the decimal point.
9. Now press the SET-button to save. The " -:-" sign will flash up in the upper line of the display and COST/kWh will disappear.
10. If you only want to program in one tariff, you can exit by pressing the FUNCTION-button. (To program a second tariff (for example: night time tariff), read the section "PROGRAMMING OF DUAL TARIFFS" below.
11. To return to the voltage display (base mode), press the FUNCTION-button and hold down for approximately 3 seconds.
12. To check your settings, press and hold down the FUNCTION-button for approximately 3 seconds in the base mode. The display will immediately show the settings for that tariff. Press the FUNCTION-button again to display the set up screen where the "maximum current" will be displayed. (You will find the procedure for the set up process later in the manual).
Press and hold down the FUNCTION-button for approximately 3 seconds to return to base mode.

Example: Input a tariff of £ 0,152/kWh

- In the voltage display mode press and hold down the **FUNCTION**-button for approximately 3 seconds. Then press the SET-button.
- The first number "0" is flashing. Press now the **SET**-button again to save.
- The second digit will flash. Press the **SELECT**-button to display "1" and save by pressing the SET-button.
- The third digit will flash. Press the **SELECT**-button, until the number "5" is displayed and save by pressing the SET-button.
- The fourth digit will flash. Press the **SELECT**-button, until the number "2" is displayed and save by pressing the SET-button.
- The decimal point will flash. Press the **SELECT**-button until the decimal point is in the desired position (before number "1") and press the SET-button to save.
  Press the **FUNCTION**-button to exit the programme mode.
  Press and hold down again for approx. 3 seconds to return to base mode.

PROGRAMMING OF DUAL TARIFFS:

You can set up the EM for two different tariffs (for example: day time tariff and night time tariff).

1. Follow the procedure for programming one tariff (see section "PROGRAMMING OF THE LOCAL ELECTRICTY TARIFF", step 1 to step 8).
2. Press the SET-button, to save the decimal point position.
3. Using the SELECT-button enter the combination of days, that apply to the first tariff. The following options are available, each day separate (display: either SU or MO or TU......), Monday to Friday (display: SU MO TU......FR), Monday to Saturday (display: MO TU WE......SA), Weekend (display: SU SA).
4. Save your selection of the day combination, by pressing the SET-button. The hour display will flash.
5. Use the SELECT-button to select the hour tariff 1 should start. Save by pressing the SET-button.
6. Use the same procedure, to enter the minutes.
7. Now press the FUNCTION-button. On the display will be "Price 2".
8. To enter the second tariff, use the same method as described above. (press the SET-button and the first digit of the cost factor will start flashing......).
9. After you have saved the minute settings with the SET-button, press the FUNCTION-button. The maximum current ("MAX. LOAD") will be displayed.
10. Now press the FUNCTION-button and hold down for approximately 3 seconds to go back to the voltage display (base mode).
11. Now check the figures you have entered.
    - Press and hold the FUNCTION-button down for approximately 3 seconds. The display shows the setting for tariff 1. If you press the FUNCTION-button again, the display will show tariff 2. Press the FUNCTION-button a third time and you will see the setting of the maximum current on the display. Press and hold the FUNCTION-button down for approximately 3 seconds to return to the base mode.
    - To cancel the tariff 2 settings press and hold down the FUNTION-button for approx. 3 seconds, then press again to display the tariff 2 settings. Now press again and hold down the FUNTION-button for approx. 3 seconds. The settings will be deleted.

FUNCTIONS:

- The EM can measure the following: main voltage (V), current (AMP), power consumption (WATT), max. power consumption (WATT), consumption rate (kWh) and the time, how long an appliance has been connected. Using the data entered, the EM calculates the cost of running an appliance by multiplying V (voltage) x A (current) x cos. Phi (power factor) x local tariff (kWh) x t (connecting time).
- The various functions available can be accessed by pressing the FUNCTION-button up to 6 times.

FUNCTION 1 (FIGURE 4):

Display of the alternating voltage: (Volts AC)
Base mode
Example:

Main voltage display:	230 (V)
Frequency display:	50 (Hz)
Time display:	14:47 38

FUNCTION 2 (FIGURE 5):

Display of the current: (AMPS)
Press Function button once
Example:

Current display:	3.30 (A)
Cos. Phi display:	0.95 (power factor)
Time display:	14:47 38

FUNCTION 3 (FIGURE 6):

Display of power consumption: (WATTS)
The power consumption is measured in Watts. It is calculated from the current (A), the voltage (V) and the indicated power factor (cos. Phi). The power factor gives the phase displacement angle and therefore the ratio of the active power to the apparent power. This is necessary, to avoid errors when measuring power consumption of inductive and capacitive equipment such as refridgerators or fluorescent lights.
Example:

Watts input display:	721 (W)
Cos. Phi display:	0.95 (power factor)
Time display:	14:47 38

FUNCTION 4 (FIGURE 7):

Display of the max. power consumption: (WATTS)
The maximum power consumption is shown on the display in watts. To differentiate between the power consumption (FUNCTION 3) and the max. power consumption (FUNCTION 4), the display will show the mark MAX. in this mode. The time and the power factor displayed, refer to the highest power consumption measured. To delete this data, press the FUNCTION-button and hold down for approximately 3 seconds.
Example:

Max. watts input display:	920 (W)
Cos. Phi display:	0.90 (power factor)
Time display:	14:47 38

FUNCTION 5 (FIGURE 8):

Display of the energy consumption: (kWh)
Press the FUNCTION-button 4 times.
The display shows you the total amount of energy used. To delete the data from the memory, press and hold down the function button for approximately 3 seconds.
Example:

Display of the energy usage:	10.30 kWh
Display of the time:	12:38 59

FUNCTION 6 (FIGURE 9):

Costs display: COST
Press the FUNCTION-button 5 times.
The unit shows the total cost of the energy used by an appliance connected to it, based on the tariff data entered. The display can show values from 0,000 to 9999. If the value is higher than 9999, the display will stop at that figure. If you want to delete this data from the memory, press and hold down the FUNCTION- button for approximately 3 seconds. The display also shows the total amount of time, the connected unit was in use. Of course, this only works if both the EM and the connected unit are switched on.
NOTE: If the connected appliance draws less than 0.02 A of current (min. 0.02 A displayed in FUNCTION 2) the EM can't measure the operating time.
Example:
Display of the total cost   :   1,563 (£)
Display of the total connected time : 14:17 (H:M)

If you have programmed in two tariffs, the EM will display the total cost and the total time during which the appliance has been connected first. Press the FUNCTION-button once more for the cost and the connected time under tariff 1. Press the FUNCTION-button again for the cost and the connected time under tariff 2.

FUNCTION 7 (FIGURE 10):

Press FUNCTION-button 6 times.
Displays when programmed max current level is exceeded. This function allows the programming of a maximum current consumption. If the programmed value is exceeded, the display shows "**Overload Warning**". During the display of the warning the EM will continue the measurement. (If you don't need this function, keep the settings for this function on the value 0:00. Then the function is deactivated.)

1. Press and hold down the FUNCTION-button for approximately 3 seconds in the base mode.
2. Press the function button again, Max. Load will be displayed. If you have programmed two tariffs, you must press the FUNCTION-button twice to come to the Max. Load display.
3. Press the SET-button. The first digit will flash.
4. To adjust the first digit press the SELECT-button.
5. To adjust the other 3 digits, proceed as described above.
6. To save, press the FUNCTION-button and hold down for approximately 3 seconds.
Now if the maximum current programmed in is exceeded the display shows "MAX OVERLOAD". You can reset the display by pressing the FUNCTION-button.

ERROR RECTIFICATION/RE-SETTING:

* The EM monitor produces no display:
Press one of the buttons, SELECT, SET or FUNCTION or press the R-button. (If you press the R-button the EM must be re-programmed).
Change the battery and press the R-button. (In this case you also have to re-programme).
* The EM shows unusual displays:
Press the R-button. (The EM must be re-programmed).
* The EM did not respond to button commands:
Press the R-button. (The EM must be programmed).
* The EM shows no current and no output, even though an appliance is connected:
The current consumption is too small < 0.02 A
* The EM didn't display any cost:
A price for one kWh has not been programmed into the unit. The switch on time is too short. The Energy monitor has not been switched on long enough.

INSERTING/CHANGING THE BATTERIES:

* Disconnect the EM from the power supply before changing the batteries.
* Open the battery compartment with a screwdriver and insert the 2 x 1.5 V batteries (Type LR44 A 76 V13 or RW82) according to their polarity. Close the battery compartment and screw tight.
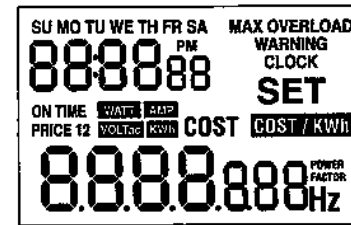* Do not dispose of batteries with the normal household rubbish. Dispose of carefully.
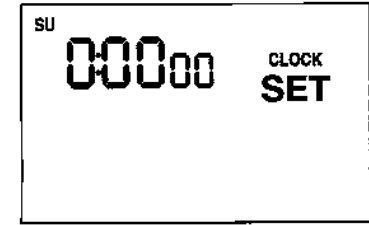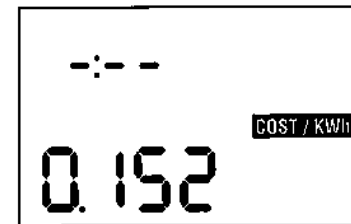

FIG. 1
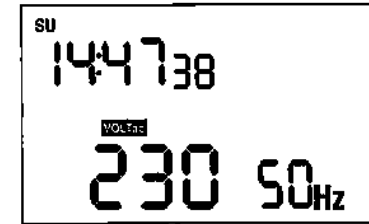

FIG. 2   Time Setting

FIG. 3   Tariff Setting

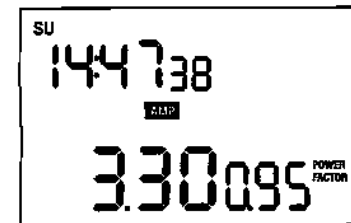FIG. 4   Voltage Reading

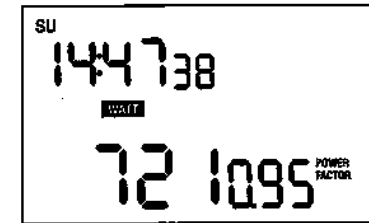FIG. 5   Current Reading

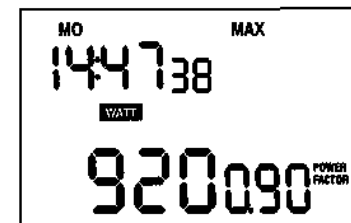FIG. 6   Power Consumption

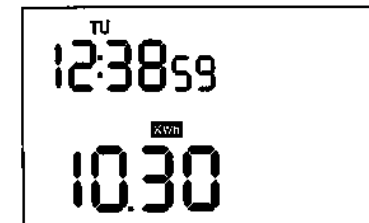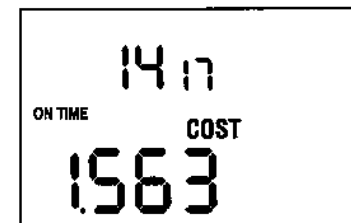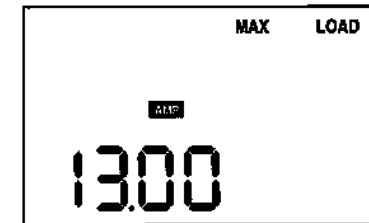FIG. 7   Max. Power consumption

FIG. 8   Kwatt Hour Display

FIG. 9   Cost of energy consumption

FIG. 10   Max. load Setting