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DC ENERGY METER

1. General Features

ICD's **DC ENERGY METER-DEM9004F** is designed with latest state of art technology. This microcontroller based instrument, displays Voltage,current, kW, import & Export kWh, runhour &Net energy(difference between import & export energy).

The above power parameters are shown on a 2 row 16 character LCD display with backlit. Four keys are provided on the front panel of the meter to access these informations easily and quickly. The front panel is provided with antiglare feature for improved readability.

The Unit is powered by 24-60V DC ,Input Voltage is 0-1500 Vdc & 0 - 4 Vdc from hall effect input current terminal provided in back side of the unitThe meter is also provided with a optional RS 485 optically isolated communication port supporting MOD BUS RTU protocol. The port is very useful in networking the meters in multidrop communication and to collect datas in a centralised control room using any standard SCADA Software package like cimplicity, intellution, wonderware & citech etc.

2. Installation & Mounting

The Unit is housed in a compact ABS plastic enclosure of dimension 96(H)x96(W)x45(D)mm. The meter is suitable for panel mounting and has reliable mounting clamps to hold the meter to the panel.

The panel cutout for fixing the meter is 92x92 mm. The depth behind the panel is 45 mm. Extra space should be provided for the connectors and wiring. The panel cutout should be punched with proper tool and should be free from burrs. Place the meter through panel cutout from front and fix the mounting clamps provided with the meter on each side. Tighten the fixing clamps with limit amount of force so as to hold the meter in position.



3. Front & Rear Panel Details

3.1 Front Panel

Front Panel consists of

a) 2 row 16 character LCD display, Run mode parameters & configuration items.

b) 3mm Red & Green LED, Each 1 No is provided to indicatate

Communication status.

c) 1x4 matrix keys to view run mode parameters & to set configuration items in Program mode

Rear Panel Details



4. NET ENERGY DESCRIPTION:

If Export energy value is greater than Import energy the difference between net energy value shows Export (N-) only For example:

 $\begin{array}{cccc}
-12.00 \longrightarrow & \text{Export energy} \\
4.00 \longrightarrow & \text{Import energy} \\
-8.00 \longrightarrow & \text{Differrence(so, it display Export N-)} \\
& \text{Whenever the Import energy is greater than Export energy} \\
& \text{the difference value of net energy shows Import(N+)} \\
& 12.00 \longrightarrow & \text{Import energy} \\
& -4.00 \longrightarrow & \text{Export energy} \\
& 8.00 \longrightarrow & \text{Differrence(so it display Import N+)} \\
\end{array}$

4.1 Key Description : Kevs Normal operating mode Program mode Index key SCRL/HLD # (To select Menus) (To switch between Scroll/Hold SCRI /HI mode) To increment Display Shift Key (To move between characters pages & to select parameters) Increment Key To decrement Display (To increment the selected pages digit & to select parameters) More Key Enter Key ┛ (To view further sub pages) (To store the modifications & MORE datas)

4.2 Changing the configuration Items

In program mode, after selecting the configuration item through Index key, It can be altered by using shift, Increment & Enter key.

The shift (\blacktriangleright) key is used to select the digit one by one. The selected digit is shown by flashing that digit.

The Increment (\bigstar) key is used to increment the selected digit. The increment key Increments the digit from 0 to 9 and then wraps down to zero once again. Shift and Increment keys are also used for selecting the required parameter.

Once the required values are set in the configuration items press the Enter \downarrow key to store it in memory. If the change is accepted the display Indicates 'E' otherwise an error message is displayed as 'Error'.

Once the configuration Items are programmed hold in the ► & ▲ keys together for 3 seconds to return back to normal operating mode.

5. Programming Instructions

All meters are to be programmed properly to work in a particular Installation. The various items that are to be programmed are shown in the table below.

Configuration	ltem	In	Meter
---------------	------	----	-------

New pass word	In All meters
Current Set	In All meters
Device Address	In All meters
LCD Power save	In All meters
Energy reset	In All meters

The Meters are provided with password facility to prevent alteration of configuration items by unauthorised persons. The configuration Items of the meter may be changed by following the sequence given below.

With power applied to the meter hold in the \blacktriangleright & \blacktriangle keys (shift and Incr) together for 3 seconds. The display Indicates enter

password

PROG PASS	W	0	RD
1	1	1	1

The password set in the menu, "new password" has to be entered by using Shift, Incr and enter keys (Refer changing the configuration items for using Shift, Incr and Enter keys). After valid password is entered the meter enters into program mode by showing it

in display.

PROGRAM MODE

Special Note :

If the user enters the 'Enter pass word' for the first time, or if the user fails to remem ber the password entered in 'New pass word', the default password **0386** can be entered.

The configuration Items can be selected by pressing the Index (#) key. Top row in displays are used to differentiate the various configuration items. The displays for various configuration item are given below,



ENERGY RESET ENERGY CLEARED Energy Reset. (pressing Enter key resets energy & Run Hour and displays "ENERGY CLEARED" in Bottom Row)

Press # Key

Again pressing Index (#) key repeats the same process in cyclic manner. Press ▶ & ▲ keys (Shift & Increment) together for few seconds to quit program mode & return to RUN mode.

6. RUN Mode display pages

When power is applied to the meter the starting message consisting of Meter name & version number is displayed and the run mode is selected automatically. In Run mode the power parameters are shown in different pages. These pages are accessed using the "Page UP & DOWN" keys provided on the front panel. The display pages, can also be made to scroll automatically 5 seconds once by selecting scroll mode by pressing scroll/hold key. The Scroll or Scroll/Hold key toggles between Scroll & Hold mode. The available display pages are given below.



7. Communication Port Details

The **Dc Energy meter** is provided with a optically Isolated **RS 485** communication Port. It is an optional Feature and has to be specified at the time of ordering. The communication protocol used is **MOD BUS - RTU** Type. Using the communication Port, the meters can be connected in multi drop network and datas can be collected in a centralised control room using any standard **SCADA** Software.

Starting Address - 40001 Data Type - FLOAT Communication - MODBUS RTU Baud Rate - 9600 No of Elements -17

Slno	Parameters	Resolution	Elements	System Element No
1	Voltage	1	1	0
2	Current	0.1	3	2
3	Kilo watt	0.1	5	4
4	Import kwh	0.01	7	6
5	Export kwh	0.01	9	8
6	Difference kwh	0.01	11	10
7	Runhour	0.01	13	12
8	Difference sign (net)	1	15	14
9	Watt Sign	1	17	16
1				

Note:

If Export mode (Watt sign &Diff.sign shows1) Otherwise it shows 0

	12		
8. Technical specification			
Туре	: ICD make DC ENERGY METER		
Model	: DEM 9004F		
Pages selection	: through keypad provided in the front panel		
No of keys	: 4 keys namely Index, SHift, Increment & Enter.		
Communication status	: LEDs provided for TxD & RxD		
Display	: 2 row 16 character LCD Display with Backlit		
Communication Output	: RS 485 Communication output		
Auxiliary Power Supply	: 24 - 60 V DC		
Input	: 0-1500VDC		
From hall effect Ct input	: 0 - 4 VDC		
Current Setting	: 0-1000A(Programmable)		
Hall effect CT excitation Voltage input : +15V,-15V & Gnd.			
Box dimension	: 96(H) x 96(W) x 80(D) mm		
Enclosure / Mounting	: Panel		