





# TOMORROW'S TECHNOLOGY AVAILABLE TODAY





## MEASUREMENT ACCURACY : 0.2 %



VOLTAGE % 0.2

CURRENT % 0.2

FREQUENCY % 0.1

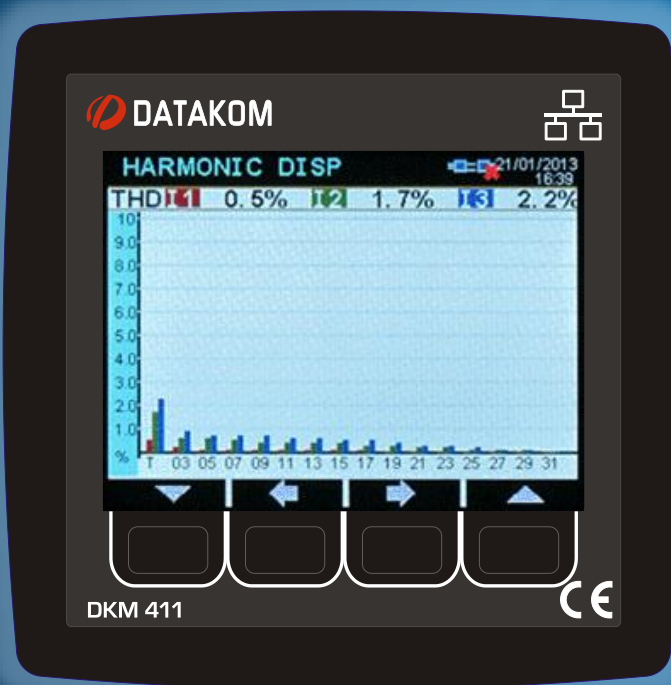
kW-kVAr % 0.4

cos  $\phi$  % 0.2



## EASY TO READ WITH COLOR GRAPHIC SCREEN

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- 3.5" TFT DISPLAY
- 320 x 240 PIXEL
- 65536 COLORS



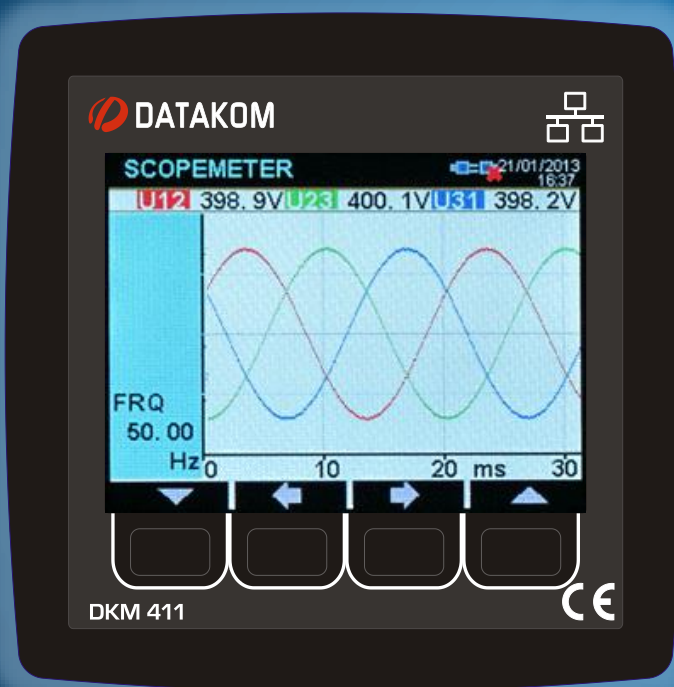
# ANALOG DISPLAYS



- READ AT A GLANCE



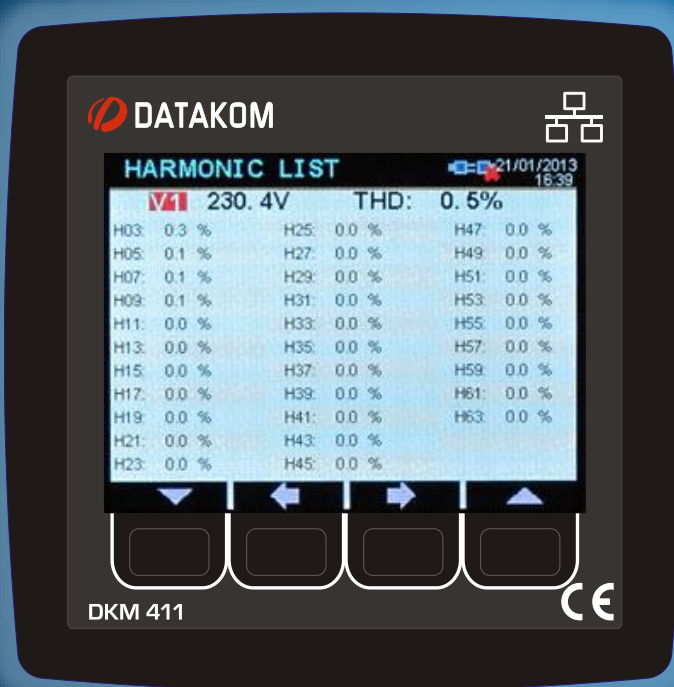
# WAVEFORM DISPLAYS



- ALL VOLTAGE & CURRENT WAVEFORMS CAN BE VISUALIZED



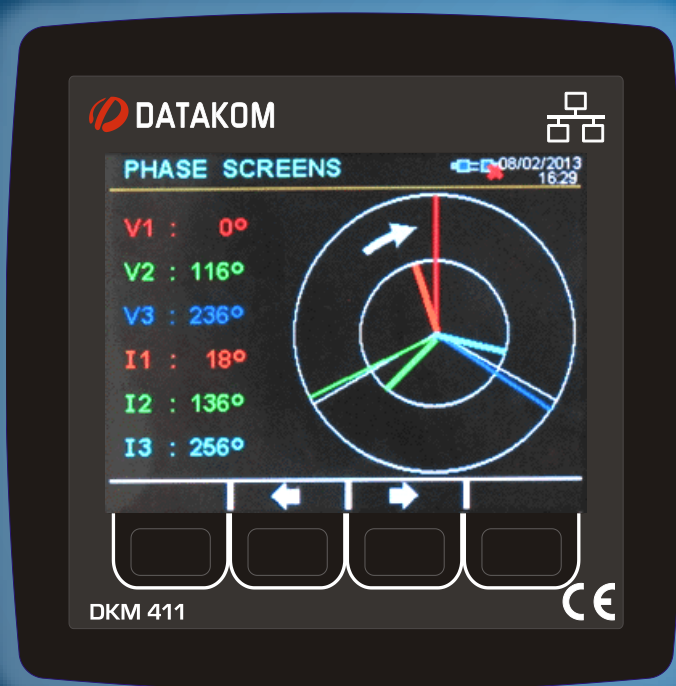
# HARMONIC ANALYSIS



- ALL VOLTAGE & CURRENT INPUTS ARE ANALYZED



# PHASOR DIAGRAM

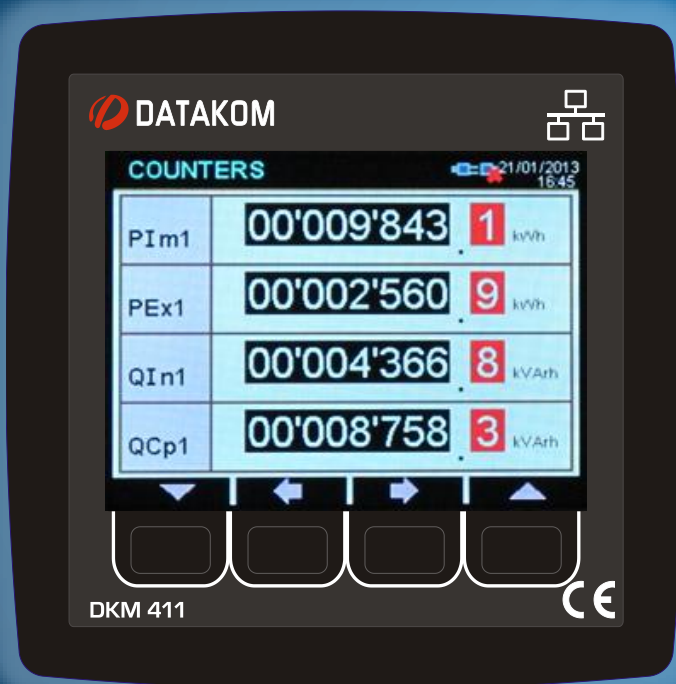


- ALL VOLTAGE & CURRENT PHASE ANGLES AT A GLANCE





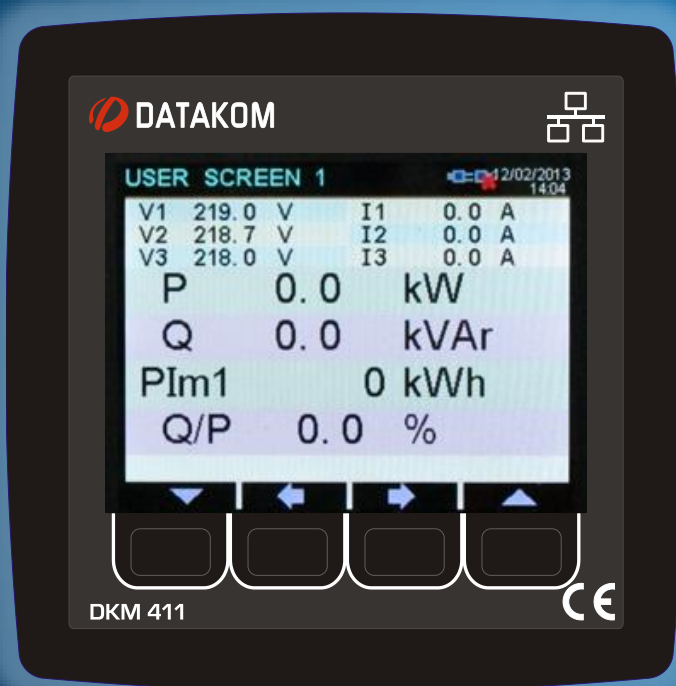
## DETAILED ENERGY COUNTERS



- IMPORT ACTIVE POWER
- EXPORT ACTIVE POWER
- INDUCTIVE REACTIVE POWER
- CAPACITIVE REACTIVE POWER
- INPUT PULSE COUNTERS
- BOTH MAINS AND GENSET



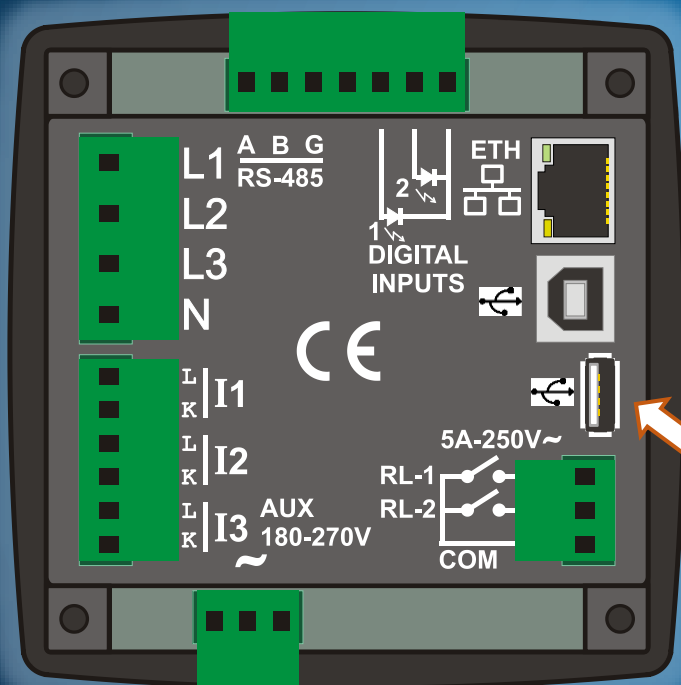
## USER CONFIGURABLE SCREENS



- 4 USER CONFIGURABLE SCREENS
- SELECTABLE CHARACTER SIZES
- MAX 24 VALUES ON ONE SCREEN



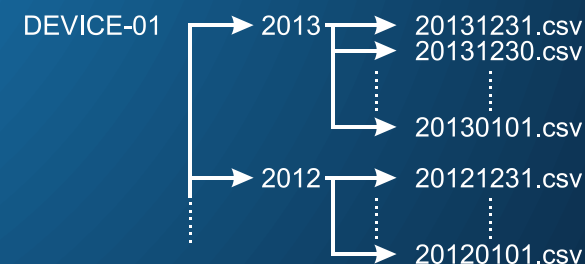
# LONG TERM DATA RECORDING



- UNLIMITED USB MEMORY CAPACITY
- RECORDS DATA IN EXCEL FORMAT
- ADJUSTABLE RECORD PERIOD
- RECORDS ALL MEASUREMENTS

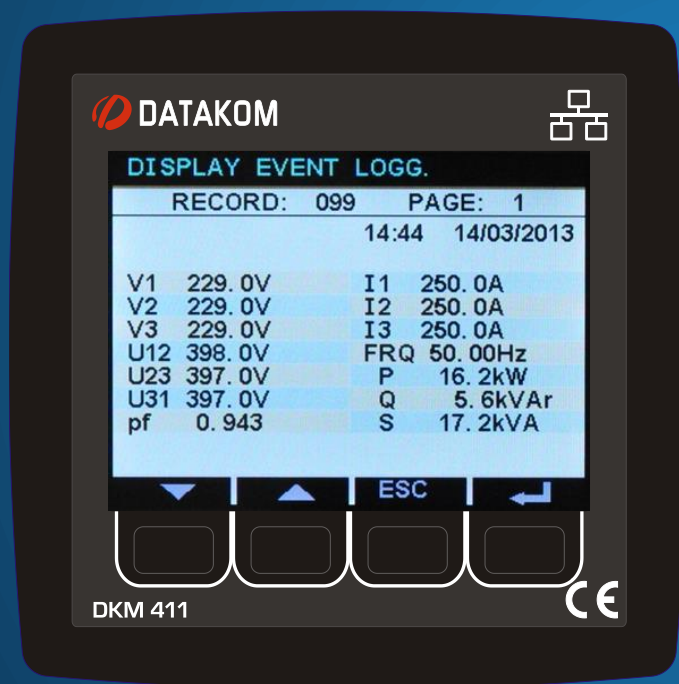


USB MEMORY





## 250 EVENT RECORDS

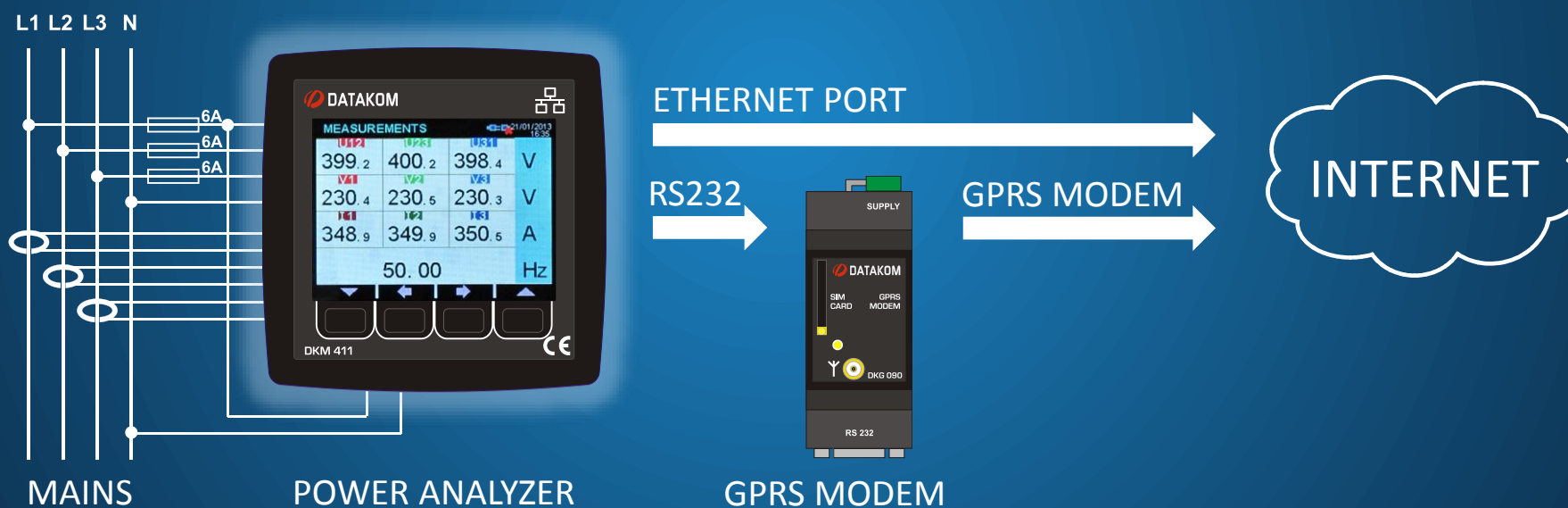


- WITH DATE & TIME STAMP
- WITH SNAPSHOT OF MEASUREMENTS
- EVENTS DOWNLOADABLE TO COMPUTER



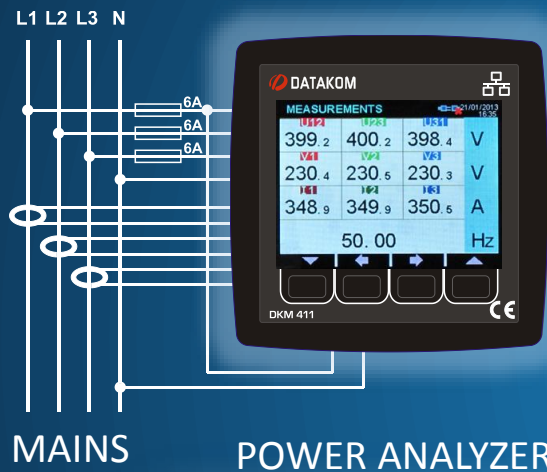
# INTERNET COMMUNICATIONS

## LAN + GPRS CONNECTIVITY





# INTERNET COMMUNICATIONS



RAINBOW SCADA  
SERVER



Rainbow Scada Ver:130314

File Help

Map Device

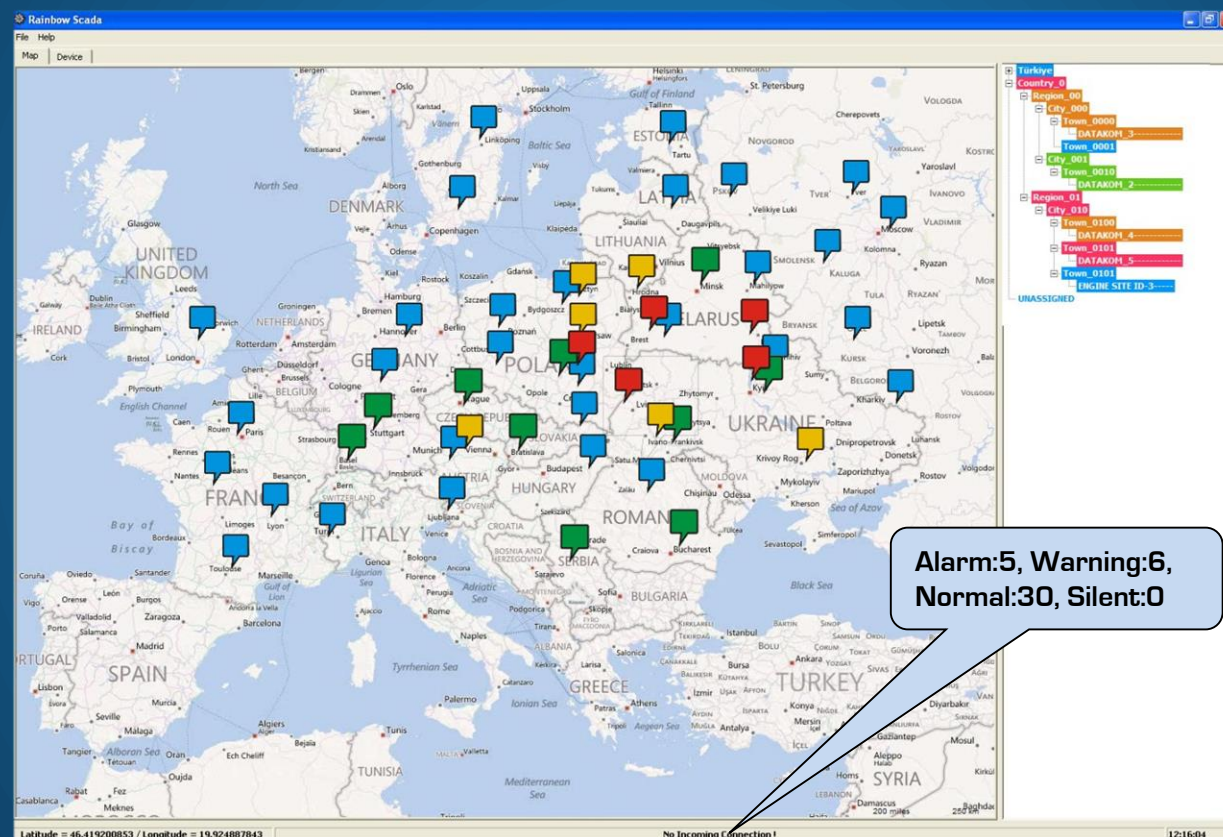
Summary Measurements Phasor Diagram Counters Demand/Min/Max Alarms

V1 = 230.4 V	P1 = 57.81 kW	THD_V1 = 0.5	Frequency = 50.00 Hz
V2 = 230.2 V	P2 = 57.73 kW	THD_V2 = 2.0	V_internal = 19.7 Vdc
V3 = 230.0 V	P3 = 57.65 kW	THD_V3 = 1.7	V_avr = 230.2 V
U12 = 399.2 V	Q1 = 0.00 kVar	THD_U12 = 1.3	U_avr = 398.9 V
U23 = 398.9 V	Q2 = 0.00 kVar	THD_U23 = 4.0	I_avr = 250.8 A
U31 = 398.6 V	Q3 = 0.00 kVar	THD_U31 = 1.5	V_Unbalance = 0.0 %
I1 = 251.0 A	S1 = 57.79 kVA	THD_I1 = 0.6	I_Unbalance = 0.0 %
I2 = 250.9 A	S2 = 57.72 kVA	THD_I2 = 2.0	
I3 = 250.7 A	S3 = 57.62 kVA	THD_I3 = 1.6	
In = 0.0 A		THD_In = 0.0	
P_tot = 173.19 kW			
Q_tot = 0.00 kVar			
S_tot = 173.13 kVA	pf_L1 = 1.000'		
pf_avg = 1.000'	pf_L2 = -1.000'		
Q/P_avg = 0.0'	pf_L3 = 1.000'		
	Q/P_L1 = 0.0'		
	Q/P_L2 = 0.0'		
	Q/P_L3 = 0.0'		

MONITORING SOFTWARE



# DISPLAYING 60'000 UNITS ON ONE SCREEN



 **ALARM**  **WARNING**  **SILENT**  **RUNNING**  **REST**



# DETAILED MONITORING

The screenshot shows the Rainbow SCADA interface for a device with ID 130314. The interface includes a menu bar with 'Map' and 'Device' options, and a tabbed navigation system with tabs for 'Summary', 'Measurements', 'Phasor Diagram', 'Counters', 'Demand/Min/Max', and 'Alarms'. The 'Measurements' tab is active, displaying phase angles for voltages (V1, V2, V3) and currents (I1, I2, I3). The 'Phasor Diagram' tab is also visible, showing a vector diagram with three voltage vectors (V1, V2, V3) and three current vectors (I1, I2, I3) plotted on a polar coordinate system. The 'Alarms and Warnings' and 'Demand and Min-Max Values' sections are also present in the interface.

**RETURN TO MAP**

**INSTANT MEASUREMENTS**

**PHASOR DIAGRAM**

**ENERGY COUNTERS**

**ALARMS AND WARNINGS**

**DEMAND AND MIN-MAX VALUES**

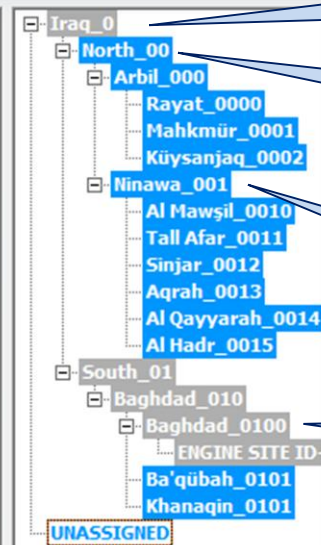
**COMMUNICATION INFORMATION**

teta\_V1 = 0°  
teta\_V2 = 120°  
teta\_V3 = 240°  
teta\_I1 = 18°  
teta\_I2 = 141°  
teta\_I3 = 260°





# GROUPING OF CENTERS



Country

Region

City

Town

Site-Id



# EMBEDDED WEBSITE

REACH THE UNIT FROM ANYWHERE IN THE WORLD WITH A WEB BROWSER

LINE	POWER	THDs
L1 Volt 230.2V	Tot P 200.7kW	THD L1 0.4%
L2 Volt 230.1V	Tot Q 51.1kVAr	THD L2 1.6%
L3 Volt 230.1V	Tot S 207.1kVA	THD L3 1.6%
L12 Volt 399.0V	PowFactor 0.969 ind	THD L12 1.9%
L23 Volt 398.6V	Demand I1 300.9 A	THD L23 8.3%
L31 Volt 398.5V	Demand I2 300.6 A	THD L31 2.1%
L1 Amps 300.5A	Demand I3 300.4 A	THD I1 0.4%
L2 Amps 300.1A	Demand Io 300.5 A	THD I2 1.5%
L3 Amps 300.3A	Demand P 207.4W	THD I3 1.6%
N Amps 0.0A	Demand Q 51.3kVA	THD In 0.0%
Frequency 50.00 Hz		
V-avg 230.1V		
U-avg 398.7V		
I-avg 300.3 A		

**COUNTERS**

Import Power (kWh1-Im)	1368.2 kWh
Export Power (kWh1-Ex)	504.3 kWh
Inductive Power (kVarh1-In)	13.8 kVarh
Capacitive Power (kVarh1-Cp)	42.4 kVarh

Import Power (kWh2-Im)	0.0 kWh
Export Power (kWh2-Ex)	0.0 kWh
Inductive Power (kVarh2-In)	0.0 kVarh
Capacitive Power (kVarh2-Cp)	0.0 kVarh

Input Counter 1 (InCnt-1)	0
Input Counter 2 (InCnt-2)	0

**EVENTS**

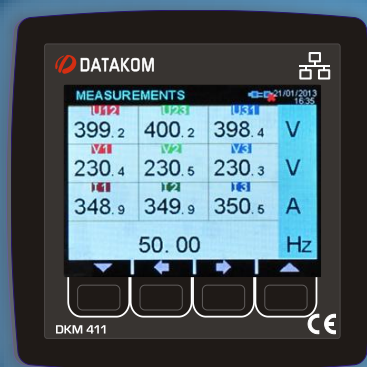
#	Event	Alarm	Date	Time	State	Status	L1 Voltage	L2 Voltage	L3 Voltage	Frequency	L12 Voltage	L13 Voltage	L23 Voltage	L1 Current	L2 Current	L3 Current
0	Periodic	0	28-03-2002	01:13:21			176 V	176 V	175 V	50.0 Hz	305 V	305 V	305 V	150 V	150 V	149 V
1	Periodic	0	28-03-2002	02:11:14			176 V	176 V	176 V	50.0 Hz	305 V	305 V	305 V	300 V	300 V	149 V
2	Periodic	0	27-03-2002	23:11:06			175 V	176 V	176 V	50.0 Hz	305 V	305 V	305 V	300 V	299 V	150 V
3	Periodic	0	27-03-2002	22:11:02			176 V	176 V	176 V	50.0 Hz	305 V	305 V	305 V	300 V	300 V	150 V
4	Periodic	0	27-03-2002	19:36:20			0 V	0 V	0 V	0 Hz	0 V	0 V	0 V	0 V	0 V	0 V
5	Periodic	0	27-03-2002	18:36:20			0 V	0 V	0 V	0 Hz	0 V	0 V	0 V	0 V	0 V	0 V
6	Periodic	0	27-03-2002	17:36:20			0 V	0 V	0 V	0 Hz	0 V	0 V	0 V	0 V	0 V	0 V
7	Periodic	0	27-03-2002	16:36:19			0 V	0 V	0 V	0 Hz	0 V	0 V	0 V	0 V	0 V	0 V
8	Periodic	0	27-03-2002	15:36:19			0 V	0 V	0 V	0 Hz	0 V	0 V	0 V	0 V	0 V	0 V
9	Periodic	0	27-03-2002	14:36:19			0 V	0 V	0 V	0 Hz	0 V	0 V	0 V	0 V	0 V	0 V
10	Periodic	0	27-03-2002	13:36:18			0 V	0 V	0 V	0 Hz	0 V	0 V	0 V	0 V	0 V	0 V
11	Periodic	0	27-03-2002	12:36:17			0 V	0 V	0 V	0 Hz	0 V	0 V	0 V	0 V	0 V	0 V
12	Periodic	0	27-03-2002	11:36:17			0 V	0 V	0 V	0 Hz	0 V	0 V	0 V	0 V	0 V	0 V
13	Periodic	0	27-03-2002	10:36:17			0 V	0 V	0 V	0 Hz	0 V	0 V	0 V	0 V	0 V	0 V
14	Periodic	0	27-03-2002	09:36:17			0 V	0 V	0 V	0 Hz	0 V	0 V	0 V	0 V	0 V	0 V
15	Periodic	0	27-03-2002	08:36:16			0 V	0 V	0 V	0 Hz	0 V	0 V	0 V	0 V	0 V	0 V

- INSTANT MEASUREMENTS
- POWER COUNTERS
- EVENT RECORDS
- ALARMS AND WARNINGS



# E-MAIL SENDING ON FAULT

BE AWARE OF FAULTS ANYTIME

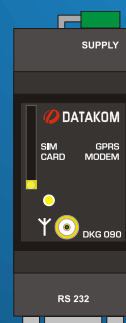


POWER ANALYZER

ETHERNET PORT

RS232

GPRS MODEM



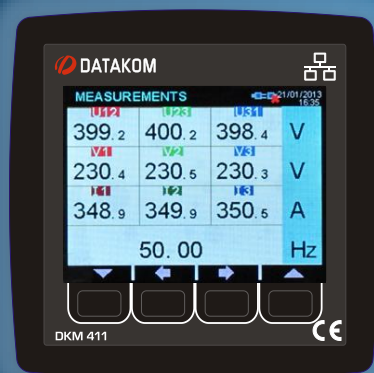
GPRS MODEM





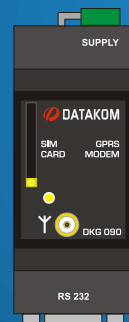
# SMS SENDING ON FAULT

BE AWARE OF FAULTS ANYTIME - ANYWHERE



POWER ANALYZER

RS232



GPRS MODEM

GPRS MODEM





# REMOTE PARAMETER SETTING

MANAGE YOUR SITE FROM YOUR DESK !

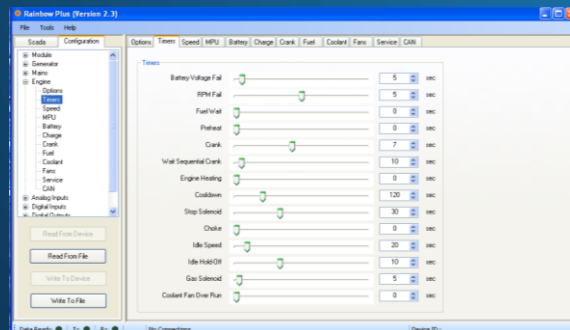
RAINBOW SCADA  
SERVER



INTERNET



POWER ANALYZER



RAINBOW PLUS  
SOFTWARE



# DATA SECURITY

DATA IS SENT TO YOUR CONTROL CENTER ONLY !



NOBODY CAN REACH YOUR DEVICE BEHIND FIREWALL !



## EASY INSTALLATION

ANALYZERS CAN WORK WITH LOCAL IP THROUGH LAN



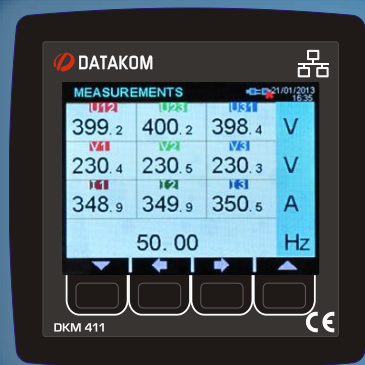
RAINBOW SCADA  
SERVER

- NO STATIC IP REQUIRED !
- NO ADDITIONAL DATA SERVER REQUIRED !



## COST EFFECTIVE

TRANSMIT DATA WITH LESS COST !



RAINBOW SCADA  
SERVER

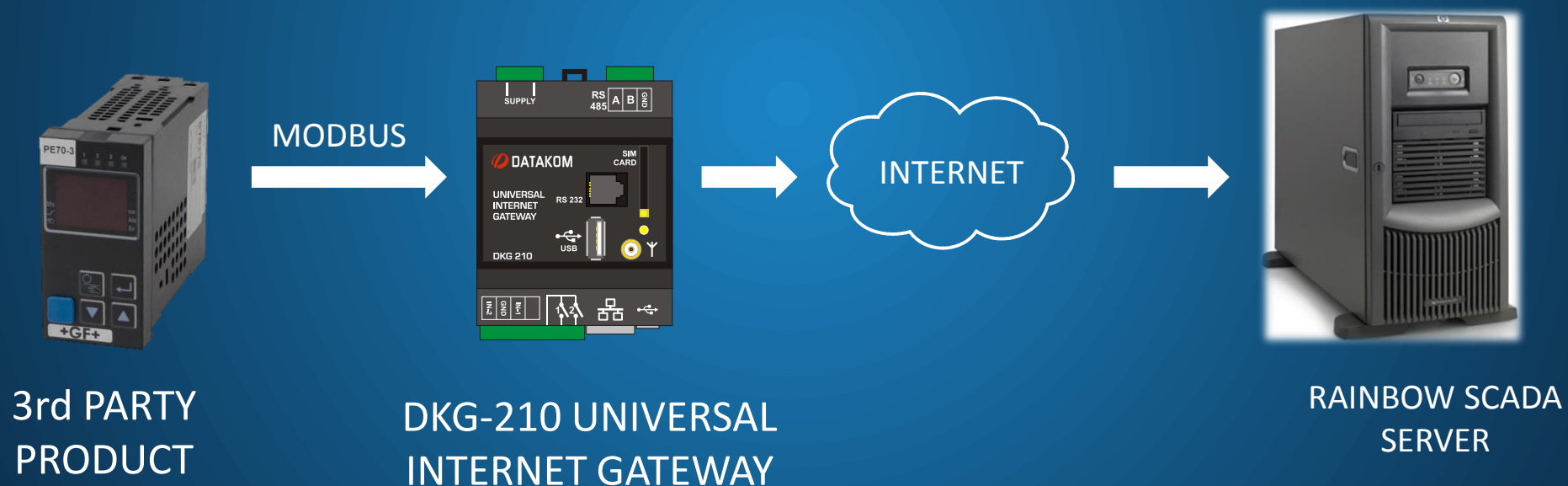
- THE DEVICE SENDS IP PACKETS TO THE DATA CENTER
- ALL INFORMATION IS SENT WITH A SINGLE DATA PACKET
- NO NEED TO QUERY THE UNIT FROM THE DATA CENTER !





# INTEGRAL APPROACH

INTEGRATE THIRD PARTY PRODUCTS IN THE SAME NETWORK



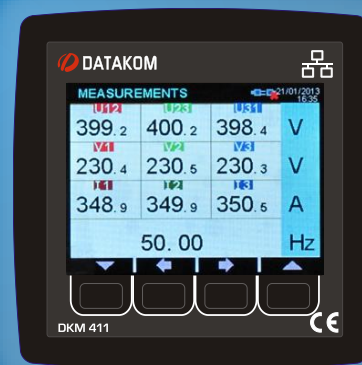


# AUXILIARY CONTROL RELAY OUTPUTS

## CONTROL YOUR REMOTE STATION VIA DKM-411



RAINBOW SCADA  
SUNUCU



POWER ANALYZER

AUXILIARY  
DEVICE

AUXILIARY  
DEVICE



# IMMEDIATE FAULT DETECTION

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REDUCE DOWN TIME WITH FASTER INTERVENTION



**YES !**



**NO !**



# USE LESS MANPOWER FOR SERVICING

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AVOID UNNECESSARY SITE VISITS



**NO !**



**YES !**



## ADVANTAGES

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- ACCURATE AND DETAILED MEASUREMENTS
- HIGH READABILITY
- LONG TERM DATA RECORDING
- INTERNET MONITORING
- 2 YEARS FREE REMOTE MONITORING
- GENERATE ALERTS BEFORE THEY BECOME EMERGENCIES
- IMMEDIATE FAULT DETECTION
- REDUCE YOUR DOWN TIME WITH FASTER INTERVENTION
- AVOID UNNECESSARY SITE VISITS
- LESS POWER FAILURE, BETTER POWER QUALITY
- SECURE DATA FLOW
- INTEGRATE THIRD PARTY PRODUCTS IN THE SAME NETWORK
- CONTROL YOUR ENTIRE REMOTE STATION VIA DKM-411