

# DKM-411

## POWER ANALYSER

- COLOUR TFT SCREEN
- IP COMMUNICATIONS
- HARMONIC ANALYSIS
- SCOPEMETER

The DKM-411 is an advanced precision metering device offering a 3.5" size, 320x240 pixel color TFT, together with unrivalled remote monitoring capabilities over internet in a compact and low-cost package.

The unit itself is a web page and can be opened through any browser for remote monitoring.

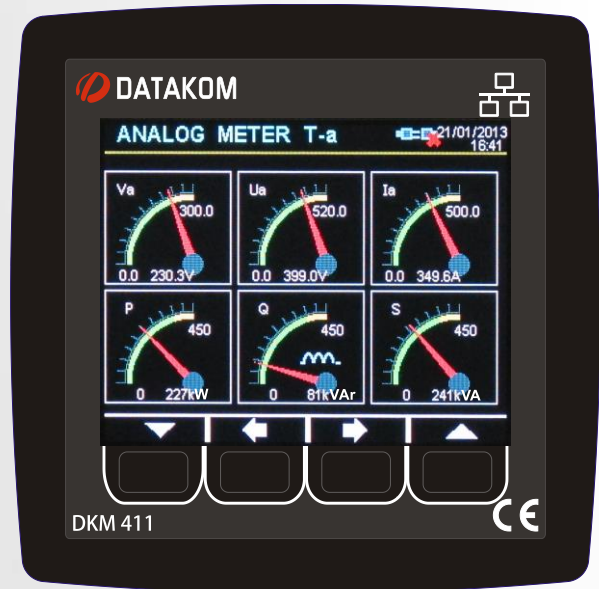
The central monitoring feature allows monitoring of thousands of meters from one central PC.

### FEATURES

- True RMS measurements, 0.2% accuracy*
- 3.5" TFT LCD, 320x240 pixels*
- Harmonic distortion display (63 harmonics)*
- Oscilloscope, waveform display*
- Phasor diagram display*
- Internal battery backed-up real time clock*
- Max demand display*
- User configurable display screen*
- 2 configurable relay outputs*
- Energy pulse output capability*
- 2 opto-isolated, configurable digital inputs*
- Dual active-reactive power counters*
- Both mains/generator energy metering*
- Configurable user counters*
- Voltage transformer ratio for MV applications*
- Password protected front panel programming*
- Universal supply input (both AC & DC)*
- Reduced panel depth*
- Sealed front panel (IP54)*

### MEASUREMENTS

- Phase to phase voltages: U12-U23-U31-Uavg
- Phase to neutral voltages: V1-V2-V3-Vavg
- Phase currents: I1-I2-I3-In-Iavg-Itot
- Active power: P1-P2-P3- $\Sigma$ P
- Reactive power: Q1-Q2-Q3- $\Sigma$ Q
- Apparent power: S1-S2-S3- $\Sigma$ S
- Power factor: cos1-cos2-cos3- $\Sigma$ cos
- Active power counters: Pc1-Pc2
- Reactive power counters: Qc1-Qc2
- User counters: USR1-USR2-USR3-USR4
- 2...63 Harmonics of any voltage or current
- Phase to neutral voltages vector angles
- Phase to phase voltages vector angles
- Phasor vector diagram



### COMMUNICATIONS

- Modbus RTU RS-485*
- Modbus TCP/IP*
- SNMP*
- TCP/IP server*
- TCP/IP client*
- UDP*
- SMTP*
- Embedded web server*
- Web monitoring*
- Web programming*
- GSM-SMS sending*
- e-mailsending*
- Central Monitoring through IP*
- Free configuration & monitoring software*

### COMMUNICATION PORTS

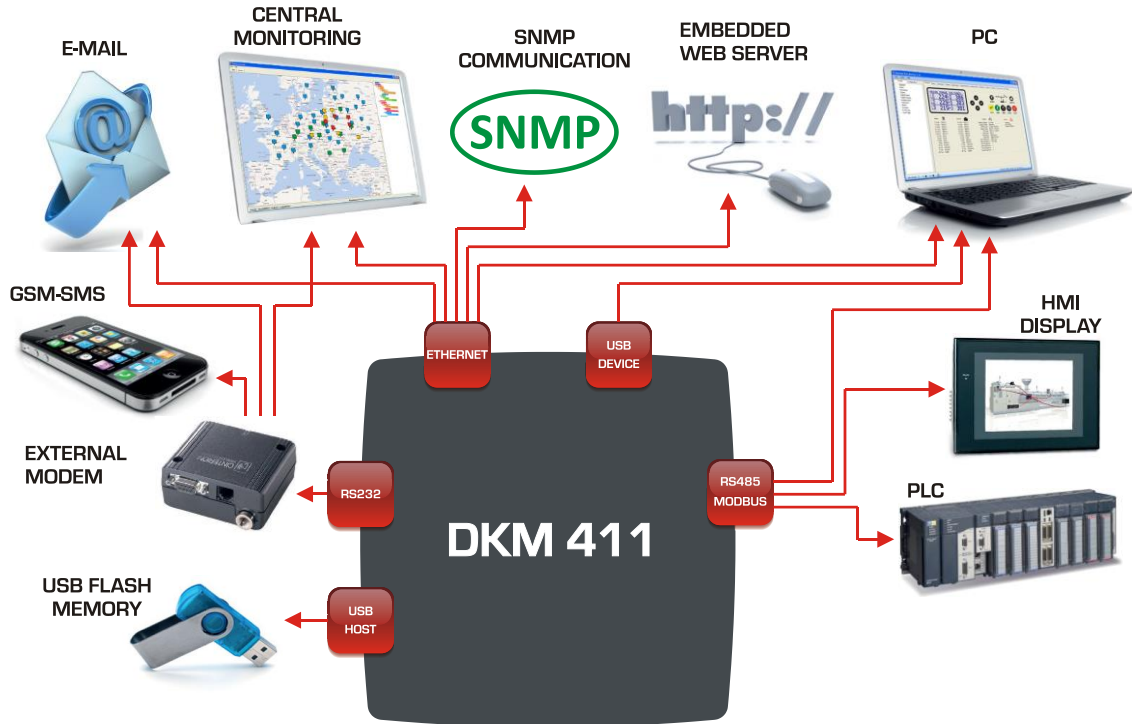
- Ethernet 10/100Mb*
- RS-485 isolated (Modbus RTU)*
- RS-232 for external GPRS modem*
- USB Host for data recording on flash memory*
- USB Device for PC connection*

### SUPPORTED TOPOLOGIES

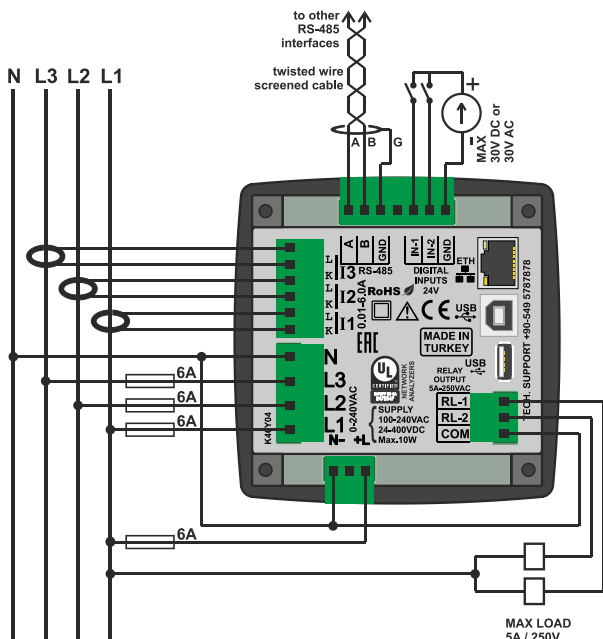
- 3 phases 4 wires, star*
- 3 phases 3 wires, 3 CTs*
- 3 phases 3 wires, 2 CTs (L1-L2)*
- 3 phases 3 wires, 2 CTs (L1-L3)*
- 3 phases 4 wires, delta*
- 2 phases 3 wires, L1-L2*
- 2 phases 3 wires, L1-L3*
- 1 phase 2 wires*



## COMMUNICATION DIAGRAM



## CONNECTION DIAGRAM



## TECHNICAL SPECIFICATIONS

**Power Supply Input:** Isolated universal input  
50-305 VAC (45-500Hz)  
19-400 VDC

**Power Consumption:** < 10 W

**Measurement Input Range:**

**Voltage:** 5 - 300 V AC (L-N)

10 - 520 V AC (L-L)

**Current:** 0.1 - 5.5 A AC

**Frequency:** 30 - 500 Hz

**Accuracy:**

**Voltage:** 0.2%+1 digit

**Current:** 0.2%+1 digit

**Frequency:** 0.1%+1 digit

**Power(kW,kVAr):** 0.4%+2 digit

**Power factor:** 0.2%+1 digit

**Measurement Range:**

**CT range:** 5/5A to 10'000/5A

**VT range:** 0.1/1 to 200.0/1

**kW range:** 0.1 kW to 6.5MW

**Voltage burden:** < 0.1VA per phase

**Current burden:** < 1VA per phase

**Relay Outputs:** 5A @ 250V AC

**Digital Inputs:**

**Active level:** 5 to 30V-DC or AC

**Min pulse:** 250ms.

**Isolation:** 1000V AC, 1 minute

**Operating Temperature:**

-20°C to +50°C (-4 to +176 °F).

**Maximum humidity:** 95% non-condensing.

**Degree of Protection:** IP 65 (Front), IP 30 (Back)

**Enclosure:** Non-flammable, ROHS compliant

**Installation:** Flush mounting with rear brackets

**Dimensions:** 102x102x53mm (WxHxD)

**Panel Cutout:** 92x92mm

**Weight:** 350 gr

**UL-CSA Certification:** UL 61010-1, 3rd Edition, 2012-05, CAN/CSA-C22.2 (File: E475547, Vol. D1)

**EU Directives:**

2006/95/EC (LVD)

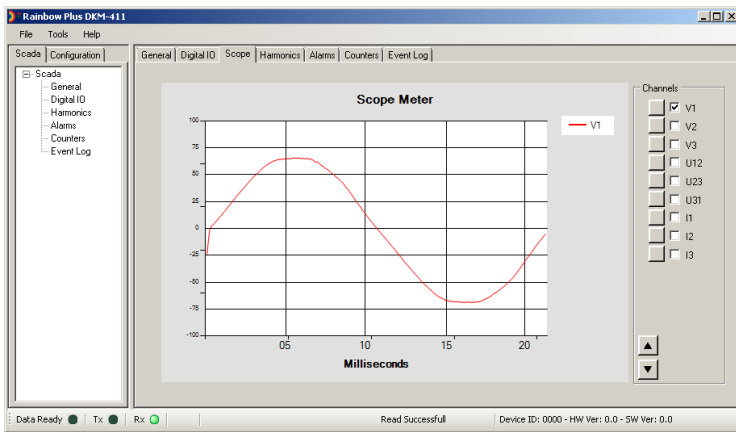
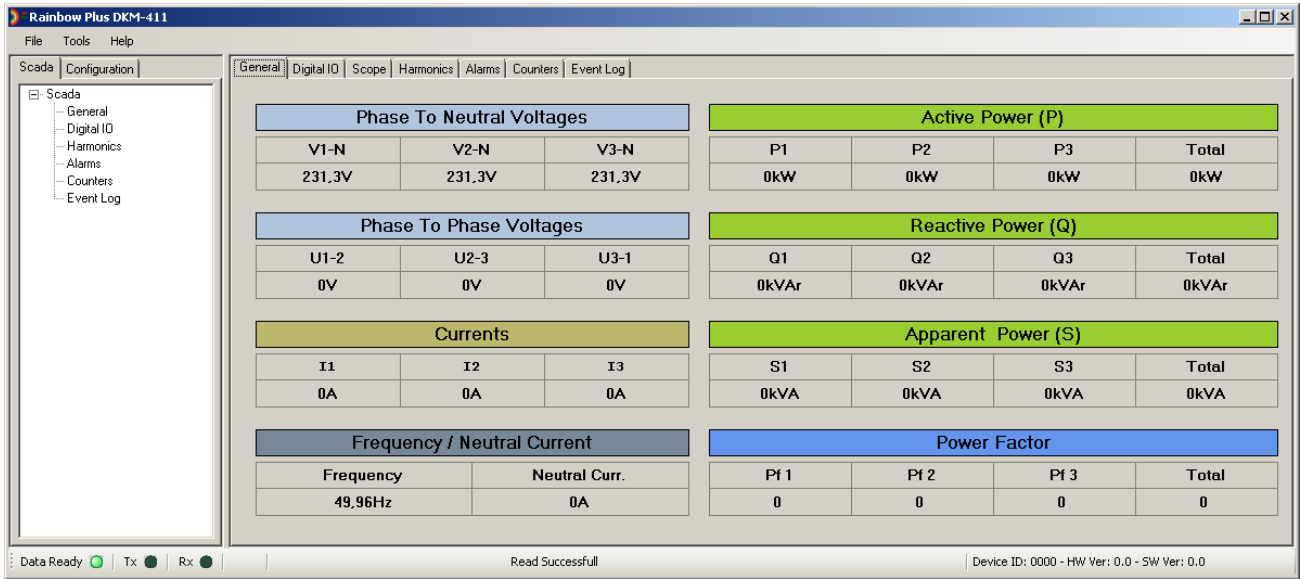
2004/108/EC (EMC)

**Norms of reference:**

EN 61010 (safety)

EN 61326 (EMC)

# RAINBOW PROGRAM



**Cancel Scada Data**

Serial Port  TCP/IP  USB  Rainbow Scada

Connect, Disconnect, Return

**TCP/IP**

IP Address: 192.168.2.6 Device Address: 1

Modbus Port: 502 Scan Interval: 1500 ms

No Connection, State, TX, RX

**Timers**

- Duration Time for Volt. Alarms: 30 sec
- Duration Time for Freq. Alarms: 30 sec
- Dur. Time for Act. Pow. Alarms: 30 sec
- Dur. Time Reac. Pow. Alarms: 30 sec
- Dur. Time for Cos. Alarm: 30 sec
- Dur. Time for Current Alarm: 30 sec
- Dur. Time for THD-V Alarm: 30 sec
- Dur. Time for THD-I Alarm: 30 sec
- Volt. Unbalance. Duration: 30 sec
- Curr. Unbalance Duration: 30 sec

Buttons: Read From Device, Read From File, Write To Device, Write To File

Status: Data Ready, Tx, Rx. Read Successful. Device ID: 0000 - HW Ver: 0.0 - SW Ver: 0.0

# CENTRAL MONITORING

**Cihaz Değerleri (ENERJİ ANALİZÖRÜ)**

Ozet | **Ölçümler** | Sayacılar | Talep/Min/Max | Alarmlar

V1 : 221.3 V	P1 : -0.02 kW	THD_V1 : 2.4	Frekans : 49.99 Hz
V2 : 227.9 V	P2 : 0.06 kW	THD_V2 : 2.0	V_internal : 18.0 Vdc
V3 : 219.7 V	P3 : 0.16 kW	THD_V3 : 1.9	V_ave : 222.9 V
U12 : 387.5 V	Q1 : -0.90 kVAR	THD_U12 : 1.6	U_ave : 386.1 V
U23 : 385.9 V	Q2 : -1.22 kVAR	THD_U23 : 3.0	I_ave : 4.3 A
U31 : 385.0 V	Q3 : 0.77 kVAR	THD_U31 : 2.4	V_dengesiz : 0.7 %
I1 : 4.1 A	S1 : 0.90 kVA	THD_I1 : 19.0	I_dengesiz : 4.6 %
I2 : 5.4 A	S2 : 1.22 kVA	THD_I2 : 27.0	
I3 : 3.6 A	S3 : 0.78 kVA	THD_I3 : 15.7	
In : 12.9 A		THD_In : 61.2	
P_tot : 0.20 kW	pf_L1 : -0.022		
Q_tot : -1.35 kVAR	pf_L2 : -0.049		
S_tot : 2.90 kVA	pf_L3 : 0.205		
Q/P_avg : -0.068	Q/P_L1 : 100.0		
	Q/P_L2 : 100.0		
	Q/P_L3 : 100.0		

# EMBEDDED WEB SERVER

**WEB Scada**

Measurements | Counters | Events | Alarms

LINE	POWER	THDS	
L1 Volt	230.2V	Tot P 200.7 kW	THD L1 0.4 %
L2 Volt	230.1V	Tot Q 51.1 kVAR	THD L2 1.6 %
L3 Volt	230.1V	Tot S 207.1 kVA	THD L3 1.6 %
L12 Volt	399.0V	PowerFactor 0.959 ind	THD L12 1.9 %
L23 Volt	398.8V	Demand I1 300.8 A	THD L23 3.3 %
L31 Volt	398.5V	Demand I2 300.6 A	THD L31 2.1 %
I1 Amps	300.5 A	Demand I3 300.4 A	THD I1 0.4 %
I2 Amps	300.1 A	Demand I0 300.5 A	THD I2 1.5 %
I3 Amps	300.3 A	Demand P 207.9 W	THD I3 1.6 %
N Amps	0.0 A	Demand Q 51.3 kVAR	THD In 0.0 %
Frequency	50.00 Hz		
V-avg	230.1 V		
U-avg	398.7 V		
I-avg	300.3 A		

Web Monitoring

**WEB Scada**

Measurements | Counters | Events | Alarms

**COUNTERS**

Import Power (kWh-In) 1368.2 kWh  
 Export Power (kWh-Ek) 504.3 kWh  
 Inductive Power (kVarh-In) 13.8 kVarh  
 Capacitive Power (kVarh-Cp) 42.4 kVarh

Import Power (kWh-In) 0.0 kWh  
 Export Power (kWh-Ek) 0.0 kWh  
 Inductive Power (kVarh-In) 0.0 kVarh  
 Capacitive Power (kVarh-Cp) 0.0 kVarh

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

Web Monitoring

**WEB Scada**

Measurements | Counters | Events | Alarms

Event	Alarm	Date	Time	Status	L1	L2	L3	Frequency	L12	L23	L31	I1	I2	I3	Current
1	Resistor 0	2010-08-02	08:11:10	176 V	176 V	176 V	50.0 Hz	305 V	305 V	305 V	130 V	130 V	130 V	144 V	
2	Resistor 0	2010-08-02	08:11:10	176 V	176 V	176 V	50.0 Hz	305 V	305 V	305 V	130 V	130 V	130 V	144 V	
3	Resistor 0	2010-08-02	08:11:10	176 V	176 V	176 V	50.0 Hz	305 V	305 V	305 V	130 V	130 V	130 V	144 V	
4	Resistor 0	2010-08-02	08:11:10	0 V	0 V	0 V	0 Hz	0 V	0 V	0 V	0 V	0 V	0 V	0 V	
5	Resistor 0	2010-08-02	08:11:10	0 V	0 V	0 V	0 Hz	0 V	0 V	0 V	0 V	0 V	0 V	0 V	
6	Resistor 0	2010-08-02	08:11:10	0 V	0 V	0 V	0 Hz	0 V	0 V	0 V	0 V	0 V	0 V	0 V	
7	Resistor 0	2010-08-02	08:11:10	0 V	0 V	0 V	0 Hz	0 V	0 V	0 V	0 V	0 V	0 V	0 V	
8	Resistor 0	2010-08-02	08:11:10	0 V	0 V	0 V	0 Hz	0 V	0 V	0 V	0 V	0 V	0 V	0 V	
9	Resistor 0	2010-08-02	08:11:10	0 V	0 V	0 V	0 Hz	0 V	0 V	0 V	0 V	0 V	0 V	0 V	
10	Resistor 0	2010-08-02	08:11:10	0 V	0 V	0 V	0 Hz	0 V	0 V	0 V	0 V	0 V	0 V	0 V	
11	Resistor 0	2010-08-02	08:11:10	0 V	0 V	0 V	0 Hz	0 V	0 V	0 V	0 V	0 V	0 V	0 V	
12	Resistor 0	2010-08-02	08:11:10	0 V	0 V	0 V	0 Hz	0 V	0 V	0 V	0 V	0 V	0 V	0 V	
13	Resistor 0	2010-08-02	08:11:10	0 V	0 V	0 V	0 Hz	0 V	0 V	0 V	0 V	0 V	0 V	0 V	
14	Resistor 0	2010-08-02	08:11:10	0 V	0 V	0 V	0 Hz	0 V	0 V	0 V	0 V	0 V	0 V	0 V	
15	Resistor 0	2010-08-02	08:11:10	0 V	0 V	0 V	0 Hz	0 V	0 V	0 V	0 V	0 V	0 V	0 V	

Event Log Display

