

# DFC-0112

## REACTIVE POWER CONTROLLER

The DFC-0112 is a low cost, precision power factor control and metering device offering unrivalled internet monitoring capabilities in a standard 144x144mm panel mount enclosure. The unit has 12 relay outputs for contactor drive. Each step can be capacitors or reactors following requirements.

The unit is very simple to install and commission thanks to the automatic setup and connection correction feature.

With its SVC outputs it can match the exact target pf value independently of capacitor rating selections.

The unit has an optional RS-232 port which can drive a Datakom DKG-090 GPRS modem for internet connection. The central monitoring facility can monitor, control and configure thousands of units at a single location.

The central monitoring supports Windows, IOS and Android based computers, smart phones and tablets.

### FEATURES

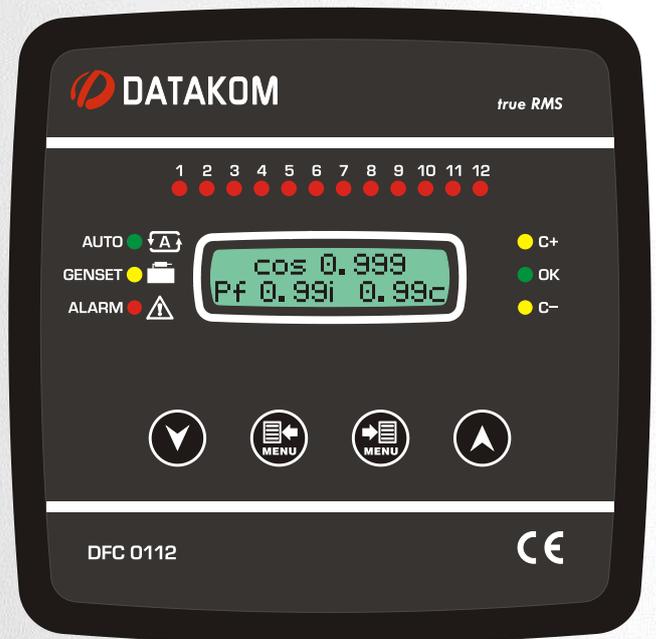
- 12 step outputs
- Always exact correction with SVC outputs
- 0.5% measurement accuracy
- Measurement period: 100ms
- Easy automatic setup
- Automatic correction of connection faults
- Automatic detection of step failures
- 250 event records with time stamp
- Alphanumeric LCD display, 2x16 characters
- Isolated RS-485 communication port
- Optional RS-232 GPRS modem port
- Reduced panel depth
- Sealed front panel (IP54)

### SVC OUTPUTS

SVC stands for "Static Var Compensation".

The unit has 3 SVC outputs which are duty cycle controlled PWMs that control 3 reactors with a precision of 1000 steps.

Thus the controller is able to supply almost any required reactive power on each phase, enabling matching the exact required PF, independently from capacitor bank selection.



### COMMUNICATIONS

- Modbus RTU RS-485, 2400-115200 baud
- TCP/IP client
- SMTP
- GSM-SMS sending
- e-mail sending
- Central Monitoring through IP
- Free configuration & monitoring software

### COMMUNICATION PORTS

- RS-485 isolated (Modbus RTU)
- RS-232 for external GPRS modem (optional)

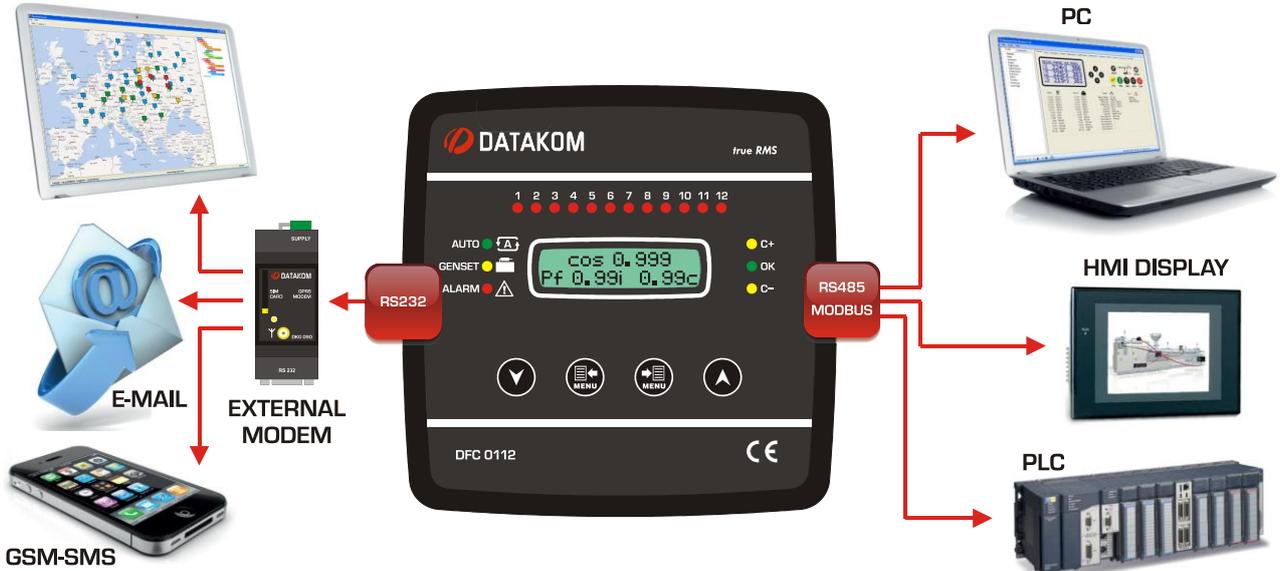
### MEASUREMENTS

- Phase to phase voltages: U12-U23-U31-Uavg
- Phase to neutral voltages: V1-V2-V3-Vavg
- Phase currents: I1-I2-I3-Iavg-I<sub>tot</sub>
- Active power: P1-P2-P3
- Reactive power: Q1-Q2-Q3
- Power factor: cos1-cos2-cos3-tg1-tg2-tg3
- Harmonic Distortion: THDI1-THDI2-THDI3



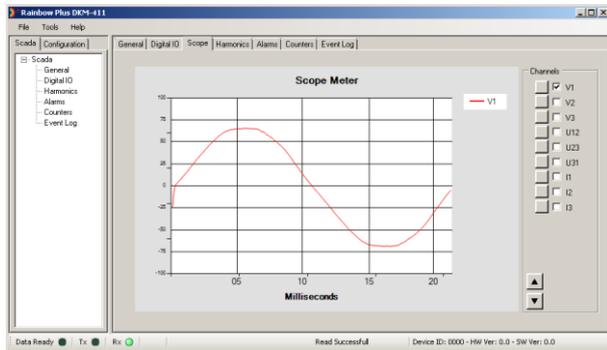
# COMMUNICATION DIAGRAM

## CENTRAL MONITORING



## COMPUTER CONNECTION

The free Rainbow program allows monitoring, control and parameter setup of the device. It works both through RS-485 and internet.



## SMS SENDING

In case of fault or in preprogrammed conditions, the device is able to send SMS messages to a maximum of 4 phone numbers. This feature is provided through the external Datakom DKG-090 GSM-modem.

## E-MAIL SENDING

In case of fault or in preprogrammed conditions, the device is able to send e-mail messages to a maximum of 3 addresses. This feature is provided through the external GSM-modem.

## EVENT RECORDS

All 250 events recorded inside the unit can be downloaded with the Rainbow Plus program and recorded into an Excel file. Event records include measurements at the time of the event.

Event No	Date	Type	Alarm	Phase-1	Phase-Phase	Current	Incs	Total P
1	18.12.2012 18:45:37	Alarm	Line No: 3/Phase	V1 0	U12 0	15.0	0	0
	18.12.2012 18:47:17	Learn-Performed		V1 0	U12 0	15.0	0	0
2	18.12.2012 19:27:34	Alarm	Line No: 3/Phase	V1 0	U12 0	15.0	0	0
	18.12.2012 19:29:30	Learn-Performed		V1 0	U12 0	15.0	0	0
	18.12.2012 19:34:41	Learn-Performed		V1 0	U12 0	15.0	0	0
3	18.12.2012 19:36:22	Learn-Performed		V1 0	U12 0	15.0	0	0
4	18.12.2012 19:36:22	Learn-Performed		V1 0	U12 0	15.0	0	0
5	18.12.2012 19:36:22	Learn-Performed		V1 0	U12 0	15.0	50	0
6	18.12.2012 19:36:22	Learn-Performed		V1 0	U12 0	15.0	50	0
7	18.12.2012 19:36:22	Learn-Performed		V1 0	U12 0	15.0	45.58	0
8	18.12.2012 19:36:22	Learn-Performed		V1 0	U12 0	15.0	45.58	0
9	18.12.2012 19:36:22	Learn-Performed		V1 0	U12 0	15.0	50	0

## MODBUS RTU

The device allows MODBUS RTU communication through its isolated RS-485 port. Thanks to the MODBUS-RTU the unit may be integrated in third party automation and monitoring systems.

## EXTERNAL GSM MODEM

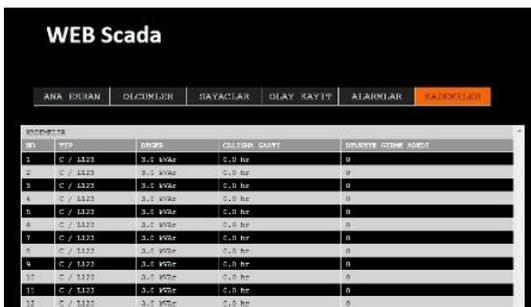
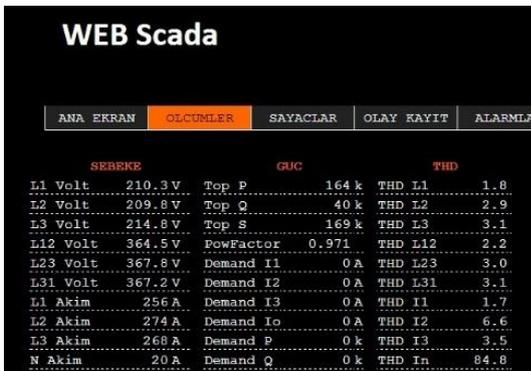
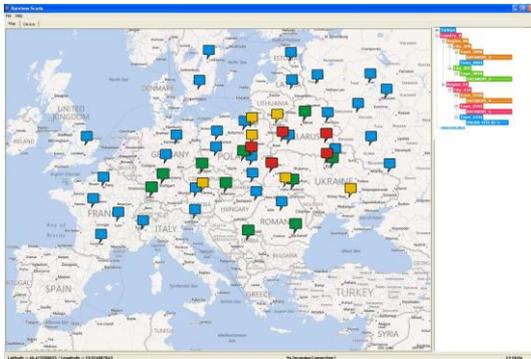
The external Datakom DKG-090 modem connected through the optional RS-232 port provides below features

- SMS,
- e-mail
- central monitoring
- remote manual control
- remote parameter setting

## CENTRAL MONITORING

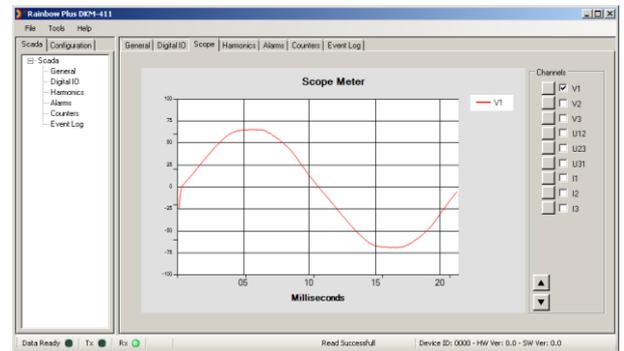
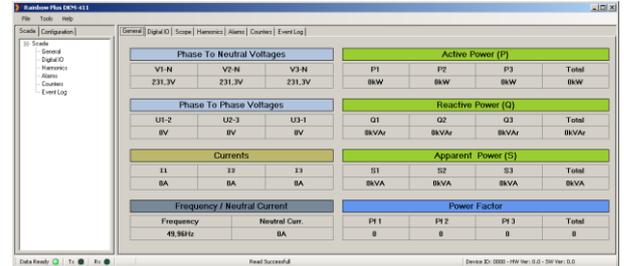
The unit is monitored through internet with the central monitoring software. The software supports devices with local IP or dynamic IP. This feature is provided through the optional RS-232 port with Datakom DKG-090 GSM modem.

The central monitoring program allows remote control of the operating mode and the manual control of step outputs for remote testing purposes.



## RAINBOW PROGRAM

The free Rainbow program allows monitoring, control and parameter setup of the device. It works both through RS-485 and internet. The Rainbow Plus program can also use the data path provided by the central monitoring program in order to access units behind firewall or units with dynamic IP.



## TECHNICAL SPECIFICATIONS

### Power Supply Input:

85 to 275V AC  
50 - 60Hz nominal ( $\pm 10\%$ )

### Power Consumption:

< 12 VA

### Measurement Input Range:

**Voltage:** 5 - 300 V AC (L-N)  
10 - 520 V AC (L-L)  
**Current:** 0.005 - 5.5 A AC  
**Frequency:** 30 - 100 Hz

### Accuracy:

**Voltage:** 0.5%+1 digit  
**Current:** 0.5%+1 digit  
**Frequency:** 0.2%+1 digit  
**Power(kW,kVA):** 1.0%+2 digit  
**Power factor:** 0.5%+1 digit

### Measurement Range:

**CT range:** 5/5A to 10'000/5A  
**kW range:** 0.1 kW to 6.5MW

### Voltage burden:

< 0.1VA per phase

### Current burden:

< 0.5VA per phase

### Number of step outputs: 12

### Output rating: 5A @ 250V AC

### SVC Outputs: 50mA @ 12V DC

### Operating Temperature:

-20°C to +70°C (-4 to +176 °F).

### Maximum humidity:

95% non-condensing.

### Degree of Protection:

IP 54 (Front), IP 30 (Back)

### Enclosure: Non-flammable, ROHS compliant

### Installation: Flush mounting with rear brackets

### Dimensions: 164x164x69mm (WxHxD)

### Panel Cutout: 140x140mm

### Weight: 400 gr

### EU Directives:

2006/95/EC (LVD)

2004/108/EC (EMC)

### Norms of reference:

EN 61010 (safety)

EN 61326 (EMC)

# INSTALLATION DIAGRAM

