

DFC-0124

REACTIVE POWER CONTROLLER

The DFC-0124 is an advanced, precision 24 step power factor control and metering device offering unrivalled internet monitoring capabilities in a standard 144x144mm panel mount enclosure.

FEATURES

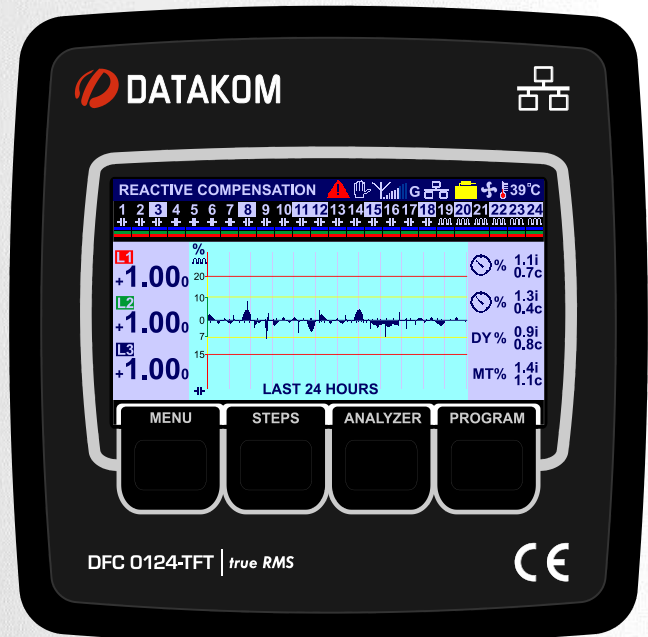
- 5" color LCD display, 480x272 pixels
- 30 day long graphical compensation history
- User friendly menu system, ease of use
- Easy and fast setup
- Automatically corrects faulty voltage/current connections
- Automatic setup under load
- MV current measuring version available
- Adjustable measurement period: 10-100ms
- Power factor correction delay as low as 20ms
- 120 MIPS, 32 bit ARM core microprocessor
- 24-18-12 step output options
- All outputs can drive static contactors
- All outputs can drive 1-2-3 phase capacitors or reactors
- Always exact correction with SVC outputs
- 0.5% measurement accuracy, true RMS measurements
- 32 bit power measurements
- Operation in low currents (3mA)
- Ready for remote monitoring Ethernet and GPRS
- Remote control of steps
- Remote parameter editing
- Automatic geo-positioning through GPRS
- Embedded website
- Long term data recording on USB flash memory
- 250 event records with date-time and measurements
- Independent target COS for the generator
- Display of 1-2-3 phased steps on screen
- Harmonic distortion display (31 harmonics)
- Oscilloscope, waveform display
- Battery backed-up real time clock
- User configurable display screens
- User configurable relay outputs
- Voltage transformer ratio for MV applications
- Password protected front panel programming
- Reduced panel depth: 69mm
- Sealed front panel (IP65 with gasket)

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, enabling matching the exact required PF, independently from capacitor bank selection.



COMMUNICATION PORTS

- Internal GPRS modem
- Internal 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

COMMUNICATIONS

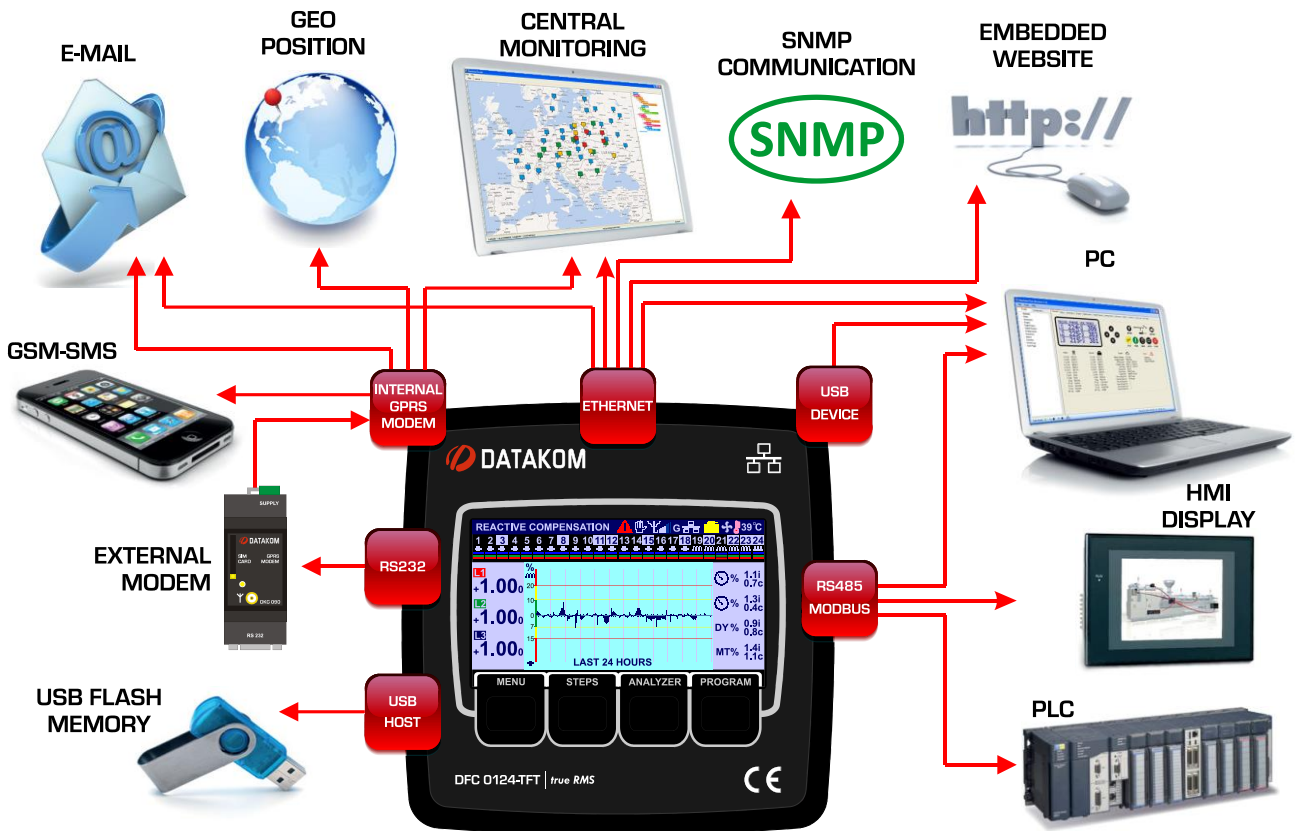
- Modbus RTU RS-485, 2400-115200 baud
- Modbus TCP/IP
- SNMP
- TCP/IP server
- TCP/IP client
- UDP
- SMTP
- Dynamic DNS support
- Embedded website, HTML
- GSM-SMS sending
- E-mail sending
- Central Monitoring through IP

MEASUREMENTS

- Phase to phase voltages: U_{12} - U_{23} - U_{31} - U_{avg}
- Phase to neutral voltages: V_1 - V_2 - V_3 - V_{avg}
- Phase currents: I_1 - I_2 - I_3 - I_{n-lavg} - I_{tot}
- Active power: P_1 - P_2 - P_3 - ΣP
- Reactive power: Q_1 - Q_2 - Q_3 - ΣQ
- Apparent power: S_1 - S_2 - S_3 - ΣS
- Power factor: $\cos 1$ - $\cos 2$ - $\cos 3$ - $\Sigma \cos$
- 1...31 Harmonics of any voltage or current



COMMUNICATION DIAGRAM



INTERNAL GSM MODEM

SMS, e-mail, geo-positioning, central monitoring and remote parameter edit features are provided through the internal GSM modem of the controller.

EXTERNAL GSM MODEM

The external Datakom DKG-090 modem provides SMS, e-mail, geo-positioning, central monitoring and remote parameter edit features.

INTERNAL ETHERNET PORT

The internal 10/100Mbps ethernet port of the controller provides e-mail, central monitoring and remote parameter edit features.

E-MAIL SENDING

In case of fault or preprogrammed conditions, the device is able to send e-mail messages to 3 addresses through both ethernet and internal / external GSM-modems.

SMS SENDING

In case of fault or in preprogrammed conditions, the device is able to send SMS messages to a maximum of 4 addresses through internal / external GSM-modems.

MODBUS RTU – MODBUS TCP/IP

The device allows MODBUS RTU communication through its isolated RS-485 port. The MODBUS TCP/IP communication is performed through the ethernet port.

SNMP COMMUNICATION

The device allows SNMP communication through its ethernet port. The MIB file is available at Datakom Technical Support.

DETAILED DATA RECORDING

The unit records all measured values with the required period to the USB flash memory placed in the USB Host port. The memory capacity is unlimited and detailed data recording may continue during years.

RAINBOW PROGRAM

The free Rainbow program allows monitoring, control and parameter setup of the device. It works both through USB, RS-485 and internet. In case of inaccessible devices behind firewall, an access path through the central monitoring program is also provided.

Phase To Neutral Voltages			Active Power (P)			
V1-N	V2-N	V3-N	P1	P2	P3	Total
231.3V	231.3V	231.3V	0kW	0kW	0kW	0kW
Phase To Phase Voltages			Reactive Power (Q)			
U1-2	U2-3	U3-1	Q1	Q2	Q3	Total
0V	0V	0V	0kVar	0kVar	0kVar	0kVar
Currents			Apparent Power (S)			
I1	I2	I3	S1	S2	S3	Total
0A	0A	0A	0kVA	0kVA	0kVA	0kVA
Frequency / Neutral Current		Power Factor				
Frequency	Neutral Curr.	PF1	PF2	PF3	Total	
49.96Hz	0A	0	0	0	0	

EMBEDDED WEBSITE

All important information of the device may be monitored through internet with any web browser. The embedded website is available through the ethernet port. Thanks to the dynamic DNS support, no static IP is required.

WEB SCADA

Home | Measurements | Counters | Events | Alarms | Banks

SITE ID : DATAKOM/DFC0124-----
 SERIAL NO : 1234567890-----
 ALARM : No Alarm
 MODE : AUTO
 COS : -0.999
 Ver : 3.6

MONTHLY PERFORMANCE							
DATE	KWh	kVArh-I	kVArh-C	COS(I)	TAN(φ)(%)	COS(C)	TAN(φ)(%)
2/2015	4042.0	114.0	74.0	0.999	3.8	0.999	1.8
1/2015	4995.1	270.7	149.5	0.998	5.5	0.999	3.0
12/2014	-	-	-	-	-	-	-
11/2014	-	-	-	-	-	-	-
10/2014	-	-	-	-	-	-	-
9/2014	-	-	-	-	-	-	-
8/2014	-	-	-	-	-	-	-

DAILY PERFORMANCE							
DATE	KWh	kVArh-I	kVArh-C	COS(I)	TAN(φ)(%)	COS(C)	TAN(φ)(%)
16/ 2/2015	92.4	1.8	1.6	1.000	1.9	1.000	1.7
15/ 2/2015	160.3	3.9	5.5	1.000	2.4	1.000	3.4
14/ 2/2015	274.8	8.9	6.7	0.999	3.2	1.000	2.4
13/ 2/2015	351.7	11.5	5.6	0.999	3.2	1.000	1.5
12/ 2/2015	338.4	10.7	6.9	0.999	3.1	1.000	2.0
11/ 2/2015	366.1	9.9	5.0	0.999	2.7	1.000	1.3
10/ 2/2015	299.1	9.7	4.4	0.999	2.8	1.000	1.2

Daily & Monthly Performance

WEB SCADA

Home | Measurements | Counters | Events | Alarms

MAINS **POWER** **THDs**

L1 Volt 227.6V Tot P 27.0k THD L1 2.8%
 L2 Volt 227.2V Tot Q 0.2k THD L2 2.1%
 L3 Volt 222.3V Tot S 27.6k THD L3 4.1%
 L12 Volt 392.7V pf-R 0.999 THD L12 2.3%
 L23 Volt 392.3V pf-S 1.000 THD L23 2.7%
 L31 Volt 391.6V pf-T 0.999 THD L31 1.0%
 L1 Amps 31.5A PowFactor 0.999 THD I1 24.7%
 L2 Amps 38.2A Demand I1 213.3A THD I2 18.3%
 L3 Amps 51.6A Demand I2 128.2A THD I3 9.8%
 N Amps 23.4A Demand I3 112.1A THD In 69.9%
 Frequency 49.98Hz Demand Io 110.9A
 V-avrg 226.7V Demand P 60.6k
 U-avrg 392.7V Demand Q 11.9k
 I-avrg 40.4A

Real-time Measurements

WEB SCADA

Home | Measurements | Counters | Events | Alarms | Banks

NO	TYPE	RATING	RUN HOURS	SWITCH ON COUNT
1	C / L123	4.6 kVar	101.4 hr	2138
2	C / L123	1.2 kVar	106.2 hr	1838
3	C / L123	1.2 kVar	89.8 hr	1123
4	C / L123	2.1 kVar	83.9 hr	1112
5	C / L123	2.1 kVar	74.6 hr	1119
6	C / L123	1.2 kVar	81.6 hr	1198
7	C / L1	0.3 kVar	64.9 hr	981
8	C / L2	0.3 kVar	73.7 hr	1101
9	C / L3	0.3 kVar	88.4 hr	1280
10	C / L2	0.3 kVar	96.3 hr	1863
11	C / L123	1.2 kVar	89.8 hr	2220
12	C / L31	0.9 kVar	107.0 hr	2207
13	C / L123	1.2 kVar	0.0 hr	0
14	-	-	-	-
15	-	-	-	-
16	-	-	-	-
17	-	-	-	-
18	-	-	-	-
19	-	-	-	-
20	-	-	-	-
21	-	-	-	-
22	-	-	-	-
23	-	-	-	-
24	-	-	-	-
25	L / L123	-8.6 kVar	-	-

Steps

CENTRAL MONITORING

Up to 100 units is monitored through internet with the free central monitoring software. The software supports devices with local IP or dynamic IP. This feature is provided through both ethernet and GSM modem.

Monitoring of more than 100 units is chargeable.

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

Central Monitoring on Map

Performance Statistics

Date	kW	kVAr	kVArC	% Ind.	% Cap.
05/11/2014	1285.7	29.8	60.2	2.8	4.7
04/11/2014	2638.9	66.4	104.8	2.5	4.0
03/11/2014	2537.2	76.6	92	3.0	3.6
02/11/2014	1192.1	37.7	101.1	3.2	8.5
01/11/2014	609.4	15.8	23.7	2.6	3.9

Performance Statistics

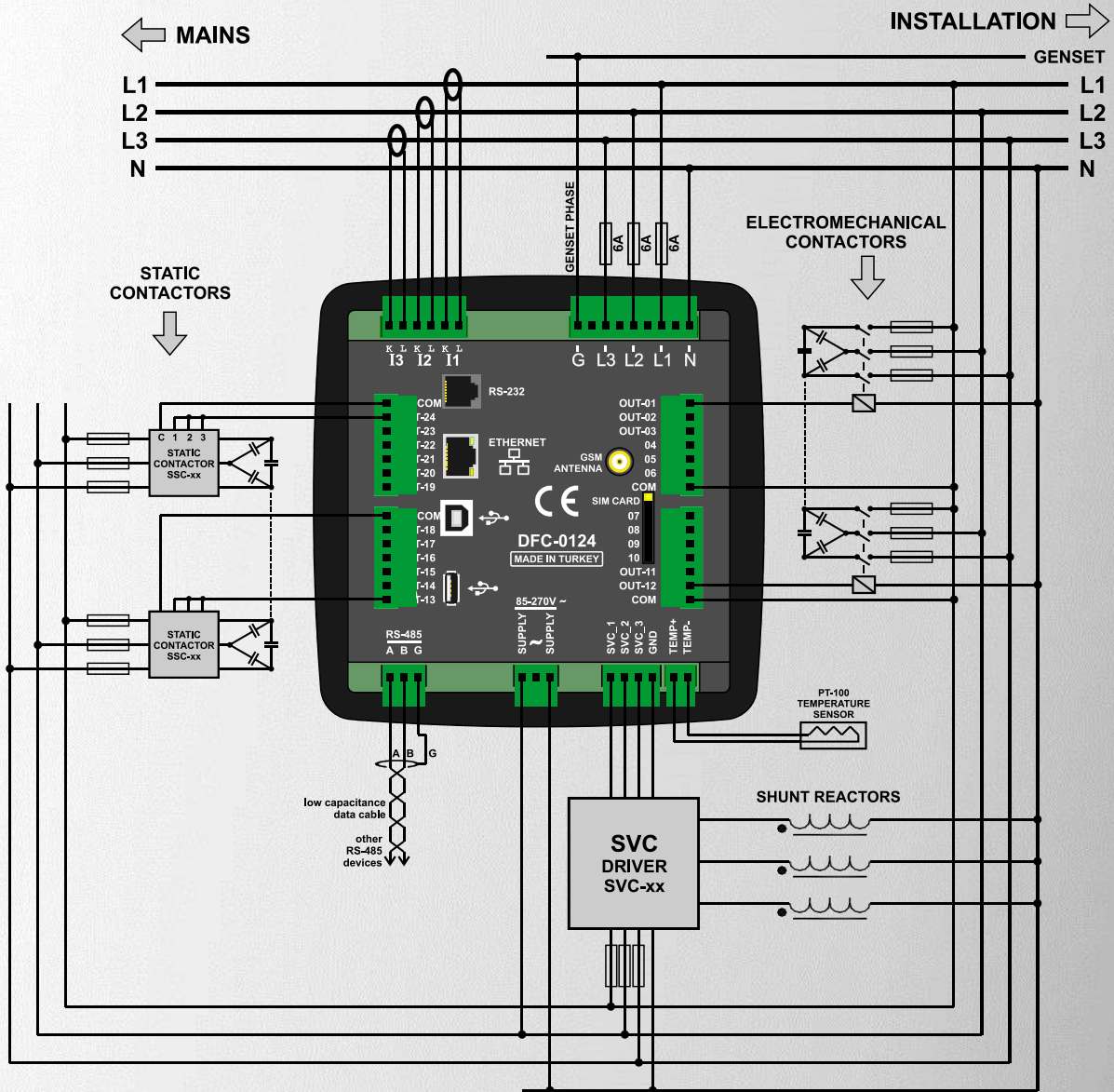
Step Monitoring & Remote Control

BankNo	Type	Measurement	Time	Number	Status
1	C / L123	9.3 kVar	1509.7	2347	OFF
2	C / L123	4.5 kVar	1513.3	2548	OFF
3	C / L123	4.5 kVar	1261.7	2866	OFF
4	C / L123	2.4 kVar	1236.9	4026	OFF
5	C / L123	9.6 kVar	1063.6	2104	OFF
6	C / L123	2.4 kVar	1047.6	5839	OFF
7	C / L123	27.3 kVar	919.3	1322	ON
8	C / L123	17.4 kVar	927.4	1845	OFF
9	C / L123	27.1 kVar	1486.4	45214	ON
10	C / L123	25.8 kVar	414.0	1221413521	OFF
11	C / L123	26.1 kVar	309.1	3256	OFF
12	C / L123	9.9 kVar	492.4	6722	OFF
13	C / L31	0.0 kVar	0.0	0	OFF
14	C / L31	0.0 kVar	0.0	0	OFF

Step Monitoring & Remote Control



INSTALLATION DIAGRAM



TECHNICAL SPECIFICATIONS

Power Supply Input:

85 to 270V AC
50 - 60Hz nominal ($\pm 10\%$)

Power Consumption: < 15 VA

Measurement Input Range:

Voltage: 5 - 300 V AC (L-N)
10 - 520 V AC (L-L)

Current: 0.003 - 6.5 A AC

Frequency: 30 - 100 Hz

Accuracy:

Voltage: 0.5%+1 digit

Current: 0.5%+1 digit

Frequency: 0.2%+1 digit

Power(kW,kVAr): 1.0%+2 digit

Power factor: 0.5%+1 digit

Measurement Range:

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

VT range: 0.1/1 to 5000.0/1

kW range: 0.1 kW to 50MW

Voltage burden: < 0.1VA per phase

Current burden: < 0.5VA per phase

Number of step outputs: 24

Relay Outputs: 5A @ 250V AC

Static Contactor Outputs: 50mA @ 12V DC

SVC Outputs: 50mA @ 12V DC

Temperature Input: PT100

Operating Temperature:

-20°C to +70°C (-4 to +176 °F).

Maximum humidity: 95% non-condensing.

Degree of Protection: IP 65 (Front with gasket)

IP 30 (Back)

Enclosure: Non-flammable, ROHS compliant

Installation: Flush mounting with rear brackets

Dimensions: 164x164x69mm (WxHxD)

Panel Cutout: 140x140mm

Weight: 700 gr

EU Directives:

2006/95/EC (LVD)

2004/108/EC (EMC)

Norms of reference:

EN 61010 (safety)

EN 61326 (EMC)