

DFC-0108 POWER FACTOR CONTROLLER
8 BANKS, HARMONIC DISTORTION DISPLAY

DFC-0108 is a high technology controller allowing the power factor of the installation to be stabilized to the requested value by switching capacitor banks through contactors. The unit allows also the visualization of various AC parameters like a network analyzer.

The unit makes harmonic analysis up to the 31th component. The THD values of all voltages and currents are available.

Stepping algorithms are selectable between various types. Thanks to the automatic setup function, the commissioning and programming are made easy.



SAFETY NOTICE
Failure to follow below instructions will result in death or serious injury

* Electrical equipment should be installed only by qualified specialist. No responsibility is assured by the manufacturer or any of its subsidiaries for any consequences resulting from the non-compliance to these instructions.

* Check the unit for cracks and damages due to transportation. Do not install damaged equipment.

* Do not open the unit. There is no serviceable parts inside.

* Fuses of fast type (FF) with a maximum rating of 6A must be connected to phase voltage inputs, in close proximity of the unit.

* Disconnect all power before working on equipment.

* When the unit is connected to the network do not touch terminals.

* Short circuit terminals of unused current transformers.

* Any electrical parameter applied to the device must be in the range specified in the user manual.

* Do not try to clean the device with solvent or the like. Only clean with a dry cloth.

* Verify correct terminal connections before applying power.

* Only for front panel mounting.

INSTALLATION

Before installation:

- Read the user manual carefully, determine the correct connection diagram.
- Remove all connectors and mounting brackets from the unit, then pass the unit through the mounting opening.
- Put mounting brackets and tighten. Do not tighten too much, this can brake the enclosure.
- Make electrical connections with plugs removed from sockets, then place plugs to their sockets.
- Be sure that relay outputs are not overloaded. If necessary use extra contactors.

Below conditions may damage the device:

- Incorrect connections.
- Incorrect power supply voltage.
- Voltage at measuring terminals beyond specified range.
- Current at measuring terminals beyond specified range.
- Overload or short circuit at relay output



Current Transformers must be used for current measurement.
No direct connection allowed

Below conditions may cause abnormal operation:

- Power supply voltage below minimum acceptable level.
- Power supply frequency out of specified limits
- Current transformers not matching related phases.
- Current transformer polarity incorrect.
- Inadequate on-delay setting
- Inadequate off-delay setting

Detailed user manual of this product may be downloaded at:
www.datakom.com.tr

ELECTRICAL INSTALLATION



Do not install the unit close to high electromagnetic noise emitting devices like contactors, high current busbars, switchmode power supplies and the like.

Although the unit is protected against electromagnetic disturbance, excessive disturbance can affect the operation and measurement precision.

- **ALWAYS** remove plug connectors when inserting wires with a screwdriver.
- Fuses must be connected to phase voltage inputs, in close proximity of the unit. Fuses must be of fast type (FF) with a maximum rating of 6A.
- Use cables of appropriate temperature range and section, at least 0.75mm² (AWG18).
- For current transformer inputs, use at least 1.5mm² section (AWG15) cable.
- The current transformer cable length should not exceed 1.5 meters. If longer cable is used, increase the cable section.
- 5A Current transformers must be used.

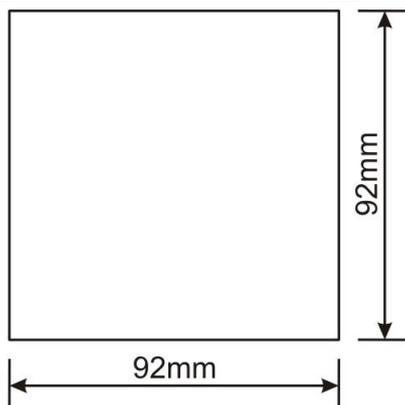


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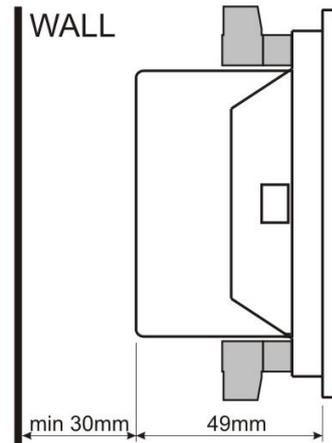


Do not overload the relay outputs. If necessary use extra contactors.

PANEL CUTOUT



REQUIRED PANEL DEPTH



TECHNICAL SPECIFICATIONS

Power Supply: 170-275VAC, 45–66 Hz (L1-N)

Measurement Input Range:

Voltage inputs: 10 - 300 V AC (L-N)
20 - 520 V AC (L-L)

Current inputs: 0.2 – 5.5 A AC

Accuracy:

Voltage: 0.5%+1 digit

Current: 0.5%+1 digit

Frequency: 0.5%+1 digit

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

Power factor: 0.5%+1 digit

Measurement Range:

CT range: 5/5A to 5000/5A

VT range: 0.1/1 to 200.0/1

kW range: 0.1 kW to 6.5 MW

Power Consumption: < 4 W

Voltage burden: < 0.1VA per phase

Current burden: < 1VA per phase

Steps: 8

Relay Outputs: 5A @ 250V AC

Operating Temperature:

-20°C to +80°C (-4 to +176 °F).

Maximum humidity: 95% non-condensing.

Degree of Protection:

IP 54 (Front Panel) ,

IP 30 (Back panel)

Enclosure: Non-flammable, ROHS compliant, ABS/PC (UL94-V0)

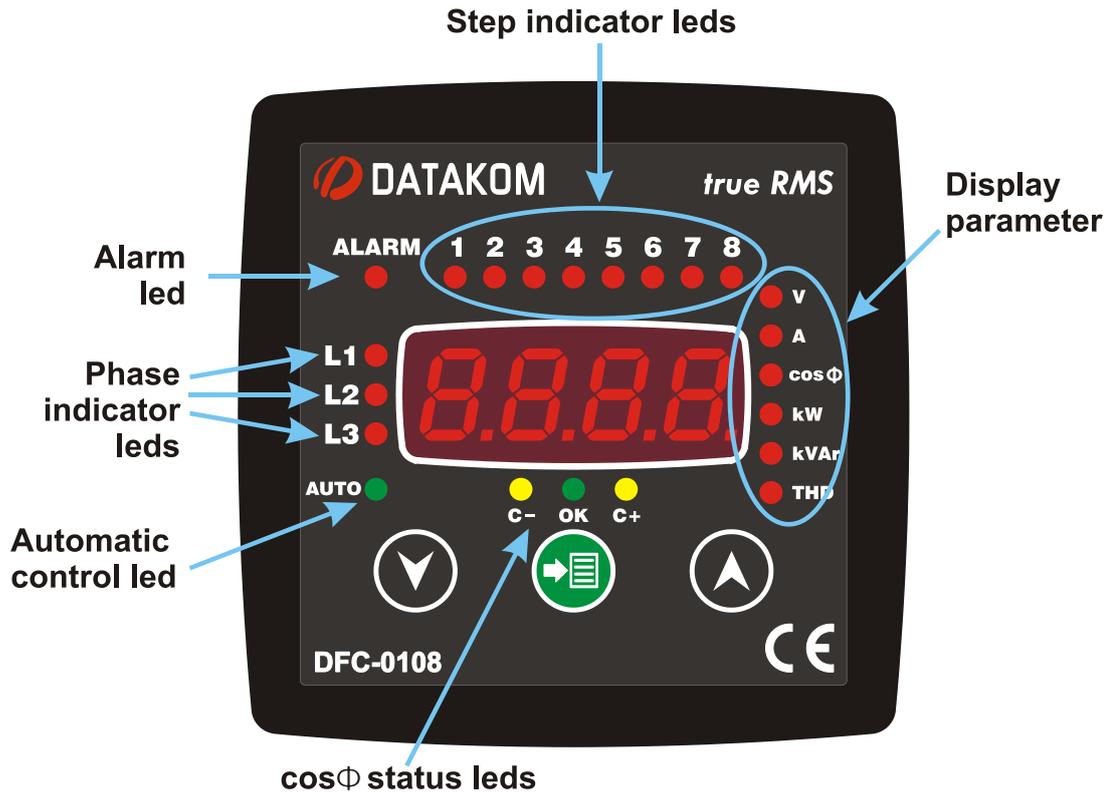
Installation: Flush mounting with rear retaining brackets

Dimensions: 102x102x53mm (WxHxD)

Panel Cutout: 92x92mm

Weight: 370 gr

PUSHBUTTON FUNCTIONS



BUTTON	FUNCTION
	In AUTO mode, acknowledges the displayed alarm. If the same alarm occurs again, it will not appear on the display.
	<u>HELD PRESSED DURING 5 SEC:</u> Resets all alarms and the alarm led. Any new coming alarm will appear on the display.
	<u>HELD PRESSED DURING 10 SEC AT POWER-ON:</u> The unit enters automatic setup mode.
	Switch to upper display or previous parameter or increase related value (programming mode)
	Switch to lower display or next parameter or decrease related value (programming mode)
	<u>HELD PRESSED DURING 5 SEC:</u> Switches between AUTO and MANUAL modes. In MANUAL mode the stepping is disabled. From the MANUAL mode TEST mode can be selected in order to test each step manually.
	<u>HELD PRESSED DURING 5 SEC IN MANUAL MODE:</u> Switches between MANUAL and TEST modes. In TEST mode, all steps may be turned on and off manually. For more detailed information please check chapter 4.2.
	<u>HELD PRESSED TOGETHER DURING 5 SEC:</u> Enters or exits programming mode.

TEST MODE. MANUAL STEP CONTROL



Holding the  pushbutton pressed for 5 seconds switches between TEST and MANUAL modes



In TEST mode, if no button is pressed during 1 minute the unit will automatically return back to MANUAL mode.

In **TEST** mode only the **total kVAr** value is displayed.

When **TEST** mode is selected then the step-1 indicator led will flash. Pressing the  pushbutton will activate this step. Pressing the  pushbutton will deactivate this step.

Pressing the  MENU pushbutton will select the next step and the related step led will flash. Using   pushbuttons the step may be activated or deactivated.

Using the  MENU pushbutton all steps may be scrolled manually.

AUTOMATIC SETUP

In automatic setup mode, the unit ::

- automatically detects and corrects reverse connected current transformers.
- automatically measures and memorizes capacitor bank ratings.



For a successful auto setup, voltage connections must be 3 phased.

Otherwise the unit will give ALARM_01 and will not perform automatic setup.



For a successful auto setup, STEP_1 capacitors must be 3 phased.

Otherwise the unit cannot detect connection errors, gives ALARM_02 and will not perform automatic setup.



For a successful auto setup, current transformers must be connected to correct CT inputs. The connection polarity is not important.

Otherwise the unit will give ALARM_03 and will not perform automatic setup.



It is preferable that there should be no other load on the capacitor panel. However with constant or slow changing loads the unit is able to perform auto setup.

If there are fast changing loads, the unit may be unable to correct CT polarity errors or may read incorrect bank capacitor ratings. In such cases, auto setup should be repeated and capacitor ratings should be checked/corrected through PROGRAMMING menu.

STEP BY STEP AUTO SETUP

PUSHBUTTON	OPERATION	DISPLAY
	<p>In order to enter the auto setup mode, power-up the unit with MENU button pressed and hold the button pressed for 10 seconds. The display will show ctrF and the unit will ask the current transformer primary rating.</p>	
	<p>Press again the MENU button. The display will show the CT primary rating.</p>	
 	<p>Adjust required CT primary rating with arrow buttons. For fast increase/decrease please hold the button pressed.</p>	
	<p>Press again the MENU button. The display will show MtEr and the unit will ask the power meter type.</p>	
	<p>Press again the MENU button. The display will show the power meter type.</p>	
 	<p>Adjust required power meter type with arrow buttons. 0 → mechanical power meter 1 → digital power meter</p>	
	<p>Press again the MENU button. The display will show LErn and the unit will ask to enter the quick commissioning mode.</p>	
	<p>Press again the MENU button. The display will show 0.</p>	
 	<p>Set the parameter to 1 with arrow buttons.</p>	
	<p>Press again the MENU button. The display will show the total kVAR value. The unit will check CT connections, correct if necessary, then activate all banks (one by one) in order to determine capacitor ratings. When auto setup is finished successfully the unit will revert to normal operation.</p>	

ALARMS

The unit constantly monitors abnormal situations occurring in the system.

Every monitored parameter has programmable alarm limits and delay timer. Alarms may be of latching or unlatching types. The automatic operation may be programmed to be aborted or continued. For more details please consider the PROGRAMMING section of this manual.

When any alarm occurs the ALARM led turns on and the alarm code appears on the display. Following programming, the auxiliary relay output may be activated. The automatic operation may be aborted or continued, based on programming.

AL-01: NETWORK NOT 3 PHASED

Occurs if automatic setup is attempted with non 3 phased network.

AL-02: FIRST BANK NOT 3 PHASED

Occurs if automatic setup is attempted with non 3 phased capacitors at the first bank.

AL-03: FAULTY CT ORDER

Occurs if automatic setup is attempted with CTs not connected to related phases.

AL-04: HIGH VOLTAGE

Occurs if at least 1 phase voltage is above **u-Hi** limit during **u-dU** period.

AL-05: LOW VOLTAGE

Occurs if at least 1 phase voltage is below **u-Lo** limit during **u-dU** period.

AL-06: HIGH FREQUENCY

Occurs if the frequency is above **F-Hi** limit during **F-dU** period.

AL-07: LOW FREQUENCY

Occurs if the frequency is below **F-Lo** limit during **F-dU** period.

AL-08: EXCESS kW

Occurs if the total active power is above **A-Hi** limit during **A-dU** period.

AL-09: LOW kW

Occurs if the total active power is below **A-Lo** limit during **A-dU** period.

AL-10: EXCESS INDUCTIVE kVAR

Occurs if the total reactive power is inductive and above **rInd** limit during **r-dU** period.

AL-11: EXCESS CAPACITIVE kVAR

Occurs if the total reactive power is capacitive and above **rCAP** limit during **r-dU** period. (Welded contactors)

AL-12: INDUCTIVE CosØ

Occurs if the total $\cos\phi$ is inductive and below **cInd** limit during **C-dU** period.

AL-13: CAPACITIVE CosØ

Occurs if the total $\cos\phi$ is capacitive and below **cCAP** limit during **C-dU** period. (Welded contactors)

AL-14: EXCESS CURRENT

Occurs if at least 1 phase current is above **CrHi** limit during **CrDU** period.

AL-15: EXCESS THD(V)

Occurs if at least 1 phase voltage THD is above **thdu** limit during **uhdU** period.

AL-16: EXCESS THD(I)

Occurs if at least 1 phase current THD is above **thdi** limit during **chdU** period.

rAt1...rAt8 CAPACITOR VALUE LOSS

Occurs when the measured step rating is below **rtio** % compared to its nominal value. In order to enable this alarm **dYnC** parameter must be 1.

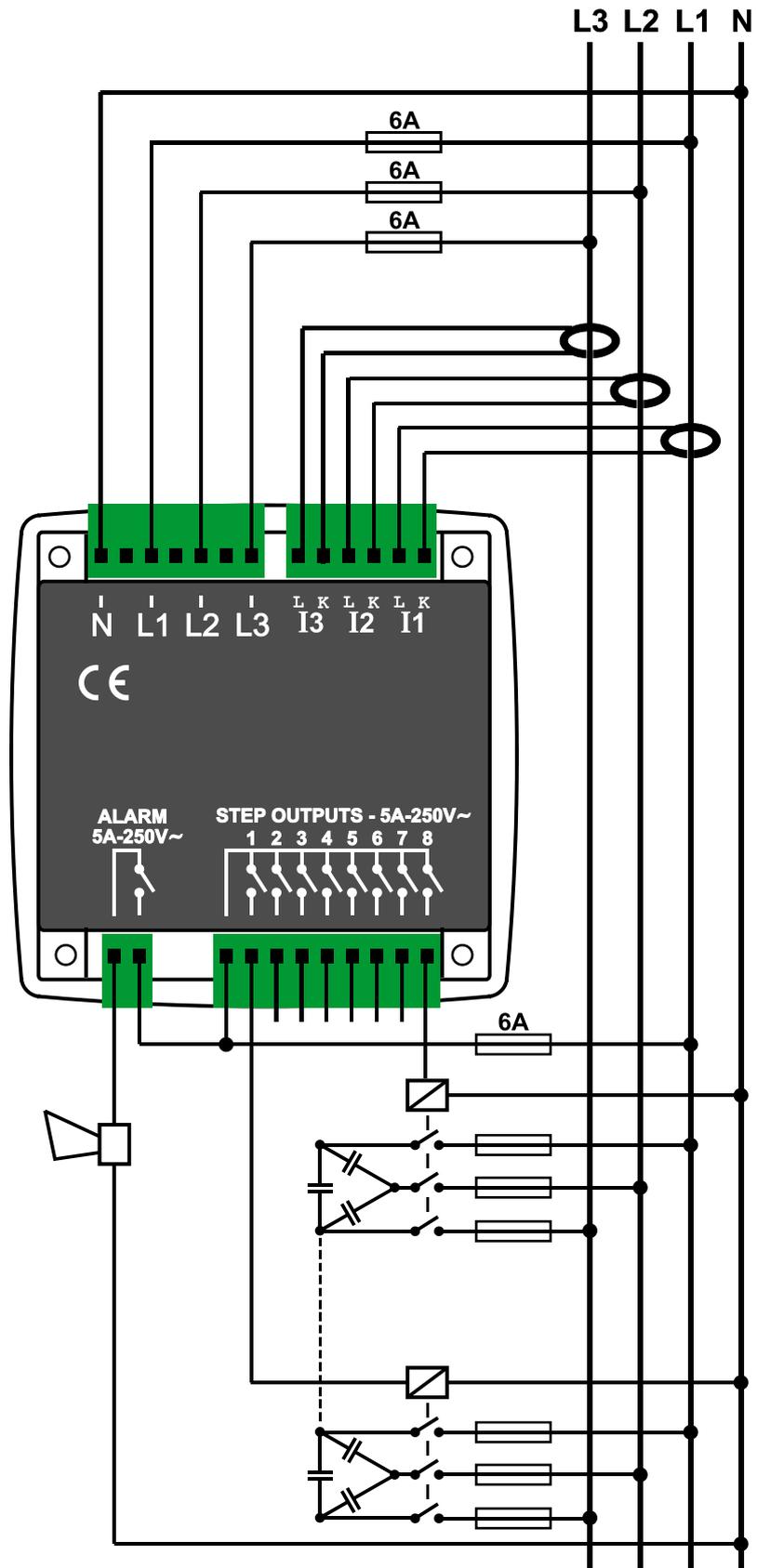
AL-18: PHASE ORDER FAULT

Occurs if the voltage phase order is faulty.

Err1...Err8: CAPACITOR DEFECTIVE

Occurs when the measured capacitor rating is below 20% of its nominal value.

CONNECTION DIAGRAM



EAC

CE