DFC-0115
REACTIVE POWER CONTROLLER

The DFC-0115 is an advanced, precision 15 step power factor control and metering device, which continuously matches the target cosø value of the load.
Installation and configuration of the DFC-0115 is very simple thanks to the auto-learning function.

Each step output supports single-phase, two-phase, and three-phase connection of capacitors and reactors.

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 with a maximum rating of 6A must be connected to the power supply and 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 dump cloth.
- Do not allow water to come in the unit.
- 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 break the enclosure.
- Make electrical connections with plugs removed from sockets, then place plugs to their sockets.
- Make sure to use adequate fuses.
- Do not subject the unit to water spill.

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.
- Overloaded or short circuited relay output terminals.

Below conditions may cause abnormal operation:

- Power supply voltage below minimum acceptable level.
- Power supply frequency out of specified limits
- Phase order of voltage inputs not correct. (Without auto-correct function)
- Current transformers not matching related phases. (Without auto-correct function)
- Incorrect current transformer polarity. (Without auto-correct function)
- Inappropriate delay for switch on, switch off delays of steps.

Current transformers must be used for current measurements. No direct connection allowed.

ELECTRICAL CONNECTIONS

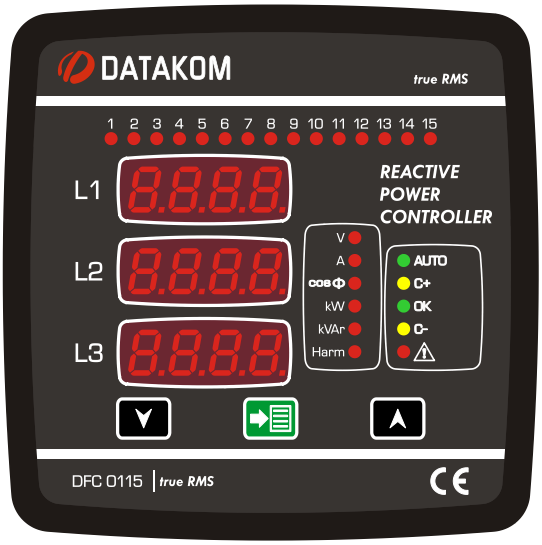
Do not place the unit close to high electromagnetic noise emitting devices like contactors, high current busbars, switch mode power supplies.

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

- **Always remove the plug connectors when inserting wires with screwdriver.**
- **Fuses of fast type with a maximum rating of 6A must be connected to the power supply and phase voltage inputs, in close proximity of the unit.**
- **Always refer to National Wiring Regulations when conducting installation.**
- **Use cables of adequate current carrying capacity (at least 0.75 mm^2).**
- **Use cables of adequed temperature range.**
- **Use at least 1.5mm^2 cables for current transformer connection (AWG15).**
- **The current transformer cable length should not exceed 1.5 meters. If longer cable is used, cable section must be increased proportionally.**
- **Current transformers must have a 5A output.**

Do not overload relay outputs. Use extra contactors if required.

BUTTON FUNCTIONS



Three buttons on the front panel provide access to configuration and measurement screens.

BUTTON	FUNCTION
	**Remove all alarms in AUTO mode.** **If the same alarm occurs again, it will not be displayed.** **<u>When held pressed for 3 seconds;</u>** **Programming mode activated.** **All alarms are enabled.**
	**Skip to the next parameter. (Measurement and parameter screen)** **Increase related parameter. (Programming screen)** **<u>When held pressed for 3 seconds;</u>** **Switch on and switch off steps.**
	**Skip to the previous parameter. (Measurement and programming screen)** **Decrease related parameter. (Programming screen)** **<u>When held pressed for 3 seconds;</u>** **AUTO-MANUAL mode switch. Reactive control is disabled at MANUAL mode.**

2. AUTO SETUP

Three phase voltage inputs must be connected for successful auto setup.

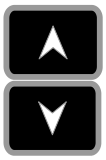
During auto setup :

- Polarity and unmatched current transformers connection will be corrected.

- Each step's reactive power and connection type will be automatically measured.

Large size three phase capacitors or reactors should be connected to first steps for successful auto setup.

Disconnecting the installation side is preferred during auto setup. However, the device can manage to complete auto setup with stable installation load. Fast varying loads might cause inaccurate detection of reactive power as well as faulty current transformer polarity.
In such cases, auto setup should be repeated and connected capacitors and/or inductors should be checked.

BUTTON	FUNCTION
	Hold pressed MENU button for 3 seconds to activate auto setup. **LErn** should be seen at top screen.
	Push up arrow buttons 4 times to navigate **ctrF** parameter. This parameter refers to primary value of current transformer. Secondary value is configured as 5A and can not be changed.
	Click **MENU** button to see the **ctrF** parameter. This is the primary value of current transformer. 500A is configured as default. Adjust primary value of current transformer by using up and down arrow buttons. If current transformer is 150/5A, **ctrF** should be adjusted to 150. Click **MENU** button to save **ctrF** (adjusted value will disappear)
	Click arrow down button 4 times to display the **LErn** parameter.
	Click **MENU** button once more to see value of **LErn** parameter. (Will be 0 as default)
	Adjust value of **LErn** to 1 by clicking up arrow button. 1 → Auto setup (3+2) 2 → Step values learning 3 → CT connection correction
	Click **MENU** button to enable auto setup. Device will check and correct current transformer connections. After that, reactive power of each step will be measured by the auto learning function. After successful auto setup, AUTO led will turn on, and steps will be swithced on and off depending on the reactive power demand of the load.

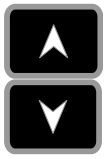
PROGRAMMING

ENABLE AND DISABLE PROGRAMMING MODE

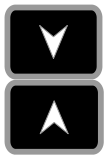
The DFC-0115 offers a set of adjustable parameters in order to provide the user with maximum flexibility.

Adjusted parameters are saved in a non-volatile memory, not affected by power failures.

As long as the program mode password is not enabled, the unit will not ask for password for programming mode. Password can be enabled or modified with the "**PASS**" parameter.

BUTTON	FUNCTION
	Hold pressed **MENU** button for 3 seconds to enable programming. **USEr** should be seen at top screen. **LErn** should be seen if password protection is not activated.
	Click **MENU** button to see value of **USEr**. Value of **USEr** (password) can be seen as zero at bottom screen.
	Adjust password by using up and down arrows. Value will increase or decrease faster if the button is held pressed.
	When the required password is set, click **MENU** button. First parameter should be seen (**LErn**), if correct password is typed.
	Hold down **MENU** button for 3 seconds, and LAMP TEST mode will be activated. (All LEDs on the device will turn on). Click **MENU** button again to navigate through measurement screens.

ADJUSTING PROGRAMMING PARAMETERS

BUTTON	FUNCTION
	Choose required parameter by using up and down arrows while parameter can be seen at top screen.
	Click **MENU** button when parameter to be changed is found. Value of parameter will be seen at the bottom screen.
	Adjust the value with arrow buttons. You can hold the button pressed for faster increase/decrease.
	Click **MENU** button to save the parameter value. Adjusted value will be recorded in the memory and the parameter value will be removed from bottom screen.

Programming will be disabled after 3 minutes if no button is pressed.

PARAMETER LIST

DEFINITION	MIN	STD	MAX
“User” **Enter Password** The user password should be entered. User password is set through “**PASS**” parameter.	0	0	9999
“Lern” **Auto Setup** 1 → Auto setup (3+2) 2 → Step values learning 3 → CT connection correction	0	0	3
“rCAP” **Reset error counters and dynamic step values** When this parameter is set to 1, error counters and dynamic values of each step will be reset.	0	0	1
“rCnt” **Reset step counters** When this parameter is set to 1, switching counters and hours-run counters of all steps will be reset.	0	0	1
“FCty” **Return to factory settings** When this parameter is set to 1, all parameters will return to their factory set values.	0	0	1
“CtrF” **Current Transformer** Primary value of current transformers. Can be set between 5/5A and 5000/5A.	5A	500A	5000A
“CoS” **Target Cosø** Target Cosø can be set between capacitive 0.800 and inductive 0.800. Capacitive power factor is displayed as c.800, while inductive Cosø is shown as 0.800	0.800 cap.	0.999 ind.	0.800 ind.
“StEP” **Number of steps** Number of steps can be adjusted from 1 to 15.	1	15	15
“ProG” Compensation algorithm Different compansation algorithms can be chosen. This parameter is advised to be set to 10 for “smart compensation”	1	10	10

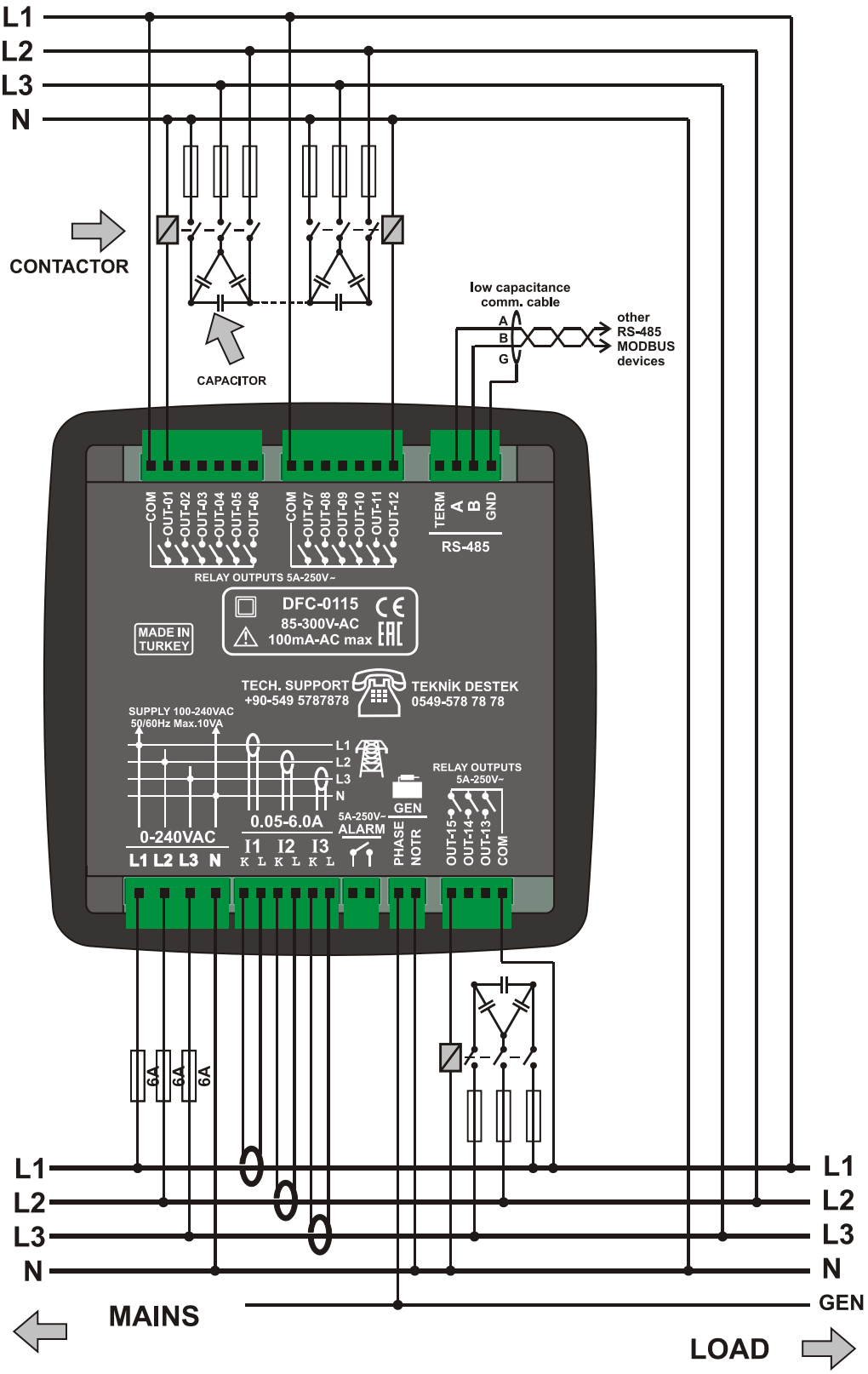
DEFINITION	MIN	STD	MAX
“t-dU” **Step switching delay** When the unit decides to switch the step configuration, it continues measurements during this delay and sets the new step configuration calculated at the end of this delay.	1 sec	1 sec	2000 sec
“t-CL” **Step switching protection delay** When the unit sets a new step configuration, all step switching will be disabled during this timer.	0 sec	1 sec	2000 sec
“dCHr” **Discharge timer** This is the common discharge timer for all steps. Any step swithed-off, cannot be switched on again before expiration of this timer.	3 sec	14 sec	2000 sec

TECHNICAL SPECIFICATIONS

Supply Voltage: 85 - 300VAC (L1-N)
50 - 60Hz nominal (± %10) (L1-N)
Generator Input: 70 - 300 V AC (P-N)
Measurement Inputs:
Voltage: 10 - 300 V AC (Ph-N)
20 - 520 V AC (Ph-Ph)
Current: 0.05 - 5.50 A AC
Frequency: 30 - 100 Hz
Accuracy:
Voltage: % 0.5 + 1 digit
Current: % 0.5 + 1 digit
Frequency: % 0.5 + 1 digit
Power(kW,kVAr)**:** %1.0 + 2 digit
Cos: %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 6.5MW
Power Consumption: < 10 VA
Loading:
Voltage Inputs: < 0.1VA per phase
Current Inputs: < 0.5VA per phase
Number of Steps: 12-15
Relay Outputs: 5A @ 250V A
Serial Port:
Signal Type: RS-485
Communication: Modbus RTU
Baud Rate: 2400-115200 selectable
Isolation: 500V AC, 1 minute
Operating Temperature: -20°C to +70 °C (-4 to +158 °F)
Maximum Humidity: %95 non-condensing.
Degree of Protection:
IP 54 (Front Panel)
IP 30 (Rear Panell)
Enclosure:
Non-flammable,
ROHS compliant,
Flame retardant,
High temp. ABS/PC
UL94-V0
Installation: Flush mounting with rear brackets.
Dimensions: 164x164x69mm (WxHxD)
Panel Cutout: 140x140 mm
Weight: 450 gr (approx.)

EU Directives:	**Norms of References:**
2006/95/EC (LVD)	TS-EN 61010 (safety)
2004/108/EC (EMC)	TS-EN 61326 (EMC)

CONNECTION DIAGRAM



Tel: +90-216-466 84 60 Fax: +90-216-364 65 65 e-mail: datakom@datakom.com.tr http: www.datakom.com.tr