

DFCC: module for the management of the electrical power

DFCC module allows, through the **Domino** system, to manage the power absorbed by a single-phase electrical system (even if distributed on a three-phase line), avoiding the interruptions caused by the simultaneous supplying of too much electrical loads. Up to 9 DFCC modules can be installed in the same **Domino** system, each one with its own identifier.

DFCC constantly monitors the active power absorbed by the electrical system (on the considered phase) and, if its value exceeds a threshold fixed during the setting up, it starts to disconnect the loads according to a well defined sequence until the total power returns under the threshold. The loads can be disconnected from the electrical system by the **Domino** power relay output modules (e.g. DF4RP). DFCC module can manage up to 8 distinct loads; many parameters for optimizing the module operation may be defined during the setting up.

Mode of operation

DFCC module measures the total active power absorbed by the connected loads through an external current transformer (TA); the measured value is compared to the threshold value defined during the setting up by the support program BDTools (allowed power range is up to 12KW, as option up to 18KW).

The loads to be monitored are connected to the electrical system by power relay output module (e.g. DF4RP) that, through the **Domino** bus, are controlled by DFCC module. If a power overload occurs, the module disconnects some loads from the electrical system. The disconnection sequence too can be defined during the setting up by the support program BDTools. DFCC module can manage up to 8 distinct electrical loads according to 2 disconnection sequences (or priority sequences) and 2 threshold values; the second sequence is useful to manage the electrical power in two different ways, e.g. a day and night mode. The change from a sequence to the other is made by a real or virtual input of **Domino** system.

If an overload occurs, the first load to be disconnected will be that defined by the user as the less important one. The user can at any time reconnect the load previously disconnected by DFCC module (or he can avoid the disconnection of this preferential load); to do this, the user has to activate a real or virtual input which forces the switching on of that output. In this case, if the overload condition occurs again, DFCC module will disconnect the next loads according to the chosen sequence until the power returns under the threshold value.

DFCC module manages the electrical system in a smart way, according to configuration parameters described in the following paragraph; when the allowed power value is exceeded, the load disconnection starts. The reconnection occurs when the power value returns under the threshold or when a maximum time allowed for the disconnection expires; in this case, if the power exceeds again the threshold, then DFCC disconnects another load and so on.



The operating status of the 8 loads is reported by DFCC module by means of luminous source (LEDs) placed on its front panel.

Each LED is OFF when the related load is connected, it is ON when the load is disconnected and it blinks when its connection was forced by the user.

Setting up

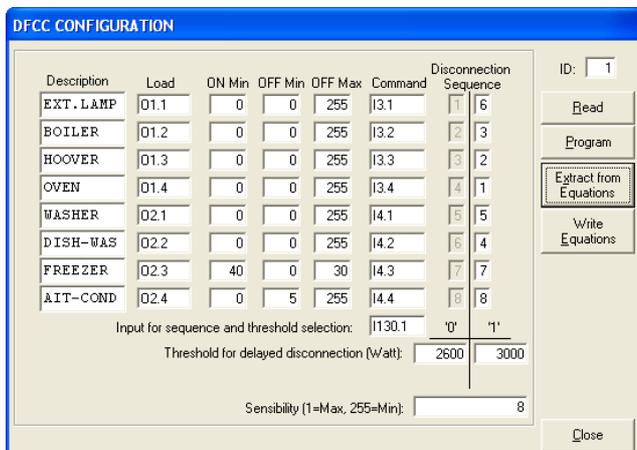
For setting up DFCC module, some parameters have to be defined by the support program BDTools *release 6.1.4 or higher*.

From the main menu of BDTools, select "Programming" and then "DFCC Configuration"; the window shown in the next page will appear (the parameters in this window are given as an example). The window has some text boxes allowing to enter the desired parameters as here described:

1. Description: identification of the electrical load (e.g. washing machine, oven, etc.)
2. Load: the address of the **Domino** output point to which the load is connected (e.g. O1.1)
3. ON Min: the minimum connection time (as minutes) of the load; for example the freezer, at the reconnection after a disconnection, may require to be activated for 40 minutes at least in order to allow the cooling of the contents. Allowed range is 0 to 255 minutes; if this feature is not required, leave the default value 0
4. OFF Min: the minimum disconnection time (as minutes) of the load; for example the air-conditioner, when disconnected, may require 5 minutes waiting time before to be reconnected. Allowed range is 0 to 255 minutes; if this feature is not required, leave the default value 0
5. OFF Max: the maximum disconnection time (as minutes) of the load; for example the freezer cannot be disconnected for more than 30 minutes to avoid the deterioration of its contents. Allowed range is 0 to 255 minutes; if this feature is not required, leave the default value 0
6. Command: the address of the **Domino** input point that forces the load connection (e.g. I3.1)

DFCC

7. Input for sequence and threshold selection: the address of the **Domino** input point (e.g. I130.1) that forces the change, depending on its status 0 or 1, between the two priority sequences and the two power thresholds
8. Disconnection Sequence: the first column is fixed and it defines the disconnection sequence from the less important load (priority 1) to the most important load (priority 8); the less important load will be disconnected first when the power threshold will be exceeded. The second column defines the alternate disconnection sequence: in this case too, the value 1 means the less important load and the value 8 means the most important load
9. Thresholds for delayed disconnection (Watt): these define the power thresholds (as Watt) that cause the start of the disconnection sequence; the disconnection occurs 3 seconds after the exceeding of the specified thresholds. Two distinct thresholds can be defined for each priority sequence, depending on the status of the input for the priority and threshold selection (see point 7)
10. Sensibility (1=Max, 255=Min): it defines how quickly the loads disconnection begins from the instant when the threshold has been exceeded; increasing the entered value the disconnection will be delayed. This allows to mask short peak of power consumption (e.g. when a Hoover starts)
11. ID: it is the identifier of DFCC module to be set or to be read



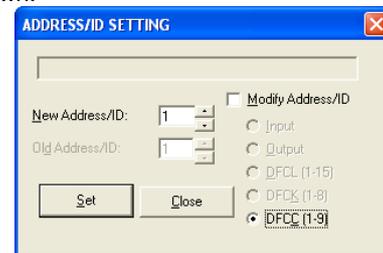
On the right side of the configuration window of DFCC, some buttons allow to perform the following functions:

- Read: reading of the configuration currently loaded in DFCC module
- Program: send to DFCC module the configuration currently shown in the window
- Extract from Equations: filling of the window using the equations loaded in the editor window of BDTTools (if any)
- Write Equations: conversion of the configuration currently shown in the window into equations that will be shown in the editor windows of BDTTools; this feature is useful to save the DFCC configuration in the program file of the system (.equ)

The program section related to the DFCC module configuration as it will be shown in the editor window of BDTTools includes all required information. The meaning of these equation does not need to be understood: always use the configuration window instead of equations.

Assigning the identifier (ID)

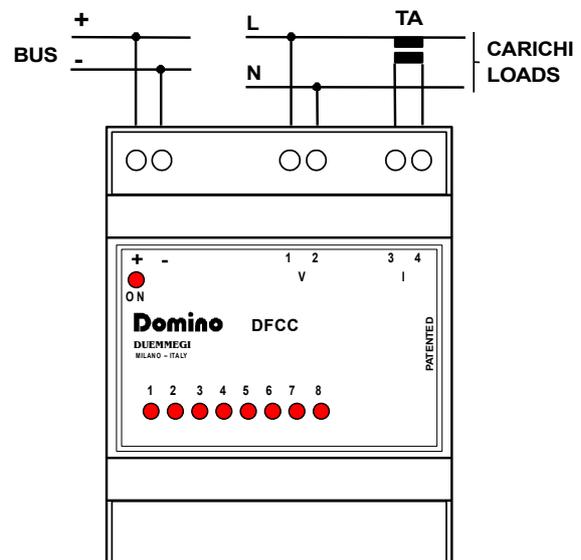
To assign the identifier (in the range 1 to 9) of DFCC modules, it is mandatory to connect to the **Domino** bus one module at a time, so that only one of them is connected at the same time. The assignment has to be executed by BDTTools, selecting from the menu "Programming" and then "Set Address". The window shown in the following figure will be shown:



Enable the option DFCC, enter the desired identifier in the text box "New Address/ID" and then push the button Set. Repeat this operation for all DFCC modules (of course changing the ID), taking attention, as said above, that only one DFCC is connected at the same time. When all the identifiers have been assigned, connect to the bus all DFCC modules and proceed to the setting as explained in the previous paragraph.

Module connection

DFCC module needs the connection to the bus, to the 230V~ electrical line and to the external current transformer (TA) for the measurement of the current consumption. The following schematic diagram shows the proper connection to be made.



Technical characteristics

Power supply (bus side)	By specific centralized power supply mod. DFPW2
A.C. mains supply	230V~ 50Hz $\pm 20\%$ single-phase
Current transformer (TA)	Provided
Active power measurement range	Standard: 12KW Option: 18KW
Amount of managed loads	Up to 8
Housing	Standard DIN 4M for DIN rail
Operating temperature	$-5 \div +50$ °C
Storage temperature	$-20 \div +70$ °C
Protection degree	IP20

Outline dimensions

