

The new SACE Emax 2 The innovative Power Controller Function

Television pickup is an interesting phenomenon. The tendency to operate electrical appliances during the break of popular TV transmissions can create a surge in electricity consumption. For example, in England on July 4th, 1990 not less than a 2800 MW demand was imposed on the national grid by the ending of the penalty shootout in the England vs West Germany soccer game.

In fact, surges in electrical consumption are not uncommon in the everyday life of industrial and commercial plants, and they can lead to substantial problems. Exceeding the contract limit can force the user of the plant to increase the contracted power with a consequent increase of fixed costs. In extreme cases, the plant could be over-dimensioned, just to prevent overheating during the peak absorption. Unfortunately, a system dedicated to load control may require the installation of several dedicated control devices, in addition to a PLC or an industrial PC that needs programming.



Ekip Power Controller, available on the new ABB SACE Emax 2 air circuit-breakers is the ideal solution for load management in plants of low and medium complexity and represents a cutting-edge compromise between reliability, simplicity and cost-effectiveness. This patented function is integrated into the electronic trip unit already used for the protection against overcurrents.

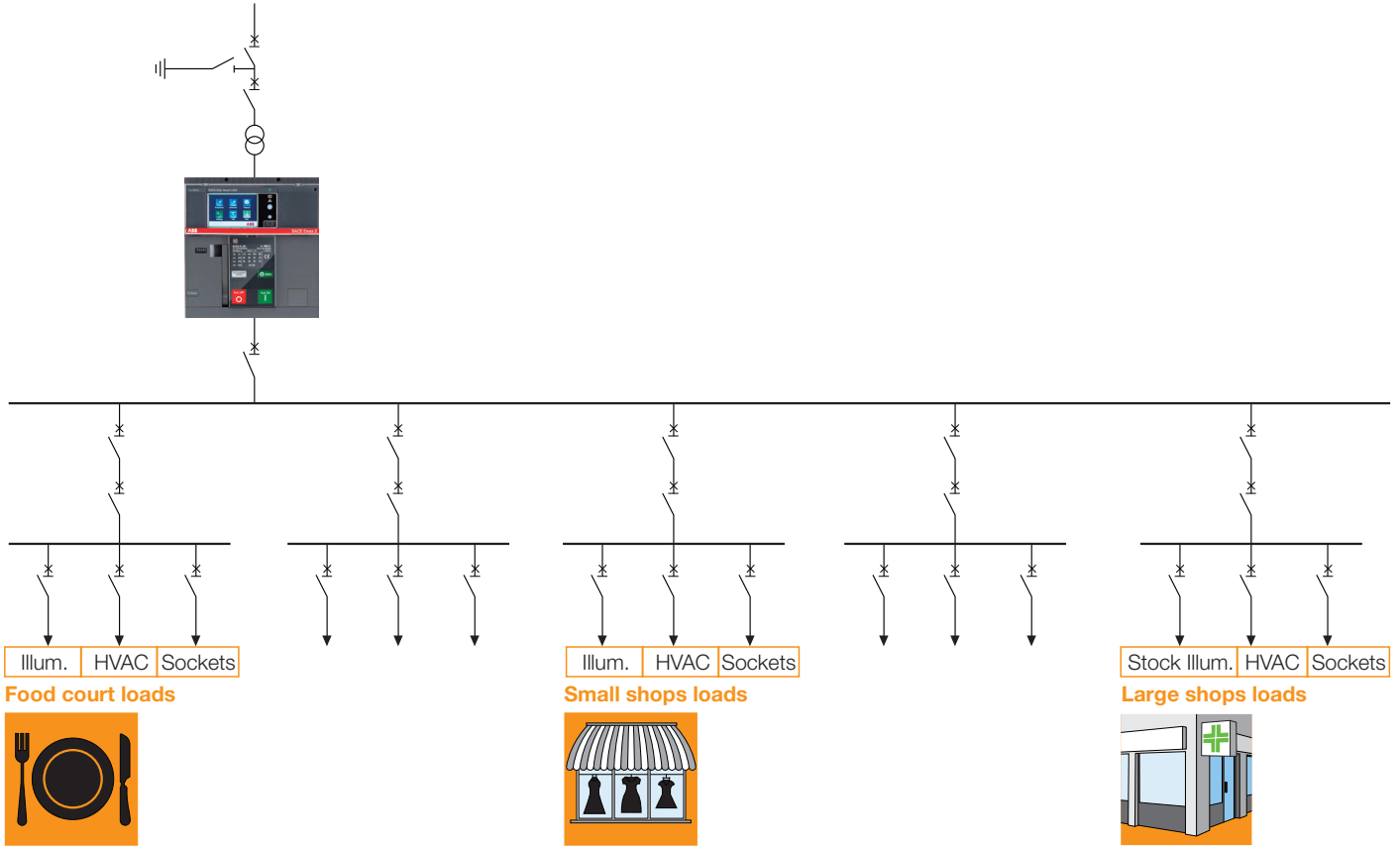
Ekip Power controller is:

- Easy: Neither complex control systems nor the implementation of dedicated software programs are necessary.
- Customizable: the function is based on a load list to be controlled according to priorities defined by the user, based on his own requirements and types of loads.
- Effective: The algorithm is based on foreseen average power absorption, settable by the user over a determined time interval. Whenever this value exceeds the contracted power, the Ekip Power Controller function intervenes to bring it back within the limits, commanding the appropriate switching devices (circuit-breakers, switch disconnectors, contactors...) placed downstream of the Air Circuit Breaker.

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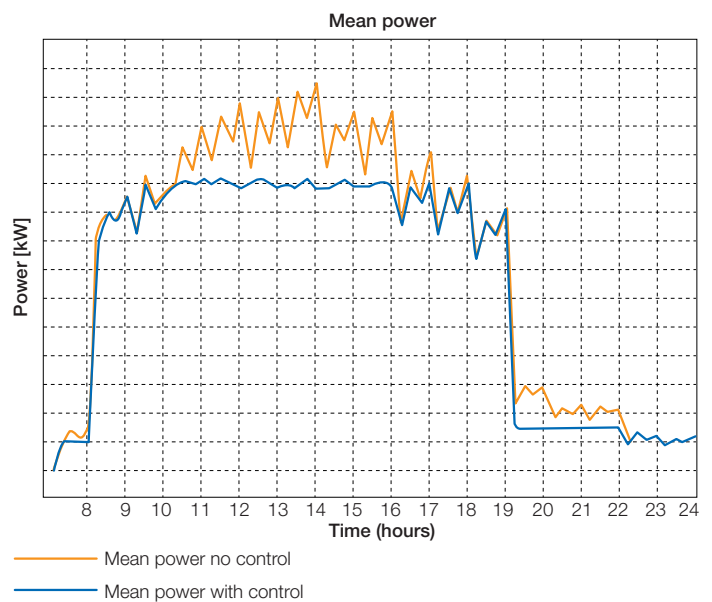
Sketch of the power distribution section of a commercial plaza: Food Court, Small and Large shops

Let's focus our attention on a practical example of how Ekip Power Controller can reduce the cost of an installation.



A commercial installation is reported here above: some loads (like HVAC) can be disconnected for a certain amount of time without compromising the plant functions.

The peak consumption of the plant is expected to be around 580 kW. Using an appropriate strategy, with Ekip Power Controller it is possible to reduce this consumption to 500 kW. In the simulation shown here, three different consumption limits were implemented, in order to take advantage of the possibility of having flexible tariff configuration, in the context of a power purchase agreement. The most dramatic effect can be seen during the central hours, where the peak shaving effect is emphasized.



An idea of the possible economic benefits

Reducing the peak power always leads to a reduction of the energy bill: basically, if two customers consume the same amount of energy but one has a higher power demand, this one will pay higher bills. In many countries if a user exceeds the contracted power he can be charged with higher fixed costs, since a higher power charge will be asked. With regard to the example made above, a rough idea of the economic savings can be given by the following table:

Contractual power	Annual costs [€]		Annual savings [€]
	580 kW	500 kW	
Italy	16261.75	14018.75	2243.00
Spain	7638.60	6585.00	1053.60
China	15590.40	13440.00	2150.40
India	17748.00	15300.00	2448.00
Brazil	20949.60	18060.00	2889.60

It is clear that the savings can be significant after only a few years, and that the savings level can be affected by local regulations (for our example, Brazilian customers would expect higher benefits).

Implementation: more than one architecture available

The remote command sent to the downstream devices (it is possible to command up to 15 switching devices) can be performed in two different ways:

- through the wired solution, by commanding the shunt opening/closing releases or acting on the motor operator of the loads to be managed;
- through a dedicated communication system.

Setting the parameters can be done by means of the Ekip Connect software: the managing software of the Ekip trip units offers a dedicated tool for the Ekip Power Controller functions.

Conclusions: the Air Circuit Breaker as a Power Manager

Demand Side Management (DSM) is a term that is normally associated with utilities. With the constantly increasing prices of energy, however, load management is a winning choice, even in many relatively small Low Voltage plants. Ekip Power Controller brings a new standard to the world of load management: no indiscriminate loads disconnection, as soon as the power exceeds the set threshold limit, like the “load control” available on standard circuit-breakers on one hand; and no need for implementing complicated PLC-based load management systems on the other hand.

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