COMPUTER PV

POWER FACTOR CONTROLLER
FOR PHOTOVOLTAIC INSTALLATIONS





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Partnering with Circutor

Discover the PF controller that understands your self-consumption



The growing implementation of photovoltaic self-consumption systems in industrial and commercial installations has created new challenges in reactive energy compensation. Although solar generation reduces active energy consumption from the grid, the demand for inductive reactive energy remains, which can lead to imbalances in capacitor bank regulation and the appearance of reactive energy penalties that did not previously exist.

These changes require controllers capable of adapting to installations where different energy sources coexist, providing accurate measurement of real consumption and ensuring efficient compensation.

The installation of dedicated Power Factor controllers like Computer PV 12 makes it possible to optimise reactive energy compensation in photovoltaic self-consumption environments, thanks to its ability to simultaneously measure different energy sources, such as the electricity grid, solar generation and even a third additional source.

Thanks to its three independent current inputs and its internal summation logic via software, the Computer PV 12 eliminates the need for external summation transformers, simplifying installation and improving accuracy in calculating the installation's real cos φ.

Computer PV

PF controller for photovoltaic installations



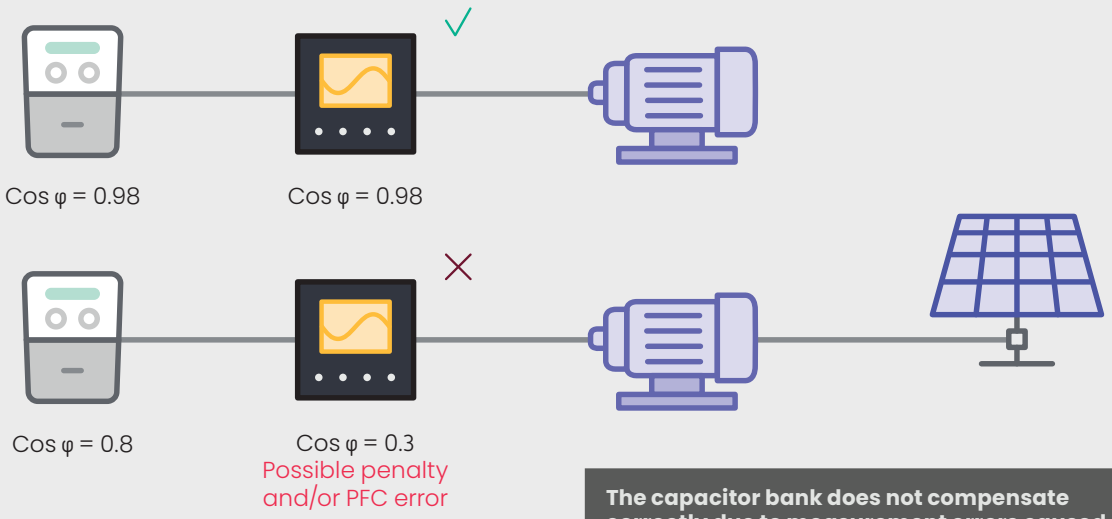
Problem:

When photovoltaic self-consumption is installed, the installation reduces active energy consumption from the grid, but the demand for reactive energy still exists. This can cause the capacitor bank to stop compensating correctly, cos φ measurement errors to appear and, consequently, penalties that did not previously exist. The traditional solution required adding extra current transformers and a summation transformer to adapt the real consumption measurement.

Solution:

Computer PV 12 directly integrates the measurement of several energy sources thanks to its independent current inputs and internally performs the summation via software, eliminating the need for external summation transformers. This yields a more accurate cos φ measurement and allows the capacitor bank to regulate correctly, reducing errors and the risk of penalties in photovoltaic installations.

Main problem



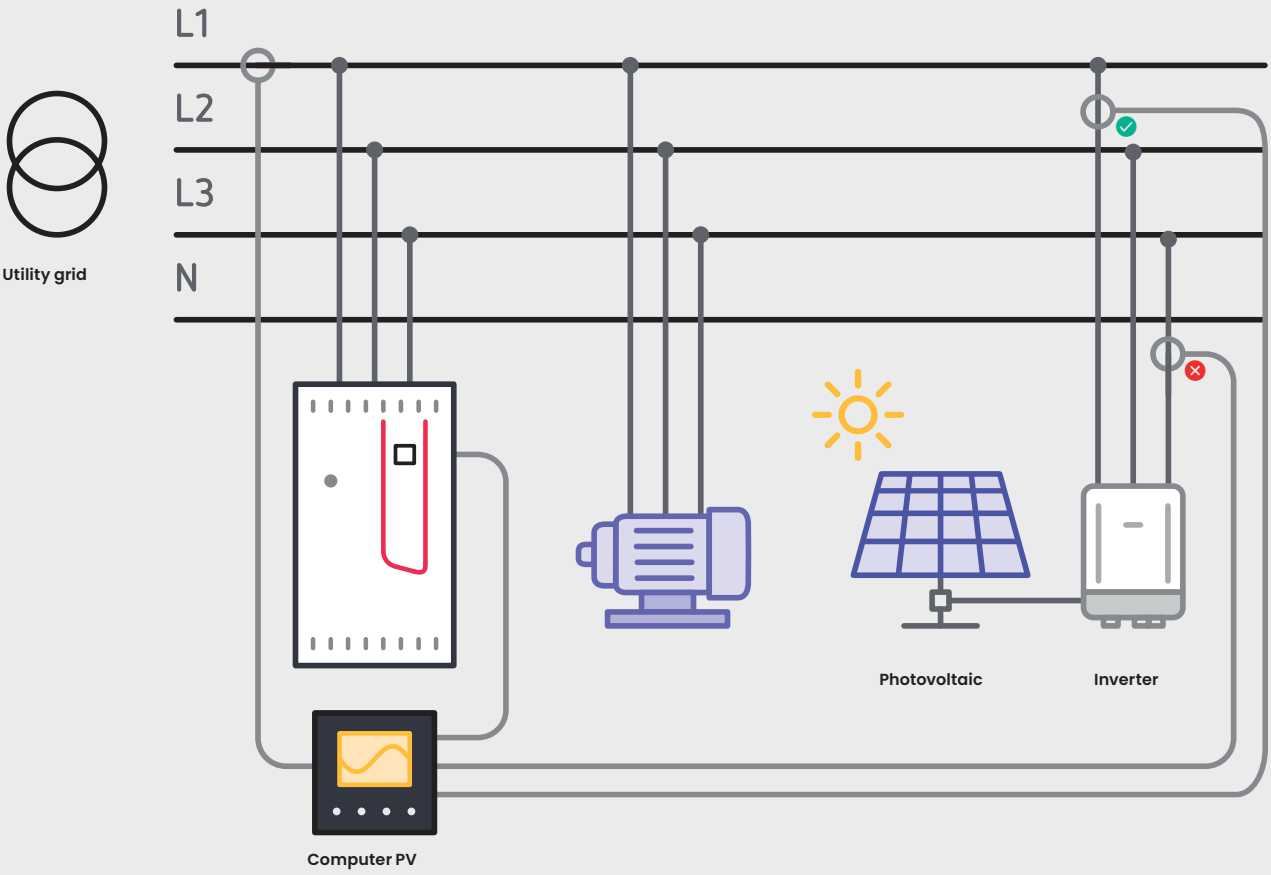
The capacitor bank does not compensate correctly due to measurement errors caused by the addition of photovoltaic generation.

- **Compensation based on real data**
- **Parameter and consumption monitoring**
- **Preventive maintenance and safety**
- **Avoid installing a current adding transformer**

Up to 3 sources, a single
Power Factor controller

This Power Factor controller allows the capacitor bank to operate correctly in installations with photovoltaic self-consumption, reducing regulation errors, preventing overcompensation and reducing the risk of reactive energy penalties.

In addition, its ability to operate in all four quadrants allows correct regulation both in consumption and in energy generation or export situations, something especially important in photovoltaic self-consumption installations, where energy flows are becoming increasingly dynamic and complex.



All current measurements must always be taken on the same phase. Using different phases may cause measurement errors and incorrect compensation regulation.

Up to 3 sources, a single Power Factor controller

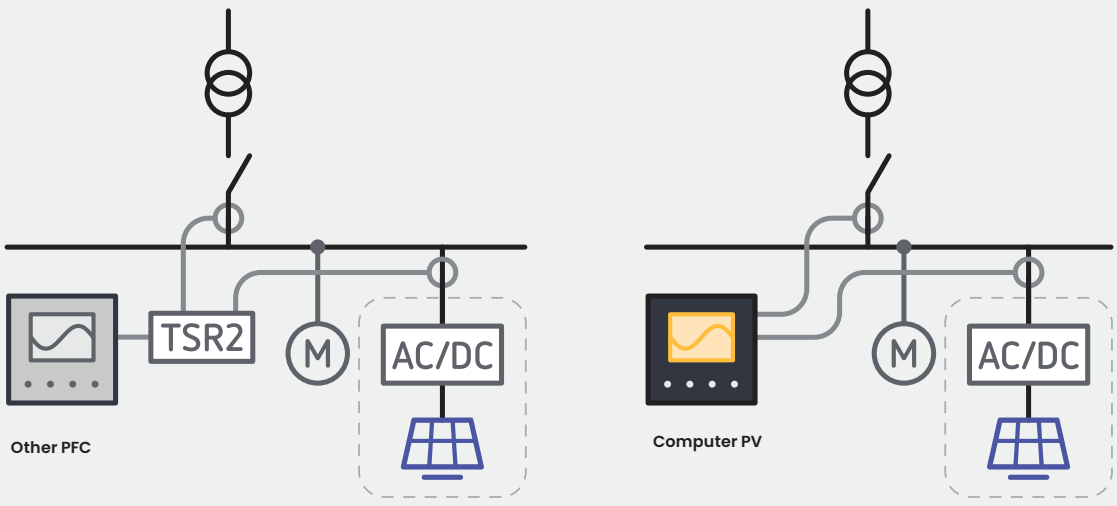
Until now, this type of installation has typically been implemented using summation transformers (grid+PV), incorporating additional current transformers to combine the measurement signals and obtain a representative reference of the installation's actual power consumption.

With the new Computer PV 12, this function is performed directly by the Power Factor controller. Specifically designed for installations where several energy sources coexist, the unit measures the cos φ and controls the connection and disconnection of the capacitor bank in order to optimise compensation.

For this purpose, it incorporates three independent single-phase current inputs (ES1, ES2 and ES3), always referenced to the same phase, allowing measurements to be taken from different points in the installation. The Power Factor controller itself internally performs the current summation via software, eliminating the need for external summation transformers, simplifying installation and yielding a more accurate and representative measurement of the real cos ⊠, thereby improving compensation quality.

Advantages of the Computer PV 12 Power factor controller

› Simplified and faster installation
› Eliminates additional components
› Greater measurement flexibility, allows the use of transformers with different primary current ratings
› Greater regulation accuracy: software-based current summation and improved cos φ calculation.



Where to install the PFC?

› **Computer PV 12** is the recommended solution for photovoltaic self-consumption installations with a cos φ equal or close to unity, or with multiple energy sources, when precise and stable reactive energy compensation is required, based on a real measurement of the entire installation.

› Measurements must be taken on the same phase, from different points within the installation.

› Correct phase selection for current measurements is an essential requirement for proper operation, and any discrepancies with the utility meter, even after installing a **Computer PV 12**, must be resolved using an **SVGm**.

Main features:

COMPENSATION

- Smart compensation
- Measurement of 1 phase from up to 3 sources (same phase)
- 4 target cos φ values
- Configurable alarms
- Communications Modbus RTU/RS-485
- Allows independent configuration of each step.

ANALYSIS

- In addition to being a reactive energy PFC, Computer PV is also a powerful power analyser.

PROTECTION

- Computer PV incorporates leakage current measurement, making it easier to disconnect the affected capacitor and ensuring service continuity for the remainder of the capacitor bank (via WGC - residual current Transformers).



Industry



Buildings



Primary Sector



Infrastructure

Technical specifications

Power circuit	Nominal voltage	100... 520 VAC
	Frequency	50... 60 Hz
Voltage measurement circuit	Nominal voltage (U_n)	230 VAC ph-n, 400 VAC ph-ph
	Voltage measurement range	20...300 VAC ph-n, 35...520 VAC ph-ph
	Frequency measurement range	45... 65 Hz
Current measurement circuit	Nominal current (I_n)	.../1 A or .../5 A
	Current measurement margin	1...120% I_n
Measurement circuit for leakage current	Secondary nominal current	3 mA
	Current measurement margin	10 mA ... 1.5 A
	Minimum current measurement (I_{start})	10 mA
Measurement accuracy	Voltage measurement	0.5% ± 1 digit
	Current measurement	0.5% ± 1 digit
	Active energy measurement	0.5% ± 2 digits
	Reactive energy measurement	1% ± 2 digits
Communications	Protocol	Modbus RTU
	Intermediate	RS-485
Environmental characteristics	Operating temperature	-10 °C ... +55°C
	Relative humidity (without condensation)	5 ... 95%
	Maximum altitude	2000 m
	Protection rating	IP30, Frontal: IP50
Mechanical characteristics	Dimensions	144 x 144 x 78 mm
	Weight	610 g
	Enclosure	Self-extinguishing V0 plastic
	Attachment	Panel
Standards	UNE-EN 55022; UNE-EN 55016-2-1; UNE-EN 61000-4-2; UNE-EN 61000-4-4; UNE-EN 61000-4-5; UNE-EN 61000-4-6; UNE-EN 61000-4-8; UNE-EN 61000-4-11; UNE-EN 61000-4-20; UNE-EN 61010-1; UNE-EN 61010-2-030.	

References

Model	Code	Power Supply	Switching	No. of steps	Communications
Computer PV 12	R13882.	100... 520 VAC	Contactor	12	Modbus RTU / RS-485





Partnering with

Circutor

Leading electrical energy efficiency company, creating innovative technological solutions for our clients, in the field of global energy transition since our foundation in 1973.

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