

## PFC power factor controllers

### Automatic power factor correction controller series PFC 6, 8, 12 RS

#### DESCRIPTION

An essential way of electrical energy cost reduction is the compensation of the reactive power caused by various type of loads. The main part of central and group power factor correction in systems with a variable load is the power factor controller. A proper power factor controller and the correct design of PFC (Power factor correction) system are the key to the reduction of reactive energy costs. Nowadays, when four-quadrant energy meters are used, the right power factor controller is essential to achieve the highest efficiency of PFC system. Reliable, smart and advanced ETI controllers assure effective reduction of reactive energy and long working life of PFC systems.

#### MAIN ADVANTAGES

- Circular usage of steps: The controller switches all steps that have the same power circularly in order to use them equally and prolong their working life time.
- Fast action: Optimal regulation is achieved in one regulation cycle with a minimum number of switched stages. Since the controller knows the needed compensation power, it can connect or disconnect several steps in one cycle.

#### REGULATION METHODS:

The power factor controller digitalizes measured phase voltage and phase current in one or three phases. From these values the controller then calculates power factor, effective values of voltage, current and powers. On the basis of allowed reactive power, which is set as a requested power factor value, the controller calculates the requested compensation power. In accordance with its size and direction, the controller connects or disconnects the appropriate capacitor steps.

- APFR (average power factor regulation): The controller quantifies an average power factor from active and apparent power over a defined period. This method assures that the controller reacts smartly to load changes taking into account the size of load and  $\cos \varphi$ . Thanks to the APFR system, the power factor controller reduces the number of switching operations together with a precisely kept requested power factor result.
- SHTD: This method uses the deceleration of time to reaction according to the size of the difference between the target power factor and instantaneous value. For every second of difference the time to the reaction is reduced by the square of difference until 0 (the moment of reaction).
- Instantaneous power factor: This method reacts to every change of the instantaneous power factor by the connection or disconnection of the exact size of reactive power step. This method is mainly used for the dynamic power factor correction system based on thyristor switching modules.

#### Advantages:

- monitoring of U, I, P, Q, S,  $\cos \varphi$ , THDU, THDI, odd harmonics up to the 19th order, temperature
- three regulation methods (APFR default)
- small design 97 x 97 mm for pannel mounting, PFC 6 RS and PFC 8 RS
- automatic or manual configuration of measuring circuit connection (load must not vary during the auto-detection process).
- automatic or manual detection of connected capacitor steps
- universal current transformer input  $\dots/1A$  and  $\dots/5A$
- internal temperature sensor
- temperature levels for ventilator control and steps disconnection
- ready for applications with de-compensation reactor steps
- monitoring of switching operations and operation time
- setting of discharging and min. operation time for each step
- memory for min. and max. values
- discharging time and min. operation time setting for each step
- last step output programmable for alarm purposes
- second tariff activation by external input, PFC 12 RS only
- programmable alarms and independent alarm output at PFC 12 RS only

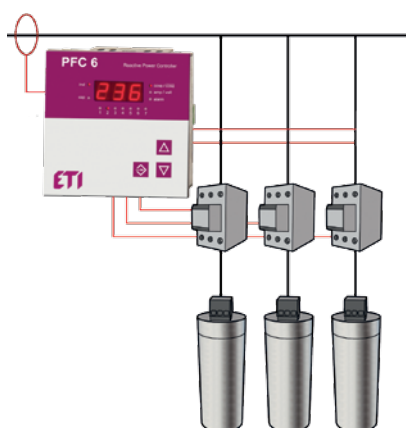
## Controllers for compensation of 3 phase balanced loads (single phase current measurement)



Power factor controllers PFC 6 (6 outputs), PFC 8 (8 outputs) and PFC 12 (12 outputs) are designed for usage in standard LV and MV power factor correction applications operated by mechanical contactors. Despite the small size of power factor controllers, they offer four quadrant measurement and regulation, automatic detection of measuring circuits and capacitor steps, high sensitivity, reliability and design for the hardest conditions.

### Technical data

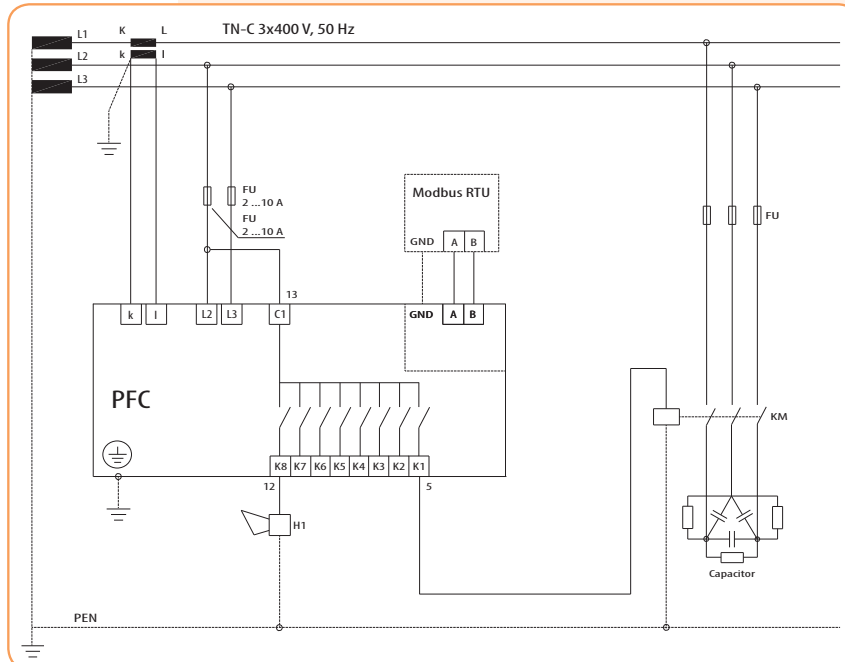
Supply and measuring voltage	400 VAC (+10%, -15%)
System frequency	50 Hz / 60 Hz
Power consumption	<3,2 VA
Current range	5mA - 6A
Current input accuracy	± 0,2%
Voltage input accuracy	± 0,5%
THD <sub>U</sub> and THD <sub>I</sub> accuracy	(U>10%UN) ±5% / (I>10%IN) ±5%
Phase error for I>3%In	± 3° (otherwise ±1°)
Switching power of relay output	250 V AC / 5 A
Range of requested power factor	0.8 inductive ÷ 0.8 capacitive
Step reconnection delay	5 ÷ 900 s
Step disconnection delay	5 ÷ 900 s
Step power setting	999 kVar inductive ÷ 999 kVar capacitive
System connection detection	manual / automatic
Communication interface	RS485 (Modbus RTU)
Working temperature	-40°C ÷ +70°C
IP rating	IP20 rear, IP54 front panel
Site depth	55mm
Related norms	EN 61010-1, EN50081-1, EN50082-1



Type	Code No.	Rated voltage Un	Description	Communication module	Weight (kg)	Packaging (pcs)
PFC 6 RS	004656905	400 V AC (+10%, -15%)	Single phase current measurement	RS485	0,65	1
PFC 8 RS	004656906				0,65	1
PFC 12 RS	004656907				1,2	1

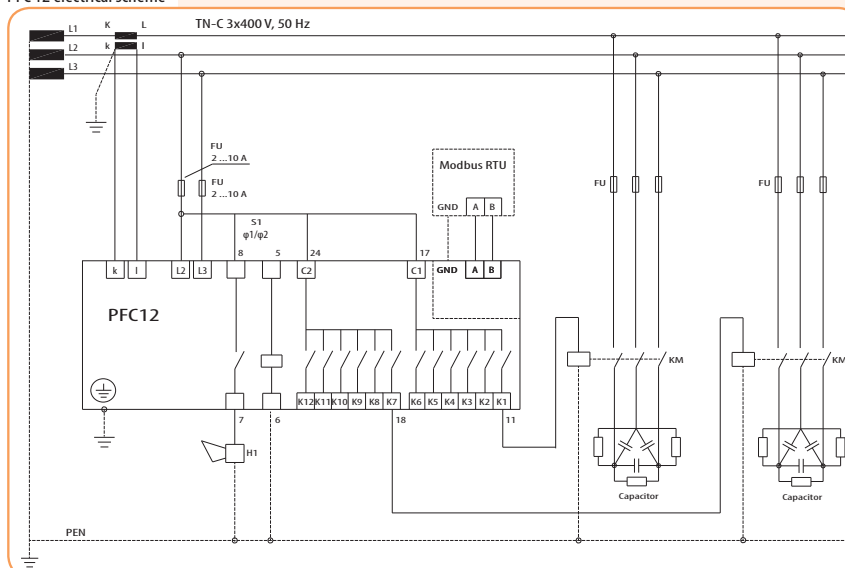


PFC 8 electrical scheme



\*Capacitor steps with the same power have to be connected next to each other (no different values between).  
 \*\*Before current circuit disconnection make short-out of CT.

PFC 12 electrical scheme



\*Capacitor steps with the same power have to be connected next to each other (no different values between).  
 \*\*Before current circuit disconnection make short-out of CT.

Position of controller

