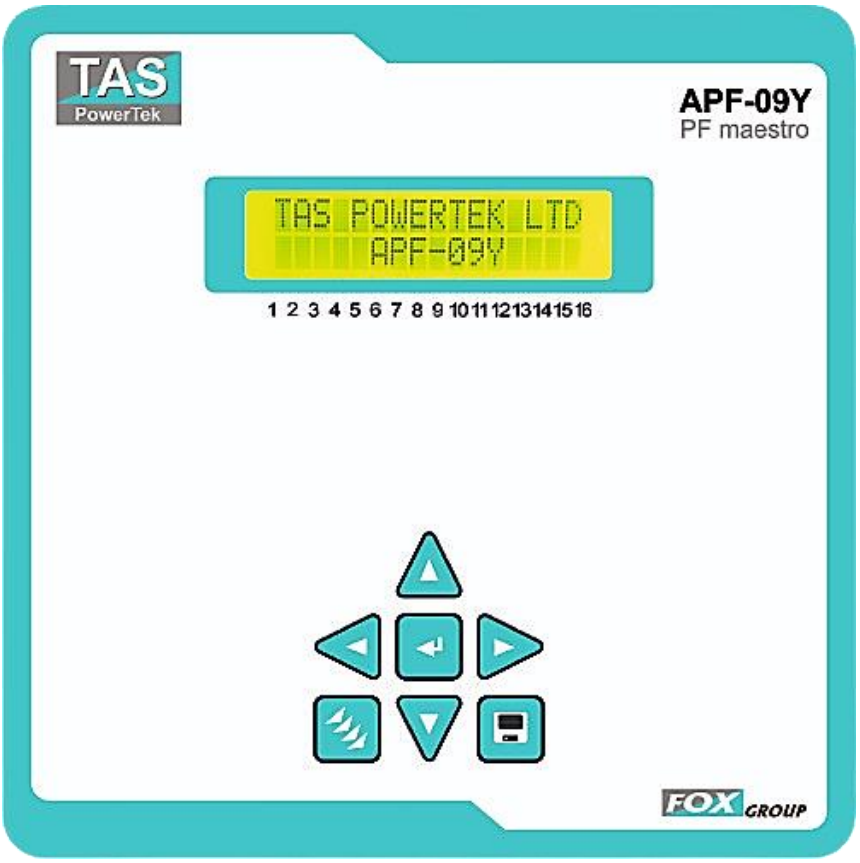
TAS PowerTek

Product Data Sheet

PF maestro – APF-09Y Series
Power Factor Controller



SAVE ENERGY

RoHS

PF meastro – APF-09Y Series is a Single CT smart Automatic Power Factor Correction (APFC) Controller built on advanced 32-bit ARM Cortex-M microcontroller technology with integrated Digital Signal Processing (DSP). It offers precise power measurements, real-time monitoring, and intelligent control of capacitor banks to improve power factor in industrial and commercial electrical systems.

PRODUCT FEATURES

- **Advanced 32-bit ARM Cortex-M Microcontroller with DSP Logic**
  Incorporates a state-of-the-art 32-bit ARM Cortex-M processor with integrated Digital Signal Processing (DSP) capabilities. This enables high-speed, real-time data acquisition and processing for accurate measurement, monitoring, indication, alarming, and automated control of power factor correction functions.

- **Standards-Compliant Power Measurement**
  Accurately measures Active (P) and Reactive (Q) power in accordance with IEC 62053 Part 21 & 23, Class 3.0, ensuring reliable performance and compliance with international energy metering standards.

- **Auto CT Polarity Detection**
  Features automatic detection and indication of Current Transformer (CT) polarity, with user-editable settings to simplify installation and ensure measurement accuracy.

- **Dedicated Voltage Feedback Inputs**
  Provides Phase-to-Phase voltage measurement through independent input terminals, enhancing flexibility and precision in diverse installation setups.

- **Single CT Current Feedback Interface**
  Supports single CT-based current measurement through a three-terminal side connector located at the rear, allowing for simplified wiring while maintaining accuracy.

- **Harmonic Analysis Capability**
  Measures supply voltage and current, along with odd harmonic coefficients up to the 15th harmonic, helping users monitor and manage power quality effectively.

- **Wide Input Voltage Range Support**

  Capable of operating over a broad AC input voltage range, accommodating various system configurations and ensuring adaptability in diverse power environments.

- **Multiple Capacitor Switching Modes**

  Offers several capacitor bank switching to optimize power factor correction:
  - Un-equal Mode – User-defined step sizes for flexible compensation
  - C-Series Mode – Predefined standard capacitor bank sequences
  - E-Series Mode – Custom-defined, energy-optimized sequences

- **Capacitor Bank Step Control**

  Supports control of 4, 6, 8, 10, or 12 output capacitor steps, depending on the selected unit model, allowing precise reactive power compensation tailored to load demand.

- **Auxiliary Digital Input & Output**

  Includes a 24V DC auxiliary digital input for external triggering or interlocks, and a potential-free Normally Open (N.O.) relay contact output. This output can be used for system interlocks or to control auxiliary equipment such as an APFC panel cooling fan (if enabled).

- **User-Friendly Display**

  Equipped with a 16-character x 2-line LCD display featuring LED backlighting, ensuring clear visibility of system status, measurements, and alerts even in low-light conditions.

- **Rugged and Standardized Enclosure**

  Housed in a DIN standard 144mm x 144mm panel-mountable enclosure, made from fire-retardant plastic, designed for secure and safe integration into electrical panels.

- **Comprehensive Built-in Protections**

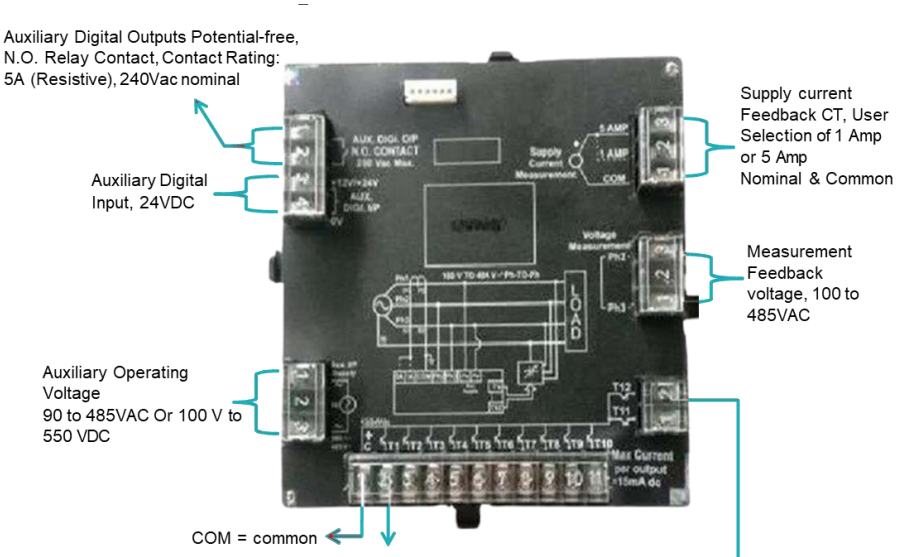
  The unit includes user-configurable protections to safeguard system performance and longevity:
  - Over and under supply voltage
  - Overcurrent or under load (based on kW)
  - Over-temperature protection for the APFC unit
  - Capacitor bank step health monitoring

TECHNICAL SPECIFICATIONS

Parameter	Specifications
Feed-back Voltage	2-Ph, 2-wire (Phase-to-Phase), Nominal 415 Volts (User Settable Range: 100 to 480 Vac, in steps of 1 Volt)
Supply Current Feedback (CT) Input	Selectable 5 Amp or 1 Amp
Measurement Accuracy	Class 2 for Voltage & Current
Power Measurement Accuracy	Class 3 (P-Active & Q-Reactive)
Mains AC Supply Frequency Range	47 Hz to 53 Hz (Nominal 50 Hz) or 57 Hz to 63 Hz (Nominal 60 Hz)
Power Factor Correction Cycle Time Range	User Selectable: 1 to 180 Seconds (in steps of 1 Second)
Capacitor Bank Discharge Time Range	User Selectable: 1 to 180 Seconds (in steps of 1 Second)
Output Commands	4 / 6 / 8 / 10 / 12 Relay 'NO' Contacts (Isolated, 5 Amp Resistive / 0.5 Amp Inductive / 250 Vac)
Relay Contact Usage	Suitable for Three-Phase Capacitor-Duty Contactor Coils (Nominal <250 Vac, 50 Hz)
Current-Sourcing transistor contact	Max. 20 milli-Amp Current-Sourcing Transistor Outputs, using external supply of 12Vdc / 24Vdc, Current-Sourcing Transistor Outputs are Short-Circuit Protected
ENVIRONMENTAL	
Operating Temperature Range	-10°C to +60°C
Storage Temperature Range	-10°C to +65°C
STANDARDS COMPLIANCE	
EMC / EMI	IEC 62326 – 1
Environment	IEC 60068 (Temp, Humid, Rust) IP-54 (front), IP-20A (back)
Measurement Accuracy – P & Q	IEC 62053 pt.21,23 table-6 Class-3.0

All specifications are typical and subject to change without notice due to ongoing product development and improvement.

WIRING TERMINALS



Output commands to Thyristor Switches.
COM = Common (+12/24 Vdc Input),
T1-------T12 (T4 to T12, as per model) = current Sourcing Transistor Outputs, maximum 20 milli-Amps Per Output Channel.
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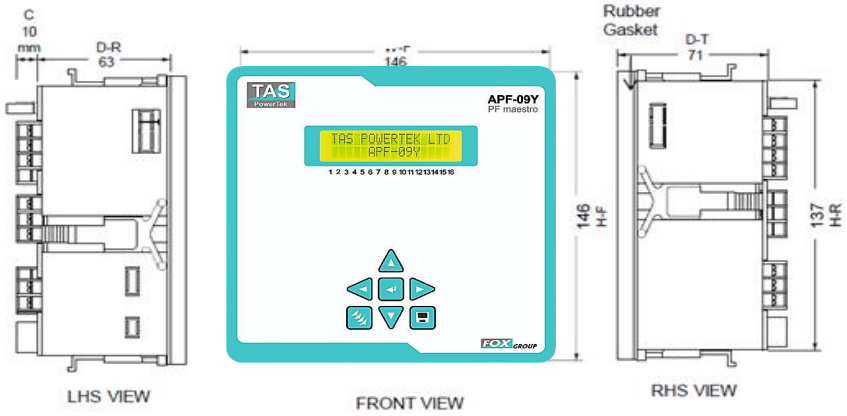
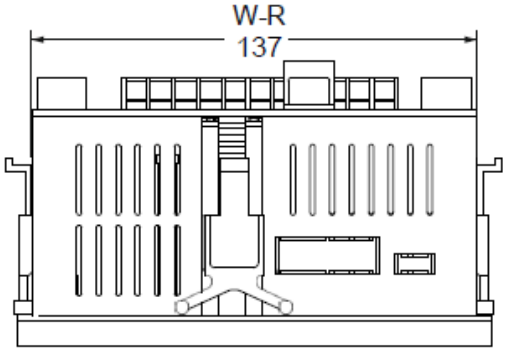
MECHNICAL DIMENSIONS





1) Width at Front - W-F
2) Width at Rear - W-R
3) Height at Front - H-F
4) Height at Rear - H-R
5) Depth (Total) - D-T
6) Depth (Rear) - D-R
7) Rear Connectors Projection - C.

PRODUCT SELECTION AND FEATURES MATRIX

	Features/Models	APF-09Y/4K1	APF-09Y/4T1	APF-09Y/6K1	APF-09Y/6T1	APF-09Y/8K1	APF-09Y/8T1	APF-09Y/AK1	APF-09Y/AT1	APF-09Y/CK1	APF-09Y/CT1
Hardware	Steps as model declared	√	√	√	√	√	√	√	√	√	√
	Mounting dimensions 144 X 144	√	√	√	√	√	√	√	√	√	√
	Step switching Relay (R)	√	X	√	X	√	X	√	X	√	X
	Step switching Transistor (T)	X	√	X	√	X	√	X	√	X	√
	Supply Current Measurement 1-CT	√	√	√	√	√	√	√	√	√	√
	Internal Temperature sensing within MCU	√	√	√	√	√	√	√	√	√	√
	Auxiliary Dig. Inputs	√	√	√	√	√	√	√	√	√	√
	Auxiliary Digital Outputs	√	√	√	√	√	√	√	√	√	√
Measurement & Display	Supply freq. phase locked measurement	√	√	√	√	√	√	√	√	√	√
	Voltage meas. 4W, 3W, 2WLL, 2WLN	●	●	●	●	●	●	●	●	●	●
	Power meas. 3Watt-met, 2Watt-met, 1Watt-met	●	●	●	●	●	●	●	●	●	●
	Supply RMS Current measurement	√	√	√	√	√	√	√	√	√	√
	Supply RMS Voltage measurement	√	√	√	√	√	√	√	√	√	√
	Frequency range 45Hz to 65Hz	√	√	√	√	√	√	√	√	√	√
	P,Q,S RMS 3-phase overall Values	√	√	√	√	√	√	√	√	√	√
	Supply Voltage harmonics THD-% & value	●	●	●	●	●	●	●	●	●	●
	Supply current harmonics THD% & TDD%	●	●	●	●	●	●	●	●	●	●
	PFC internal operating temperature	√	√	√	√	√	√	√	√	√	√
	Capacitor steps VAR on-line detection (normalized)	√	√	√	√	√	√	√	√	√	√
Reliability	PFC power voltage 90V~ to 485V~ (Max limit 600V~)	√	√	√	√	√	√	√	√	√	√
	EMI filter for transient protection on PFC power supply	√	√	√	√	√	√	√	√	√	√
	Capability to work in Dusty & Conductive environment	√	√	√	√	√	√	√	√	√	√
	Operability at -10°C to +60°C ambient temperature	√	√	√	√	√	√	√	√	√	√
	S/c protected sourcing / sinking current Transistor o/p	X	√	X	√	X	√	X	√	X	√
	Fire retardant material housing	√	√	√	√	√	√	√	√	√	√
	Housing Front facia IP-54, Back IP-30	●	●	●	●	●	●	●	●	●	●
Alarms & Aux. Functions	Over & Under Voltage on meas. Voltage	√	√	√	√	√	√	√	√	√	√
	Supply Voltage Over-frequency and Under-frequency	√	√	√	√	√	√	√	√	√	√
	Capacitor step VAR health monitor & selective trip	√	√	√	√	√	√	√	√	√	√
	Capacitor step user masking	√	√	√	√	√	√	√	√	√	√
	Over Temperature internal to PFC unit	√	√	√	√	√	√	√	√	√	√
	Fan control by over temperature	√	√	√	√	√	√	√	√	√	√
	Step/s declared faulty & masked	√	√	√	√	√	√	√	√	√	√
	Indicative Fault / Event alarm	√	√	√	√	√	√	√	√	√	√
Applications	EASY EDIT settings for standard LV usage	●	●	●	●	●	●	●	●	●	●
	Steps Capacitor testing mode	√	√	√	√	√	√	√	√	√	√
	Fixed capacitor banks step declaration by user	√	√	√	√	√	√	√	√	√	√
	User friendly Keyboard for front operations	√	√	√	√	√	√	√	√	√	√
	Capacitor step status on front LCD	√	√	√	√	√	√	√	√	√	√
	Adjustable C/K:Offset & VAR band width to Target PF	●	●	●	●	●	●	●	●	●	●
	Automatic Supply V & A synchronization	●	●	●	●	●	●	●	●	●	●
	High speed cycle to cycle control with Thy.version	X	√	X	√	X	√	X	√	X	√
	Two X'mer with 2 APFC with bus coupler operation	√	√	√	√	√	√	√	√	√	√
	Password protected user settings	√	√	√	√	√	√	√	√	√	√
	"I AM OK" self-monitoring health indicator (LED / LCD)	√	√	√	√	√	√	√	√	√	√