



TRINITY

MAKING ENERGY MATTER

RTVC3P

The RTVC3P controls the automatic system for correction of the power factor. It is a KVAR based controller which controls up to 16 capacitor banks optimally to achieve near unity power factor and also measures/calculates various electrical parameters. RTVC3P is meant for use in three phase four wire electrical systems. The main features of the RTVC3P are:



COMPREHENSIVE POLY PHASE MEASUREMENT

The RTVC3P needs three CT inputs from the mains and also all the three phase and neutral connections. So, in addition to accurate control of VAR, this model also provides comprehensive electrical measurement. The parameters measured and displayed are all voltages, currents, power factor, system PF, active power, apparent power, reactive power, active energy, apparent energy, average PF maintained since last reset and THD figures for voltages and currents. This model also gives LED pulse output of 1000 impulses/Unit for KWh and KVAh separately.

EASE OF INSTALLATION

CT primary and secondary of Mains as well as Capacitor, PT Gain, switching time of control action (250mS, 500mS, 1 Second, 2 Second) and target PF are site programmable. RTVC3P has an autosense feature, which senses the sizes of the capacitor banks connected on each stage automatically. No need to program bank sizes manually.

TRINITY ENERGY SYSTEMS PVT LTD

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LOW CURRENT OPERATION

Since there is no fixed sequence of switching capacitors, if very small capacitor banks are connected, RTVC3P sense down to 0.4% and 2% of the main load and take corrective action in VAR mode and FIFO/SFIFO mode respectively.

INTELLIGENT CONTROL

The control parameter is VAR, and not PF. Target PF value is just used to calculate the capacitive VAR required to be added/removed to achieve the desired PF. e.g. If the target PF is unity, means that the target VAR in the system is zero. If system KVAR is 200 lagging, then the controller needs to add 200 KVAR of capacitor banks to reach zero VAR.

The calculation of the reactive power in the system is done by taking Instantaneous samples of all voltage and current waveforms, in all four quadrants. These values are then subjected to DSP techniques to add a frequency independent 90 phase shift to current samples. The product of these voltage and current samples then generate signed VAR value.

VAR controller takes into calculation the prevailing system KVAR, the prevailing bank KVAR and the bank sizes of each stage, and then switches ON/OFF the combination which is closest to the needed VAR.

SWITCHING TIME OF CONTROL ACTION

The Switching Time is selectable from one of the following values: 250mS, 500mS, 1 Second and 2 Second. RTVC3P is fast enough to sense load fluctuation and take action accordingly at programmed Switching Time but its fast switching performance totally depends on external factors like TSM & Capacitor bank discharge resistors. Needlessly selecting fast switching times for slow varying loads, without adequate attention to using correctly sized fast discharge resistors can cause control loop instability and PF may not be achieved.

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TECHNICAL SPECIFICATION

Parameters			
Type	Name	Statistics	
INPUT	Supply	Three Phases and Neutral of a 3P4W system	
	Voltage	Direct Voltage Input : Up to 280V L-N PT Ratio : Site Selectable Burden : 0.5VA	
	Current	Secondary Current Input : 5A or 1A (Site Selectable) CT Ratio : Site Selectable Range of Reading : 5 – 5000A Burden : < 1.0VA Overload : 5A CT → 6A RMS Continuous : 1A CT → 1.2A RMS Continuous	
	Power Supply	Self powered from Mains	
MEASUREMENT	True RMS Basic Parameters	Voltage (Volts L-N : VRN, VYN, VBN)	Accuracy : 0.5% of Reading
		Current (Amps IR, IY, IB)	Accuracy : 0.25% of Reading
		Line Frequency	45 to 55 Hz, Accuracy : 0.3% of Reading
	Power	Active Power (P)	Accuracy : 1% of Reading (For IPFI>0.5)
		Reactive Power (Q)	Accuracy : 1.5% of Reading (Between 0.5 Lag to 0.8 Lead)
		Apparent Power (S)	Accuracy : 1% of Reading
		Power Factor	For Individual phases and System Accuracy : 1.0% of Reading (IPFI 0.5) Range of Reading : 0.05 to 1.00 Lag/Lead
	Energy	Total Active Energy (KWh)	Range of Reading : 0 to 99999999.9 Accuracy : Class 1.0s as per IS13779
		Total Apparent Energy (KVAh)	Range of Reading : 0 to 99999999.9 Accuracy : 1.0% of Reading
	Power Quality	3 rd to 15 th Harmonics (Odd) for all voltages with THD	
		3 rd to 15 th Harmonics (Odd) for all currents with THD	
MISCELLANEOUS	Dimensions	Bezel	144 X 144 mm
		Panel Cutout	138 X 138 mm
		Depth of installation	55 mm
		Display	128 x 64 graphical backlit LCD
		Operating temp	10°C to 50°C
		Weight	0.600 Kg (Approx)
		Min. Operating Current	VAR Mode : 0.4% of CT primary FIFO/SFIFO Mode : 2.0% of CT primary
		Calibration LED	Red Colour. 1000 impulses/Unit
	Comm.	RS485	Modbus-RTU protocol