



Automatic Power Factor Correction Relay

NEWTON+

USER MANUAL

USER'S MANUAL

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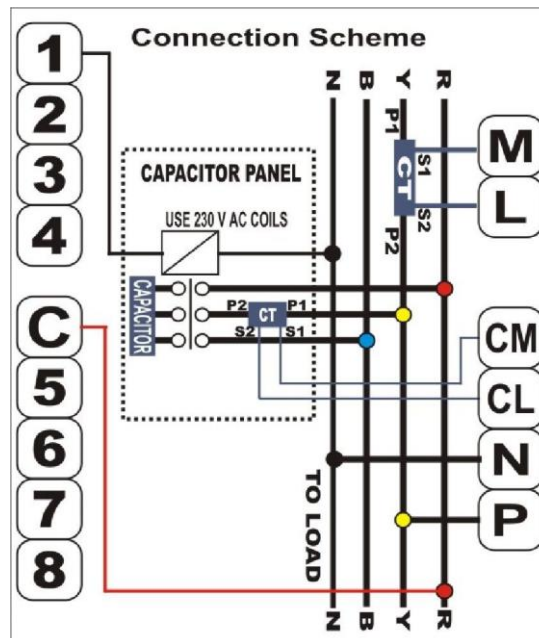
AUTOMATIC POWER FACTOR CORRECTION RELAY

This document contains the latest technical information about Automatic Power Factor Correction Relay Newton+ which is a micro-controller based KVAR controller. The product, Newton+ is sophisticated electronic equipment and, the user is advised to read this User's Manual carefully before attempting to install or operate the equipment.

General

The relay is meant for flush mounting in a panel for connection to the electrical system.












The relay is the 'intelligence' which controls the automatic system for correction of the power factor. It senses the power factor by taking the ratio of the true rms KW and KVA of the system, for any one phase of the three phase electrical system. NEWTON+ provides auto phase sequence and polarity detection in programming mode. So same or different phase can be use for voltage and current inputs. For correct operation of relay, however, there are some minimum system requirements to be met. Unless the various points in the system which are mentioned below are correctly setup, proper operation of the relay cannot be expected.



Connection Scheme

Operational Details

There are two types of Modes in this unit such as Programming Mode and Run Mode. Once the unit is supplied power 240 V AC to the Single phase supply, the unit enters into Run Mode.

Press  key for about 4 to 5 seconds continuously and then the unit will enter into Programming Mode showing “PROG MODE PRESS^”, now press  key and it will show first programming mode parameter “MCT_PRI” and “P” starts blinking which indicates unit is in programming mode. Set “>” by using  and  to desired parameters which need to modify. Press  key. Immediately “>” starts blinking, it shows that the parameters can be changed. Set the parameters by pressing  key and  key according to your desire and then, press  key to confirm the setting. To set for all the programmable parameters, press  key or  key to receive the desired parameters and set such as steps before. To exit the programming Mode and return into Run Mode, press  for about 4 to 5 seconds continuously. However, key operation is not being done for about one minute, the unit returns into Run Mode.

Backlight will be dimmed after 5 minutes. On any key press event LCD will have full brightness.

The **Programming Mode** contains the following programmable parameters.

1. MCT_PRI

In order to give actual current values in your system, the Main CT Ratio between the primary and secondary current should be set. The Main CT primary can be set from 5A to 5000A.

2. MCT_SEC

In order to give actual current values in your system, the Main CT Ratio between the primary and secondary current should be set. The Main CT secondary can be set to 1A or 5A.

3. PT_RATIO

The unit has PT Ratio on the basis of HT PT installations in between primary and secondary voltages. PT Ratio is selectable from one of the following values: 1, 3.7727, 4.000, 6.2727, 30, 60, 100, 200, 300, 600, and 1200.

NOTE: If PT Ratio selected other than ‘1’, unit considers it as HT sensing.

4. CONTROL

For PF correction, there are four types of Control action such as **FIFO**, **VAR**, **BINARY** and **Straight FIFO (SFIFO)** which are also selectable at site. In case, the CONTROL action is selected to VAR, capacitor CT and AUTOSENSING parameters are applicable at site. However, both the two parameters will not be applicable in case of FIFO, Straight FIFO (SFIFO) and Binary

5. CAP_CT_ENB

NEWTON+ supports VAR control action with/without capacitor CT. However it is recommended to use capacitor CT. In VAR control action mode, using capacitor CT, proper Bank KVAR can be sensed.

CCT_PRI (Capacitor CT Primary) and CCT_SEC (Capacitor CT Secondary) will be enable in case of CAP_CT_ENB is set to YES.

6. CCT_PRI

In order to sense proper capacitor KVAR based on capacitor CT, the Capacitor CT Ratio between the primary and secondary current should be set. The capacitor CT primary can be set from 20A to 2000A.

7. CCT_SEC

In order to sense proper capacitor KVAR based on capacitor CT, the Capacitor CT Ratio between the primary and secondary current should be set. The Capacitor CT secondary can be set to 1A or 5A.

8. SET_PF

The desired PF can be set to either Lead or Lag side according to your requirement In case of LAG, the PF could be set from 0.800 to 1.000. In case of LEAD, the PF could be set from 1.800 to 1.999. e.g., the PF to be set for 0.998 LEAD should be set as 1.998.

9. SWITCH

In case, Normal (Contactor) OR Fast (Thyristor) switching is site selectable.

10. STAGE

NEWTON+ supports up to 8 capacitor bank Stages. For user's system requirement, the number of Stages can be selected from 2 to 8 so as to operate the KVAR control.

11. OPERATION (OPER.)

If you have Solar panel installation at your site, select Solar else select Normal mode for proper control action.

NOTE: This is optional feature.

12. SCROLL

The Run Mode displays freeze by default which starts displaying system PF and is also freely programmable from 5 to 12 seconds so as to scroll to each parameter on a cyclic basis. If the SCROLL is set to 0, the display will freeze.

13. TIME DELAY

This is one type of digital dead band in case of VAR control action. Time Delay is freely programmable from 1 to 10 in Fast (Thyristor) and from 40 to 180 in Normal (Contactor) switching.

14. ON DELAY

In case of FIFO or Straight FIFO (SFIFO) control action, On Delay is freely

programmable from 1 to 10 in Fast (Thyristor) and from 10 to 20 in Normal (Contactor) switching. Either target PF is set on LAG side and system PF falls below target PF or if target PF set on LEAD side and system PF goes above target PF in LEAD side, the unit checks whether the switching capacitor could be persistent or no. If target PF is not achieved, the relay switches on the capacitor bank accordingly.

15. OFF DELAY

In case of FIFO or Straight FIFO (SFIFO) control action, Off Delay is freely programmable from 1 to 10 in Fast (Thyristor) and from 10 to 20 in Normal (Contactor) switching. Either target PF is set on LAG side and system PF falls below 0.980 PF LEAD or if target PF set on LEAD side and system PF falls below OFF_SET parameter in LEAD side, the unit checks whether the switching capacitor could be persistent or no. If target PF is not achieved, the relay switches off the capacitor bank accordingly.

16. REF_BANK

The unit will switch ON and OFF the bank number selected by user in REF_BANK, in order to detect phase sequence of inputs.

NOTE: Make sure to connect three phase capacitor bank on selected REF_BANK number.

17. CHECK_SEQ

This feature can use to detect phase sequence error and correct all values according to detection. In order to this feature works, the load current should have a value greater than zero. The unit will switch ON and OFF the bank selected by user in REF_BANK, in order to perform auto correct. If load is nonlinear or too many sudden changes occur in the load during this process, it may not be able to correct the connection. In this case, user must disable non liner load temporarily and repeat the process or can manually enter the phase sequence value.

18. PHASE_SEQ

User can manually enter phase sequence value if above features fails to recognize phase inputs due to certain conditions of nonlinear load and etc. phase sequence value can be set from 0, 60, 120, 180, 240 and 300.

19. MIN. BANK

In case, the need KVAR exceeds 75% of the minimum capacitor bank, the relay switches the minimum bank on. Hence, the parameter can also be set to 100% according to your desire.

20. AUTO SENSING

In case, the Autosense is set to YES, the unit switches on all relays one by one. The bank sizes will also display as they get sensed one by one and the user must therefore be patient and wait for about 4 to 5 minutes while the autosense is in progress. This process is vital for the smooth operation of the relay. Once all capacitor banks could be sensed, the relay will restart for control action after a while.

21. M_OPR

This parameter is used to set minimum current required to start control action in FIFO, SFIFO and BINARY mode. If this parameter is set to "Sensitive" it will do control action until current goes below 1% of Main CT Primary. If this parameter is set to "Normal" it will do control action until current goes below 5% of Main CT Primary.

22. OFF_SET

This parameter can be used to switch OFF banks in FIFO, SFIFO and Binary mode. If target PF is set on Lag side it will switch OFF banks if PF goes below 0.980 lead. If Target PF set on the lead side, it will switch OFF banks when PF goes below this parameters value. Value of "OFF_SET" parameter can be set to 1.780 to (Target_PF-0.2).

Warranty statement

Trinity warrants to the original retail purchaser of the Trinity product enclosed with this limited warranty statement that the product, if purchased new and used in the India conforms to the manufacturer's specifications and will be free from defects in workmanship and materials for a period of one year from the date of original purchase, unless expressly stated otherwise by Trinity, in a written format.

Should your Trinity product prove defective during the warranty period, please bring the product securely packaged in its original container or an equivalent, along with proof of the date of original purchase, to our Trinity Dealer or Factory. Trinity will, at its option, repair or replace on an exchange basis the defective unit, without charge for parts or labor. The replacement unit may be new or refurbished to the Trinity standard of quality, and at Trinity's option, the replacement may be another model of like kind and quality. Trinity's liability for replacement of the covered product will not exceed the original retail selling price of the covered product. Exchange or replacement products or parts assume the remaining warranty period of the product covered by this limited warranty.

What This Warranty Does Not Cover:

This warranty does not cover damage to the Trinity product caused by parts or supplies not manufactured, distributed or certified by Trinity. This warranty is not only transferable but does not cover third party parts also. Trinity is not responsible for warranty service should the Trinity label or logo or the rating label or serial number be removed or should the product fail to be properly maintained or fail to function properly as a result of misuse, abuse, improper installation, neglect, improper shipping, damage caused by disasters such as fire, flood, and lightning, improper electrical current, interaction with non-Trinity products, or service other than by an Trinity Authorized Service.

In the event, the remedies above fail, Trinity's entire liability shall be limited to a refund of the price paid for the Trinity product covered by this limited warranty.

Result of Test : **OK.**
Remarks : **8 STAGES.**
Test engineer : **KST.**
Date : **06/06/2019.**

Routine and function tests conducted to relevant standards and our Specifications/Literature/O & M Manual. Traceability: tested against "MTE" Standard Model PRS1.3 having basic accuracy of 0.05% traceable upto International Standards derived using appropriate ratio techniques.