



C.V.T. ERROR TESTER 590K DATASHEET



REDPHASE INSTRUMENTS

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BRIEF:

- **A TRULY PORTABLE, FULL FUNCTION CVT ANALYZER CAPABLE OF TESTING CVT'S AT VARIOUS BURDEN / LOAD LEVELS.**
- **PORTABLE AND LIGHT WEIGHT, THE 590K IS A PURPOSE BUILT CVT OR CAPACITIVE VOLTAGE TRANSFORMER ANALYZER WHICH COMES EQUIPPED WITH A DATABASE OF ALMOST 60 CHARACTERIZED CVT'S FROM 12 MANUFACTURERS.**
- **A SOPHISTICATED PROCESSING ABILITY WHICH ALLOWS IT TO MAP AND CHARACTERIZE EVEN UNKNOWN CVTS TO A WORST CASE METERING RATIO ACCURACY OF JUST 0.25%, ALTHOUGH 0.05% TO 0.08% IS MORE COMMON.**
- **ADVANTAGE OF THIS INSTRUMENT IS THAT THE CVT DOES NOT NEED TO BE TESTED AT RATED VOLTAGE, YET THE 590K WITH ITS HIGHLY ADVANCED MODELLING IS ABLE TO CHARACTERIZE THE EQUIPMENT'S RATIO ERRORS AT VARIOUS TEST POINTS FROM 80 TO 120%. OF RATED PRIMARY VOLTAGE BY APPLYING ONLY 3KV TO THE CVT'S PRIMARY INPUT.**
- **THE UNIT COMES READY WITH FOUR PRESET TEST POINT STANDARDS ALTHOUGH RED PHASE INSTRUMENTS IS ABLE TO CUSTOMIZE TEST POINTS TO ANY REGULATION THE OPERATOR REQUIRES.**

KEY FEATURES:

- **TESTS CVT'S WITH PRIMARY VOLTAGE RATINGS TO 550KV**
- **RATED METERING RATIO ACCURACY FROM 0.05% TO 0.08%
RATED PROTECTION RATIO ACCURACY FROM 0.15% TO 0.5%**
- **50HZ AND 60HZ VERSIONS AVAILABLE**
- **CVT SECONDARY : 1, 2 OR 3 OUTPUT WINDINGS, (MEASUREMENT AND / OR PROTECTION TYPES.**
- **AUTOMATICALLY CALCULATES OVERALL CVT ERRORS UNDER VARIOUS BURDEN AND POWER FACTOR CONDITIONS.**
- **THE INSTRUMENT INCLUDES A DIGITAL SIGNAL PROCESSOR FOR CVT CHARACTERIZATION AND AN EMBEDDED PC FOR A USER FRIENDLY WINDOWS XP INTERFACE, TO STORE THE TEST RESULTS FOR LATER DOWN-LOADING.**
- **SUITABLE FOR CVT'S WITH COMPENSATION REACTOR TERMINATION AT HIGH OR LOW END OF INTERMEDIATE TRANSFORMER.**

1.0 APPLICATION.

1.1. Where it is used

The Model 590K is a lightweight field portable instrument designed to perform audit testing of a CVT in a utility or laboratory environment by just one person. It is capable of determining all CVT errors and tolerances against a manufacturer's listed specification.

1.2. What and how it measures CVT's

The Model 590K will fully test a CVT and display its Error of Magnitude (EM) and Error of Phase (EP) at specific Voltage and Burden test points. It can perform ratio error measurements on meter windings to an accuracy of 0.05% to 0.08% and on a protection winding from 0.15% to 0.5%. The operator may also choose to perform a quick ratio test or a burden only test for each winding.

Up to 3kV may be applied to the primary input of a the CVT when performing a test.

A secondary switching arrangement is used to support connections for different types of tests. Also an auto-ranging feature allows the 590K to measure many kinds of CVTs whether part of its database or not by using sophisticated DSP hardware to perform CVT modelling and automated test and measurement calculations.

1.3. Other measurements performed but not displayed

- CVT Core admittance
- CVT DC Winding Resistance
- CVT LV VP/VA transfer ratio test
- Input impedance

1.4. Physical test limitations

The 590K is capable of performing tests at a distance of up to 12 metres to the CVT primary terminals. Hence a CVT of up to 5 metres or more can be tested. The long distance separation will allow operators to perform testing at ground levels safely.

2.0. HARDWARE FEATURES

2.1. Power Source

The Model 590K requires a standard mains input which is capable of delivering at least 400VA. The 400VA is required to generate 2 sources of supply:

1. For the supply used to power the electronics.
2. To a power control board which can generate an output up to 3kV at 200VA in either 50Hz or 60Hz for direct application to the C.V.T.

2.2. 590K Control Interface

- Alphanumeric keyboard and separate panel function keys.
- LED backlit 6.4 inch TFT screen.
- A USB slot for separate keyboard, mouse or up to 4 Giga Bytes of test data can be stored or downloaded to a Laptop or PC for further analysis. New or upgraded software may also be installed via the USB port as well

The operator interface is based on a Windows platform and is very easy to navigate, enter parametric information and perform tests.

2.3. 590K Case .

The 590K is housed in a rugged pelican case, Total weight is 12 kg approximately, which is still sufficiently light and compact for one operator to carry on-site.

The case is robust and hard wearing and comes with wheels for easy transport.

There is an internal aluminium chassis and an aluminium front panel with a reverse screened "Lexan" polycarbonate finish.

2.3.1. Transit Case

A transit case is also provided as standard for transportation. Purpose built from ABS plastic, it is foam lined and offers suitable protection for the 590K during transportation to and from site. The case has room for test leads and accessories.

2.3.2. Case Sizes (L x W x H)

590K case: 560mm X 455mm x 265mm.
Transit case: 640mm X 350mm X 740mm

2.3.3. Weight

590K ~12kgs
Transit case: ~6kgs
Test leads & accessories: ~5 to 6kgs



3.0. OPERATING RANGES

3.1. Primary range

Input range selectable to 550kV

3.2. Secondary range

Secondary output range selectable from:
57.7V to 115V AC.

3.3. VA range

The 590K will do tests at two burden points such as 25% and 100% for any burden value up to 500VA.

Custom burden requirement up to 100% may be requested and Red Phase shall program at least one test point to suit.

3.4. Default and test point range

Operator may select any of the 4 common IEEE standard test points listed below:

- i. 25%VA, 100%VA
80%U, 100%U, 120%U
- ii. 2.5%VA, 100%VA
80%U, 100%U, 110%U
- iii. 2.5%VA, 100%VA
80%U, 100%U, 115%U
- iv. 2.5%VA, 100%VA
80%U, 100%U, 120%U

Please note that other test points may be implemented by Red Phase Instruments upon request.

3.5. C.V.T types, ranges and accuracy:

- Suitable for CVTs with compensation reactor termination at high end or low end of intermediate transformer.
- Suitable for CVTs with 1, 2 or 3 secondary terminals
- Accuracy class: 0.2% 0.5% 1.00% 3.0% 3P & 6P manually selectable.
- Metering ratio error accuracy: 0.05-0.08%
- Protection ratio error accuracy: from 0.15%
- Phase error measurement accuracy: +/-5min
- Winding resistance accuracy: 10mΩ +/-0.5%
- External burden accuracy: 0.2Ω +/- 0.5%

4.0. PROTECTION FEATURES.

- Fuse for Mains input, 240V AC Supply
- Flashing LED when terminals are live.
- Emergency Stop Button
- Buzzer to indicate operating and error conditions

5.0. POWER SUPPLY & CONSUMPTION

150W, 84V to 265V AC mains input at 50Hz/60Hz used for powering the units interface and control boards.

Standby power consumption: 10VA

Operating power consumption:100VA

6.0. ACCESSORIES

6.1. Accessories included

Supplied with 590K is the 590K-2 junction box complete with Primary and Secondary CVT inter-connection leads.

The 590K-2 is the interface between the 590K and the CVT as shown in the picture below.

The interface between the 590K and the 590K-2 Junction box is comprised of 2 x Amp connectors, which connect to the primary and secondary sockets on the 590K and a separate metal Control connector which connects to the upper right socket on the 590K.

The interface between the 590K-2 and the CVT comprises of separate primary and secondary cables whose leads and connections are as described in the operating manual.

The 590K-2 Junction box also has a hinged magnetic base for ease of mounting to either round or square base metallic CVT bodies.



6.2. Accessories optional

Electromagnetic shield for testing in live substation environments.

Custom length test leads.

7.0. OPERATING CONDITIONS

Operating temperature range: 0 to +40°C.

Humidity to 90%

WARRANTY

One year limited warranty.