

Case study: BSES Rajdhani  
Power Limited (India)

**Megger**<sup>®</sup>



## Preface:

Electrical maintenance departments are often faced with the challenge of performing different tests on instrument transformers according to official standards and within a limited shutdown time. This is made even more difficult when multiple instruments are needed to perform all the required tests.

## Most common tests:

- Ratio test
- Polarity and phase deviation test
- Knee point test/saturation test
- Secondary winding resistance test
- Insulation resistance test and more

## Most common challenges:

- Minimal available downtime
- Need for different equipment for multiple tests
- Dependency on multiple vendors
- Test time exceeds >45 minutes

## About BSES:

With more than 150 grids and distribution networks running up to 66 kV and catering to a density of 3100 customers per square km, BSES Rajdhani Power Limited (BRPL) is the leading power distribution company in India and is undoubtedly one of the largest purchasers of MRCT units in the country. This is because the MRCT is a one-size-fits-all solution to testing instrument transformers.

BSES provides reliable, high-quality electricity, however, maintaining this consistent supply of power has been a challenge for the company in the past. BSES used discrete methods to test their transformers, instrument transformers and other electrical assets. Indeed, testing instrument transformers, such as a current transformer and a potential transformer, as per standard practice, took longer than 45 minutes each! This was because a different test setup was required, along with accessories, and it was done using a manual test format that was very time consuming. Not only did this complicate the process, it led to dubious test results.



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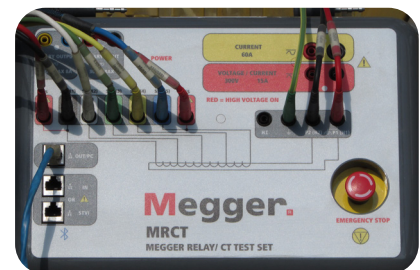
In response to these issues, BSES upgraded their testing system by using Megger's MRCT relay and current transformer test set. As a result, they were able to get accurate test results and test each CT/PT in less than 10 minutes, thanks to its multi-tap feature.

The MRCT has many features that enable users to perform a host of tests, including ratio, polarity, phase angle deviations, winding resistance and 'single go' saturation, according to the IEC, IS and other applicable standards. These abilities of the MRCT make it a unique, time saving instrument.

### Pain points of BSES:

- Transportation of individual equipment from one site to another was laborious and needed unnecessary coordination
- Trivial tasks of yearly maintenance and calibration of individual equipment became tedious over time
- Changing the test setup/connection after each test based on individual equipment was cumbersome
- CT was mounted under a bushing turret, making it untestable with traditional primary current injection methods

### Why MRCT is the most efficient troubleshooting instrument



- It saves time, as you can see in the below table:

Test type	Standard test time with multiple equipment	Standard test time with MRCT
Ratio, phase angle, polarity test (traditional primary current injection method)	40 to 45 minutes	<=10 minutes
Winding resistance	10 to 15 minutes	
Knee point testing	10 to 15 minutes	
Insulation resistance testing	15 to 20 minutes	
Total	75 to 100 minutes	

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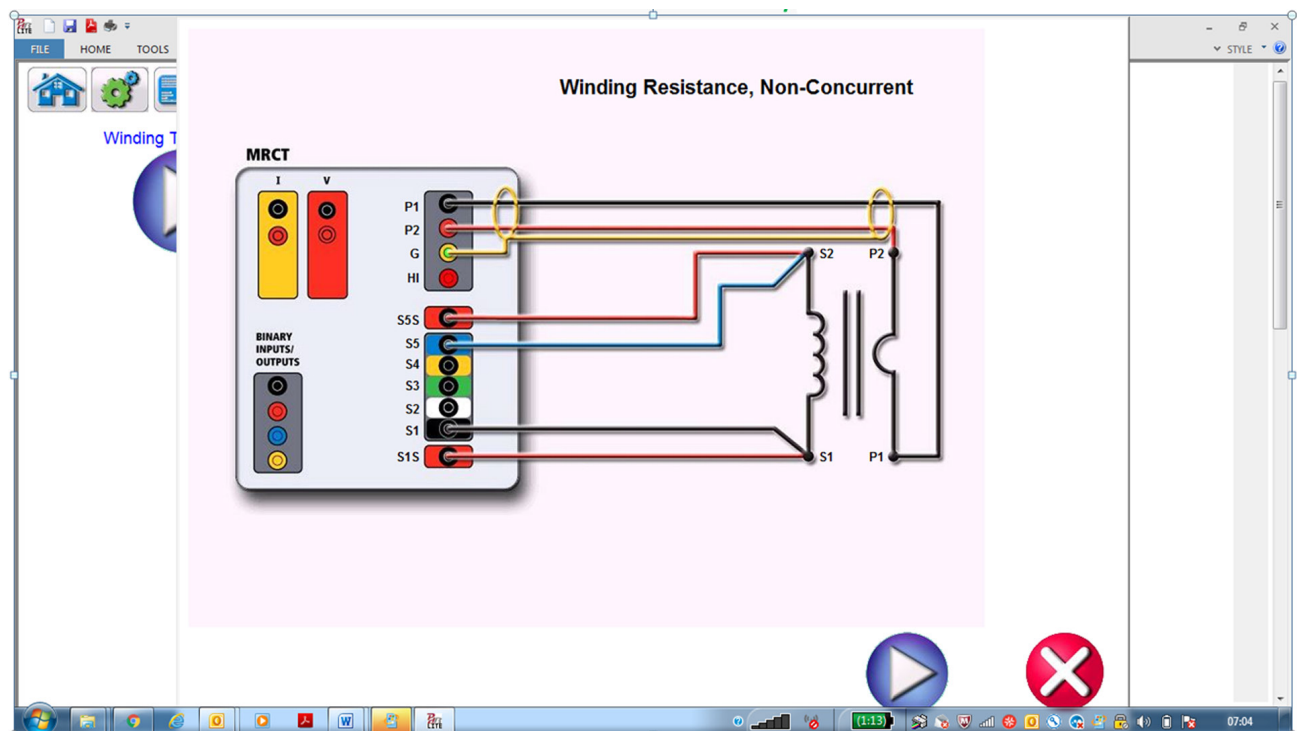


- It gives results efficiently and with high accuracy, making it a reliable instrument

MANUFACTURER	BSES	SERIAL NO.		IN SERVICE TAP	S1-S2	
ASSET ID	BSES-0245	ACCURACY CLASS	0.5	Meter	SATURATION STD	IEC60044-1
Phase	R PHASE	FS	20	VA	15	

Tap	Ratio						Knee		Phase Dev.	Polarity	Resist. (Ohms)	Resist. at 75°C
	Nameplate	Measured	% Error	Test V (V)	Test I (A)	Prim V (V)	Volt.(V)	Cur.(A)				
S1-S2	80:5	80.077:5	0.096	5.6096	0.0278	0.3503	10.614	0.0575	0°4'	Correct	0.126	0.147

- It eliminates dependency on multiple agencies for maintenance.
- Less expertise is required to use this one instrument, thanks to its intuitive, user-friendly software. For example, for each test connection, the screen displays an easy-to-read diagram, shown below:



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