

Under-Burdened CTs in Cat-2 & Cat-3 (LV) Installations

Some of the Pros & Cons we have identified for the options we have considered

The Code Requirement

EIPC Part-10 Sched 10.7 Cl 31 (7)

- (7) An **ATH** must, before it **certifies** a **measuring transformer**, if the in-service burden is less than the lowest burden test point specified in a standard set out in Table 5 of Schedule 10.1,—
- (a) install burdening resistors to increase the in-service burden to be equal to or greater than the lowest test point specified in the standard; or
 - (b) confirm that—
 - (i) a **class A ATH** has confirmed by **calibration** that the accuracy of the **measuring transformer** will not be adversely affected by the in-service burden being less than the lowest burden test point specified in the standard; or
 - (ii) the **measuring transformer's** manufacturer has confirmed that the accuracy of the **metering transformer** will not be adversely affected by the in-service burden being less than the lowest burden test point specified in the standard.

EIPC Part-10 Sched 10.1 Table 5

Measuring transformer standards	
Instrument transformers – Part 1: Current transformers	IEC 60044-1

IEC 60044-1

11.4 Type tests for accuracy of measuring current transformers

Type tests to prove compliance with 11.2 shall, in the case of transformers of classes 0.1 to 1, be made at each value of current given in table 11 at 25 % and at 100 % of rated burden (subject to 1 VA minimum).

The “Easy” Solution

Have verification that the CTs remain in-class at < 25% rated burden

Pros

- No work is required on the CTs
- Immediate Installation Certification is possible

Cons

- Not all CT makes & models have proof available that they remain in-class at burdens below 25%

The Next Best Solution

Install new CTs

Pros

- Verified as remaining in-class at < 25% rated burden

Cons

- Shutdown required
- Likely delay before Installation Certification is possible
- New CT costs
- CT replacement labour costs



A Remedial Solution

Increase in-service burden to $\geq 25\%$ rated burden

Pros

- Immediate Installation Certification is possible
- Low cost compared to CT replacement
- A range of possible methods



Cons

- A range of possible methods, with;
 - Varied opinions on preferred and acceptable methods
 - Varied costs depending on method

Remedial Solution 1

Additional CT Secondary Circuit Length

Pros

- Low cost materials
- Easy to obtain materials

Cons

- To achieve sufficient burden resistance with the required minimum 2.5mm² conductors results in big coils of wire
- Finding a protected and sealable installation location can be a challenge
- Installing in the CT Chamber can pose safety concerns



Remedial Solution 2

Meter Terminal mounted Burden Resistors

Pros

- Generally quick & safe to install
- Well protected
- No additional sealing required
- Easy to add a 2nd set of resistors for 10VA CTs
- Low material & installation labour cost

Cons

- Not easily visible



Remedial Solution 3

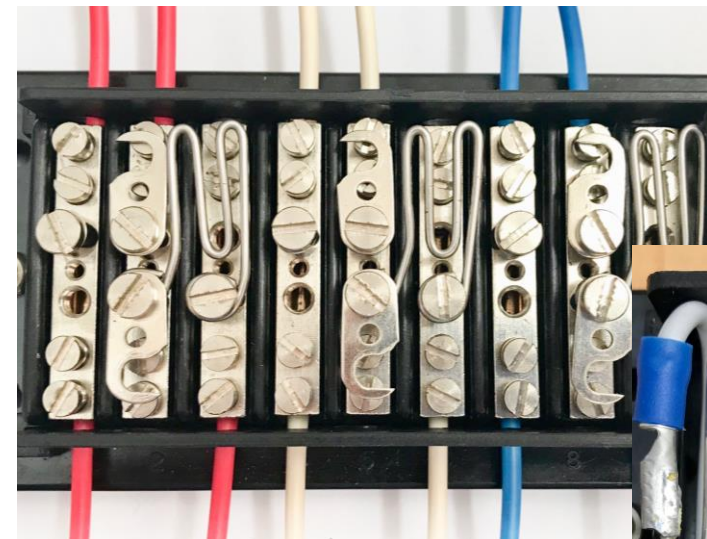
Test Block mounted Burden Resistors

Pros

- Safe to install
- Well protected & easily visible
- No additional sealing required
- Shorting link still functional in both test block sizes
- Low material & installation labour cost

Cons

- Fiddly to install
- 10VA resistor fits only in an 10-terminal test block
- Is 13-terminal test block's circuit opening link ever required with current test practices?



13-terminal Test Block



10-terminal Test Block

Remedial Solution 4

Burden Resistor Module with Terminals

Pros

- Safe to install
- Well protected & easily visible
- Reasonably easy to seal
- Could be manufactured as 5VA or 10VA version

Cons

- Moderate material and installation cost
- Requires space on meter board



Remedial Solution 5

Burden Resistor Module with Flying Leads

Pros

- Safe to install
- Well protected & easily visible
- Easy to seal
- Could be manufactured as 5VA or 10VA version

Cons

- Moderate material and installation cost
- Requires space on meter board



Remedial Solution 6

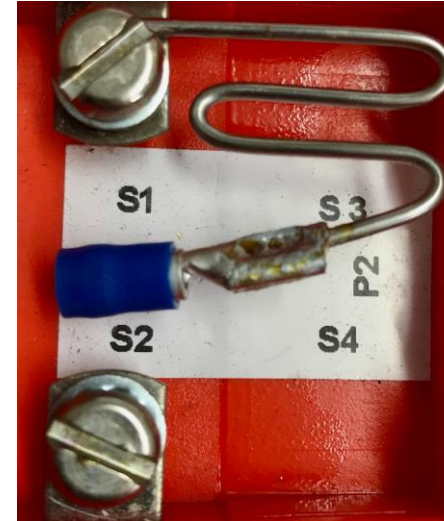
Burden Resistor at CT terminals

Pros

- Low material & installation labour cost
- No additional sealing required

Cons

- Often difficult to install
- Working on CTs can pose safety concerns
- Often no physical protection of CT terminals
- Often not visible after installation



Remedial Solution Summary

1. Additional CT Secondary Circuit Length
2. Meter Terminal mounted Burden Resistors
3. Test Block mounted Burden Resistors
4. Burden Resistor Module with Terminals
5. Burden Resistor Module with Flying Leads
6. Burden Resistor at CT terminals
7. ???

There are a range of options available, and a range of approaches being requested and being implemented, so consensus among participants is desirable to achieve industry consistency, and to maintain the economic viability of burden resistor installation as an alternative to CT replacement.