





Approval

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Amendment Record

Approval Date	Version	Description
23/07/2014	1	Initial issue under MTM



	MTM DESIGN PRACTICE NOTE – SIGNAL POWER SUPPLY TRANSFORMERS	
L1-CHE-INS-001	Version: 1	Effective from: 23 rd July 2014

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	MTM DESIGN PRACTICE NOTE – SIGNAL POWER SUPPLY TRANSFORMERS	
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1. Purpose

To prohibit the procurement and installation of 1000Vac/110Vac signal power supply transformers designed and constructed as given in the Specifications SC040101-06, High Tension 6kVA 1000Vac/110Vac and other signal power supply transformers of 3, 6, 10, 15 and 20KVA as specified in Table 1.

To require that transformers supplied from the 2200Vac, 1000Vac and 650Vac signal power distribution systems providing signal power at 110Vac are procured, designed and constructed against a specification which includes inrush current, transformer impedance and protection parameters.

To ensure that modifications and additions to the signal power distribution system are designed in accordance with contemporary electrical safety and operational parameters.

2. Background

The power to the signal system is at 110Vac requiring transformation of the distribution power to that voltage. The distances between supply points dictates that the distribution voltage be at a reasonably high level at various voltages.

The transformers specified for the transformation of the 1000Vac distribution system to 110Vac are intolerant of switching and dips in supply, resulting in a loss of signal power.

Much of the modern electronic based signalling and communications equipment is susceptible to momentary loss of supply, requiring intervention by technical staff to restore operations.

The policy of building an Essential Services Distribution System to supply all signalling, communications and other apparatus that must be powered and functioning for the operation of trains places a greater emphasis on the integrity of supply.

3. The Issue

The momentary loss of supply to the primary side of the 1000Vac/110Vac transformers through system disturbances or system switching results in the blowing of the protective fuses to the transformer. Tests have demonstrated that the design of the transformers is such that the inrush current to the transformers on energisation is excessive in magnitude and duration.

The transformers are an integral part of the distribution system, requiring voltage drop, loading, fault condition and protection calculations to be undertaken for their safe and reliable operation. All future signal power supply transformers are required to be adequately engineered to ensure inrush current is within adequate limits.

4. The Requirement

Transformers of the current design built in accordance with Specification SC040101-06, High Tension 6kVA and the Ironcore transformers as detailed in Table 1 are not to be procured or installed.

Table 1- Prohibited Signal Power Supply Transformers

1000Vac/110Vac Transformer KVA Rating	IRONCORE PART NUMBER
3	T14/296E
6	TG/524E
10	TG/526E & TG/693E
15	TG/527E
20	TG/688E

All signal power supply transformers must have a maximum inrush current which does not exceed 6 to 8 times rated full load current.

A specification for new transformers for 1000Vac/110Vac is to be written which has inrush current and impedance characteristics based on system requirements.

The design and construction of the signal power distribution system shall follow the principles of the Essential Services Distribution System.

Prior to the in field works commencing, all new works and modifications to the signal power supply distribution system of 3.3kVac, 2200Vac, 1000Vac and 650Vac shall be provided with a design including calculations for voltage drop, loading, fault condition and protection of cables, transformers and other apparatus.

The types and setting for the protective devices comprising fuses, over current and earth leakage and other devices shall be recorded and held in a central register.

5. Type Approval

Not applicable.

6. MTM Standards

MEST 000002-06	Electrical Networks Principles and Performance
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