

Standard

# Infrastructure - Network Power - SCADA Traction Power Alarms

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PROUD OPERATOR OF



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## 1 PURPOSE

The purpose of this standard is to specify the minimum requirements for SCADA traction alarm settings to be applied for the management of infrastructure traction power network.

The alarm parameters set must enable network operators appropriate warnings of asset performance out of the nominal spectrum of normal operations (high or low) to protect critical assets.

## 2 SCOPE

The scope of this standard is requirements for the definition of network operational alarms to alert network operators to a change of conditions via the SCADA system.

This standard is based on the requirements documented in PTV - Network Technical Standards (NTS) for Traction power systems, and legal and regulatory requirements.

This standard is applicable to all SCADA system design, configuration and maintenance activity on the Yarra Trams power network, and any third parties or Contractors who undertake SCADA activities for Yarra Trams.

## 3 COMPLIANCE

This standard shall be fully complied with.

Deviation from this standard is only permitted when a waiver has been sought and approved by the Yarra Trams Engineering Design Authority.

The Yarra Trams Engineering Change Management process shall be followed in all circumstances where change is proposed to this standard.

'Shall' statements are mandatory in the context of compliance with requirements stipulated in this standard.

'Should' statements are considerations in the context of compliance with requirements stipulated in this standard.

'Information' statements provide additional content for clarification purposes only and are not requirements in the context of compliance with this standard.

'So far as is reasonably practicable' statements must result in the provision of a risk assessment including proposed list of design controls to demonstrate compliance to this standard.

Any third party or contractor undertaking design activities on the Yarra Trams network shall complete and return a compliance schedule for this standard. Assessment of compliance shall be provided for each requirement, defined by one of three permissible responses:

- a) Compliant;
- b) Partially Compliant;
- c) Non-Compliant.



## 4 REQUIREMENTS

### 4.1 General

#### 4.1.1 Applicable Plant

4.1.1.1 The SCADA system shall as a minimum provide alarms from plant specified in Table 1 below.

*Information: The table below details the parameters for plant alarms that the Yarra Trams SCADA (proprietary name – MOSAIC) is capable of monitoring.*

Table 1 - SCADA Alarm Criteria

Plant	Alarm Parameters
Rectifier	Current and Negative Current
HV Bus Bar	AC Voltage
DC Bus	DC Current and DC Voltage
HVCB	HV Voltage
HSCB	DC Voltage and DC Current
Substation	Temperature

#### 4.1.2 Mandatory Alarms

4.1.2.1 The SCADA system shall be programmed with mandatory alarms for each site to ensure the safe and sustainable operation of the power system so far as is reasonably practicable.

4.1.2.2 A mandatory alarm shall be provided for any event deemed to be of a nature that could cause harm so far as is reasonably practicable.

4.1.2.3 A mandatory alarm shall be provided for any operational limit which has a low resistance pathway to an undesired event so far as is reasonably practicable.

4.1.2.4 A mandatory alarm shall be provided for any undesired event which has a risk rating of medium, high or extreme according to the (SS-016-MA-0001) Enterprise Risk Management Manual.

4.1.2.5 A mandatory alarm shall be provided for any undesired event that could be averted by operator response to the alarm so far as is reasonably practicable.

#### 4.1.3 Critical Alarms

4.1.3.1 The SCADA system shall be programmed with critical alarms for each site to ensure the safe and sustainable operation of the power network so far as is reasonably practicable.

4.1.3.2 A critical alarm shall be provided to the network operator for any preventative alert of a possible critical fail that has a consequence rated as Major or Catastrophic on the Operational scale of the (SS-016-MA-0001) Enterprise Risk Management Manual.

4.1.3.3 A critical alarm shall be subject to resilience testing annually.



## 4.2 SCADA Alarm Setting

### 4.2.1 Alarm Types

4.2.1.1 The SCADA system shall have the capability to apply alarm types as specified in Table 2 below.

Table 2 - SCADA Alarm Types

Alarm Type	Calculation	Time Setting	Application	Alarm Setting
Excess Values (Rolling RMS)	Exceeds rolling rms value. (set allows either a rms or an average value)	Exceeds rolling rms value for nominated time. T may be from 1 minute to 2 hours	Manage damage to electrical asset	Critical
Excess Values (Set Limit – Set Time)	Exceeds a set limit for set time	Instantaneous or can be set for exceedance time greater than time “t”. T might be typically 0+ to 60 seconds	Monitor of protection applications and peak current levels	Mandatory
Minimum Values	Activity Alarm	Value drops below a minimum average threshold for a set time. (typically, if current drops to below 10 amps for more than 12 hours bring up alarm	Monitors where an asset may be in abnormal state/is not functioning correctly	Mandatory
Energised State	Energised Parallel De-Energised Earthed	On/off	Applied to electrical sections	Mandatory
Temperature	Over Temperature	Exceeds an ambient temperature rating for the equipment.	Monitors the environment on the substation room or at certain plant locations within the substation	Mandatory



#### 4.2.2 Alarm Properties

4.2.2.1 The SCADA system shall have the capability to further determine alarm properties as specified in Table 3 below.

Table 3 - SCADA Alarm Properties

Alarm Property	Calculation	Application
Ganged Alarms	Ability to set more than one alarm value above on a point. For example, may have two different rolling rms value alarms and 3 “set limit for set time” alarms	Allows above management of asset on multiple levels
Data Capture on exceedance	Date and time of exceedance. Alarm type, Value of exceedance and time	
Monitor value	Monitor if supply authority voltage levels exceed +/- voltage percentage for set time	Monitor compliance to regulations
Control Intervention	A particular alarm may initiate a suggested control action for shedding or load management	

#### 4.2.3 Alarm Limits

4.2.3.1 Alarm limits shall be set in accordance with the configuration items detailed within MOSAIC and managed through the OCMS change management process.

4.2.3.2 Designers and support engineers shall define the required limits that are programmed in SCADA for each substation.

4.2.3.3 All alarm limits and changes to limits shall be authorised by the Yarra Trams Engineering Design Authority.

### 5 RELATED LEGISLATION & DOCUMENTS

Name	Document Number
Traction Power Systems – Network Technical Standard	PTV-NTS-004
Rail Safety National Law	N/A
Enterprise Risk Management Manual	SS-016-MA-0001
Victorian Traction Industry Electrical Safety Rules 2019 (Orange Book)	N/A
Management of Alarm Systems for the Process Industries	AS IEC 62682



## DOCUMENT VERSION CONTROL

Version History	Date	Detail
1.0	28 Mar 2020	Original approved issue

## APPENDIX A – GLOSSARY

Acronym	Definition
NTS	The Network Technical Standard is promulgated to prescribe the necessary requirements that must be considered when designing, maintaining or modifying rail traction power systems for the Metropolitan Rail Network (MRN) and Metropolitan Tram Networks (MTN).