Division / Business Unit: Safety, Engineering & Technology
Function: Signalling
Document Type: Guideline

Tools and Instruments for Signalling Applications

ESH-00-07

Applicability

Network Wide	SMS

Publication Requirement

Internal / External

Primary Source

SMP 47 v1.2

Document Status

Version #	Date Reviewed	Prepared by	Reviewed by	Endorsed	Approved
1.0	22 Jan 21	Standards	Stakeholders	Manager Signalling Standards	General Manager Technical Standards 22/02/2021

Amendment Record

Amendment Version #	Date Reviewed	Clause	Description of Amendment
1.0	22 Jan 21		First Issue. Supersedes SMP 47 (v1.2).

Table of Contents

1 Introduction

1.1 Purpose

This document provides the requirements for tools and instruments generally used in the maintenance and testing of signalling systems on the ARTC network.

1.2 Scope

The scope covers the standards to which tools and instruments are required to comply and calibration requirements.

1.3 Document Owner

The General Manager Technical Standards is the Document Owner. For any query, initial contact to be made at standards@artc.com.au

1.4 Responsibilities

The Business Units are responsible for meeting the requirements of this document.

Contractors who are working on the ARTC network are responsible to comply with this document.

1.5 Reference Document

EGH-10-08 – Calibrated Equipment Management using Ellipse

2 General Requirements

Calibration requirements are related to the specific tasks being performed. An instrument used for multiple applications needs to be calibrated only to the highest standard required, and only on the measurement ranges applicable.

Calibration shall only be performed by the manufacturer or calibration service centre authorised by the manufacturer.

Where the manufacturer guarantees that an instrument will exceed the accuracy stated in the following table without recalibration, for the life of the instrument or for longer intervals than stated, then the calibration frequency may be amended accordingly. Confirmation from the manufacturer needs to be recorded by the business unit.

Tools and equipment of contractors should be compliant to this document when working on the ARTC network. The contractor is required to provide documentary evidence for the calibration when requested by ARTC.

3 Tools and Instruments for Signalling Applications – Applicable standards and Calibration requirements

ITEM and TYPE	PREFERRED MANUFACTURER/MODEL	COMPLIANCE TO STANDARD	APPLICATION	TEST RANGE	CALIBRATION ACCURACY	CALIBRATION FREQUENCY
Multimeter	Fluke 287 NUC Fluke 287	IEC 61010-1 : Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements IEC 61010-2-033: CAT IV 600v, CAT III 1000v Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 2-033: Particular requirements for hand-held multimeter and other meters, for domestic and professional use, capable of measuring mains voltage EMC EN61326-1: Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 1: General requirements	General checking and fault finding			2 year
			Certification Tests	AC 50 mV to 1000V range	+/-0.3 % @ 50Hz	
				AC mA 0-50	+/- 0.6 % @ 2KHz	
				AC mA 50-400	+/- 1.5 % @ 2KHz	
				DC 50mV to 1000V	+/-0.5 % @ 50Hz	
Tong / Clamp Ammeters AC and DC	Fluke 325 Fluke 324	CAT III 600 V CAT IV 300 V	General checking and fault finding	All	N/A	N/A
			Certification testing	AC A 0 -400 – DC A 0-400	+/- 2.0 % @ 50 Hz +/- 2.0 %	2 year
Track circuit integrator	Australian Rail Technology - Pulse Integrator	Manufacturer Specification	General checking and fault finding	N/A	N/A	N/A
TFA - Track Circuit Frequency Adaptor	Australian Rail Technology – Audio Frequency Track circuit filter	Manufacturer Specification	General checking and fault finding	N/A	N/A	N/A
			Periodic maintenance checks	AC V 0-2	+/- 0.1 @ 2KHz	
				AC V 0-20	+/- 1 @ 2Khz	
SFTM – Selective Frequency Track Meter	Bombardier and various others	CE marked to EN 61326 CE marked to EN 61010.	General checking and fault finding	N/A	N/A	N/A
			Periodic maintenance checks	AC V 0-2	+/- 0.1 @ 2KHz	
				AC V 0-20	+/- 1 @ 2Khz	

ITEM and TYPE	PREFERRED MANUFACTURER/MODEL	COMPLIANCE TO STANDARD	APPLICATION	TEST RANGE	CALIBRATION ACCURACY	CALIBRATION FREQUENCY
Scope Meter	Fluke 124B	IEC 61326-1: Industrial, CISPR 11: Group 1, Class A IEC 61010-1: Pollution Degree 2 IEC 61010-2-033: CAT IV 600 V/CAT III 750 V	Various Troubleshooting	mV to V mA to A	As per manufacturer specification	2 year
Insulation resistance tester -‘ Megger’	Kyoritsu 3132A	IEC 61010-1 CAT III 600V Pollution Degree 2 - Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements IEC 61010-2-031 - Safety Requirements For Electrical Equipment For Measurement, Control And Laboratory Use - Particular Requirements For Hand Held Probe Assemblies For Electrical Measurement And Test IEC 61557-1/2/4 - Electrical safety in low voltage distribution systems up to 1 000 V AC and 1 500 V DC - Equipment for testing, measuring or monitoring of protective measures - Part 1: General requirements IEC 60529-IP54 - Degrees of protection provided by enclosures (IP Code) EMC EN61326-1: Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 1: General requirements	Measure insulation resistance	Megohms Output volts Output current	-0 @ 1M 500/-0 @ 1M <3mA	2 year

ITEM and TYPE	PREFERRED MANUFACTURER/MODEL	COMPLIANCE TO STANDARD	APPLICATION	TEST RANGE	CALIBRATION ACCURACY	CALIBRATION FREQUENCY
Earth Tester	Kyoritsu 4102A	IEC 61010-1 - CAT III 600V Pollution Degree 2 - Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements IEC 61557 - Electrical safety in low voltage distribution systems up to 1 000 V AC and 1 500 V DC - Equipment for testing, measuring or monitoring of protective measures - Part 1: General requirements IEC 60529-IP54 - Degrees of protection provided by enclosures (IP Code)	For earth measurements	Earth Resistance: 0-12Ω 0-120Ω 0-1200Ω Earth Voltage: 0-30V	± 3.0 % of full scale	2 years
	Fluke 1630	IEC 61010-1 - CAT III 600V Pollution Degree 2 - Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements IEC 60529-IP30 - Degrees of protection provided by enclosures (IP Code)	Ground Leakage Current mA / A	0.300 to 1.000mA	± 2.0 % rdg ± 0.05 mA	2 years
				1.00 to 10.00 mA	± 2.0 % rdg ± 0.03 mA	
				10.0 to 100.0 mA	± 2.0 % rdg ± 0.3 mA	
				100 to 1000 mA	± 2.0 % rdg ± 3.0 mA	
				0.200 to 4.000A	± 2.0 % rdg ± 0.03 A	
				4.00 to 35.00A	± 2.0 % rdg ± 0.03 A	
Relay Tester	MRD - Relay Doc	EN50121 – Railway Application – Electromagnetic Compatibility CE Compliance	Testing of relays	Coli Voltage – 1-110v DC Coil Current – 0-500mA	As per manufacturer specification	4 years
Combination Insulation & Continuity Test Set	MRD Bell Mega BM-510	Manufacturer Specification	Measure insulation resistance	Megohms	0 @ 60M	4 years
				Output volts	500/-0 @ 1M	
				Output current	<3mA	
				into short cct		
			Continuity	Maximum Ohms	100/+0	
Track Shunt Tester - DN2000	Australian Rail Technology	Manufacturer Specification	General testing and fault finding	N/A	N/A	N/A
			Certification testing	N/A	-0 /+5%	4 years
Track Shunt box - variable	MRD – SB-100W-J	Manufacturer Specification	General testing and fault finding only	All	N/A	4 years

ITEM and TYPE	PREFERRED MANUFACTURER/MODEL	COMPLIANCE TO STANDARD	APPLICATION	TEST RANGE	CALIBRATION ACCURACY	CALIBRATION FREQUENCY
Cable locator	RD 8100	EN 61010-1:2010 - Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements EN 61326-1:2013 - Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 1: General requirements EN 60529 - Degrees of protection provided by enclosures (IP Code) EN 60068 - 2-64: Environmental Testing - Part 2-64: Tests - Test fh: Vibration, Broadband Random and Guidance	To locate cables	-	Manufacturer's specification	2 year service
Measuring wheel	Trumeter	Manufacturer Specification	Non-critical distance measurements	metres	+/- 2%	Inspect annually for wheel wear