

# Why choose a SafeTcheck Portable Appliance Tester?

## Introduction

Portable Appliance Testers (PATs) are used extensively for the electrical safety testing of portable appliances in Australia. Following is the philosophy behind the design, and the standards employed in the manufacture of the TRIO SafeTcheck PAT.

It's very important to understand what Trio's fundamental design philosophy is and how that relates to the PAT market and other testers. Hopefully this will help you with making the correct decision when purchasing a suitable PAT for your particular situation.

Although Portable Appliance Testers used in the electrical safety testing of portable appliances report to do the same i.e. test appliances for compliance in relation to *AS3760 In-service safety inspection and testing of electrical equipment*, they are very different in the way they are designed, manufactured and meet the requirements of that standard. In short, it is true to say that not all PATs are the same and not all PATs provide the user with an instrument that will ensure the appliance under test is compliant with the standard.

Trio's SafeTcheck PATs have been designed and manufactured in SA since the late 1960s ([see the History of the SafeTcheck](#)). The original tester was designed and built by Trio in conjunction with the then School of Mines (now TAFE) for Telecom (now Telstra) and predates the introduction of any standard relating to electrical safety. The current Australian Safety Standard, *AS3760 In-service safety inspection and testing of electrical equipment*, came into being in 1990, more that 20 years after the first 'SafeTcheck'. Some 40 plus years later, that very basic tester has developed into the technically advanced SafeTcheck models we manufacture today, with the original design philosophy unchanged: simple and safe to use, fail safe in operation and robust in construction.



SafeTcheck  
Pro Logger II



SafeTcheck  
Nanto



SafeTcheck  
Pro Logger Plus

# Why choose a SafeTcheck Portable Appliance Tester?



## Work Health & Safety and Appliance Testing

Complacency would appear to be rife in the electrical safety testing industry today and may be the greatest challenge in establishing high standards for workplace safety.

It could also be argued that there is a growing misconception that portable appliance testers will alone identify electrically faulty equipment. Today, with the large number of testers in the marketplace, many boasting a growing number of irrelevant features like user programmable electrical thresholds (not applicable to the safety standard) and increased testing speed for so called productivity improvement, appliance safety testing becomes increasingly erroneous.

The SafeTcheck has been designed as an interactive safety tool to simultaneously monitor and data log applied soaking hi-pot voltages and currents while flexing, twisting and probing an appliance for a testing period approximating real life conditions.

Trio's years of experience in the field of electrical testing has determined that only the relationship between a competent operator and a SafeTcheck tester can determine an intermittent electrical fault in an appliance. Faults such as these are generally not found using static testing at unrealistic testing times.

A SafeTcheck used by a competent operator provides a testing environment that reflects an appliance in actual use (a real life situation). Soaking (testing) times must reflect real time operation. This aspect of the SafeTcheck's design is traceable to *AS/NZS3100 Approval and test specification - General requirements for electrical equipment*.

On-screen prompts preceding electrical tests in the SafeTcheck are designed to warn operators before proceeding into hazardous modes of operation. A single push button operation, without any safety prompt acknowledgement is dangerous, especially on live appliance run tests. In some cases a single button press to initiate a test does not comply with *AS 4024.1-2006 Series - Safety of machinery*

Acknowledging prompts may be seen as tiresome, but they provide alerts for the operator to concentrate on the task at hand. Repetitive testing does bring complacency.

Visual inspection of electrical appliances is mandatory in the latest WHS codes of practice and in some cases electrical testing is required. For either visual or electrical testing, uniquely identifying appliances and their associated safety test records is mandatory. The SafeTcheck does support assets identified with numbered Test Tag labels but this could be considered an inefficient use of resources and time in many workplaces (in some, such as the Building Industry, Test Tags are mandatory). Appliance Test Tags must be complete with all required test results and adhered to an appliance after each test.

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## Work Health & Safety and Appliance Testing (continued)

Alternatively Asset Tags may be used for this purpose and are normally applied only once to the appliance, saving application time and increasing efficiency for subsequent tests. The SafeTcheck also supports asset tagging which increases testing and data logging efficiency. Asset Tagging in association with Asset Management programmes is in most cases compliant with testing standards and can provide test data on demand for the requesting supervisors or authorities.

Employing Asset Tagging as a means of identification and data management is far more cost effective than using Test Tags. It's far more resource and time efficient.

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## SafeTcheck Design and Compliance

The SafeTcheck is designed and built to what we consider exacting standards by complying with the following Australian Standards:

1. AS/NZS 3000:2007/Amdt 1:2009  
Electrical installations (known as the Australian/New Zealand Wiring Rules)
2. AS/NZS 3100:2009  
Approval and test specification - General requirements for electrical equipment
3. AS/NZS 60335.1:2002  
Household and similar electrical appliances – Safety
4. AS 4024.1-2006 Series  
Safety of machinery

It is important to note that PATs are currently considered to be in the same category as electrical meters, meaning they are not classified as 'prescribed items' in *AS/NZS 4417.2:2001 Marking of electrical products to indicate compliance with regulations - Specific requirements for electrical safety regulatory applications*. By definition, meters measure electrical parameters only and do not provide a mains power source. This means that PATs, currently classified as measuring devices, do not have to comply with the Australian Standard *AS/NZS3000 Wiring Rules* and *AS/NZS3100 General Requirements for Electrical Appliances* in all respects.

Since the 2003 revision of *AS3760 In-service safety inspection and testing of electrical equipment*, where we saw the introduction of Leakage Current Tests for appliances requiring power for their on/off switch to operate, the idea that PATs are meters is, we believe, incorrect. Most PATs now provide users with the option to perform Leakage Testing. Leakage Tests or Run Tests, require 240 Volt mains power to operate appliances while the leakage current is measured. So in our opinion, PATs capable of supplying mains power to appliances, should now be prescribed Items and as such comply with all aspects of the relevant Australian Standards.

Insulation and Current Leakage Testing are the two methods of establishing electrical safety compliance with the Australian Standard. The SafeTcheck has two mains test sockets to achieve this: one for Insulation Testing and the other for Current Leakage Testing. The second leakage test socket on a SafeTcheck has a hard wired earth wire, compliant with the wiring rules. If the same socket used for Insulation Testing is used for Leakage Testing then the earth wiring will not be compliant (this socket must have a switched earth for the insulation tests). Most, if not all, other PATs on the market today only have one socket available for both the Insulation and Leakage Tests, making them noncompliant with *AS/NZS3000 Wiring Rules* (noncompliant if PATs were designated 'prescribed items' as previously mentioned).

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## SafeTcheck Design and Compliance (Continued)

In relation to operator safety, prescribed items and the Australian Standards, it is important to note that PATs may be noncompliant because of:

1. incorrect physical spacing of signal and power circuits (noncompliant with AS/NZS3000);
2. tests starting automatically when an appliance under test is connected to the PAT (noncompliant with AS/NZS4024); and
3. mains earth wiring being switched instead of hard wired (noncompliant with AS/NZS3000).

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## SafeTcheck Features

Specifications and Unique Features (please see [SafeTcheck brochure](#) for more detailed specifications)

1. Housed in a 'Pelican Case' (Pro Logger) – a robust water and dust resistant instrument case
2. Mains check - Checks the 240V mains power outlet supplying power to the SafeTcheck (polarity, earth and mains tolerances) prior to beginning any tests
3. Lead Tests – ensures correct earth current (good connector wetting/mating surfaces); conducts insulation breakdown tests between the Active & Neutral conductors; provides for testing 'figure 8' mains leads (no earth wire); IEC Leads; and provides an Australian plug for Australian Extension Leads
4. Earthed Appliance Tests – ensures an earth test current of 200mA prior to commencing a test; ensures good connector wetting/mating surfaces; optional 10 & 25A test currents available also, see *High Current Earth Bond Testing* below
5. Double Insulation Tests – **checkCONNECT** ensures the appliance has a 'return circuit' before it commences a real test (is 'fail safe' for Insulation Testing); an optional Stainless Steel Cloak provides a more thorough testing environment for Double Insulated appliances
6. Run (Leakage) Tests – the Run Test socket and circuit is compliant with AS/NZS3000; Uses a second socket separate to the Insulation Test socket and so guards against accidentally applying mains power to an appliance; Provides an operator with a 6mA leakage current shut down (similar to an RCD in circuit)
7. Other Appliance Menu options – provides many preset parameters for the 'more difficult to test' appliances and/or those with special requirements e.g. MIMS Run and 250V EPOD Tests
8. RCD Test – has integrated mains isolation; tests the 0° & 180° AC crossings for trip times; starts RCD tests on the zero crossing; concurrently tests the RCD lead as an Extension Lead
9. Test Sockets: have 'flashing Led Indicators' to ensure the operator uses the correct test socket; are designed to enable easy replacement (these generally exhibit a high degree of wear over time); and use 20 Amp contacts

## High Current Earth Bond Testing (Pro Logger II only)

Optional Continuity and Earth Bond Testing at 200mA (Continuity Test), 10A (Routine Test) and 25A (Type Test) with current maintained via a constant current source for the duration of each test performed. Prior to commencing any safety tests, the SafeTcheck checks the appliance under test for the existence of an earth circuit and the correct earth current (minimum 200mA for the SafeTcheck).

### Note:

Other PATs generally use constant voltage sources, meaning stated currents cannot be guaranteed; this includes the mandatory 100-200mA continuity testing current. It's also important to note that some testers, reporting to have a 10A (or more) earth test current, actually only have this higher current present for a few milliseconds (not a valid high current test in our opinion).



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## 3 Phase Appliance Testing (Pro Loggers only)

Optional Run Testing (current leakage) of Portable 3 Phase Appliances in accordance with AS/NZS 3760. This option comes with 20 and 32A 3 phase sockets (or other current ratings as requested). The test sequence looks for:

1. an Earth Connection  $\leq 1 \text{ Ohm @ } 200\text{mA}$ ;
2. a run current to ensure the appliance is switched on and running; and
3. a leakage current of  $\leq 5\text{mA}$ .

If any of the test parameters (Earth Current, Run Current or Leakage Current) fail, then the 3 phase test fails otherwise the Pro Logger will indicate a pass.

To test a 3 phase extension lead, run a test with the extension lead connected between an already tested (and passed) 3 phase appliance and the 3 phase adaptor.

## Data logging & Test Tag Printing

The SafeTcheck has onboard data logging for up to 2,000 records. It will log test results and print Test Tags, including your company logo, compliant with AS/NZS 3760 *In-service safety inspection and testing of electrical equipment* and AS/NZS ISO 31000:2009 *Risk management - Principles and guidelines*, including Visual Test pass/fail. STC Downloader software (included free) enables data from the SafeTcheck to be stored in .csv files capable of being easily loaded into a spreadsheet or data/asset management software.

## Asset Management Software

Full Asset Management Software is available. The SafeTcheck talks directly via USB to a PC running Asset Management Software. Data can be stored in real time on a PC or after storing all tests in the SafeTcheck's memory via its own data logging function. Test Tags with a company logo may also be printed after each test.

## Calibration & Lifetime Warranty

Calibration is recommended every 12 months

Standard Warranty is 2 Years (from date of purchase) against faulty components and workmanship

A Lifetime Warranty is available with regular factory calibration from new (conditions apply). For all detail go to: [STC Calibration & Repair](#)

## Local service

The local Design and Manufacture of the SafeTcheck means all technical support, calibration and repairs are in country (Adelaide SA). This local service provides a whole of life, cradle to grave service.

## Hardware & firmware upgrades

Applied free of charge with regular unit calibration (if applicable)

## Operator Instruction

Phone assistance available during business hours (free of charge)

Formal operator training available (charged per hour)

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## References:

AS/NZS 3760:2010

*In-service safety inspection and testing of electrical equipment*

AS/NZS ISO 31000:2000

*Risk management - Principles and guidelines*

AS/NZS 3000:2007/Amdt 1:2009

*Electrical installations (known as the Australian/New Zealand Wiring Rules)*

AS/NZS 3100:2009

*Approval and test specification - General requirements for electrical equipment*

AS 4024.1-2006

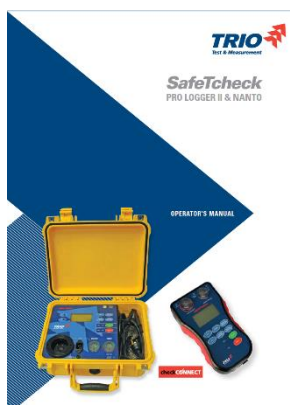
*Series Safety of machinery*

AS/NZS 4417.2:2001

*Marking of electrical products to indicate compliance with regulations - Specific requirements for electrical safety regulatory applications*

AS/NZS 60335.1:2002

*Household and similar electrical appliances –Safety –Part1: General requirements (IEC 60335-1:2001, MOD)*



SafeTcheck  
Operator's Manual

All links in this document can be found at  
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