



## Features

- 3- $\phi$  Voltage output from 1- $\phi$  supply
- 0-450V  $\phi$ -N output voltage
- 20VA/phase maximum output
- Variable Frequency 30-999.9Hz
- Phase shift  $\pm 180.0^\circ$
- Multi-function timing system
- USB keyboard for comment
- USB data storage.
- Ideally suited to testing G59 schemes
- Step change of phase and df/dt
- Large 6.5" back-lit colour LCD
- Automatic mains voltage selection
- Fully Programmable test procedures.
- Rugged case and weighs under 9kg.

The new ART3V brings new features to our range of relay test equipment making it far more adaptable. The new output voltages are higher and have a finer level of accuracy and control. The new full colour LCD provides more test detail, making it easy to understand. The ART3V user interface is an improvement of the DVS3 mk2 allowing simple testing of complex voltage and loss of mains protection systems.

The ART3V has vastly improved accuracy, stability, and features. Designed to be the trusted and reliable voltage source for relay testing. The ART3V has been designed using the latest digital technology to generate a highly stable and accurate output with very low distortion. Each phase output is individually adjustable for voltage, frequency and phase angle. The unit is controlled by a simple user interface within defined menus. Values may be either typed in at the capacitive keypad or finely varied using a smooth rotary encoder.

Bespoke test procedures can be created for step changes of any output variable at set times or with automatic timing of the response of the relay under test.

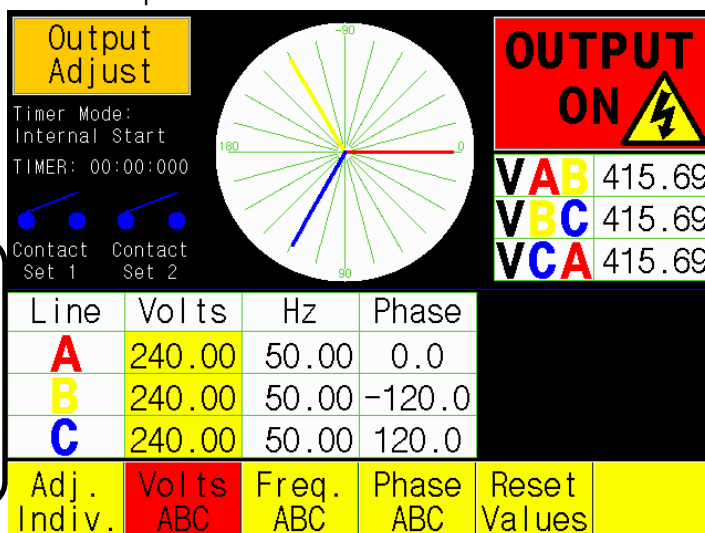
*The ART3V has a colour back-lit display to provide an easy to read user interface. Menu options are selected by dedicated buttons on the panel, allowing easy mode change. All information is displayed including contact set status, and a phasor diagram.*

The ART3V is ideally suited to testing G59 protection, including loss of mains protection. Vector surge and df/dt (ROCOF) relays can be simply tested and timed, as well as other protection requiring one to three voltages, including:

- Under and over frequency relays
- Under and over voltage relays
- Synchronising relays
- ROCOF relays (df/dt)
- Vector surge relays

In conjunction with the ART3C or a current source (such as the 200ADM-P), the ART3V can be used to test protection circuits, including:

- Directional relays
- Distance protection
- Power transducers



## ART<sub>3V</sub> Specification

### Output

The output of the ART<sub>3V</sub> has 4mm safety sockets for phases A, B, C and neutral. The neutral connection may be omitted for a delta connection. The neutrals can be linked for a star connection using the provided accessory.

Voltage	0-450Vac phase-neutral
Current (continuous)	40mA at 450V
Voltage resolution	0.01V phase-neutral
Phase rotation	±180.0°
Voltage accuracy	±0.1%rdg+2d

\*All output ratings are based on an ambient temperature of 25°C.

### Timing System

The timing system on the ART<sub>3V</sub> is flexible and transparent with different modes of operation. In INTERNAL START mode step changes of any quantity will automatically resets and starts the timer when the change is applied. The timer then stops on a change of state of either contact set input 1. Contacts can be used to trigger the timer based on external relay changes. Also, more complex timing functions are handled by the Fault Config mode.

Two contact inputs are provided, both of which have LEDs and a mimic on the display to show the contact state. The contact inputs auto-select for normally open or normally closed contacts. A DC voltage can also be used to trigger the timer using the Vdc contact.

Timer resolution	1/10/100ms
Timer full scale	0-999.999s/9999.99s/99999.9s
Timer accuracy	±0.01%rdg+2d
Contact O/C voltage	24V
Contact S/C current	20mA
Vdc input range	24-240Vdc

### USB Data

The ART<sub>3V</sub> can be connected to a USB keyboard for adding comments to tests. Each test is stored to a USB memory key with each comment. The data is stored in a \*.CSV format allowing it to be opened in all types of desktop PC spreadsheet software.

### Protection and Safety

The ART<sub>3V</sub> is CE marked and is designed to meet the requirements of BS EN61010, and EMC tested to BS EN 61326. The outputs are protected by overcurrent and thermal trips, and the contact inputs are protected by PTC thermistors. The phase lock current input is fuse protected, and the voltage input is impedance protected. An earth terminal is provided for connection to a local earth.

### Supply Requirements

90V-264V±10% 45-65Hz 1ph 300VA max

### Temperature Range

Storage -20°C to 60°C      Operating 0°C to 45°C

### Dimensions

419 x 325 x 195mm

### Weight

8.9kg

### Accessories

Output lead set & carry case, mains lead, neutral link, spare fuse set, operating manual, USB flash memory key, USB keyboard.

## Modes of Operation

### Output Adjust

This mode allows full control of frequency, voltage and phase. Each voltage, phase and frequency can be controlled together or independently. All parameters are continuously variable using the adjust control, and step changes of any value. The timer automatically resets and starts when a step change of value is entered, and stops if either contact input changes state. Step changes of phase for testing Vector Surge relays are easily generated in this mode.

Frequency Range	30-999.99Hz
Frequency resolution	0.01Hz
Frequency accuracy	±0.05%rdg+2d
Phase resolution	0.1°
Phase accuracy	±0.1° phase to phase

### Phase Lock Mode

The frequency and phase of the output can be controlled by an external reference in phase lock mode. The reference may be the mains supply to the ART<sub>3V</sub>, an external voltage, current. This mode allows testing of directional and distance protection in conjunction with an external current source.

Phase lock range	45-65Hz
External voltage ref.	20-250V AC
External current ref.	0.2-5A AC
Phase resolution	0.1°
Phase accuracy	±0.3° phase to phase ±3.0° reference to output

### Fault Config Mode

Fault Config mode allows extra flexibility in testing complex timed events or several sets of values that must be applied to a relay in turn. This mode allows three sets of values to be set in advance (pre-fault, fault, and post-fault values). The ART<sub>3V</sub> may be set to switch from one state to the next on a change of contact or after a specific time. In addition, the timer may be set to start or stop on any one of the state changes or a change of contact state. This mode allows frequency, phase and voltage to be changed simultaneously if required. Test configurations can be save to USB. More complex configurations can be loaded from the USB, such as a complete G59 relay test, such as relay stability tests.

### df/dt and ROCOF (Rate Of Change Of Frequency)

Loss of mains protection often takes the form of a df/dt relay, sensitive to the rate of change of frequency over time. The ART<sub>3V</sub> is able to generate a swept frequency output with accurate rates of change of frequency between preset frequencies. The rate of change may be continuously varied to find the relay setting or stepped to time the relay. The output may be set to either sweep continuously or generate single sweeps with timing.

Frequency Range	30-999.99Hz
Frequency resolution	0.01Hz
Rate of change range	0.001-9.001Hz/s

### Lead Set Specifications

1 x 3m 4 core output lead terminated in 4mm plugs  
2 x 3m 2 core timer lead terminated in 4mm plugs

*Note: Due to the company's continuous research programme, the information above may change at any time without prior notification. Please check that you have the most recent data on the product.*

T&R Test Equipment Ltd, 15-16 Woodbridge Meadows, Guildford, Surrey, GU1 1BJ, UK

Tel: +44 (0)1483 207428 Fax: +44 (0)1483 511229 email: sales@trtest.com

**www.trtest.com**