

# DVS3 mk2 Relay Test System



Optional 260V  
VT box

## Features

- 3- $\phi$  Voltage output from 1- $\phi$  supply
- 0-133V  $\phi$ -N output voltage  
0-266V/292V  $\phi$ -N with optional VT box
- 45VA/phase maximum output
- Variable Frequency 40-999.9Hz
- Phase shift  $\pm 180.0^\circ$
- Multi-function timing system
- Ideally suited to testing G59 schemes
- Step change of phase and df/dt
- Large back-lit liquid crystal display
- Compact and lightweight
- Automatic mains voltage selection

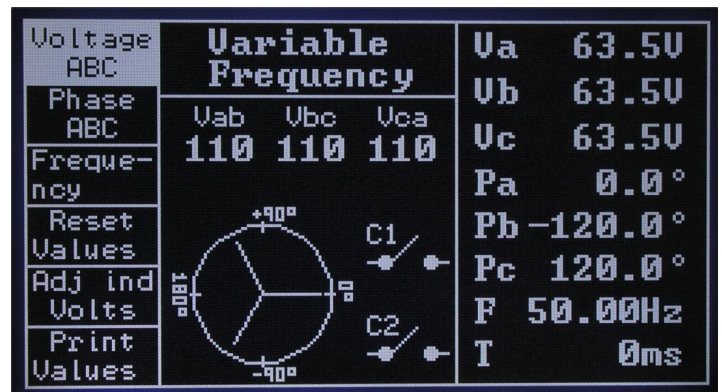
The DVS3 mk2 is the new smaller, lighter, higher power version of the T&R DVS3, offering three times the output power of the original DVS3. The exceptionally easy to understand user interface of the DVS3 is retained, allowing simple testing of complex voltage and loss of mains protection systems.

Equally at home in a commissioning, maintenance, or laboratory environment, the DVS3 mk2 is a truly flexible system. The DVS3 mk2 has been designed using the latest

The DVS3 mk2 is ideally suited to testing G59 protection, including loss of mains protection. Vector surge and df/dt (ROCOF) relays may be simply tested and timed, as can other protection requiring one to three voltages, including:

- Under and over frequency relays
- Under and over voltage relays
- Synchronising relays
- df/dt & ROCOF relays
- Vector surge relays
- Transducers

*The display on the DVS3 is back-lit and exceptionally clear. Menu options on the left are selected by dedicated buttons on the panel next to the display, allowing immediate access to adjust voltage, phase and frequency. Phase to phase and phase to neutral voltages are both shown on the display, along with frequency and phase*



digital technology to generate a highly stable and accurate output with very low distortion. Each phase output is individually adjustable for voltage and phase angle. In addition, full control of frequency is available. Step changes of any quantity may be generated with automatic timing of the response of the relay under test.

The unit is controlled by a simple user interface with context sensitive menus. Values may be either typed in at the keypad or smoothly varied using a digital potentiometer.

In conjunction with a current source (such as the 200ADM), the DVS3 mk2 can be used to test protection requiring current injection with a phase-shiftable voltage including:

- Directional relays
- Distance protection
- Power transducers

## H.V. TEST (PTY) LTD

3 Gaiety Ave, Robindale, Randburg, South Africa, 2010  
P.O. Box 651287, Benmore, 2010

Tel: +27(11) 782 1010 Fax: +27(11) 782 2770

Email: sales@hvtest.co.za Website: www.hvtest.co.za

## DVS3 mk2 Specification

### Output

The output of the DVS3 mk2 has four 4mm safety sockets for phases A, B, and C and neutral. The neutral connection may be omitted for a delta connection.

<b>Voltage</b>	0-133Vac phase-neutral 0-230Vac phase-phase
<b>Current (continuous)</b>	200mA at 133V, 120mA at 0.1V*
<b>Current (5min on/ 15min off)</b>	335mA at 133V, 200mA at 0.1V*
<b>Voltage resolution</b>	0.1V phase-neutral
<b>Phase rotation</b>	±180°
<b>Voltage accuracy</b>	±0.3%rdg+3d

\*The current trip drops linearly between maximum and minimum output voltage. All output ratings are based on an ambient temperature of 25°C.

### Timing System

The timing system on the DVS3 mk2 is flexible and transparent in operation. Step changes of any quantity may be generated by typing in value using the keypad. Entering a value in this way automatically resets and starts the timer when the change is applied. The timer then stops on a change of state of either contact input. More complex timing functions are handled by the PF-F-PF 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.

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

### Protection and Safety

The DVS3 mk2 is CE marked and is designed to meet the requirements of BS EN61010. 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

115V/230V±10%±10% auto-selecting, 45-65Hz 1ph 425VA max

### Temperature Range

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

### Lead Set Specifications

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

<b>Dimensions</b>	<b>Weight</b>
380mm x 314mm x 221mm	9.1kg

### Accessories

Output lead set, lead set case, mains lead, spare fuse set, operating manual.

### Optional Accessories

Printer, 133:266V step up VT box, 133:292V step up VT box.

## Modes of Operation

### Variable Frequency Mode

This mode allows full control of frequency, voltage and phase. The voltage and phase may be controlled individually for each phase or for all three phases together. All parameters are continuously variable using the adjust control, and step changes of any value may be generated by typing the required value on the keypad. The new value is applied to the output when the enter key is pressed. 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.

<b>Frequency resolution</b>	0.01Hz 40.00-99.99Hz 0.1Hz 100.0-999.9Hz
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<b>Frequency accuracy</b>	±0.01%rdg+1d
<b>Phase resolution</b>	0.1°
<b>Phase accuracy</b>	±0.3° phase to phase

### Phase Lock Mode

The frequency and phase of the output are controlled by an external reference in phase lock mode. The reference may be the mains supply to the DVS3 mk2, an external voltage, or an external current. This mode allows testing of directional and distance protection in conjunction with an external current source.

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

### 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 DVS3 MK2 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.

<b>Frequency range</b>	45.00-65.00Hz
<b>Default sweep range</b>	49.75-50.25Hz (50Hz supply) 59.75-60.25Hz (60Hz supply)
<b>Rate of change range</b>	0.010-3.000Hz/s

### Pre-fault - Fault - Post-fault Mode

PF-F-PF mode allows extra flexibility in testing where complex events must be timed or several sets of values 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 DVS3 MK2 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 of a change of contact state. This mode allows frequency, phase and voltage to be changed simultaneously if required.

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