

# PTE-100-V

*Single phase relay test set  
Voltage / Current*



**SMC**  
EURO

# PTE-100-V



## MAIN FEATURES

- Variable voltage to 300 V or current to 8 A.
- Variable frequency from 40 to 420 Hz.
- Variable phase angle between 0 - 359.9°.
- Output power: 100 VA.
- Reversible output voltage/current.
- Outputs are fully isolated and electronic.
- Dynamic capability.
- Completely programmable.
- External current or voltage reference input.
- External timer control output.
- Dimensions: 200 x 300 x 200 mm / 13.5 Kg  
8 x 12 x 8 in. / 30 lb

## APPLICATIONS

- Testing of single phase Generation and Interconnection Relays, such as Frequency, Synchronizing, and Phase Angle.
- Combining with a Current Injector, forms a complete single phase test set (Current, Voltage, Phase Angle) to test single phase Directional, Power Relays, etc.

## DESCRIPTION

The PTE-100-V equipment is a universal, portable, test system with an output to test single phase protective relays. The output channel is reversible and can be either Voltage or Current.

The unit is extremely compact and rugged. The design incorporates the latest in modern digital microprocessor technology to achieve unbeatable output characteristics in terms of power, accuracy, low distortion, and dynamic capability. This technology allows users to test many different specific functions required in relay testing, without the need of additional accessories.

All output signals are digitally generated, amplified, and internally controlled by the IGM's (Intelligent Generator Modules), which interpret the orders received from the front

panel to produce a highly accurate, stable, and low distorted output, independent of the voltage supply.

The equipment also allows optional connection to a computer for either automatic testing of relays or control of the equipment using Windows compatible software.

Even the adjustment and calibration of the equipment is made by software, supplied with the units, which permits calibration and/or adjustments in the outputs, without any intervention in the hardware. (Closed Case Calibration)

In summary, the PTE-100-V is an equipment which offers all the characteristics and functions needed for protective relay testing, in a manual or automatic mode, and in laboratory and/or for on site testing.



*Typical single phase system of 1 voltage (PTE-100-V) and 1 high current output (PTE-100-C).*

## FEATURES

The PTE-100-V was designed as a unit capable to test relay applications, which require a variable frequency whether current or voltage. This is generally the case in relays installed in Generation.

The equipment can also work with other single phase current units such as the PTE-100-C or the PTE-50-CE via the BUS-PTE or with any other test equipment made by another manufacture via the external reference input.

In the following sections are the details, which makes the PTE-100-V, your practical choice from all the other test equipment with this application, which exist in the market.

### USER FLEXIBILITY

Any type of test equipment should be flexible in a way that it should perfectly cover and adapt from one relay test to another.

Among the many special characteristics of the PTE-100-V the following covers the flexibility of the equipment.

- Due to the Reversible channels the unit can be use as a second current for differential relay tests.
- Can be combined to operate with any other complimentary equipment, PTE range equipment or even to any other relay test equipment from any other manufacture.

### MANUAL CONTROL

The need for a manual control mode, even when testing the most sophisticated relay, lies at the core of efficient testing. In effect, often commissioning work, the larger parts of the tests are not systematic, but depend on the installation and the functions assigned to the relay under test. This implies that the manual control must be intuitive, easy to use,

understandable by any operator, without the need of special training and without the need of any external elements from the system. This and other functions are included in the PTE-100-V.

- The manual controls are clearly arranged for the user. There is a control step-knob beside the display of each parameter, whether it is output level or phase angle, which sets the display value in real time.
- Programming pre-fault and fault conditions, by the corresponding front panel controls, by individual parameter change or by changing all available.
- Up to two frequency ramps (Hz/s) can be programmed from the front panel key board.
- Total system status display enables the user to view outputs status, alarms, monitor signals, phase angle, etc. in real time.

### INTERCONEXION CAPABILITY

By simply connecting a cable, via the PTE-BUS, the PTE-100-V can be interconnected to any other equipment in the PTE range, including another PTE-100-V. This capability widens the application scope of the PTE units, in that to the test system and be up dated and amplified by simply adding units via the BUS interconnection. In this way 3 PTE-100-V can be interconnected to form a 3 phase voltage or 3 phase current outputs with 3 single phase units.

Furthermore incorporated in the PTE-100-V is a frequency and phase external reference will allows interconnection with other test equipment including relay test equipment from other manufacturers.



# PTE-100-V

## 1 RS-232 COM PORT

Used to control the equipment from an external Computer, and can be used to perform the following:

- Connected to the Computer
  - Software Calibration.
  - Automatic Testing.
- Connected to a printer to directly print test results.

## 2 PTE-BUS

Enables the interconnection with any other unit in the PTE RANGE, allowing an easy access for references, controls, etc.

## 3 POWER OUTPUTS

The unit has an output channel which may be used in Voltage or Current mode up to 300 V in 3 ranges or up to 8 A in 2 ranges.

All the outputs have a Dynamic Capability, which means that any combination of Dynamic steps to 2nd values, can be selected in amplitudes and phase angles.

## 4 OUTPUTS PROTECTION

The outputs and the unit are electronically protected against overload, short-circuit and over temperature. The appropriate alarm is indicated on the front panel, as well as the channel where it occurs. The outputs are fuse protected.

## 5 EXTERNAL REFERENCE INPUT

The equipment can be synchronized, in terms of frequency and phase, with any external signal from 0.1 to 25A or in voltage from 5 to 300V. This feature enables the equipment to work with any other test set.

## 6 INTERNAL FREQUENCY GENERATOR

The PTE-100-V enables frequency to be selected between 40 and 420Hz. Furthermore, by an easy to use preprogrammed key located on the front panel, frequency can be set to ramp (ROCOF) setting ramp-rates, stabilized times and frequency levels. The slip frequency mode allows testing of frequency synchronisation where the frequency difference between an external reference is compared, with a resolution of 1mHz.

Also included is a BNC output which gives a 5V TTL square wave output of exactly the same frequency as is generated by the output.

## 7 SELECTABLE REFERENCES

The power outputs can be synchronized to four different references in both frequency and phase.

- The main supply phase (Line).
- The BUS-PTE, when working with other PTE equipment (Bus).
- External Phase Reference (Ext).
- Internal Frequency Generator (Freq).



## 8 MAINS VOLTAGE SUPPLY

The voltage is supplied to the equipment by a standard SCHUKO male plug with ground. Contain in this is a main filter to eliminate possible perturbations from entering the equipment. Standard 5 x 20 mm. fuses protects the inputs and circuits.



### 9 AUXILIARY VOLTAGE OUTPUT

The auxiliary voltage output has a nominal voltage of 110V ac with a maximum current of 0.3A. This output is fuse protected.

### 10 EVENT OUTPUT

Normally used to start an external timer, this output produces a voltage free pulse with a duration of 20ms each time the ON/OFF key is pressed or any of the step to a 2nd value key are pressed on the front panel, this is used to start an external timer.

### 11 MASTER/SLAVE CONTROL

Enables all of the controls of two or more units, such as Output ON/OFF and change to a 2nd value in the different units by one control.

### 12 SIGNAL MONITOR

The signal monitor informs the state of the relays under test. These can work with Dry Contacts (voltage free) or with Voltage Signals from 5 to 250 V ac or dc.

## COMPUTER CONTROL

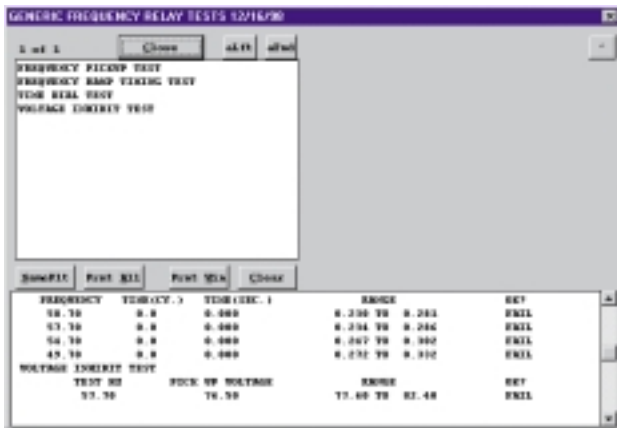
The PTE-100-V can be completely controlled by an external computer, along with its corresponding software programs with various levels and objectives.

The PTE-100-V uses the PTE-12 adapter, which connects to the RS 232 serial port of the computer to the BUS-PTE port on the unit.

The corresponding software of the PTE-100-V is divided in various packages and optional programs which gives a variety of application use. These are:

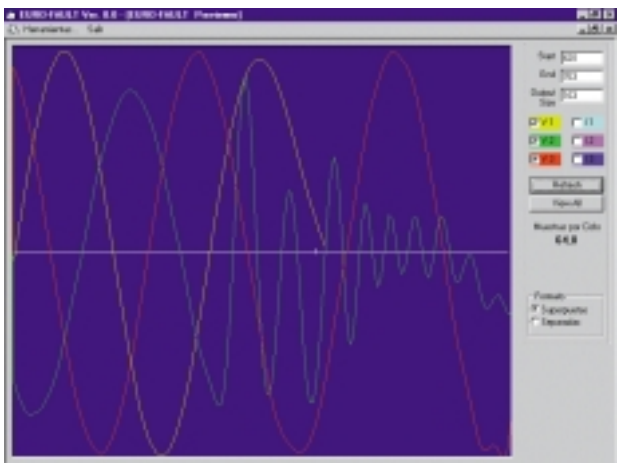
### EUROTEST ERTST-1V

This software enables automatic and systematic tests routines, with standard routine tests for each type of relays. There is also a library of routine tests supplied with the software. These can easily be edited to adapt to the application desired or the user can create new routines.



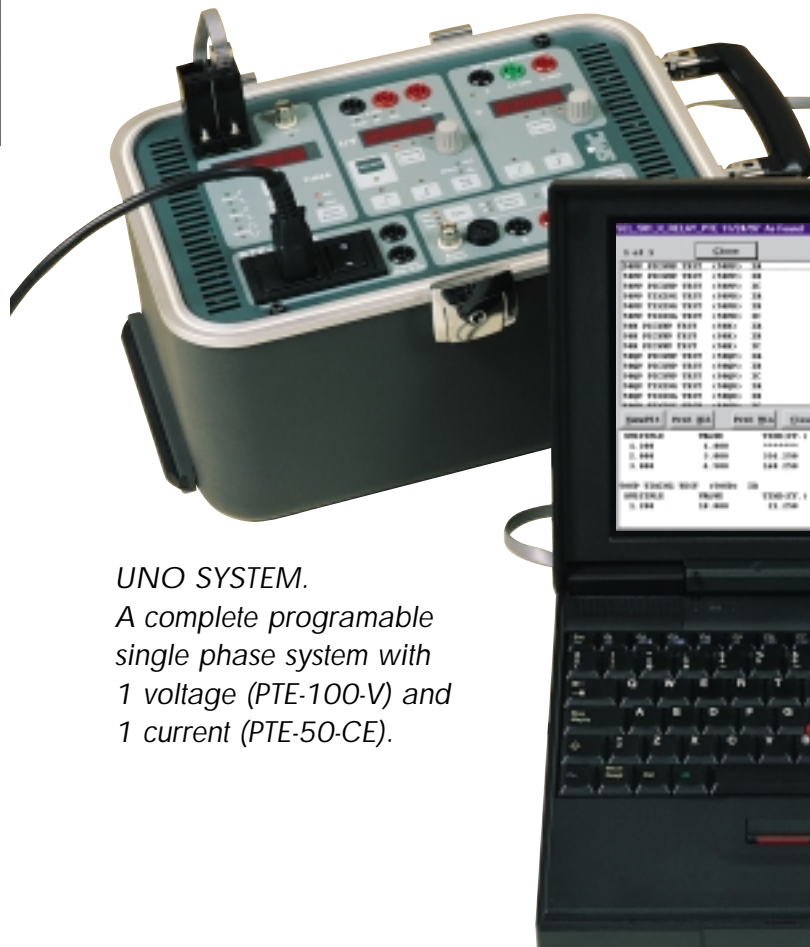
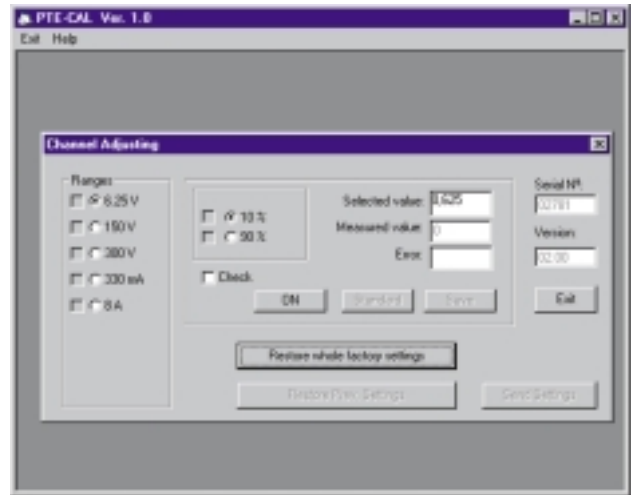
### EUROFAULT

Enables the playback of any previously registered or calculated fault in COMTRADE format. The bandwidth is 0.5 to 5000 Hz.



### PTE-CAL

Enables the adjustment and calibration of the unit, without the need of any intervention inside the equipment. (Closed Case Calibration)



### UNO SYSTEM.

A complete programmable single phase system with 1 voltage (PTE-100-V) and 1 current (PTE-50-CE).

## STANDARD ACCESORIES

- Instruction Manual.
- 1 Voltage supply cable with earth, 1.5 m length.
- 4 Connection Adapters, 4 mm / Flat Terminal.
- 4 Crocodrile clips, input 4 mm.
- 6 Connection Cables, 2 meters length and 1.5 mm<sup>2</sup> section.
- 1 RS-232 Cable.
- 1 BNC cable with Banana terminals, 4 mm.
- 1 Interconnection Cable BUS-PTE.
- 1 Complete set of fuses.
- 1 Nylon protection bag.



## OPTIONAL ACCESSORIES

### PORTABLE TIMER (PTE-30-CH)

The portable timer the PTE-30-CH can be connected via the BUS-PTE or directly to the digital output control.

The timer has a 1 ms resolution. Optionally this timer may be incorporated into the top lid of the PTE-100-V



### BATTERY SIMULATOR (PTE-FCG)

An auxiliary DC voltage supply, which is needed for the majority of relays, the PTE-FCG has fixed outputs of 48, 125 or 250 V dc with 60 W in each output.

This can be incorporated in the top lid of the PTE equipment.



### INTERFACE RS-232/BUS-PTE (PTE-12)

Acts as the interface between the RS-232 serial port of the computer and the BUS-PTE. Includes all the adapters and cables required, along with the control command manual, PTE COM.



### VARIABLE VOLTAGE (PTE-FCF)

Connected to the auxiliary voltage output, enables to regulate the fixed voltage output of 110 V between 10 and 120 V with a maximum current of 0.3 A.



# TECHNICAL SPECIFICATION

## POWER OUTPUT

MODE	RANGES		Permanent Current	Permanent Voltage	Accuracy	Maximum Distortion	Permanent Power	Power 1 minute
	LEVEL	RESOLUTION						
VOLTAGE	0 - 6.25V	0.01 - 0.1 - 1V	8A	-	±0.5%	1%	50VA	100VA
	0 - 150V	0.01 - 0.1 - 1V	0.33A	-				
	0 - 300V	0.01 - 0.1 - 1V	0.15A	-				
CURRENT	0 - 0.330A	0.001 - 0.01 - 0.1A	-	150V	± 0.5%	1%	50VA	-
	0 - 8.000A	0.001 - 0.01 - 0.1A	-	6.25V				
PHASE ANGLE	0 - 359.9°	0.1 - 1 - 10°	-	-	± 0.5°	-	-	-

TRANSIENT BANDWIDTH: 0.5 - 5000 Hz

## EXTERNAL REFERENCE INPUT

MODE	SIGNAL RANGE	FREQUENCY RANGE	INPUT IMPEDANCE
VOLTAGE	5 - 300 V	40 - 70 Hz	47 KΩ
CURRENT	0.1 - 25 A	40 - 70 Hz	25 mΩ

## INTERNAL FREQUENCY GENERATOR

MODE	RANGE	RESOLUTION	ACCURACY	SLOPE RANGE	DURATION RANGE
STANDARD	40 - 420 Hz	0.01 - 0.1 - 1 Hz.	±0.003 Hz.	0.1 - 10.0 Hz/s.	0.01 - 10.0 s.
DIFFERENTIAL	0.001 - 10 Hz.	0.001 - 0.01 - 0.1 Hz.	±0.001 Hz.	-	-

## SIGNAL MONITOR

Dry Contact Input
• Open circuit voltage: 10.2 V. D.C.
• Short-circuit current: 25 mA
• Fuse protected.
Voltage input
• Level Limits: From 5 to 250 V A.C./D.C.
• Input Impedance: 19 KΩ
• Fuse protected.

## DIGITAL CONTROL OUTPUT

Maximum AC Voltage:	20 V
Maximum DC Voltage:	± 28 V
Maximum AC/DC Current:	0.5 A
AC Power:	10 VA
DC Power:	14 W

## GENERAL

Auxiliary Voltage Output:	NomV: 115 Vac/MaxI: 0.3 Aac/Fuse protected		
Temperature Range:	Operation: 0 - 50° C /Storing: -20° - 70° C		
Voltage supply:	230 V ± 10% (Standard version) 50-60 Hz 115 V ± 10% (upon request) 60 Hz.		
Dimensions:	Height: 200 mm 8"	Width: 300 mm 12"	Depth: 200 mm 8"
Weight:	13,5 Kg. - 12 lb.		

DISTRIBUTED BY:

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