PTE-300-V

Three phase relay test set
Voltage/Current

SMC EURO

PTE-300-V

MAIN FEATURES

- Variable three phase voltage to 3 x 300V or Current up to 3 x 8A.
- Variable phase angle between 0 - 359.9° (Single or three phase).
- Variable frequency output between 40 - 420 Hz.
- Output power: 3 x 100 VA.
- Reversible outputs.
- Outputs are fully isolated and electronic.
- Dynamic capability.
- Completely programmable.
- External frequency or phase reference input.
- External Timer control output.
- Dimensions: 200 x 442 x 327 mm / 22 Kg
  8 x 18 x 13 in. / 48 lb.

APPLICATIONS

- Testing of three and single phase Generation and Interconnection Relays.
- Combined with a single phase Current injection set, allows relay tests which require three phase voltage.
- Can be used as a complete single phase unit in voltage, current, and phase as outputs are reversible (V, I, φ).

DESCRIPTION

The PTE-300-V equipment is a universal, portable, test system with three outputs to test single and three phase protective relays.

The equipment compromises of three independent output channels than can be selected as voltage or current. This enables the unit to be used as a complete single-phase equipment (Voltage, Current, and phase angle between them), or with channels synchronized, as a three phase voltage or three phase current generator from a single phase mains input.

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 manual hardware setting. (Closed Case Calibration)

In summary, the PTE-300-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.

PTE-300-V and PTE-50-CE is a three phase voltage and single phase current supply that can be software controlled.

FEATURES

The PTE-300-V was designed as a unit able to test relay applications which require variable frequency, three-phase voltage or three phase currents at the same time. This is generally the situation for relays installed in Generation or Power installations. The equipment improves its characteristics when it is working or connected to a single phase injection set, such as the PTE-100-C or PTE-50-CE. Connecting the PTE equipment is made via a simple cable connected in the BUS-PTE of each unit. The PTE-300-V can also work with any current injection test set, made by any other manufacture via the external reference input.

Obviously there is a wide range of relay types and relay functions in this scenario such as Overcurrent, Directional, Generator Protections, Differentials, Frequency, Synchronizing, Voltage, etc. Not only can these types of relays be found, but as well the generations of relays relay designs (Electromechanical, Electronic, and Digital) which all need to be tested.

Each relay designs demands differing requirements of the testing equipment, not only related to power and accuracy, (which normally determines the selected tester), but also design concepts. Design concepts such as various control modes, size, modularity, etc. properly developed can notably improve the application of the equipment.

In the following sections are the details, which makes the PTE-300-V your practical choice above all the other test equipment in the market.

- *A single control step-knob can simultaneously change values in one or more channels. This allows, for example, the use of paralleled channels as if there were one, with greater power and reach.*
- *Programming pre-fault and fault conditions, either as a single parameter change or by changing all available outputs at the same time (3 output channels in current or voltage).*
- *Up to two frequency ramps can be programed from the front panel controls.*
- *Total system status display enables the user to view outputs status, alarms, monitor signals, phase angle, etc. in real time.*

USER FLEXIBILITY

Any type of test equipment should be flexible in a way that it should perfectly preform and adapt from one relay test to another. Among the many special characteristics of the PTE-300-V the following covers the flexibility of the equipment.

- *Due to the Reversible channels of current and voltage the unit can be use as a stand-alone unit for single phase testing.*
- *Can be combined to operate with any other equipment from the PTE range, or other complimentary equipment, 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. Particularly during commissioning work, the mayor 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-300-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.*

REVERSIBLE OUTPUTS

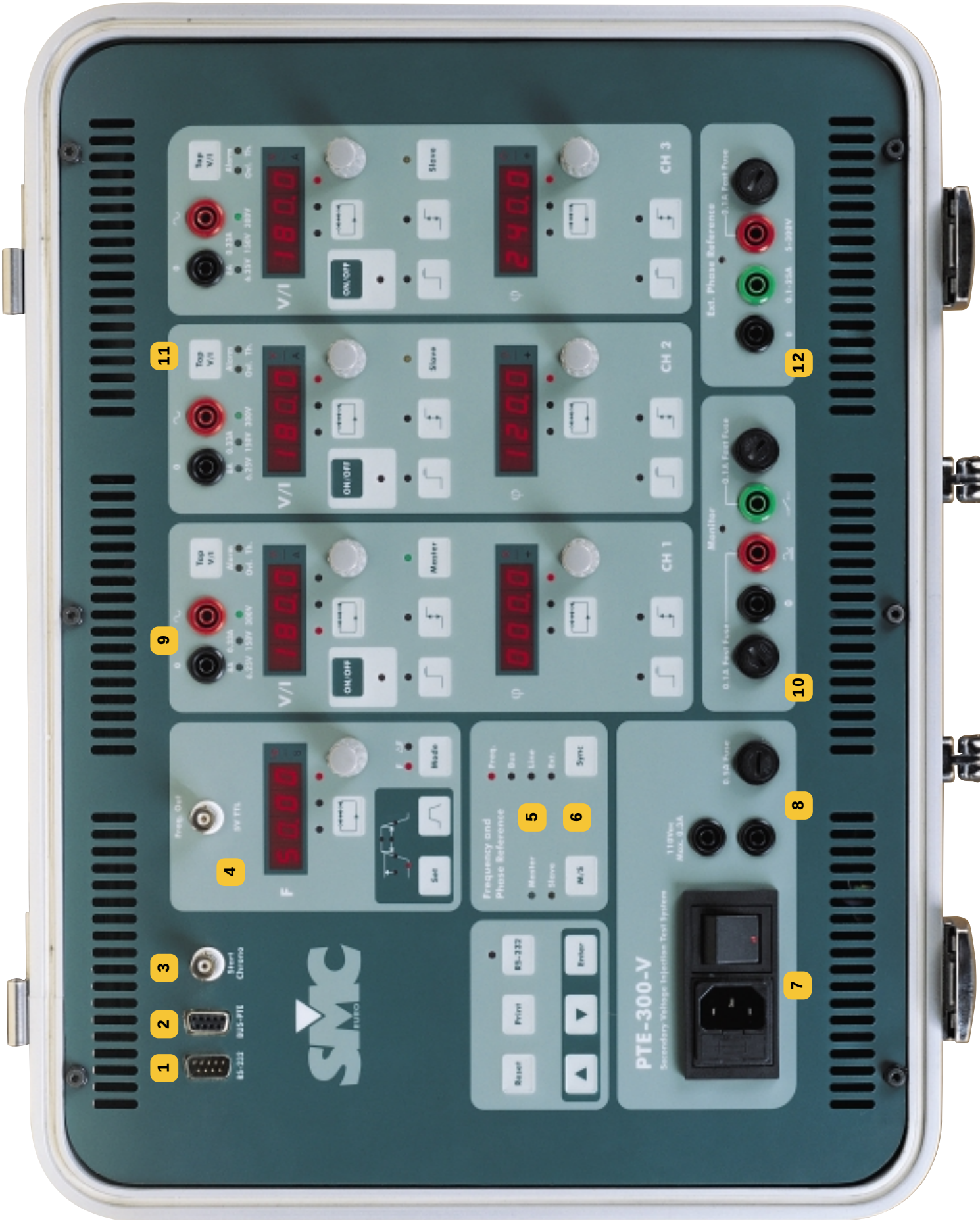
The three channels of the PTE-300-V are reversible in their function, this means that they can be used either as voltage or current generators completely independent from each another. This provides applications as follows:

- *Up to 3 Voltages or 3 Currents are available simultaneously.*
- *Converts the PTE-300-V into a complete single-phase unit in voltage and current with their corresponding phase angle.*
- *Numerous combinations of voltage and current in the three channels are available.*
- *Creating outputs by linking channels with identical parameters to sum the power and reach available*

The PTE-300-V unit permits the connection of all outputs in parallel, which practically covers all the secondary relay testing requirements. The following are the output ranges that can be obtained.

- *0 - 1 A 150 V max.*
- *0 - 24 A 6.5 V max.*

PTE-300-V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PTE-300-V
CH 1
CH 2
CH 3
V/I
ON/OFF
Monitor
Ext. Phase Reference
Frequency and Phase Reference
Reset
Print
RS-232
Enter
Mode
Set
Sync
Slave
Master

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***

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

3 ***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 slep to a 2nd value key are pressed on the front panel, this to used to start an external timer.

4 ***INTERNAL FREQUENCY GENERATOR***

The PTE-300-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.

5 ***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).

6 ***MASTER/SLAVE CONTROL***

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

7 ***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.

8 ***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.

9 ***POWER OUTPUTS***

There are three output channels, that can operate simultaneously or independently. Each Channel may be used in Voltage or Current mode up to 300 V in 3 ranges or up to 8 A in 2 ranges.

All output regulation including the phase angle can be independent by phase, or linked in a three-phase regulation, all linked channels can be changed simultaneously by a single control step.

Any combination of voltage and current channels can be selected.

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. This Dynamic capability can work independently in each channel or linked in a three-phase system, in a way which allows for an easy and flexible method to perform any type of fault simulation.

10 ***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.

11 ***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.

12 ***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 equipment.

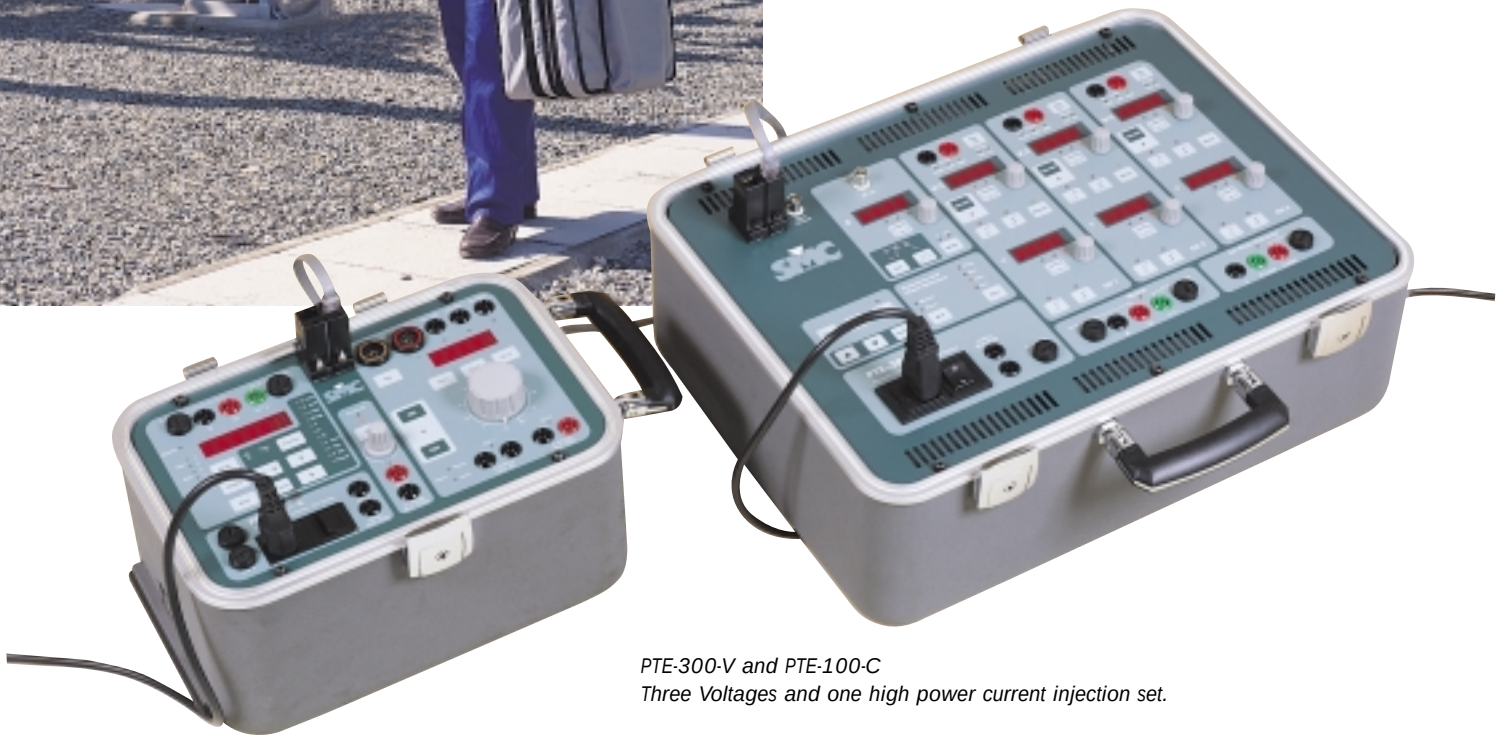
INTERCONEXION CAPABILITY

By simply connecting a cable, via the BUS-PTE, the PTE-300-V can be interconnected to any other equipment in the PTE range, including another PTE-300-V. This capability widens the application scope of the PTE units as combinations of units can be made to match the requirements of the relay system. An example is our three-phase system TRES.

Furthermore incorporated in the PTE-300-V is a frequency and phase external reference will allows interconnection with other test equipment including relay test equipment from other manufacturers.

STANDARD ACCESSORIES

- Instruction Manual.
- 1 Voltage supply cable with earth, 1.5 m length.
- 4 Connection Adapters, 4 mm / Flat Terminal.
- 12 Crocodile clips, input 4 mm.
- 9 Connection Cables, 2.5 mm section 2 meters length.
- 1 RS-232 Cable.
- 2 BNC cables with Banana terminals, 4 mm.
- 1 Interconnection Cable BUS-PTE.
- Complete set of fuses.
- Nylon protection bag.



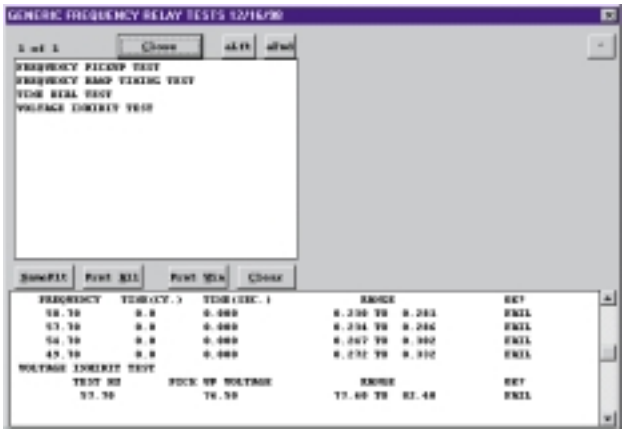
PTE-300-V and PTE-100-C
Three Voltages and one high power current injection set.

COMPUTER CONTROL

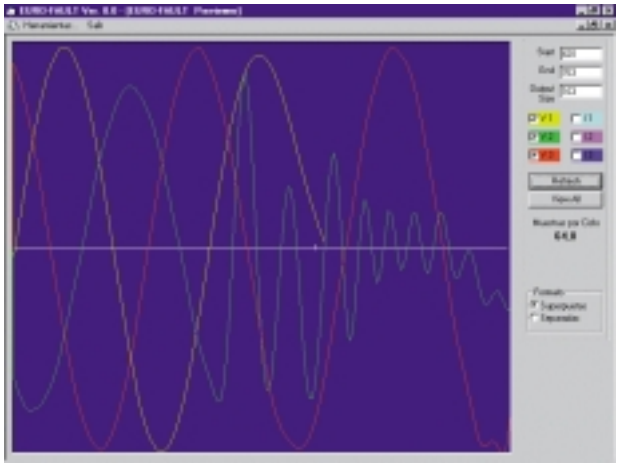
The PTE-300-V can be completely controlled by an external computer, along with its corresponding software programs. The PTE-300-V uses the PTE-12 adapter, which connects to the RS 232 serial port of the computer to the BUS-PTE port on the unit.

The corresponding software of the PTE-300-V is divided in various packages and optional programs, to suit a variety of application uses. These are:

- ***EUROTEST*** *ERTST-3V. This software enables automatic and systematic test 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 between 0.5 and 5000 Hz.*



OPTIONAL ACCESSORIES

BATERY SIMULATOR (PTE-FCG)

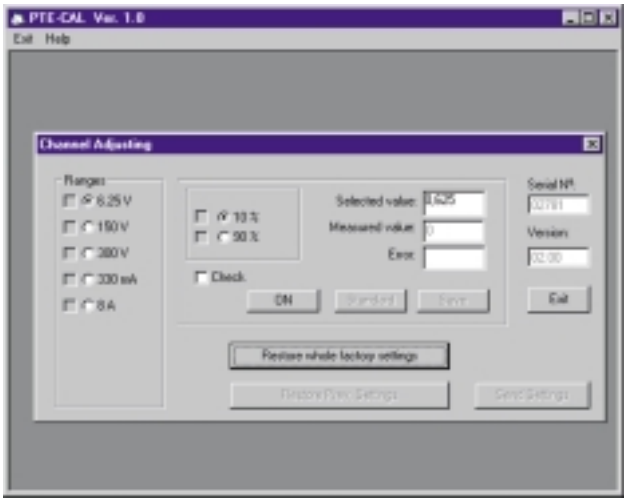
An auxiliary DC voltage supply, which is needed for the majority of relays, the PTE-FCG has fixed outputs of 48, 125 o 250 V dc with 60 W in each output.

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.

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



TECHNICAL SPECIFICATION

POWER OUTPUT (Each channel)

MODE	RANGES		Permanent	Permanent		Maximum	Permanent	Power
	LEVEL	RESOLUTION	Current	Voltage	Accuracy	Distortion	Power	1 minute
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 - 359.9º	0.1 - 1 - 10º	-	-	± 0.5º	-	-	-
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 - 420Hz	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: 442 mm 18" Depth: 327 mm 13"
Weight:	22 Kg. - 48 lb.

DISTRIBUTED BY:

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