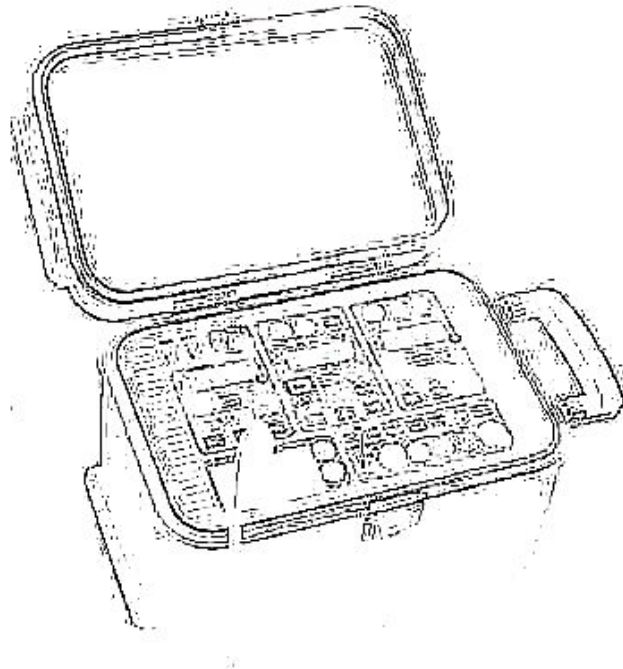




VOLTAGE, FREQUENCY, AND SYNCHRONIZING
RELAY TESTING UNIT

USER'S MANUAL



PTE-100-V

REFERENCE: FABVMV02

EDITION: March 01, 2013

VERSION: 11

USER'S MANUAL

Quality is the core reference for EuroSMC's activities, aimed to fully satisfy our customers' needs and expectations.

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PTE-100-V PACKING LIST

1	UNIT PTE-100-V
1	Nylon bag
1	Voltage supply cable type SCHUKO
6	2-meter, 2.5 mm ² section test leads (3 black, 3 red)
1	Interconnection cable between PC and PTE-100-V Unit, RS-232
1	PTE-Bus cable for two units
1	PTE-BUS Interconnection cable for frequency external output PTE-100-V type BNC
4	Clips up to 50A (2 red and 2 black)
4	Clips up to 10A (2 red and 2 black)
	Replacement fuses. <ul style="list-style-type: none"> - 2 fuses 5x20 100mA, fast - 1 fuse 5x20 400mA - 2 fuses 5x20 500mA - 1 fuse 5x20 630mA, fast - 2 fuses 5x20 4A - 2 fuses 5x 20 6,3 A fast - 2 fuses 5x20 8A - 2 fuses 5x20 12,5 A, fast Equipment with 220 Vac voltage supply: -2 fuse 5x20 4A standard, included in the assembly switch ON/OFF Equipment with 125 Vac voltage supply: -2 fuse 5x20 8A standard, included in the assembly switch ON/OFF
1	Case Key
1	Warranty
1	Measurement Certificate
1	User manual

1. INTRODUCTION

The PTE 100 V is designed as a portable single phase unit that allows the user to test, as stand alone unit or in combination with others, all type of Protective Relays.

Extremely compact and rugged, this unit incorporates the latest in the modern mprocessors technology to achieve unbeatable output characteristics in terms of power, accuracy, low distortion, and dynamic capability. This technology allows the unit to perform, without any external accessories, different specific functions very often used in the Relay Testing.

All the output signals are digitally generated, amplified and controlled. by the internal IGM's (Intelligent Generation Modules) in terms of amplitude, phase and frequency. A high accuracy and stability are obtained in the output waveforms, that are absolutely independent of the main supply.

Contained in a aluminum IP-65 case, with a membrane keyboard that allows full manual control, and a RS-232 COM PORT for Computer control, the PTE 100 V offers the best features actually available for the on site Manual or Automatic Relay Testing.

The PTE-100-V includes all the accessories needed for testing, such as cables, clips, nylon bag for transport, spare fuses etc. as standard equipment.

We appreciate your suggestions about the PTE-100-V and this manual, in our commitment to improve our quality. Our technical staff will be pleased to help you on any difficulties or questions that you may have.

Thank you for choosing EuroSMC products.

EUROSMC, S.A.

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1.1 MAIN FUNCTIONAL FEATURES

The following are the more remarkable functions/features that the PTE 100 V has:

INTERNAL FREQUENCY GENERATOR

Allows the user to work in any Frequency between 40 and 210 Hz. The frequency ramps can be easily pre-programmed from the front panel controls, and allows to test the complex Frequency, Harmonics, and Synchronizing Relays.

AVAILABLE REFERENCES:

The power output has four different references available:

- Internal Frequency Generator (Freq.)
- The main supply phase (Line).
- The PTE BUS (BUS).
- The External Phase Reference (Current or Voltage).

POWER OUTPUT:

Voltage or Currents output are available, up to 300 V in 3 ranges and up to 8 A. in two ranges respectively.

All the outputs have a Dynamic Capability. The output regulation can work independently or linked in a three phase system, when three PTE 100 V units are working together interconnected through the PTE BUS, any combination of Dynamic steps to 2nd. values, can be selected in amplitudes and phase angles for any type of Fault Simulation.

EXTERNAL REFERENCES INPUT

Can be synchronized, in terms of frequency and phase with any external signal, from 0.1 to 25 A. in current, and from 5 to 300 V. in Voltage.

SIGNAL MONITOR

The unit has a Signal Monitor input that can work with Dry Contacts or with Voltage Signals from 5 to 250 V. a.c. or d.c.

RS-232 COM PORT

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

- Software Calibration.
- Automatic Testing.
- Direct printing of the Test results in a RS-232 input Printer.

PTE BUS

Allows the interconnection with any other unit of the PTE RANGE.

EXTERNAL TIMER CONTROL OUTPUT

Delivers a pulse signal, dry contact type, 20 ms. duration. This can be used to start an External Timer, for timing measurements. This signal is produced every time the Power Outputs changes its status, or the "Step" key is activated in amplitude or in phase.

OUTPUT PROTECTION

The outputs and, in general, the unit, are electronically protected against overload, short-circuit and over temperature. These alarms are indicated on the front panel.

Standard 5 x 20 mm. fuses protect the rest of inputs and general devices included in the unit.

1.2. APPLICATION

AS STAND ALONE TESTING UNIT:

- Frequency Relays.
- Load Sharing Relays.
- Synchronizing Relays.
- Automatic Synchronizers.
- Multifunction Generator Protection Relays.
- Harmonics Relays.
- Over current Relays (up to 8 A).
- Inverse time

- Definite time
- Earth and Neutral, including harmonics filtering.
- Voltage controlled
- Maximum and Minimum Voltage Relays.
- Dynamic Test. Fault Simulation.

COMBINED WITH A SINGLE PHASE CURRENT INJECTOR

- Single phase Distance Relays.
- Directional Relays.
- Differential Relays, including the Harmonics restrain function.
- Single phase power Relays.
- Full single phase Network Fault Simulation.

MISCELLANEOUS

Due to its good characteristics of accuracy and stability, Transducers, Energy Meters and Measuring instruments can be tested as well, in the following range:

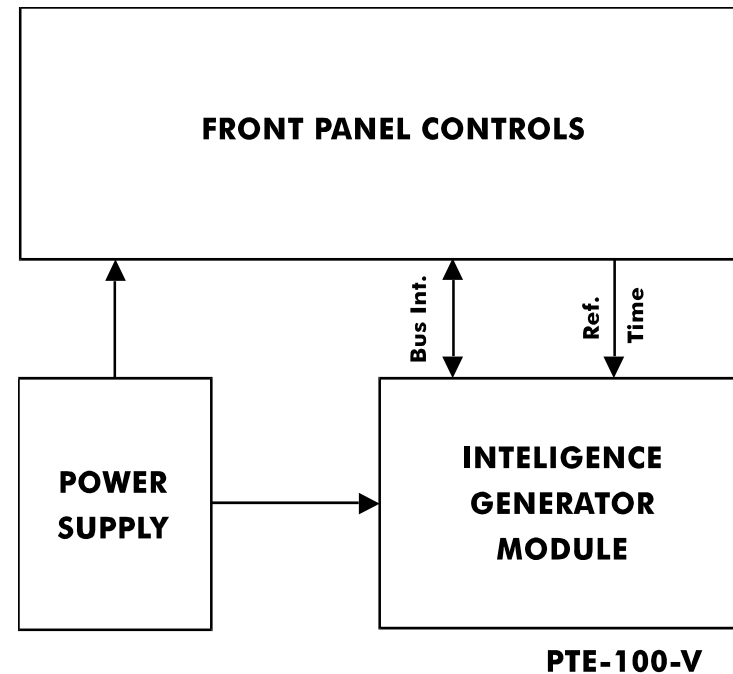
- Single phase Voltage up to 300V.
- Single phase current up to 8 A.
- Frequency from 40-210 Hz.
- Phase Angle 0-360°.

2. PRINCIPAL FUNCTIONS

Describe what are the various sections of the unit on an internal functional level.

The PTE-100-V is distinguished in 3 distinct blocks which are independent by function. (See fig.1)

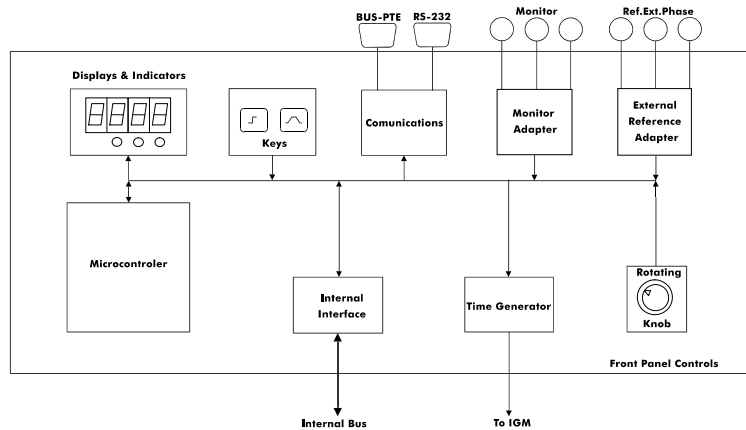
- Front Panel Controls
- Intelligence Generator Module
- Power Supply



2.1. FRONT PANEL CONTROLS

This part of the unit serves as an interface between the user and/or external equipment and the signal generating section of the unit. The following explains the functions of each:

- Display and LED indicators. These indicate the various selections made by the operator and the state of the unit.
- Press key controls. This is a membrane keyboard with acoustic supply, in which configures the various parameters.
- Multiturning control knobs. These are a rotative pulse generators which are used in conjunction with the press key controls and LED indicators, to select the magnitude in an easy and rapid manner.
- Monitor taps. Contains the circuits to change the form of the signals applied in these taps.
- External Reference Tap. Contain the circuits to gather the phase and frequency signals connected to these taps.



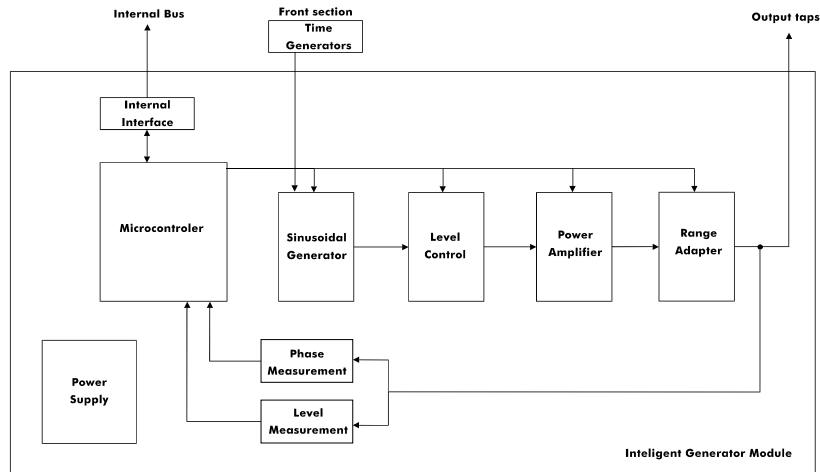
- Communications. This is the communication interface by RS-232 (printing results, calibration from the PC) and by BUS-PTE (interconnection of the PTE Range and the control of these by a PC).
- Internal Bus Interface. This establishes the communication between the front panel and the Intelligence Module Generator, and allows that the various selections made by the operator,

whether by the front panel or from as external the communication bus, to reach the module which is in charged to generate the signal required.

- Time Generator. This gives the Module the time references needed when generating phase and frequency.
- Signal taps. These are the taps of the auxiliary voltage supply of 110Vac, the output taps, the tap to start an external timer.
- Microcontroller. One of the most important parts of the unit, which as its name indicates, controls or establishes the flow of information between all the functions previously mentioned.

2.2. INTELLIGENCE MODULE GENERATOR

This section of the PTE-100-V produces the sinusoidal signal in the frequency and the phase selected. This is amplified and adapted by a transformer in the active output range. This generator also feedback's the output level in voltage, current, and phase, in the generation stage, thus achieving a high accuracy output.



As shown in the block drawing, and in the front panel control functions, a microprocessor is in charge of supervising all the functions of this generator module. This receives the output measurements and makes the corrections necessary in the amplitude and phase to obtain the accuracy necessary. Also the microprocessor stores the calibration parameters and corrects the selections made on the front panel.

2.3. POWER SUPPLY

In this group is the toroidal transformers which supply the front panel and the Intelligence Module Generator.

3. CONTROLS DESCRIPTION

This section describes one by one and in detail all the controls, indicators, displays, and connection taps on the front panel of the PTE-100-V. As well the situation, function, and marked indications of each.

To understand this clearly, the controls will be described by sections, by their functions, and by their physical position on the front panel. The different types of controls that you can find are classified as follows:

CONTROLS:

This refers to the press key and rotating knobs. The location and functions are described.

DISPLAY AND OPTIC INDICATORS:

This refers to the LED indicators and the selection displays. The location and functions are described.

CONNECTORS (TAPS):

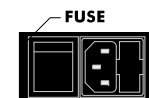
This refers to all taps (input and output), connectors, etc., that are contained in the PTE-100-V. The location and functions are described. This section describes all the connectors that are incorporated in the unit. All meet international safety standards and are easily identified with their corresponding identification marks on the front panel.

3.1. MAIN SUPPLY SECTION:

3.1.1. MAIN VOLTAGE SUPPLY:

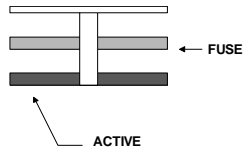
The unit is supplied with a SCHUKO type plug 2 poles with earth. Also incorporated in the connector is a filter to avoid perturbations from the main supply.

This is situated on the bottom left hand side of the unit and includes the following.



Power supply male with 2 poles and earth

Power Supply fuse holder



To reach these fuses, the cover must be lifted as indicated in the drawing. There are two fuses. The lower fuse is the active fuse and fuse located above is the spare fuse.

The fuse is a Standard fuse, 5 x 20mm, 4 A (220 Vac Voltage Supply) or 5 x 20 mm, 8 A (110Vac Voltage Supply).

0.1A Fast Fuse



Power Supply Switch

This has 2 positions, ON/OFF. The unit is disconnected when the red point of the switch is visible. As mentioned before the input fuses are contained inside.

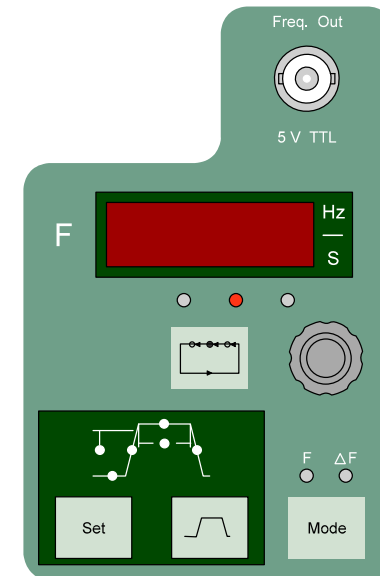
3.1.2. FIXED 110 V AC VOLTAGE SUPPLY

This output is located in the lower central section to the right of the Power Supply switch. It is made up of 2 black taps.

This output is always active when the unit is switched on. The taps have a distance of 19mm which is the standard two pole plug size.

3.2. FREQUENCY SECTION

This section is located on the left hand side of the unit and is clearly marked. Contains all the control knobs, keys, and LED's necessary for the operator to use the frequency functions described in this section.



3.2.1. CONTROL KEYS AND KNOBS

MODE FUNCTION

F Δ F
○ ○

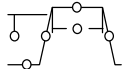


This key works in a sequential way, when this key is pressed the LEDs will indicate the option selected. The two options are:

Normal frequency mode (F).

Slip frequency or relative frequency mode (Δ F).

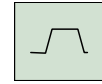
SELECTION OF THE RAMP PARAMETERS



This section is made up of 6 LED indicators and a key that works in a sequential way. Each time this key is pressed it allows to introduce a different ramp parameter. The associated LED will indicate which one is being selected. The Ramp Parameters available are as follows:

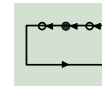
- Initial Frequency value for the 1st Ramp (Hz). This value acts as the Final value of the 2nd. Ramp.
- Rate of the frequency change or slope for the 1st Ramp (Hz/s).
- Time Duration that the final value of the first ramp remains before the beginning of the 2nd. ramp. (Time Duration in seconds-s).
- Final value of the 1st Ramp (Hz). This value acts as the initial value of the 2nd. Ramp.
- Rate of the frequency change or slope for the 2nd. Ramp (Hz/s).
- It is possible to select a frequency value, on which a 20 ms. duration pulse is produced at the "Start Chrono" output (Hz)

START THE RAMP SELECTED



This key starts the ramp previously selected by pressing the key. This ramp will stop when it arrives to the programmed cycle or when there is a signal in the monitor taps.

SELECTING THE DIGIT TO BE USED



This key works in a sequential way and it is associated with 3 LEDs located above this press key. This allows the operator to select the output in a fine or course regulation, by changing the digit to be adjusted. The following resolutions can be obtained:

- 1 digit
- 10 digit
- 100 digit

When this key is pressed for more than 2 seconds, it will block the rotating pulse generator, not allowing any modifications to the frequency selected.

ROTATING CONTROL KNOB

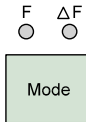


This is a rotating pulse generator and has step by step sensation. The values can be increased or decreased by turning this control knob clockwise or anti-clockwise by one digit per step, according to the selected digits weight as described previously.

This knob does not have an end and can be controlled at any speed. However if the control knob is turned very fast the value will be changed at a rate of 1 digit per second

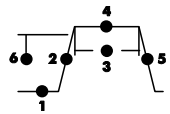
3.2.2. DISPLAYS AND OPTIC INDICATORS

FUNCTION MODE INDICATORS



These are two 3mm LED (red), one will always be lit and indicates the frequency mode function that is actually selected. This is associated with the press key MODE

RAMP STATUS INDICATORS



These are six 2mm LED (red), which indicates the situation of the ramp, in the selection level and when it is active. They have 2 different function modes.

Permanently lit: This indicates the Selection Mode. Allows the operator to select new values, which will be shown in the frequency Display. At this stage the selected values are not in the output. The relationship between the LED's and the parameters that can be selected are as follows:

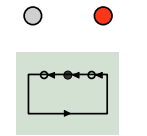
- LED 1: Indicates that the INITIAL value of the first ramp can be selected. The value will be shown in the display in Hz.
- LED 6: Indicates that the "START CHRONO" frequency value can be selected. The value will be shown in the display in Hz.
- - LED 2: Indicates that the frequency slope (rate of change) for the 1st. ramp, from the Initial to the final value can be selected. It is in Hz per second, (Hz/s). If 0 is selected the equipment will go directly (step) to the final value.
- LED 4: Indicates that that the FINAL value of the 1st ramp can be selected. The value will be shown in the display in Hz.
- LED 3: It indicates that you can select the time duration in which the unit will remain in the final value before starting the 2nd ramp. This value will be shown in the display in seconds (s). When 0 is selected the unit will maintain the final value indefinitely.

- LED 5: Indicates that the frequency slope (rate of change) for the 2nd. ramp, from the Final to the Initial value can be selected. It is in Hz per second, (Hz/s). If 0 is selected the equipment will go directly (step) to the initial value.

These LEDs are associated with the press key SET

WHEN FLASHING: Indicates that the ramp is active When the key is pressed the ramp will start. The LEDs will pass in successive order which indicates the state of the equipment and the ramp at each moment.

SELECTION INDICATORS:



These three, 3mm LEDs (red), indicate the digit to be regulated. Only one will be lit and it indicates the digit above it to be regulated..

These LEDs are associated with the press key

SELECTION DISPLAYS



The display is made up of 4 digits of 7 segments, red in color and 0.3 inches in height, which show the selected value, and the units of the parameter selected. This is located to the right of the. There are 3 different parameters available:

- Hz (Frequency)
- Hz/s (Rate of change or slope)
- s (Time Duration in seconds)

When the output of the unit is not synchronized with this frequency generator the Display will show "----" instead of the selection made, and all the controls in the frequency section becomes to be deactivated.

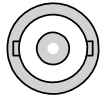
When working in the frequency ramp mode, and the monitor signal receives a signal (which indicates a relay trip) the frequency display will hold the frequency value at the time of the trip.

3.2.3. CONNECTORS – TAPS

AUXILIARY FREQUENCY OUTPUT

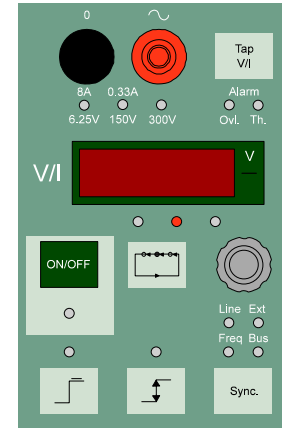
Freq. Out

This is a BNC connector that can be used at all times to obtain a square wave form, TTL level, exactly the same as the frequency being produced by the output, in real time.



5 V TTL

3.3. POWER SELECTION (Voltage-Current)



This is situated in the central section of the unit, and is clearly identified. All the controls, indicators, etc. contained in this part of the unit will be explained.

3.3.1. CONTROL KNOBS AND PRESS KEYS

REFERENCE SELECTION

Line Ext

 Freq Bus

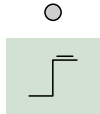
This key works in a sequential way, each time this key is pressed it corresponds to a different position. There are 4 LED's associated with this key. Each time this key is pressed one of the following can be choose:

Sync.

1. LINE: The frequency and phase will be synchronized to the voltage supply.
2. EXT: The frequency and phase will be synchronized to an external reference connected in the taps marked External phase Reference.
3. BUS: The frequency and phase will be synchronized to the actual frequency in the BUS PTE.

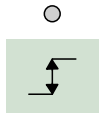
4. **FREQ:** The equipment is synchronized to the internal frequency generator of the unit.

SELECTING THE 2ND VALUE



When this key is pressed it allows the selection of a 2nd. value and it is shown in the display. This selection does not cancel the value already selected in the output at the moment. To distinguished the actual value and the 2nd value selected, the LED over the key lits when 2nd value is displayed.

ACTIVATING THE 2ND VALUE



This key works in a sequential way. When pressed the output value changes to the 2nd value, when pressed again it will return to the 1st value.

When this key is pressed at the same time with the similar key in the phase section during (5) seconds the functions of both sections become synchronized. To cancel repeat this process.

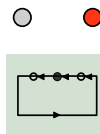
SELECTION OF THE OUTPUT ON/OFF.



When this key is pressed the output is on and the LED situated below will light up.

When pressed again it will disconnect this output and the LED will be off

SELECTING THE DIGIT TO BE USED

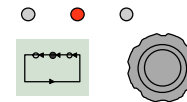


This key works in a sequential way and it is associated with 3 LEDs located above this press key. This allows the operator to select the output in a fine or course regulation, by changing the digit to be adjusted. The following resolutions can be obtained.

- o 1 digit
- o 10 digit
- o 100 digit

When pressing this key for more than 2 seconds, it will block the rotating pulse generator, not allowing any modifications to the level selected.

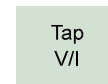
ROTATING CONTROL KNOB



This is a rotating pulse generator and has step by step sensation. The values can be increased or decreased by turning this control knob clockwise or anti-clockwise by one digit per step, according to the selected digits weight as described previously.

This knob does not have an end and can be controlled at any speed. However if the control knob is turned very fast the value will be changed at a rate of 1 digit per second.

OUTPUT RANGE AND OUTPUT TYPE SELECTION



This key has 2 function modes:

SELECTION OF THE OUTPUT TYPE: This key serves to select the output type desired, that is Voltage (V) or Current (I). When turning on the unit it will be in voltage output. To change this output to current you must press this key for more than 2 seconds. To change this output back to voltage repeat the process.

OUTPUT RANGE SELECTION : This key also serves to select the output range, in voltage and current. This key works in a sequential way each time it is pressed, it will change the output range. There are 3 ranges in voltage and 2 ranges in current. They are:

Voltage:

- 0 - 6.25V
- 0 - 150V
- 0 - 300V

Current:

- 0 - 8A
- 0 - 0.33^a

This key is associated with the 3 red LEDs with the ranges marked and the display in this section.

3.3.2. OPTICAL INDICATORS AND DISPLAYS.

REFERENCE SELECTION INDICATORS



Sync.

These are 4, 3mm LEDs which indicate the actual reference selected in the output (see 3.3.1.1.). There are two different function modes:

Permanent lit: It indicates that the Reference selected exists and it is suitable for a proper operation.

Intermittent lit: It indicates that the Reference selected does not exist or it is not suitable for the proper operation of the unit. In this case, if the Power Output is activated, the output values will be synchronized with the last valid reference that the unit had.

LED INDICATOR FOR THE 2nd VALUE SELECTION



This is a 3mm red LED which is situated over the corresponding key. When this LED is lit, it indicates that it is in the 2nd value selection mode and that this value is shown in the display.

This is associated with the key

LED INDICATOR WHEN THE 2nd VALUE IS ACTIVATED

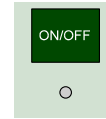


This is a 3mm red LED which is situated over its corresponding press key. It has 2 states:

Not lit: Indicates that the value in the output is the first value.

Lit: Indicates that the value has changed or in the second value

ON/OFF LED INDICATOR



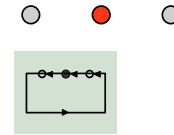
This is a 3mm red led which is situated below the corresponding press key. It has 2 states:

Not lit: Indicates that there is no output.

Lit: Indicates that the output is on.

This is associated with the press key ON/OFF. Also reflects the true output of the unit, as it may be controlled by alarm

SELECTION INDICATORS



These three, 3mm leds (red), indicate the digit set for regulation. Only one will be lit and it indicates the digit above it to be regulated.

These leds are associated with the press key

SELECTION DISPLAYS



The display is made up of 4 digits of 7 segments, red in color and 0.3 inches in height, which show the selected value, and the units of the

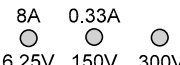
parameter selected. This is located to the right side of the display. There are 3 different parameters available:

- Voltage (V)
- Current (A)

In current and voltage, depending on the range selected, the decimal point will adjust automatically. The V and A indicators will light up automatically when selected

When the value in the display begins to flash, it indicates that the value selected and is not in the output.


OUTPUT RANGE SELECTION INDICATORS


 8A 0.33A
 6.25V 150V 300V

These 3, 3mm LEDs (red) are located below the output taps. These indicate the output range selected, in voltage and current.

These are selected by pressing the key TAP V/I

ALARM INDICATORS

Alarm

 Ov. Th.

There are two, 3mm LEDs (red) which indicate the status of the 2 alarms in the output of the PTE-100-V. They are as follows:

Ov!: This LED indicates an overload in the output, whether it be current or voltage. When it is lit, the output will cut off and the display will begin to flash during 5 seconds. During this time it is not possible to reset the unit.

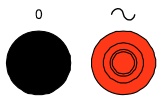
Th: This LED indicates an internal thermal overload, (temperature overload). When this alarm is on, the LED will light up, and the output will cut off. While this LED is on it is not possible to work with the unit and the operator must wait until the inside temperature lowers.



When the thermal alarm is lit, turn off the unit for at least 1/2 hour.

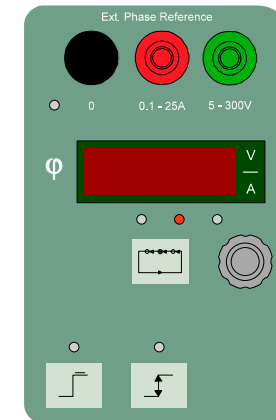
3.3.3. TAPS

OUTPUT TAPS



These taps are situated in the upper central part of the unit and consist of 2, 4mm female connectors. These are used for the voltage and current outputs. Supplied with the unit are 2 testing cables, which are used with these taps.

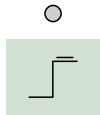
3.4. PHASE SELECTION



This is situated to the right of the unit and is perfectly identified. It contains all the control knobs, keys, and LEDs necessary for the operator to use the functions in this section.

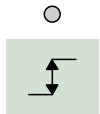
3.4.1. CONTROL KNOBS AND PRESS KEYS

SELECTING THE 2nd VALUE



When this key is pressed it allows the selection of a 2nd. value and it is shown in the display. This selection does not cancel the value already selected in the output at the moment. To distinguished the actual value and the 2nd value selected, the LED over the key lits when 2nd value is displayed.

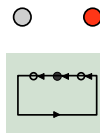
ACTIVATING THE 2nd VALUE



This key works in a sequential way. When pressed the output value changes to the 2nd value, when pressed again it will return to the 1st value.

When this key is pressed at the same time with the similar key in the power (voltage) section during (5), seconds the functions of both_sections become synchronized. To cancel this repeat the same process.

SELECTING THE DIGIT TO BE USED

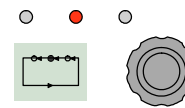


This key works in a sequential way and it is associated with 3 LEDs located above this press key. This allows the operator to select the output in a fine or course regulation, by changing the digit to be adjusted. The following resolutions can be obtained.

- 1 digit
- 10 digit
- 100 digit

When pressing this key for more than 2 seconds, it will block the rotating pulse generator, not allowing any modifications to the level selected.

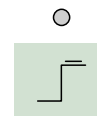
ROTATING CONTROL KNOB



This is a rotating pulse generator and has step by step sensation. The values can be increased or decreased by turning this control knob clockwise or anti-clockwise by one digit per step, according to the selected digits weight as described previously. This knob does not have an end and can be controlled at any speed. However if the control knob is turned very fast the value will be changed at a rate of 1 digit per second..

3.4.2. DISPLAY AND OPTICS INDICATORS (LEDS)

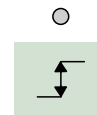
LED INDICATOR FOR THE 2nd VALUE SELECTION



This is a 3mm red LED which is situated over the corresponding key. When this LED is lit, it indicates that it is in the 2nd value selection mode and that this value is shown in the display.

This is associated with the key 

LED INDICATOR WHEN THE 2nd VALUE IS ACTIVATED

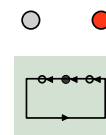


This is a 3mm red LED which is situated over its corresponding press key. It has 2 states:

Not lit: Indicates that the value in the output is the 1 St. value.

Lit: Indicates that the value in the output is the 2nd value.

SELECTION INDICATORS



These three, 3mm LEDs (red), indicate the digit set for regulation. Only one will be lit and it indicates the digit above it to be regulated.

These LEDs are associated with the press key



PHASE ANGLE SELECTION DISPLAYS

The display is made up of 4 digits of 7 segments, red in color and 0.3 inches in height, which show the selected value, and the units of the parameter selected. This is located to the right side of the display.

EXTERNAL REFERENCE LED INDICATOR



This is a 3mm LED (red) located below and to the left of the common tap 0 of the external reference input taps. When this LED is lit it indicates that the external reference is valid and you may work with it.

If this is not lit there is no connection in these taps or the reference is not valid.

3.4.3. TAPS

These are situated in the upper right hand side of the unit and consist of 3, 4 mm female connectors. These taps can withstand up to 25A.

These taps serve to receive an external reference to the unit in frequency and phase, in a way that the output given by the PTE-100-V refers to this reference. There can be two types of reference:

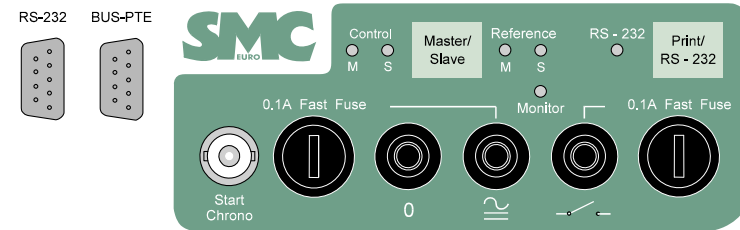
VOLTAGE: This is connected between the black tap (common) and the red tap (5-300V). This admits voltages from 5 to 300V and frequencies from 40 to 70 Hz.

CURRENT: This is connected between the black tap (common) and the green tap (0.1-25A). This admits currents from 0.1A to 25A and frequencies from 40 to 70 Hz.



Be careful not to connect any voltage source in the current taps, as there is a low impedance (shunt). It may provoke the destruction of the exterior voltage supply by short circuit.

3.5. GENERAL CONTROL SECTION

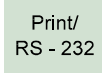


This section explains the general control of the unit and the controls, Leads, displays of the following functions:

- o MASTER/SLAVE Selection
- o Serial Port RS-232
- o Output control for the external timer
- o Monitor Signal Taps
- o Interconnection via BUS PTE

3.5.1. CONTROL KEYS

RS-232 serial port control

RS - 232  This press key controls the functions related to the serial port RS-232. It has a function mode for the following:

Print Mode: By pressing briefly this key will send to printer, connected to the RS-232, the display readings.

RS-232 Mode: By pressing this key for more than 2 seconds the serial port RS-232 remains active. This is indicated by the RS-232 LED.

MASTER/SLAVE CONTROL



When two or more PTE 100 V Equipments are interconnected through the PTE BUS, this key allows to use the system like if it were a single unit , in terms of reference and/or control. This function key allows the following status:

Short Press: Each time this key is pressed the function mode will change to one of the 3 following modes:

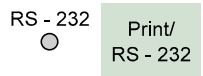
- o Independent
- o Master of Control
- o Slave of Control

Pressing for more than 2 seconds: Then, the 3 possible modes available, with regards to the Reference status, will change from one to the other in a sequential way. When the desired one is reached, releasing the key it will remain. The possible modes are as follows:

- o Independent
- o Master of Reference
- o Slave of Reference

3.5.2. OPTIC INDICATORS (LED)

RS-232 port indicator



This is a 3mm LED (red) situated close to the Print/RS-232 key and when lit indicates that the serial port RS-232 is active (open) and that it can give and receive information.

This is associated with the key PRINT/RS-232

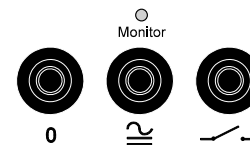
MASTER/SLAVE Indicators (BUS-PTE)



These are 4, 3mm LEDs of different colors. These are divided into 2 sections, CONTROL and REFERENCE. When none of the LEDs are lit it indicates that the unit is in independent mode. When one or any of these LEDs are lit it indicates that the unit is in the state of CONTROL and/or REFERENCE, whichever is lit. M stands for Master and S for Slave.

Please Note: In the case that there is no interconnection with any other instruments in the BUS-PTE, the LED indications are not valid and the equipment will remain in the independent mode.

MONITOR STATE INDICATOR (LED)



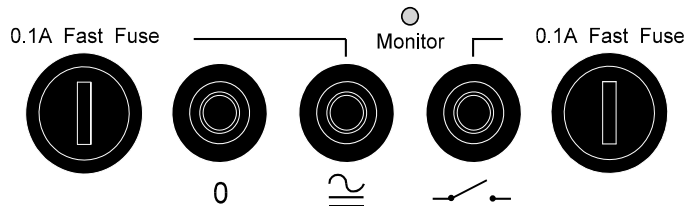
This 3mm red LED, when lit, indicates the monitor is active, if it is not lit the monitor is not active.

3.5.3. CONNECTORS AND FUSES

SIGNAL MONITOR INPUT TAPS

These taps are situated in the lower right hand part of the unit and consist of three, 4mm female connectors. These taps receive the input signals to the unit.

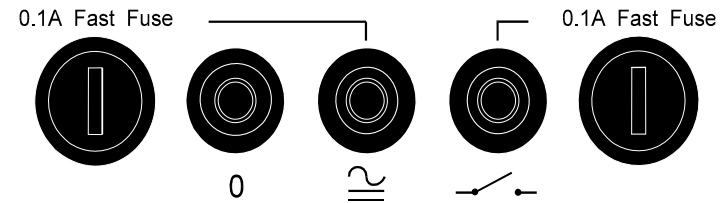
- Black tap (0.). This is the common tap.
- Red tap (\cong). Any DC or AC voltage between 5 and 250 V can be connected between the common tap (0) and this one. The presence of voltage will activate the monitor.
- Green tap . Between this tap and the common a “dry contact” can be connected. A close contact will activate the monitor



Both inputs are protected by Fuses, fast characteristic, 0.1A..



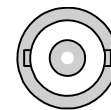
PLEASE NOTE: Never change a fuse characteristics for another, as it may cause damage to the unit.



The monitor signal fuses are situated to the left and to the right of the monitor taps. The fuse on the left protects the voltage input tap and the fuse on the right protects the free contact input tap. To remove the fuse, turn the cap anti-clockwise.

These are a fast fuses, 5x20mm, 0.1A.

AUXILIARY OUTPUT TO START AN EXTERNAL TIMER



Start Chrono

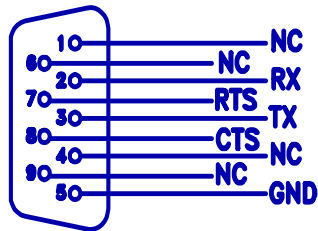
This is a BNC connector that delivers a “close contact” signal 20ms duration, with the main objective to start an external timer. This output will activate each time one of the following occurs:

- When the ON/OFF key of the unit is pressed activating or deactivating the power output
- When the step key is pressed in Voltage and /or phase.
- When, during a frequency ramp, the frequency value reach the one that was selected to start the external timer, in the Ramp Setting process.
- Becomes active when the monitor input is activated or deactivated.

RS-232 CONNECTOR

This communication connector Serial Port RS-232 is a CANON connector of 9 pins, situated in the upper left part of the unit.

The pin out is as follows:



RS-232

NC	Not connected
GND	Earth ground
RX	Input DATA
TX	Transmission DATA
RTS	Output - Send
CTS	Input - Ready to receive

The unit is supplied with a connecting cable ready to connect directly to this output, to any type of computer or printer.

4. FUNCTIONS USE AND DESCRIPTION

Throughout this section of the manual a detailed description of the use and procedures for the PTE-100-V will be given. This unit has been designed to be used as an instrument to test voltage, frequency and synchronizing relays, and, combined with any current injection set, can be used to shift the phase angles, and as another current source for differential relays testing. All the functions that are incorporated in this unit were designed to easily test the relays previously mentioned. This is achieved as all functions are located on the front panel in a MANUAL mode, which before required test units that were programmable by an external computer .

Furthermore, the PTE-100-V, and thanks to the BUS-PTE, can be easily interconnected to other 100 V and even to another units in the PTE Range, making the specific functions for relay testing, much more simple and effective.

4.1. FREQUENCY SECTION

This section describes the functions of the internal frequency generator incorporated in the PTE-100-V. It is obvious that this is combined with the power output to be effective. Furthermore, when used in ΔF (slip frequency) mode, the external reference input must be used.

4.1.1. INITIAL STATUS

When the unit is turned on the frequency generator has the following values and readings:

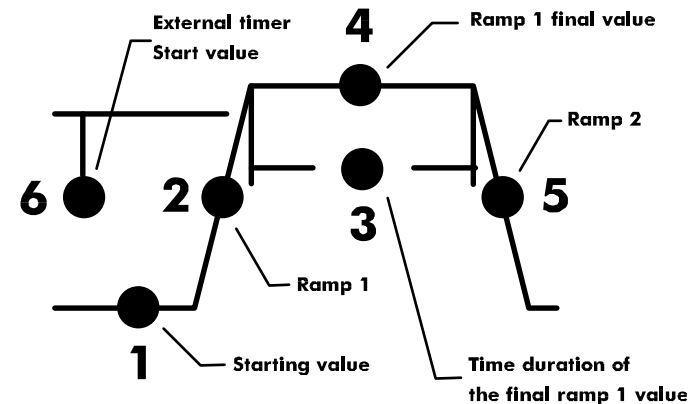
1. Initial Frequency : This is 50.00 or 60.00 Hz. It depends on the frequency ordered when the unit was purchased.
2. Function Mode: Enters in the normal frequency mode (F).
3. Reference of the unit: It will synchronize the voltage output to the internal frequency generator (freq). In summary, if a voltage or current value is selected, this will be in the output with the frequency at 50 or 60 Hz, as the frequency display indicates. If you turn the rotating knob, this frequency value will change, and the output frequency is instantaneously actualized to the actual display value.

4.1.2. FUNCTION MODE SELECTION

The Internal Frequency Generator (I.F.G.) has 2 function modes: Normal frequency and the Differential frequency. To select one or the other use the press key MODE which will indicate the state by the LED indicators located below F or ΔF . The following explains these frequency modes.

1. NORMAL FREQUENCY MODE (F). In this mode the I.F.G. acts as an absolute frequency generator, that is, the values indicated in the display are the actual frequency output in Hz. The active range is 40 to 210Hz. It is capable to be programmed with different parameters in a way that it can automatically perform different frequency ramps, or steps.
2. SLIP FREQUENCY MODE (ΔF). In this mode the I.F.G. acts as a differential frequency generator. The output frequency will be the one that is applied to the External Reference input plus/minus the difference selected in the frequency display. This is, "SLIP" the output frequency against the reference frequency. This mode cannot be used without an external reference. It allows to select differences between ± 0.001 Hz up to ± 10.00 Hz.

4.1.3. DYNAMIC TESTS - SELECTING FREQUENCY RAMP



The process to select a frequency ramp is as follows:

1. Select Normal Frequency Mode (F), if not in this mode before. Press the key SET, the LED indicator 1, (starting value), must be already light up. Select in the display the frequency value desired as the ramp Initial value. Selection can be made between 40 and 210Hz.
2. Press the key SET, the LED indicator 2, (slope 1), will light up and the display will change to the units Hz/s. Selection is made by the rotating knob and the slope of the 1st ramp can be set in Hz per second. This selection is from 0.01Hz up to 10Hz/s. If 0 is selected the slope will be infinite, which means there is no ramp and the change is instantaneous to the second value, when ordered.
3. Press the key SET, the LED indicator 3, (time duration of the Final value of the 1st ramp), will light up and the display will change to the units seconds (S). Selection is made by the rotating knob and it is the time, in seconds, in which remains the final value of the 1st ramp and it is the time before the second ramp begins. (ramp 2). This selection is from 0.001s up to 10s. If 0 is selected, the Final value remains until a manual order is given.

4. Press the key SET , the LED indicator 4, (final value of the first ramp), will light up and the display will change to the units Hz. Selection is made by the rotating knob and is in Hz, and the value selected is the final value of the 1st ramp. This selection is from 40Hz up to 210Hz.
5. Press the key SET , the LED indicator 5, (2nd slope), will light up and the display will change the units to Hz/s. Selection is made by the rotating knob and it defines the slope of the 2nd ramp. This selection is from 0.01Hz/s up to 10Hz/s. If 0 is selected indicates that there is no slope and the change produced is instantaneous, when ordered.
6. In case of the ramp 2, the initial value is the same as the final of the first ramp, and the final value will be the initial value of the 1st ramp.
7. Press the key SET , the LED indicator 6, (value to start the timer), will light up and the display will change its units to Hz. Selection is made by the rotating knob, and the value is in Hz, when the ramp passes for this value will send a signal pulse to START TIMER. The values selected can be from 40 to 210Hz.
8. Press the key SET , the LED indicator 1 (initial value to start the ramp) will light up and the display will show the frequency value previously selected.

The ramp is now defined and ready to start. If the operator wishes to change any parameters or simply revise the settings made, the cycle may be repeated always stopping at the LED indicator 1. If any other of the LEDs are lit or it is in any other position, the ramp will not start.

IMPORTANT: *When the unit is generating a frequency and the operator wishes to select a ramp, this frequency will not change during the selection process, although it is not indicated in the display.*

4.1.4. START THE SELECTED RAMP. DYNAMIC CHANGE



To start the selected ramp, the key should be pressed once and the ramp will follow the procedure previously programmed. The LED indicators will begin to flash slowly indicating where the ramp is at each stage.

Concerning the LED indicator 6(start value of the timer), when the frequency value reaches the selected value, this LED will light up for only 1 second, indicating that the signal has been sent to start the timer.

4.1.5. DYNAMIC CHANGE, STEP TO A 2ND VALUE



When only a step to a second value is desired without a ramp, a second value step can be achieved by pressing key for 2 seconds. Repeating this process the step can be made to the first value.

4.1.6. TTL AUXILIARY OUTPUT. APPLICATIONS AND CHARACTERISTICS

The auxiliary output "Freq. Out" generates a square wave output signal TTL (5V) which corresponds to the frequency and phase value, of the voltage output. (whether it is synchronized to Line,Freq,Ext,Bus) This output allows to use the PTE-100-V as a highly accurate frequency reference for other units (such as our COMPATEST 1000) and to synchronize the PTE-100-V outputs to any other instrument like an Oscilloscope, for example.

4.2. POWER OUTPUT SECTION

This section describes the correct use of the PTE-100-V power outputs. The output can be in voltage mode up to 300V or in current mode up to 8A. As well, described in this section are the four possible references available, and how to select them.

4.2.1. INITIAL STATUS

When the unit is turned ON the following values and selections appears:

1. Voltage Value: 000.0V
2. Range selected: 300V
3. Output Status: OFF
4. Reference: Freq.

5. Output Mode: Voltage

4.2.2. SELECTING THE OUTPUT (V/I)

As mentioned before the PTE-100-V can be used as a voltage or current source. When the unit is turned on the unit will be in the voltage mode. The current output is achieved in the following manner:

- Press the key TAP V/I for about, 5 seconds. The display will change the units to A (Amps) and the output range will automatically change to 0.33A (150V). The values selected from here on will be in Amps.
- To return to the voltage mode press the same key again for 2 seconds.



This mode cannot be changed when the output is ON.

4.2.3. SELECTION OF THE OUTPUT RANGE

The following output ranges can be obtained:

- o Voltage Mode: 300/150/6.25V
- o Current Mode: 0.33A/8A

To select any of these ranges press the key TAP V/I. The display will automatically change. In the case where the selected value is greater than the range selected, the value will go to the maximum available in the selected range.

The active range is that which has its corresponding LED lit.

4.2.4. SELECTION OF THE REFERENCE SOURCE

When the unit is turned on, it will synchronize with its own internal signal produced by the I.F.G., which is indicated by the LED (Freq). Changing this reference is explained as follows:

1. Press the key SYNC. The unit will pass to the reference BUS-PTE, which is indicated by the corresponding LED marked BUS. This implies that the reference is the BUS-PTE, with any other unit of the PTE Range. If the units are not interconnected (BUS-PTE is not connected) the LED indicator will flash slowly indicating that there is no reference. If there is no reference in the BUS and the output is turned on, the unit will synchronize automatically to the last valid reference.
2. Press the key SYNC. The unit will pass to the LINE reference, which is indicated by the corresponding LED marked LINE. This implies that the reference is the main voltage supply.
3. Press the key SYNC. The unit will pass to the External reference, which is indicated by the corresponding LED marked EXT. This implies that the reference is now the signal connected to the External Phase Reference Input, introduced in the taps "Ext. Phase Reference". If there is no signal in these taps the LED EXT, will flash slowly indicating that there is no reference or that it is not suitable.
4. If there is no reference and the output is turned ON, it will synchronize to the LINE reference, which is the reference prior to this reference in the cycle. If for some reason there is an external reference and this reference disappears, the unit will synchronize to the last valid reference that was.
5. Press the key SYNC. The unit will pass to the internal frequency reference, which is indicated by its corresponding LED and marked Freq.. This is the start of the cycle.



Reference changes cannot be made when the output is ON.

4.2.5. SELECTION AND REGULATION OF THE OUTPUT VALUES



This is achieved by turning the rotating knob and the digit selector key

The actual value selected is shown on the display, whether the output is ON or OFF. The selected value shown in the display remains the same when the output is ON. If the value selected is higher than allowed in the range chosen, the rotating knobs continue to turn, but the value cannot be increased.

The unit does not feedback values less than 3% of the end of the range selected. In this case the phase and the magnitude values cannot be guaranteed. The following table clarifies this:

Range selected	3% of range not feedback	feedback
300V	0-9V	9-300V
150V	0-4.5V	4.5-150V
6.25V	0-0.187V	0.187-6.25V
0.33A	0-0.01A	0.01-0.33A
8A	0-0.24A	0.24-8A

4.2.6. OUTPUT CONTROL /ON/OFF AND ALARMS

The power output status is controlled by the press key ON/OFF, and is active when the corresponding LED is lit. To turn off this output simply press the key again.

This output is protected by 2 types of electronic protection, which are indicated by the corresponding LEDs marked, OVERLOAD (OVL) and/or THERMAL (TH).

When either of these are active (lit), the power output is immediately cut off and the LED ON/OFF will turn off.

When the overload alarm is lit, it is due to an overload of the maximum power values allowed in the output. In some cases it may be due to fast transitories that the unit can not feedback properly, such as a sudden step from a very low output value to another one very high. To start again, simply press the output key ON, to activate the output. If the cause of this overload has been rectified the unit will function as normal, if the overload has not been rectified the unit will turn off again.

When the thermal alarm is lit, it is because the inside temperature has reached the allowable limit. When this occurs turn off the unit. When this alarm LED is lit, the unit cannot be used, and there will be no output. When the unit has cooled down to a lower temperature the LED will go off and the unit can be used.

4.2.7. DYNAMIC TESTS: STEP TO A 2ND VALUE

The PTE-100-V allows the operator to make dynamic tests, by allowing jumps (Steps) from one value to another, whether it be from higher to lower or vice versa. This is very useful, for example, when making tests of minimum voltage relay test. This is achieved as follows:



Press the key. In the display will appear the reading "0000" or the 2nd value previously recorded. Select by mean of the rotating knobs the desired value to acts as 2nd value.



Press again the key. The display will show the actual value that is the 1st value.




Press the key. This will produce instantaneously the step from the actual value to the 2nd. value selected. At the same time there is a signal sent to the "START CHRONO" output, to start an external timer if desired. Furthermore, the LED situated above this press key indicates that the 2nd value is in the output.



When the unit is in this situation the displayed values cannot be changed even if the rotating knobs are turned.



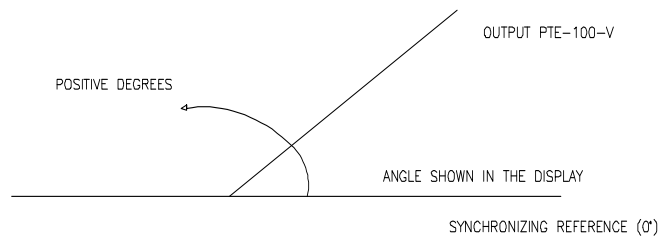
When the key is pressed again, the step will be the opposite, that is from the 2nd value to the 1st. At the same time, there is a signal sent to "START CHRONO" output. The LED will go off indicating it is at the first value.

NOTE: By pressing the key  for the 2nd value selection and having the output ON. The effect in this case even though the display marks a different value the output remains the first value.

4.3. PHASE ANGLE SELECTION

In this section describes in detail the use of the Phase Shifter incorporated in the PTE-100-V as well as the External Phase and frequency reference.

The display in this section is indicated in hexadecimal degrees (0-359.9) between the output and the reference choose (Freq. Ext, Line, Bus) in a ANTI-CLOCKWISE sense as follows:



4.3.1. INITIAL STATUS

When the unit is turned on, the phase angle display shown the following value:


1. Value: 000.

As explained before, it means that the Power Output is exactly at Zero degrees, so, in phase, with the selected Reference. For example, if your reference is LINE, the output coincides, in phase angle, with the phase of the main supply that is already supplying the unit.

4.3.2. DYNAMIC TESTS: STEP TO A 2ND VALUE

The PTE-100-V allows the operator to make dynamic tests, by allowing jumps (Steps) from one value to another, whether it be from higher to lower or vice versa. This is very useful, for example, when making tests of out-of-step generator protective relay test. This is achieved as follows:




Press the key . In the display will appear the reading "0000" or the 2nd value previously recorded. Select by mean of the rotating knobs the desired value to acts as 2nd value.



Press again the key . The display will show the actual value that is the 1st value.




Press the key . This will produce instantaneously the step from the actual value to the 2nd. value selected. At the same time there is a signal sent to the "START CHRONO" output, to start an external timer if desired. Furthermore, the LED situated above this press key indicates that the 2nd value is in the output.

NOTE: When the unit is in this situation the displayed values cannot be changed even if the rotating knobs are turned.



When the key is pressed again, the step will be the opposite, that is from the 2nd value to the 1st. At the same time, there is a signal sent to "START CHRONO" output. The LED will go off indicating it is at the first value.

NOTE: By pressing the key  for the 2nd value selection and having the output ON. The effect in this case even though the display marks a different value the output remains the first value.

4.3.3. USE OF THE EXTERNAL REFERENCE INPUTS

The external reference input admits 2 types of signal; Current from 0.1A up to 25A or Voltage from 5V up to 300V, with frequencies between 40 and 70 Hz. This input is very useful as it allows the unit to work in a differential mode against the signal inputs. Because of the wide range of input values in both voltage and current, it is capable to work with various types of supply generators for a signal reference.

The Current input should be connected to the black tap marked "0" and the green tap marked 0.1 -25A. The voltage input should be connected to the black tap marked "0" and the red tap marked 5-300V.



PLEASE NOTE: The current input has a low impedance SHUNT detector. NEVER connect a voltage signal to this tap as it is equivalent to short-circuit. It can cause serious damage to the external voltage supply if it is not protected .

When the reference connected is "valid", the LED indicator situated to the left of the tap "0", will light up in the following cases:

- o When the reference is set in EXT.
- o When the reference is set to Internal Frequency (Freq) in the mode ΔF (Differential Frequency).

4.4. GENERAL CONTROL SECTION

The General Control Section is intended to acts as an interface between the unit and all the external equipment, relay under test, etc. that may be used in the normal testing. There are two main functions:

THE SIGNAL MONITOR: Connected to the relays output, informs to the unit about the status of the relay (Trip, Not trip)

THE MASTER/SLAVE CONTROL: The PTE 100 V can be interconnected through the PTE BUS with another 100 V units, and, of course, with any other unit of the PTE Range (30 CH, 100 C, 300 V, 50 CET, etc.). In the first case, the interconnection of three 100 V's allows to have a full three phase system, even in controls (Three phase regulation). This is the reason why the Master/Slave Control exists, giving to the PTE SYSTEM the maximum of flexibility and versatility available, to fill all the possible applications in the relay testing.

4.4.1. SIGNAL MONITOR

It is designed to receive the signals from the relay being tested and the status is shown in the LED indicator marked "Monitor"

The signal monitor are active (LED Monitor lits) in the following conditions:

- o When there is a voltage between the common tap (black) and the voltage tap (red).

This voltage can be between 5 to 250V in ac or dc. This input tap is protected by a fuse clearly marked on the front panel.

- o When there is a closed, free of voltage, contact between the common tap (black) and the contact tap (green). this input tap is protected by a fuse clearly marked on the front panel.

In both of these conditions, a red LED marked "monitor" will light up.



Be sure that, when connecting a signal to the green tap, it is voltage free. If not, the protection fuse will break immediately.

4.4.2. USE OF THE MASTER/SLAVE PRESS KEY

The press key MASTER/SLAVE is used to select the STATUS of the unit, in terms of REFERENCE and/or CONTROL when it is connected with other equipment of the same model or other models in the PTE Range. In the PTE-100-V, 3 working modes related to both modes can be selected. They are:

INDEPENDENT This is the normal mode used when the unit is working independently by itself. None of the LED's will be lit.. When turning ON the unit it will be in independent mode.

MASTER/SLAVE OF CONTROLS: This is exactly what the names implies; the unit will either be working as the Master or as the Slave, with regards to the command controls. In case that a unit is the MASTER means that all the values selected in frequency, voltage, or phase will be set automatically, and at the same time, in the units which are in SLAVE mode. When a unit is in the SLAVE mode the controls can be used as normal, and, furthermore, when there is a change in the MASTER this change is produced in the SLAVE unit from the value that is already selected in the SLAVE.

The selection of these modes are as follows:

- Press the key MASTER/SLAVE , the LED indicator to the left (M) will light up, indicating the unit is now selected as the **Master of Controls** in the system.
- By pressing this key again the unit will change to be in the **Slave of Controls** mode and the corresponding LED marked (S) will light up.
- When pressing this key again the unit will return to the independent mode and none of the LEDs will be lit.

MASTER/SLAVE OF REFERENCES: As the name implies the unit will act as a MASTER or SLAVE of reference.

When a unit is a **MASTER** the selected reference in the **MASTER** unit (Freq, EXT, LINE, BUS) acts as the reference to all the units connected to the BUS-PTE, if the other units are in the SLAVE mode.

When a unit is in the **SLAVE REFERENCE** mode, the reference will come from the unit which is in the **MASTER REFERENCE** mode. The reference source, in the **SLAVES** units, is automatically selected to the BUS.

The selection of these modes are as follows:

- Press the key **MASTER/SLAVE** for more than 2 seconds, the LED indicator on the right marked (M) will light up for 1 second, after the LED indicator on the left marked (S) will light up for 1second, and then both LED's will be off. If remains pressing the key the selection cycle starts again. To select one of the three modes, just release the key when the desired is selected.

The sequence allows the following modes:

- (M) LED indicator lits: The unit is the MASTER OF REFERENCES
- (S) LED indicator lits: The unit is in SLAVE OF REFERENCE mode.
- NO LED's are lit: The unit is in INDEPENDENT Mode

4.5. COMMUNICATIONS IN THE BUS-PTE

4.5.1. EVENTS IN THE BUS-PTE

The PTE Range equipment has been designed in such a way that the test equipment can be interconnected via the BUS-PTE connector, thus forming a stronger system when testing. The equipment not only can receive commands by software, but can also send information about its own status through determined signals, called EVENTS. Activation and deactivation of the Signal Monitor, Output On or Off, a step to 2nd. value in amplitude and/or Phase, etc., are some examples of these mentioned EVENTS.

These events can be positive or negative. The positive are as follows:

- Monitor active in a PTE equipment
- Output active in a PTE equipment
- A output value step to a second level, higher in value than the first one.
- Phase angle step to a second level, higher in value than the first one.
- Etc.

The negative signals are as follows:

- Monitor becomes non active
- Equipment output is cut off
- Step to a minor level

In any case, the documentation/instruction manuals supplied with each PTE equipment, gives information about the particular events transmitted to the BUS-PTE by the particular unit.

4.5.2. EVENTS TRANSMITTED BY A PTE-100-V

A PTE-100-V sends to the BUS-PTE the following events:

Positive events:

- Output ON.
- Step to a 2nd. value (voltage/current) higher than the actual.
- Step to a 2nd. value (Phase Angle) higher than the actual
- Signal Monitor Active.
- Positive transition of the frequency in the "start external timer" output (see 4.2.1.2).

Negative events:

- Output OFF.
- Step to a 2nd. value (voltage/current) lower than the actual.
- Step to a 2nd. value (Phase Angle) lower than the actual
- Signal Monitor not Active.
- Negative transition of the frequency in the "start external timer" output (see 4.2.1.2).

4.6. SPECIAL FUNCTIONS

The PTE-100-V incorporates a self-check function that is active every times the unit is turned ON. If a failure is detected in one or more of the controlled parameters, a message appears in the Displays in the following manner:

Stat ABCD EFGH								
	A	B	C	D	E	F	G	H
0	Always 0	No error	No error	No error	No error	No error	No error	No error
1		LINE failure	RadF temp.	---	+12VA high	+5V high	+12V high	+28V high
2		6'25 fuse	Int temp.	PI/CIk failure	+12VA low	+5V low	+12V high	+28V high
3		1+2	OVL	---	+12VA null	+5V null	+12V low	+28V low
4		150 fuse	1+4	Trf temp.	---	No error	+12V null	+28V null
5		1+4	2+4	---	-12VA high	+5V high	-12V high	-28V high
6		1+2+4	1+2+4	2+4	---	1+4	1+4	1+4
7		300 fuse	OVL	RadA temp.	2+4	+5V low	2+4	2+4
8		1+8	1+8	---	3+4	+5V null	3+4	3+4
9		2+8	1+2+8	2+8	---	-12VA low	-12V low	-28V low
A		1+2+8	4+8	---	1+8	No error	1+8	1+8
B		4+8	1+4+8	4+8	2+8	+5V high	2+8	2+8
C		1+4+8	2+4+8	---	3+8	+5V low	3+8	3+8
D		2+4+8	1+2+4+8	2+4+8	---	-12VA null	-12V null	-28V null
E		1+2+4+8	8	---	1+C	+5V null	1+C	1+C
F					2+C	No error	2+C	2+C
					3+C	+5V high	3+C	3+C
						+5V low		
						+5V null		

Notes:

- : This code will never be shown.
- xxx: Basic error code.
- 1+2: This code must be interpreted as the occurrence of basic errors 1 and 2 simultaneously

Furthermore, the output fuses status can be checked, identifying the faulty one, if exists, by the bits FUS.XXX. To perform this checking, proceed as follows:

Press, at the same time, during more than two seconds, the press keys "Step to a 2nd. value" and the "Selection of the digit to be regulated". If there is any fuse failure, the corresponding error message will appears in the Displays. If not, nothing will appears, and the operator can follows with the normal operation.



VERY IMPORTANT: Any load connected to the unit should be disconnected from the taps before using this function

5. SPECIFICATIONS

5.1. OUTPUTS

FREQUENCY:

- Control: Multiturning control (20 steps per turn).
- Range: 40-210 Hz.
- Resolution: Selectable: 0.01-0.1-1 Hz.
- Accuracy: ± 0.003 Hz.
- Ramp inc.: Depends on the speed of ramp.
- Ramp speed: 0.001 - 10 Hz/s.
- Reading: 4 digits (Selection).

PHASE:

- Control: Multiturning control (20 steps per turn).
- Range: 0-359.9°.
- Resolution: Selectable: 0.1-1-10°.
- Maximum error: $\pm 0.5^\circ$.
- Reading: 4 digits (Selection).

PRODUCER:

- Control: Multiturning control (20 steps per turn).
- Voltage: 0-300V
- 3 Ranges: 0-6.25-150-300V.
- Resolution: Selectable: 0.1-1-10V.

CURRENT:

- 2 Ranges: 0-0.33, 0-8A.
- Resolution: Selectable: 1-10-100mA.
- Power: 50 VA permanent, 100VA during 1 minute.
- Reading: 4 digits (Selection/Measurement).

- Measurement accuracy: $< 1\%$.
- Synchronization: Line/Frequency/Exterior/Bus/Bus-Line.

VOLTAGE SUPPLY:

- 220V $\pm 10\%$ (Standard Version) 50Hz-60Hz.
- 240V $\pm 10\%$ (Upon request) 50Hz-60Hz.
- 115V $\pm 10\%$ (Upon request) 60 Hz.

5.2. DIMENSIONS AND WEIGHT

- 300x200x200 mm
- 13,5 Kg.

6. FUSES REPLACING INSTRUCTIONS

The absence of outputs in the equipment, or if the equipment does not work properly, it is usually due to an internal protection fuse which is broken.

These instructions describe the steps that you can follow for replacing the internal protection fuses of the equipment.

When replacing the fuses it is necessary to open the equipment, by removing the front panel to have access to the fuses.

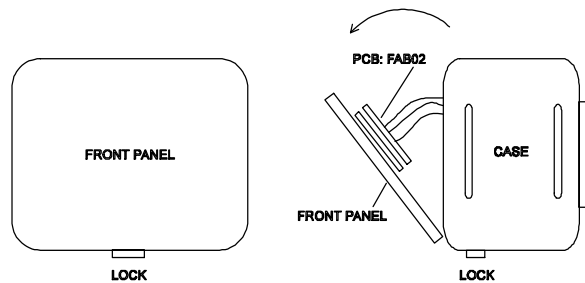
There are two drawings to explain where the positions of these fuses are, inside the equipment.

Necessary materials.

- 3mm ALLEN key

6.1. INSTRUCTIONS FOR REMOVING THE FRONT PANEL (OPENING THE EQUIPMENT).

- Remove the four ALLEN screws of the front panel.
- Turn the equipment with the lock side down (see drawing).
- Extract the front panel by pulling it slowly.



It is better to place a protection material (packing plastic, for example) between the case and the front panel on the lower/bottom side. This is to not damage the front panel with the case.

This position is more comfortable when working with the equipment.

Situated on the top part inside the case is the MGI. The PCB FAB02 is the first PCB that you can see in the rear part of the front panel, under the cardboard.

6.2. REPLACING FUSES

The equipment has internal protection fuses in three sections: in the Intelligent Generator Module (IGM), in the P.C.B FAB02 and in the 110 a.c. Voltage Auxiliary Output (Drawing 1 and 2).

110 a.c. Voltage Auxiliary Output Fuse.

FS0.- Placed at the top of the smallest toroidal transformer which is placed inside the equipment at the bottom left corner.

Fuse 0: 0.4A Standard.

MGI Fuses.

There are five fuses in this module. See drawing 2.

The fuses 1, 2 and 3 protect the voltage ranges of the equipment (Voltage to Current convertible ranges). These ranges are: 6,25V (8A in current mode), 150V (0,33A in current mode), 300V (0,15A in current mode).

- Fuse 1: 0,63A fast (150V Voltage Range)
- Fuse 2: 0,4A standard (300V Voltage Range)
- Fuse 3: 12A fast (6,25V Voltage Range)

The fuses 4 and 5 protect the internal power supply.

- Fuse 4: 6,3A fast
- Fuse 5: 6,3A fast

P.C.B FAB02 Fuses.

There are three fuses in this P.C.B. See drawing 1.

The fuses 6 and 7 protect the External Phase Reference inputs.

- o Fuse 6: 100mA fast
- o Fuse 7: 2A fast

The fuse 8 protect the output Start Chrono.

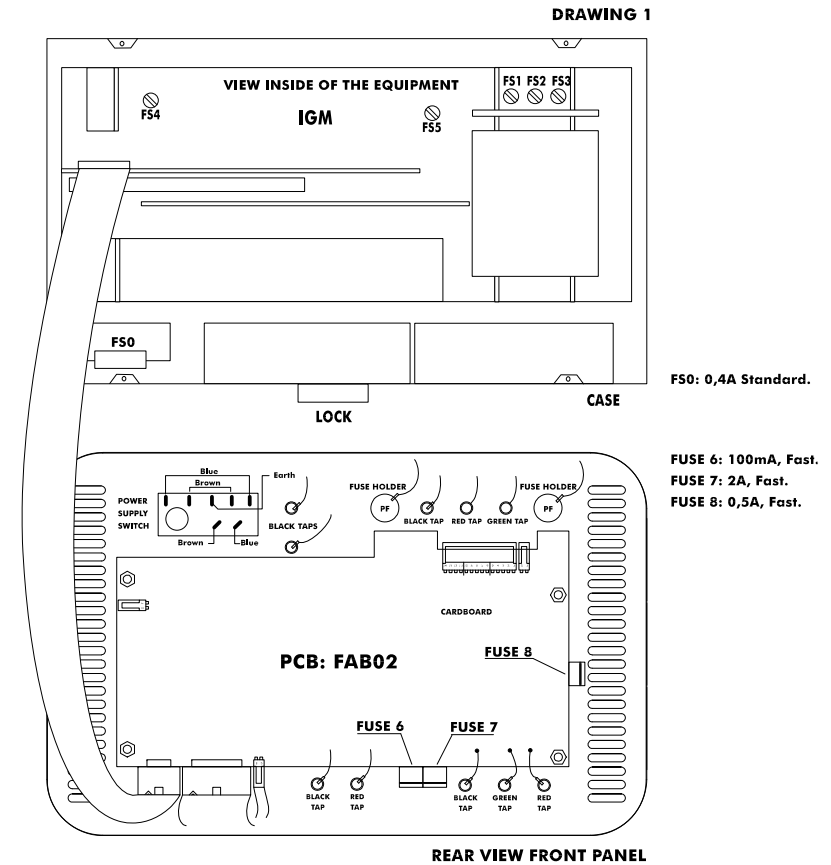
- o Fuse 8: 0,5A fast



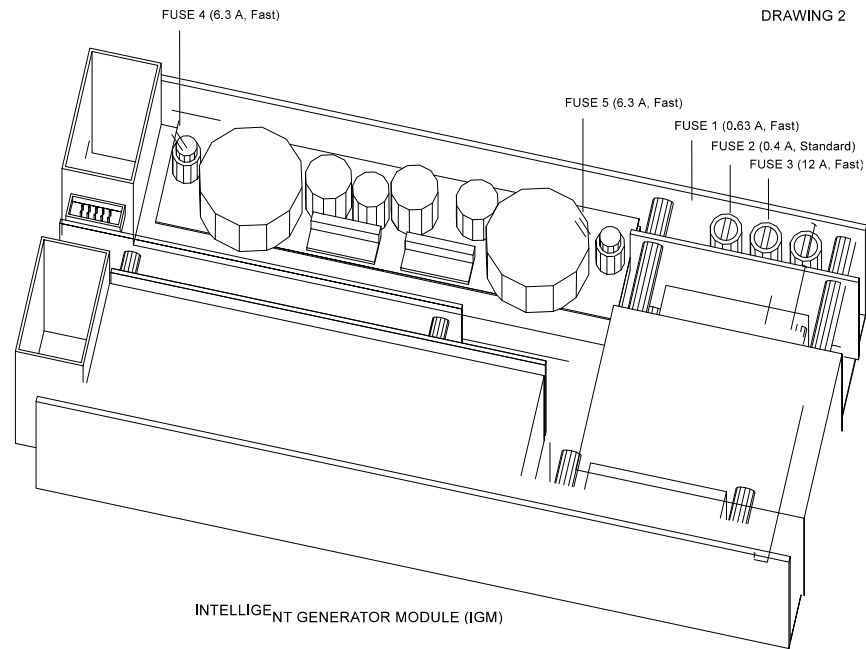
Always replace the damage fuses by others with the same characteristics.

When the fuses have been check and/or changed the equipment can be closed to work again.

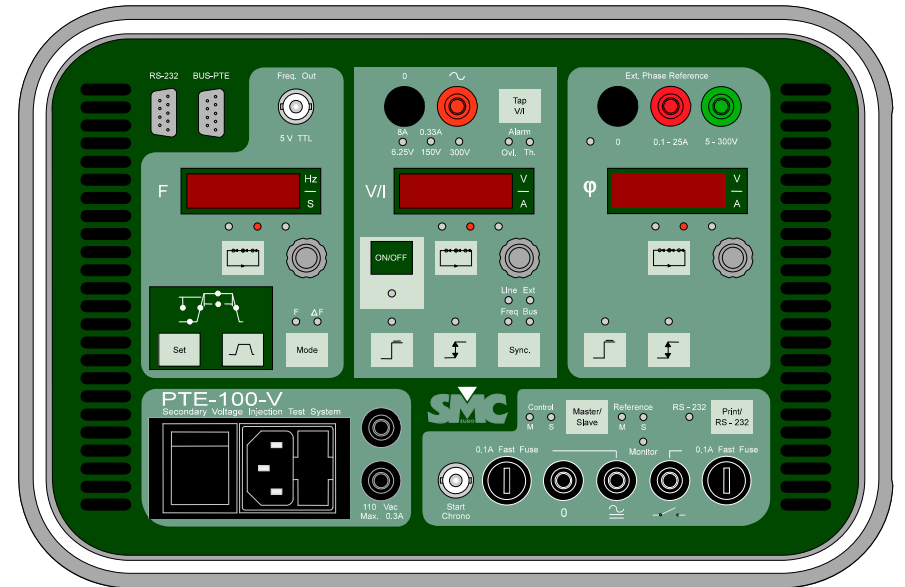
Drawing 1.- General View (Fuses, PCB FAB02, IGM).



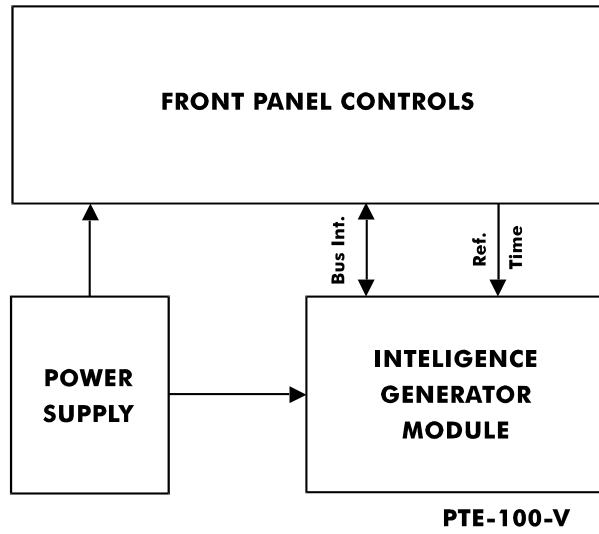
Drawing 2.- View of the IGM (Intelligent Generator Module)



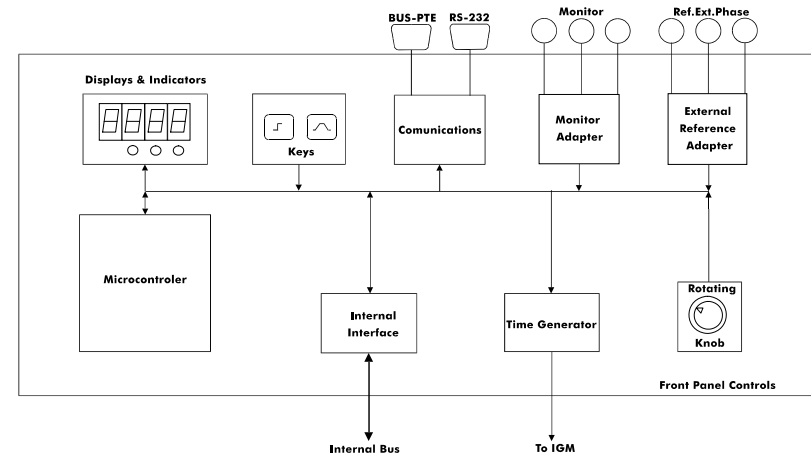
ANNEX 1: FRONT PANEL



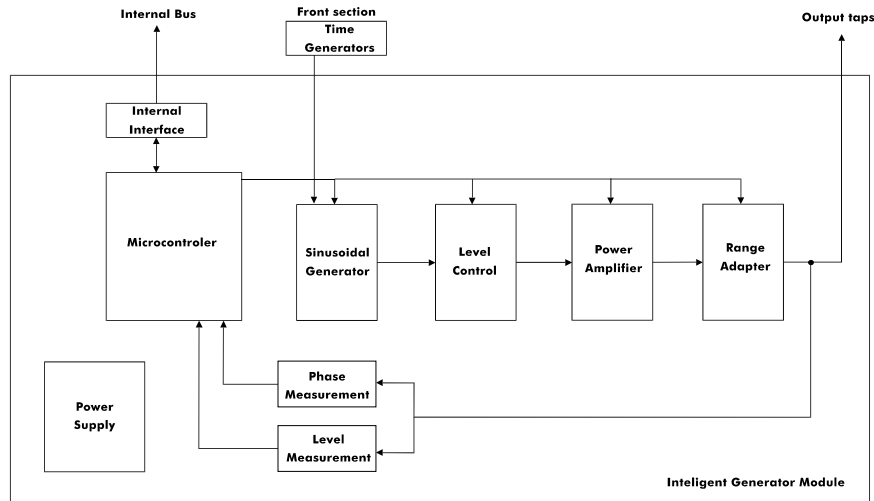
ANNEX 2: SECTIONS



ANNEX 3: FRONT PANEL CONTROLS



ANNEX 4: INTELLIGENT GENERATOR MODULE (MGI)



7. AFTER SALES SERVICE AND WARRANTY

7.1. WARRANTY

This is an expression of trust that our products obtain, based on the reliability and functionality standards that our customers expect.

The warranty covers the free replacement or repair of defective components for one year in the terms specified in the supplied warranty statement and registration card.

Damages resulting from improper handling of the product, use outside the scope and limits of the product's specifications, negligence, installation not in accordance with the standards or warnings listed in the Instructions Manual and servicing or manipulation by unauthorized persons are not covered by the warranty.

7.2. CUSTOMER SUPPORT

EUROSMC guarantees the supply of materials and components for its products up to 3 years after discontinuation. This support is extendable to 5 years for technical service.

7.3. OTHER EUROSMC PRODUCTS

Portable Relay Test Equipment and Software

Primary injection units up to 20,000 A

Digital handheld chronometer.

Digital handheld phase angle meter

Digital Portable microhmeter up to 100 A Test current.

Test systems for automatic miniature circuit breakers.

Voltage and current regulation equipment.

Step & Touch Voltage measurement equipment