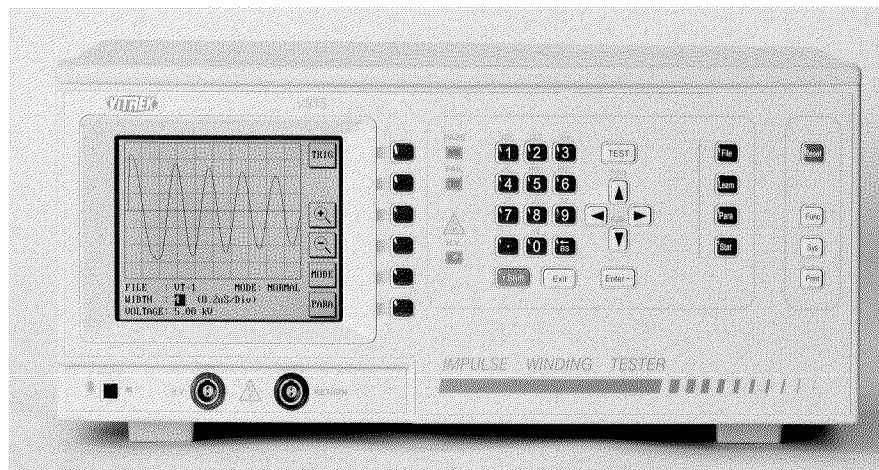




IMPULSE WINDING TESTER V815

User Manual



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Safety

1. SAFETY

1.1 General

This equipment has been designed to meet the requirements of EN61010-1 'Safety requirements for electrical equipment for measurement, control & laboratory use' and has left the factory in a safe condition.

The following definitions in EN61010-1 are applicable:

OPERATOR Person operating equipment for its intended purpose.
Note: The OPERATOR should have received training appropriate for this purpose.

RESPONSIBLE BODY Individual or group responsible for the use and maintenance of equipment and for ensuring that operators are adequately trained.

The RESPONSIBLE BODY must ensure that this equipment is only used in the manner specified. If it is not used in such a manner, the protection provided by the equipment may be impaired.

This product is not intended for use in atmospheres which are explosive, corrosive or adversely polluted (e.g. containing conductive or excessive dust). It is not intended for use in safety critical or medical applications.

The equipment can cause hazards if not used in accordance with these instructions. Read them carefully and follow them in all respects.

Do not use the equipment if it is damaged. In such circumstances the equipment must be made inoperative and secured against any unintentional operation.

1.2 AC Power Supply

Power cable and connector requirements vary between countries. Always use a cable that conforms to local regulations, terminated in an IEC320 connector at the instrument end.

If it is necessary to fit a suitable AC power plug to the power cable, the user must observe the following color codes:

WIRE	EUROPEAN	N. AMERICAN
LIVE	BROWN	BLACK
NEUTRAL	BLUE	WHITE
GROUND	GREEN/YELLOW	GREEN

The user must also ensure that the protective ground lead would be the last to break should the cable be subject to excessive strain.

If the plug is fused, a 3-amp fuse should be fitted.

If the power cable electrical connection to the AC power plug is through screw terminals then, to ensure reliable connections, any solder tinning of the cable wires must be removed before fitting the plug.

Before switching on the equipment, ensure that it is set to the voltage of the local AC power supply.

WARNING!

Any interruption of the protective ground conductor inside or outside the equipment or disconnection of the protective ground terminal is likely to make the equipment dangerous. Intentional interruption is prohibited.

1.3 Adjustment, Maintenance and Repair

WARNING!

The equipment **must** be disconnected from all voltage sources before it is opened for any adjustment, replacement, maintenance, or repair.

When the equipment is connected to the local AC power supply, internal terminals may be live and the opening of the covers or removal of parts (except those to which access can be gained by hand) is likely to expose live parts.

Safety

Capacitors inside the equipment may still be charged even if the equipment has been disconnected from all voltage sources.

Any adjustment, maintenance, or repair of the opened equipment under voltage must be carried out by a skilled person who is aware of the hazards involved.

Service personnel should be trained against unexpected hazards.

Ensure that only fuses with the required rated current and of the specified type are used for replacement. The use of makeshift fuses and short-circuiting of fuse holders is prohibited.

1.4 Static Electricity

The unit supplied uses static-sensitive devices. Service personnel should be alerted to components which require handling precautions to avoid damage by static electrical discharge.

Before handling circuit board assemblies containing these components, personnel should observe the following precautions:

- 1) The work surface should be a conductive grounded mat.
- 2) Soldering irons must be grounded and tools must be in contact with a conductive surface to ground when not in use.
- 3) Any person handling static-sensitive parts must wear a wrist strap which provides a leaky path to ground, impedance not greater than $1M\Omega$.
- 4) Components or circuit board assemblies must be stored in or on conductive foam or mat while work is in progress.
- 5) New components should be kept in the supplier's packaging until required for use

2. INTRODUCTION



Figure 2-1 Impulse Winding Tester V815

The Impulse Winding Tester V815 provides a non-destructive way to test windings using a high voltage pulse of between 100V and 5kV. By comparing the decay waveforms with a standard winding, deviation in core material, number of turns, shorted turns, and insulation breakdown can be identified.

The tester's measurement, display and control facilities include:

- memory for up to 200 standard windings;
- auto learn for standard windings;
- waveform area, waveform comparison, differential area, flutter and corona values;
- full statistics for each winding stored in memory;
- output of measurements and statistics to an Epson-compatible printer;
- built-in High Voltage calibration and test;
- key lock to lock the unit in test mode.

3. INSTALLATION

3.1 AC Line Connections

The unit is provided with a power cable capable of carrying the input current for both 115V and 230V operation. This cable should be connected via a suitable connector to the local AC power supply. The color code employed is as follows:

WIRE	EUROPEAN	N. AMERICAN
LIVE	BROWN	BLACK
NEUTRAL	BLUE	WHITE
GROUND	GREEN/YELLOW	GREEN

The supply voltage setting can be checked by looking on the rear panel next to the power inlet socket. Ensure that the unit is not connected to the power supply. Adjust the switch to read the required voltage. No adjustment is required for variation of supply frequency.

Before connecting the AC power, read the precautions listed under section 1.2 AC Power Supply.

The power switch is located on the left of the front panel.

The instrument is not suitable for battery operation.

3.2 Location

The V815 is intended for use on the bench. The power modules are fan cooled and care must be taken not to restrict any of the air paths. Ensure that the unit is located in an area appropriate for the hazardous voltages produced when testing components. See sections 3.3 and 3.4.

3.3 Measurement Connections

WARNING!

This equipment is intended for use by suitably trained and competent persons.

This product is capable of having hazardous voltages (up to 5kV) on its terminals in normal use. Appropriate safety precautions should be taken.

This product can cause hazards if it is not used in accordance with these instructions. Read them carefully and follow them in all respects. Double check connections to the unit before use.

DO NOT USE THIS EQUIPMENT IF IT IS DAMAGED.

For maximum user safety, it recommended that a safety interlock, such as described in section 3.4 is used.

3.4 Safety Interlock

WARNING!

HIGH VOLTAGE

This product is capable of having hazardous voltages (up to 5kV) on its terminals in normal use. Appropriate safety precautions should be taken.

A high voltage pulse, or pulses, is applied during testing. The front panel High Voltage (H.V.) LED will light whenever a high voltage pulse is applied to the component under test.

ENSURE THAT THE COMPONENT UNDER TEST AND TEST LEAD TERMINATIONS CANNOT BE TOUCHED DURING THE TEST CYCLE.

The High Voltage (H.V.) output is inhibited until the safety interlock circuit is complete. The terminal fixture for the winding under test should be placed within housing with an interlocked door controlled by a circuit such as that shown in Figure 3-1.

Resistor R should be $< 1k\Omega$.

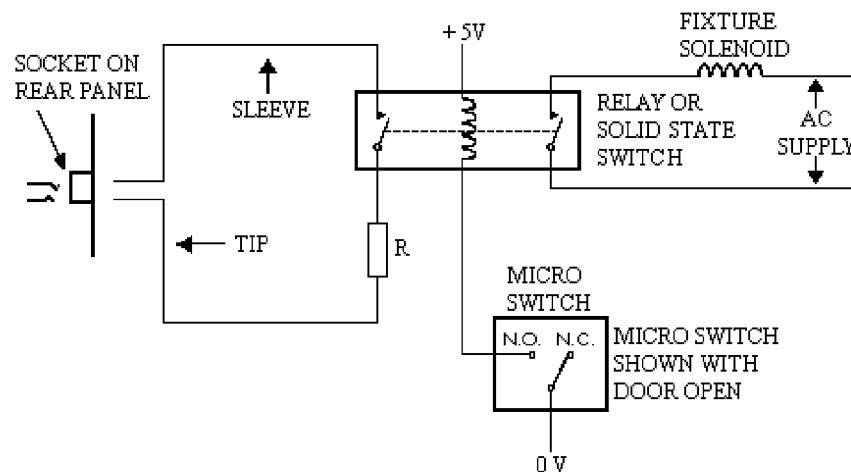


Figure 3-1 Typical High Voltage (H.V.) Interlock Fixture

When the fixture door is closed, and the microswitch therefore made, the High Voltage output is activated via the relay. The relay also energizes an AC supply for a solenoid which can be used to lock the door while the High Voltage output is on.

4. OPERATION

WARNING!

This equipment is intended for use by suitably trained and competent persons.

This product is capable of having hazardous voltages (up to 5kV) on its terminals in normal use. Appropriate precautions should be taken for safety.

This product can cause hazards if it is not used in accordance with these instructions. Read them carefully and follow them in all respects. Double check connections to the unit before use.

READ SECTIONS 1 and 3 OF THIS MANUAL BEFORE USING THE V815.

DO NOT USE THIS EQUIPMENT IF IT IS DAMAGED.

4.1 The Front Panel

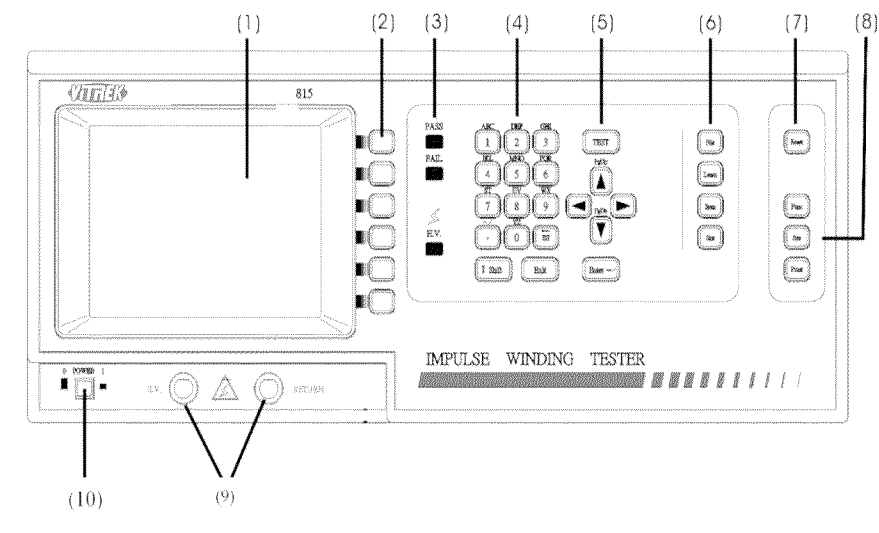


Figure 4-1 Front Panel

- (1) LCD display
- (2) Soft keys
- (3) PASS, FAIL & High Voltage (H.V.) indicators
- (4) Alphanumeric and navigation keys
- (5) Test key
- (6) Short cut keys
- (7) Reset
- (8) System set-up keys
- (9) Test connections
- (10) Power switch

4.2 The Rear Panel

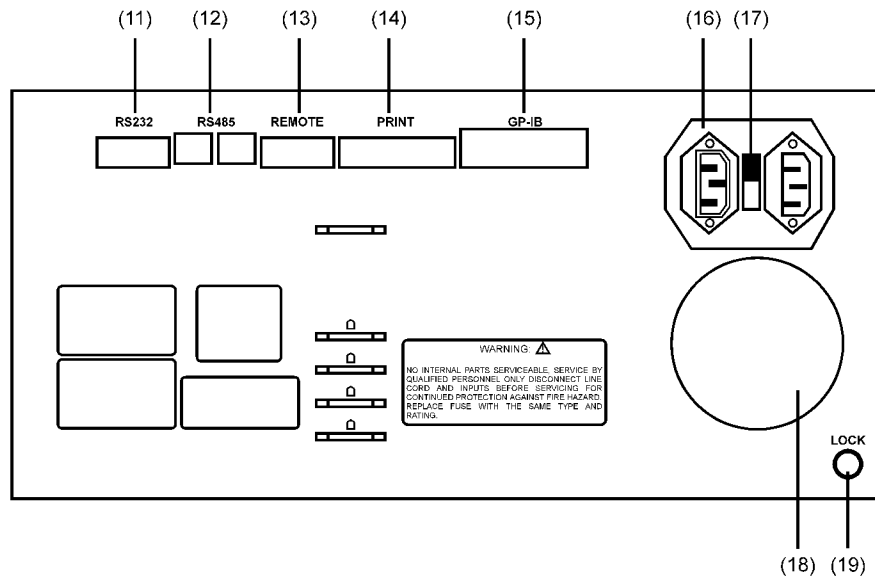


Figure 4-2 Rear Panel

- (11) RS232 port (reserved)
- (12) RS485 port (reserved)
- (13) Remote port
- (14) Printer port
- (15) GPIB port (reserved)
- (16) AC voltage input (115/230V AC)
- (17) 115/230V voltage selector
- (18) Fan
- (19) Safety Interlock connector

4.3 Switching the Unit On

With the instrument connected to the correct AC power supply, press the front panel POWER switch. The unit will default to the last setting selected before the power was switched off.

The power can be switched off at any time without damage to the instrument; however to avoid loss of data the unit should not be switched off while performing a test.

4.4 Indicators

The PASS and FAIL indicators are only illuminated while in the TEST screen, and indicate the result of the last test.

The High Voltage (H.V.) indicator will illuminate when a high voltage is present on the output terminals of the unit.

4.5 Front Panel Keys

4.5.1 Soft

The soft keys are used to select the corresponding function on the display. The function of each soft key changes according to the mode selected.

4.5.2 Alphanumeric

In the FILE menu the alphanumeric keys can be used to name a file. When there is more than one character available on a key, the first key press will display the first character; pressing the key again will display the second character, etc.

4.5.3 Navigation

The ◀ and ▶ navigation keys can be used to move the cursor. The ▲ and ▼ navigation keys are used to select different fields in certain screen displays.

4.5.4 Test

The TEST key will start a test when the TEST screen is shown, or will return the unit to the TEST screen, if another screen is displayed.

4.5.5 Short Cut

The short cut keys will display the corresponding menu. For example, if the user is in the TEST menu then pressing the **File** key will display the FILE menu, allowing another test file to be loaded.

4.5.6 Reset

Under normal operation this key should not need to be used. Pressing this key will reset the unit to the default state. Stored files will not be lost, but the current set-up will be lost.

4.5.7 System Set-up

The front panel **Func** and **Sys** keys allow access to system set-up parameters. See sections 4.6 and 4.7 for further information.

The **Print** key will print the current screen if an Epson-compatible printer is connected to the rear panel printer port.

4.6 FUNCTION Menu

Pressing the front panel **Func** key will display the FUNCTION menu. Select an option by pressing the appropriate alphanumeric key or by using the ▲ and ▼ navigation keys to highlight the option and then press **Enter**.

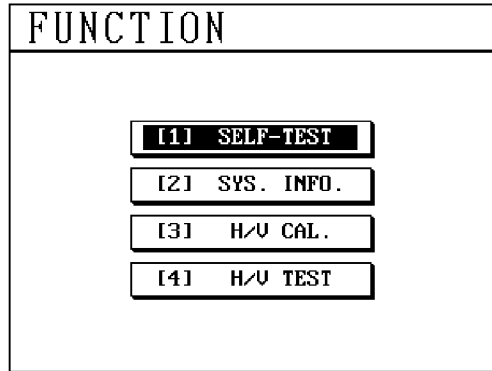


Figure 4-3 Function Menu

4.6.1 SELF-TEST

To run self test press **Enter** when the SELF-TEST option is highlighted (use the ▲ and ▼ navigation keys to select the required option), or press the alphanumeric **1** key.

The self-test will now run and display the test results. Figure 4-4 shows the SELF-TEST result screen with all tests passed.

Press the SKIP soft key to disable any test. If the unit fails any stage of the self-test please contact VITREK Corp.

SELFTEST		SKIP
ITEM	TEST	
[1] CPU	OK	
[2] RAM	OK	
[3] ROM	OK	
[4] EEPROM	OK	
[5] CLOCK	OK	
		EXIT

Figure 4-4 Self Test Menu

Use the EXIT soft key or the **Exit** key to return to the FUNCTION menu.

4.6.2 SYS. INFO.

To display system information press **Enter** when the SYS. INFO. Option is highlighted (use the ▲ and ▼ navigation keys to select the required option), or press the alphanumeric **2** key.

The system information will now be displayed on the screen and includes file space available, software and hardware versions. Some of this information may be requested if VITREK CORP. is contacted for assistance with the unit.

SYSTEM INFO.	
[1] MODEL	V815 (5KV)
[2] SOFTWARE VERSION	1.3
[3] EDITION	STANDARD
[4] RELEASED DATE	Jul 27 2001
[5] HARDWARE VERSION	1.5
[6] TOTAL FILE SPACE	200
[7] FREE FILE SPACE	199
EXIT	

Figure 4-5 System Information Menu

Press the EXIT soft key or the **Exit** key to leave the SYSTEM INFO screen.

4.6.3 H/V CAL. and H/V TEST

Refer to section 6 for High Voltage Calibration and Test procedures.

4.7 SYSTEM SETUP Menu

Pressing the front panel **Sys** key will display the SYSTEM SETUP menu. Select an option by pressing the appropriate alphanumeric key or by using the ▲ and ▼ navigation keys, to highlight the option and then press **Enter**.

SYSTEM SETUP	
[1]	SYSTEM
[2]	GRAPHICS
[3]	DATE TIME
[4]	PASSWORD

Figure 4-6 System Set-up Menu

4.7.1 SYSTEM Menu

To display the SYSTEM SETUP sub-menu press **Enter** when the SYSTEM option is highlighted (use the ▲ and ▼ navigation keys to select the required option), or press the alphanumeric 1 key.

SYSTEM SETUP		PROG
[1] TESTER ID No.	1	
[2] KEY LOCK	OFF	
[3] KEY STROKE SOUND	OFF	
[4] LCD CONTRAST	4	
[5] TEST ALARM	ALL	
		EXIT

Figure 4-7 System Set-up Sub-Menu

4.7.1.1 TESTER ID No.

The **TESTER ID No.** can be changed to identify the unit. This is useful when analyzing results from more than one tester. To change the number:

- 1) Move the highlight to the existing number with the ▲ and ▼ navigation keys.
- 2) Type in the new number; up to three digits may be entered.

4.7.1.2 KEY LOCK

KEY LOCK prevents unauthorized users accessing the test set-up. A password must be entered when switching the key lock on or off. See section 4.7.4 for details on how to change the **KEY LOCK** password. The default password is **V815**.

To change the key lock state:

- 1) Move the highlight to the KEY LOCK option with the ▲ and ▼ navigation keys.
- 2) Press either of the ◀ or ▶ navigation keys, or the PROG soft key: the CHECK PASSWORD box, shown below, will be displayed.
- 3) Enter the correct password, and then press **Enter**. The key lock will now be set to the opposite state.

CHECK PASSWORD
PASSWORD <input style="width: 50px;" type="password"/>

Figure 4-8 Key Lock Password

4.7.1.3 KEY STROKE SOUND

When set to ON the **KEY STROKE SOUND** option enables a beep for each key press. To change the KEY STROKE SOUND state:

- 1) Move the highlight to the KEY STROKE SOUND option with the ▲ and ▼ navigation keys.
- 2) Press either the ◀ or ▶ navigation keys, or PROG soft key to set the opposite state.

4.7.1.4 LCD CONTRAST

The **LCD CONTRAST** is set by highlighting the option with the ▲ and ▼ navigation keys. Use the ◀ or PROG soft key to lighten the screen. Or ▶ to darken it. Range: 1 – 8. Default: 5.

4.7.1.5 TEST ALARM

The **TEST ALARM** is set by highlighting the option with the ▲ and ▼ navigation keys, then using the ◀ and ▶ navigation keys or the PROG soft key to change the setting. There are four settings, shown below. The alarm will sound when the corresponding state is indicated during a Test.

Setting	Alarm
NO	NO test alarms
ALL	test alarms for both PASS and FAIL
PASS	test alarm for PASS only
FAIL	test alarm for FAIL only

Figure 4-9 Test Alarm Settings

4.7.2 GRAPHICS Menu

To display the GRAPHICS SETUP menu press **Enter** when the GRAPHICS option is highlighted (use the ▲ and ▼ navigation keys to select the required option), or press the alphanumeric 2 key.

GRAPHICS SETUP		PROG
[1] STANDARD WAVE	LINE	
[2] D.U.T. WAVE	DOT	
[3] COMPARISON MASK	OFF	DEF-
[4] CENTER LINE	ON	AULT
[5] GRID	OFF	
		EXIT

Figure 4-10 Graphics Set-Up Menu

4.7.2.1 STANDARD WAVE

The **STANDARD WAVE** can be shown on the test screen in either a line or dot format, or can be turned off.

To change the STANDARD WAVE setting:

- 1) Move the highlight to the STANDARD WAVE option with the ▲ and ▼ navigation keys.
- 2) Press either the ◀ or ▶ navigation keys, or the PROG soft key to change the setting.

4.7.2.2 D.U.T. WAVE

The **D.U.T. WAVE** can be shown on the test screen in either a line or dot format. To change the D.U.T. WAVE setting:

- 1) Move the highlight to the D.U.T. WAVE option with the ▲ and ▼ navigation keys.
- 2) Press either the ◀ or ▶ navigation keys, or the PROG soft key to change the setting.

4.7.2.3 COMPARISON MASK

If **COMPARISON MASK** is set ON and WAVEFORM COMPARISON is selected (see section 4.9.5), the upper and lower limit waveform will be displayed.

To change the COMPARISON MASK setting:

- 1) Move the highlight to the COMPARISON MASK option with the ▲ and ▼ navigation keys.
- 2) Press either the ◀ or ▶ navigation keys, or the PROG soft key to change the setting.

4.7.2.4 CENTRE LINE and GRID

The **CENTRE LINE** and **GRID**, shown in the TEST display, can be turned ON or OFF as follows:

- 1) Move the highlight to the required option with the ▲ and ▼ navigation keys.
- 2) Press either the ◀ or ▶ navigation keys, or the PROG soft key to change the setting.

4.7.3 DATE TIME Menu

To display the SET TIME menu press **Enter** when the **DATE TIME** option is highlighted (use the ▲ and ▼ navigation keys to select the required option), or press the alphanumeric **3** key.

SET TIME	
DATE: MM-DD-YY	SET
TIME: HH:MM:SS	
OLD DATE: 02-25-02	
OLD TIME: 10:27:15	
NEW DATE: 07-25-01	
NEW TIME: 10:27:04	EXIT

Figure 4-11 Set Time Menu

The date and time may be set using the navigation and alphanumeric keys. Once the correct time and date is entered, press the SET and EXIT soft keys to return to the SYSTEM SETUP menu.

4.7.4 PASSWORD

To display the CHECK/SET PASSWORD text box press **Enter** when the PASSWORD option is highlighted (use the ▲ and ▼ navigation keys to select the required option), or press the alphanumeric 4 key.

SYSTEM SETUP	SYSTEM SETUP	SYSTEM SETUP
<div style="border: 1px solid black; padding: 5px; text-align: center;"> SET PASSWORD NEW PSW <input type="text"/> </div>	<div style="border: 1px solid black; padding: 5px; text-align: center;"> CHECK PASSWORD PASSWORD <input type="text"/> </div>	<div style="border: 1px solid black; padding: 5px; text-align: center;"> SET PASSWORD CONFIRM <input type="text"/> </div>

Figure 4-12 Key Lock Password Entry

This option modifies the password for the KEY LOCK function. For more information on the KEY LOCK function see section 4.7.1.2.

To change the password:-

- 1) Enter the old password and then press the front panel **Enter** key.
- 2) Enter the new password and then press the front panel **Enter** key.
- 3) Re-enter the new password again and press the front panel **Enter** key.

4.8 Test Program File Management

4.8.1 FILE Menu

To enter the FILE menu press the front panel **File** short-cut key.

FILE				Total 3 file(s)	NEW
No.	Name	Date	Time		TEST
1	6815	07-25-01	10:34		EDIT
2	117	07-25-01	10:34		DEL.
3	NONAME	07-25-01	10:33		SORT
					VIEW MODE

Figure 4-13 File Menu

4.8.2 Creating a Test Program

- 1) Press the NEW soft key.
- 2) Enter a file name of up to eight characters in the CREATE NEW FILE box using the alphanumeric keys.
- 3) Press **Enter** to confirm the file name.

FILE				Total 3 file(s)	NEW
No.	Name	Date	Time		TEST
1	6815	07-25-01	10:34		EDIT
2	117	07-25-01	10:34		DEL.
3	NONAME	07-25-01	10:33		SORT
CREATE NEW FILE					VIEW MODE
NAME <input type="text"/>					
ENTER-OK EXIT-QUIT					

Figure 4-14 Creating a New File

- 4) The unit is now ready for test parameters to be entered (see section 4.9 'Editing a Test Program').

4.8.3 Deleting a Test Program

To delete a file:

- 1) Use the ▲ and ▼ navigation keys to highlight the required file.
- 2) Press the DEL soft key: the DELETE FILE box, shown below, will be displayed.
- 3) Press the front panel **Enter** key to confirm the file deletion, or press **Exit** to cancel the file deletion and return to the FILE menu.

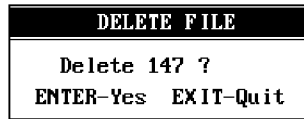


Figure 4-15 Delete File Menu

4.8.4 Sorting

While in the FILE menu, the files can be sorting by four different criteria by repeatedly pressing the SORT soft key.

The sort options are:-

- Ascending by name
- Descending by date
- Ascending by date
- Descending by date

4.8.5 File Display

While in the FILE menu, the file listing mode can be changed by pressing the VIEW MODE soft key. The two file listing modes are shown below.

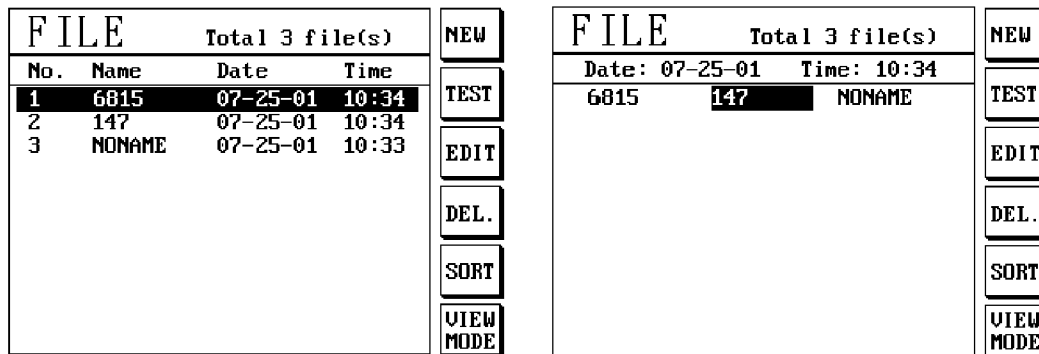


Figure 4-16 View Mode

4.9 Editing a Test Program

To edit an existing file:

- 1) Enter the FILE menu by pressing the front panel **File** short-cut key.
- 2) Use the ▲ and ▼ navigation keys to highlight the required file.
- 3) Press the EDIT soft key or the front panel **Para** key: the TEST PARAMETER menu will be displayed.

TEST PARAMETER		ON
PARAMETER	TEST	OFF
[1] WAVEFORM AREA SIZE	<input checked="" type="checkbox"/>	OFF
[2] DIFFERENTIAL AREA SIZE	<input checked="" type="checkbox"/>	
[3] FLUTTER VALUE	<input checked="" type="checkbox"/>	SET-UP
[4] WAVEFORM COMPARISON	<input checked="" type="checkbox"/>	
[5] CORONA VALUE	<input checked="" type="checkbox"/>	
FILE: NONAME		LEARN

Figure 4-17 Test Parameter Menu

- 1) Each parameter test can be turned ON or OFF by highlighting it with the ▲ and ▼ navigation keys, and then pressing either the ON or OFF soft key.
- 2) Each parameter test turned ON can be set up by highlighting it with the ▲ and ▼ navigation keys, and pressing the SET-UP soft key: the SET-UP options are detailed below.

4.9.1 Waveform Area Size

The **WAVEFORM AREA SIZE** test looks for a change in the area under the waveform but does not take into account any distortion or movement of the waveform.

With the **WAVEFORM AREA SIZE** test turned ON and selected with the cursor, press the SET-UP soft key: the **WAVEFORM AREA SIZE** set-up display (Figure 4-18 left) will be shown.

The **TOLERANCE** is set by typing in the required value with the alphanumeric keypad, followed by **Enter**.

The **TEST RANGE** (Figure 4-18 right) is set with the T1 and T2 soft keys.

Pressing the PRE-TEST soft key with a component connected to the unit's test connectors will show the component characteristics superimposed on the standard waveform to allow an instant comparison. Adjustments can then be made to the **WAVEFORM AREA SIZE** set-up if required. See sections 3.3 and 3.4 for important safety information.

Press the EXIT soft key or the front panel **Exit** key to return to the **TEST PARAMETER** menu.

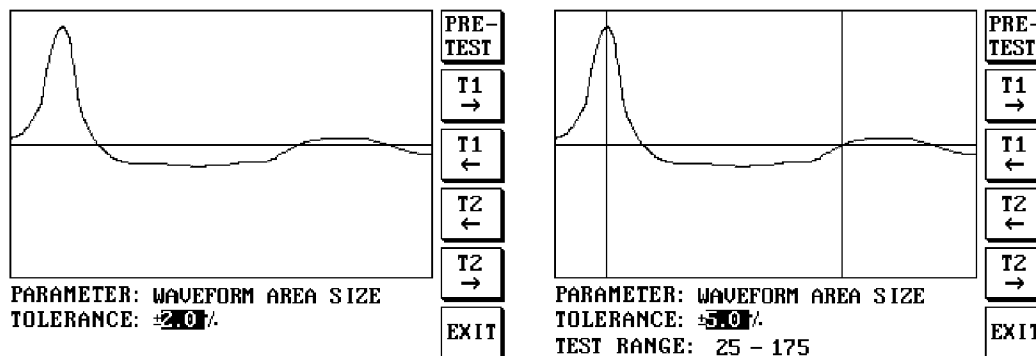


Figure 4-18 Waveform Area Size

4.9.2 Differential Area Size

The **DIFFERENTIAL AREA SIZE** test looks for any movement or distortion outside the waveform but does not take into account any change in the area of the waveform.

With the **DIFFERENTIAL AREA SIZE** test turned ON and selected with the cursor, press the SET-UP soft key: the **DIFFERENTIAL AREA SIZE** set-up display (Figure 4-19) will be shown.

The TOLERANCE is set by typing in the required value with the alphanumeric keypad, followed by **Enter**.

The TEST RANGE is set with the T1 and T2 soft keys.

Pressing the PRE-TEST soft key with a component connected to the unit's test connectors will show the component characteristics superimposed on the standard waveform to allow an instant comparison. Adjustments can then be made to the **DIFFERENTIAL AREA SIZE** set-up if required. See sections 3.3 and 3.4 for important safety information.

Press the EXIT soft key or the front panel **Exit** key to return to the TEST PARAMETER menu.

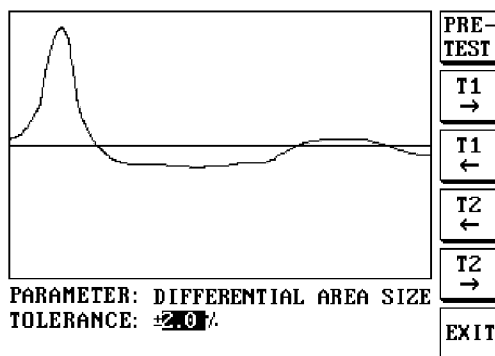


Figure 4-19 Differential Area Size

4.9.3 Flutter Value

The **FLUTTER VALUE** is calculated by summing the level differences from one waveform point to the next on a voltage waveform. The number of corona discharges can be set. See section 5 Theory of Operation for more information.

With the **FLUTTER VALUE** test turned ON and selected with the cursor, press the SET-UP soft key: the **FLUTTER VALUE** set-up display will be shown.

The corona COUNT value is set by typing in the required number with the alphanumeric keypad, followed by **Enter**.

The TEST RANGE is set with the T1 and T2 soft keys.

Pressing the PRE-TEST soft key with a component connected to the unit's test connectors will show the component characteristics superimposed on the standard waveform to allow an instant comparison. Adjustments can then be made to the **FLUTTER VALUE** set-up if required. See sections 3.3 and 3.4 for important safety information.

Press the EXIT soft key or the front panel **Exit** key to return to the TEST PARAMETER menu.

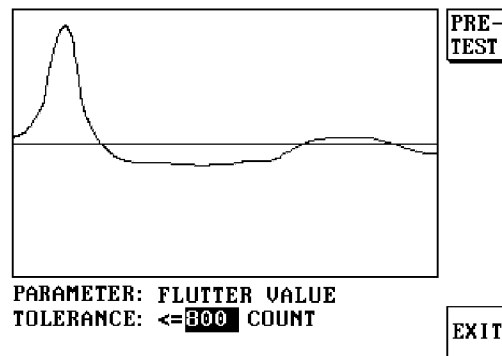


Figure 4-20 Flutter Value

4.9.4 Corona Value

The **CORONA VALUE** is measured from a current waveform with the number of corona discharges able to be set. See section 5 Theory of Operation for more information.

With the **CORONA VALUE** selected and the test turned on using the ON soft key, press the SET-UP soft key: the **CORONA VALUE** set-up display will be shown.

The corona COUNT value is set using the alphanumeric keypad, followed by **Enter**.

The TEST PARAMETER menu will then be displayed.

4.9.5 Waveform Comparison

WAVEFORM COMPARISON looks for a change in the waveform voltage or frequency.

With the **WAVEFORM COMPARISON** test turned ON and selected with the cursor, press the SET-UP soft key: the **WAVEFORM COMPARISON** set-up display (Figure 4-21) will be shown.

The TIME TOL and VOLTAGE TOL values are set by typing in the required value with the alphanumeric keypad, followed by **Enter**. Use the ◀ and ▶ keys to navigate between the two settings.

Pressing the PRE-TEST soft key with a component connected to the unit's test connectors will show the component characteristics superimposed on the standard waveform to allow an instant waveform comparison. To pass this test the waveform must be between the upper and lower waveforms displayed. See sections 3.3 and 3.4 for important safety information.

The TEST RANGE is set with the T1 and T2 soft keys.

Press the EXIT soft key or the front panel **Exit** key to return to the TEST PARAMETER menu.

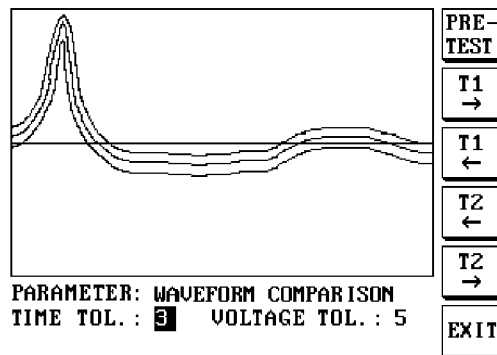


Figure 4-21 Waveform Comparison

4.10 Testing a Component

WARNING!

HIGH VOLTAGE

This product is capable of having hazardous voltages (up to 5kV) on its terminals in normal use. Appropriate safety precautions should be taken.

A high voltage pulse, or pulses, is applied during testing. The front panel High Voltage (H.V.) LED will light whenever a high voltage pulse is applied to the component under test.

ENSURE THAT THE COMPONENT UNDER TEST AND TEST LEAD TERMINATIONS CANNOT BE TOUCHED DURING THE TEST CYCLE.

4.10.1 Learning

The unit tests components by comparing each one with a waveform learned from a standard component.

To learn a component:

- 1) Create a new test file (section 4.8.2) or edit an existing one (section 4.8.3) and return to the TEST PARAMETER menu (Figure 4-17).
- 2) Ensure that the standard component is connected to the test leads. See sections 3.3 and 3.4 for important safety information.
- 3) Press the LEARN soft key or the front panel **Learn** key: the standard component will be tested and its waveform will be displayed.
- 4) Use the zoom in and zoom out soft keys if the waveform is not as required. After each change the unit will prompt the user to press the TRIG key to test the standard component at the new settings.
- 5) Press the MODE soft key to enter the TEST MODE menu.
- 6) Set the TEST MODE to NORMAL, LOW Q, LOW L or LOW LQ with the PROG soft key.
- 7) Enter the number of DUMMY Pulses. The DUMMY PULSE facility pre-magnetizes a component and may be useful where a residual magnetic field is present prior to applying the test pulse.
- 8) Set the number of TESTING Pulses required using the alphanumeric keypad.
- 9) Press the EXIT soft key to return to the LEARN menu.
- 10) Press the TRIG soft key to learn the component. See sections 3.3 and 3.4 for important safety information.
- 11) Press the PARA soft key to return to the TEST PARAMETER menu.
- 12) Save the settings to the Test mode by pressing the front panel TEST key.

4.10.2 Testing

- 1) Press the front panel **File** key and highlight the file required with the ▲ and ▼ navigation keys.
- 2) Press the TEST soft key and the standard component waveform will be displayed.
- 3) Connect the component to be tested to the test leads. See sections 3.3 and 3.4 for important safety information.
- 4) Press the front panel TEST key.

The front panel H.V. LED (High Voltage) will illuminate when the high voltage pulse is applied to the component.

When the test is complete PASS or FAIL is displayed on the screen together with test results. The component waveform will be displayed, superimposed on the standard waveform. The PASS/FAIL front panel LEDs will also indicate the result of the test.

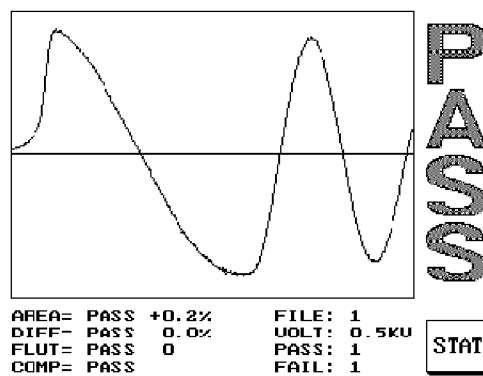


Figure 4-22 Test Result

4.10.3 Test Statistics

Pressing the STAT soft key or the front panel **Stat** key will show the test statistics of the currently loaded file. An example is shown below.

STATISTICS		QTY. RATE
TESTED	██████████	4
PASSED	██████████	4
FAILED		0
— FAIL ANALYSIS —		
AREA		0
DIFF.		0
FLUT.		0
COMP.		0
FILE: NONAME		EXIT

STATISTICS		QTY. RATE
TESTED	██████████	100.0%
PASSED	██████████	100.0%
FAILED		0.00%
— FAIL ANALYSIS —		
AREA		0.00%
DIFF.		0.00%
FLUT.		0.00%
COMP.		0.00%
FILE: NONAME		EXIT

Figure 4-23 Test Statistics

Press the QTY. RATE soft key to toggle between absolute and percentage statistics.

To clear the data press the CLR soft key.

The front panel **Print** key prints the screen display to an Epson-compatible printer.

Press the EXIT soft key or the front panel **Exit** key to return to the Test mode.

5. THEORY OF OPERATION

5.1 Applied Pulse

When a short high voltage pulse is applied to a perfect unloaded inductor a sine wave would be seen that continued to infinity without changing amplitude.

However, the perfect inductor does not exist and making a measurement will always apply a small load to the device under test. So what is actually seen is a sine wave with decaying amplitude.

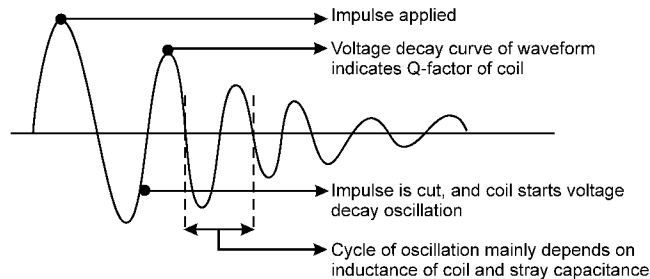


Figure 5-1 Theory of Operation

The waveform decay is related to the Q-factor of the coil: the higher the Q, the slower the rate of decay. The frequency of the waveform is related to the inductance and stray capacitance of the coil.

The Impulse Winding Tester V815 allows the user to store a 'good' waveform. It will then compare this waveform against the waveform of the device under test.

5.2 Why Use Impulse Testing?

Impulse testing characterizes a winding in a way not possible on a conventional LCR meter. The short high voltage pulse will cause no damage to the device under test.

Comparing the waveform from a good device to that of the device under test will show differences in the number of turns, changes in the core material, shorted turns and corona discharge (damage to the winding).

The differences are shown as a waveform that decays at a different rate, which would be indicated by the area under the curve. A waveform that is out of phase with the standard waveform would be indicated by differential area size, or a combination of both indicated by waveform comparison.

Corona discharge, indicated by a spike on the waveform, is normally present when a high voltage charge is applied across a wire (winding) that has some damage to the insulation.

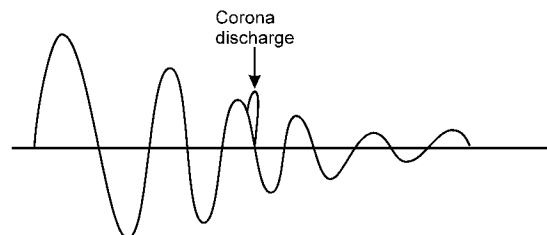


Figure 5-2 Corona Discharge

6. CALIBRATION

WARNING!

HIGH VOLTAGE

This product is capable of having hazardous voltages (up to 5kV) on its terminals in normal use. Appropriate safety precautions should be taken.

High voltages are applied during calibration. Double check connections before calibration and test.

**DO NOT TOUCH TEST LEAD OR VOLTAGE METER
TERMINATIONS WHILE CALIBRATING THE INSTRUMENT.**

CAUTION!

If the following procedure is not carried out correctly the output voltage may be set incorrectly, which could cause incorrect reading and/or damage to the device under test. Consult VITREK Corp., before calibration, if the unit is suspected of being faulty.

6.1 High Voltage Calibration

To calibrate the output voltage levels, select the FUNCTION menu using the **Func** key. Select High Voltage Calibration by pressing **Enter** when the **H/V CAL.** option is highlighted (use the **▲** and **▼** navigation keys to select the required option), or press the alphanumeric **3** key.

The 6815 will require a password before the calibration values can be adjusted, the password is **38114** (HVCAL).

To change voltage levels use the **▲** and **▼** navigation keys to select the required voltage. Once selected, the actual output will be displayed in the **READING** column. To adjust the voltage use the **UP** and **DOWN** soft keys until the correct voltage level is set.

Repeat this process for each level. When completed, press the **DONE** soft key. Pressing the **EXIT** key will exit without saving the new values.

6.2 High Voltage Test

Each output voltage step can be measured with an external high voltage meter (input resistance $\geq 1G\Omega$) connected between **H.V.** and **RETURN**.

To check the output voltage levels at each step, select the FUNCTION menu using the **Func** key. Select the high voltage test by pressing **Enter** when the **H/V TEST** option is highlighted (use the **▲** and **▼** navigation keys to select the required option), or press the alphanumeric **4** key.

The unit will default to the 500V test. Turn the voltage on using the ON soft key: the unit will display the output voltage.

Use the UP or DOWN soft keys to step through the voltages.

7. SPECIFICATION

7.1 Measurement Parameters

Area under curve

Differential area size

Flutter value (corona discharge)

Waveform comparison

7.2 Test Voltage

Range	200V to 5kV in 100V steps
Accuracy	±2%

7.3 Measurement Time

50ms

7.4 Measurement Connections

Two self-latching connectors

7.5 Interfaces

Parallel printer, Safety interlock

7.6 Memory

200 waveform files

7.7 Display

320 x 240 dot LCD display with CFL back lighting

PASS/FAIL LED indicators

High Voltage LED indicator

Internal speaker

7.8 Power Supply

Input voltage	115VAC ±10% or 230VAC ±10% (selectable)
---------------	---

Frequency	50/60Hz
-----------	---------

7.9 Environmental

Installation category	II (in accordance with IEC664)	
Temperature range	Storage	-40°C to +70°C
	Operating	0°C to 40°C
	Full accuracy	15°C to 35°C
Relative humidity	up to 75% non-condensing	
Pollution degree	2 (mainly non-conductive)	
Altitude	up to 2000m	

7.10 Safety

Complies with the requirements of EN61010-1. Instrument has accessible hazardous live terminations during normal operation. See sections 1, 3.2, 3.3 and 3.4 for user guidelines.

7.11 EMC

Immunity	EN61326-1
Emissions	EN55022 Class A

7.12 Mechanical

Height	190mm
Width	425mm
Depth	350mm
Weight	20kg

7.13 Panel Symbols







	Refer to manual.
	Alternating current
	Earth (ground) terminal
	CAUTION - Risk of electric shock.
	On
	Off

Figure 7-1 Panel Symbols

7.14 Guarantee

The equipment supplied by VITREK CORP. is guaranteed against defective material and faulty manufacture for a period of twelve months from the date of dispatch. In the case of materials or components employed in the equipment but not manufactured by us, we allow the customer the period of any guarantee extended to us.

The equipment has been carefully inspected and submitted to comprehensive tests at the factory prior to dispatch. If, within the guarantee period, any defect is discovered in the equipment in respect of material or workmanship and reasonably within our control, we undertake to make good the defect at our own expense subject to our standard conditions of sale. In exceptional circumstances and at the discretion of the service manager, a charge for labor and carriage costs incurred may be made.

Our responsibility is in all cases limited to the cost of making good the defect in the equipment itself. The guarantee does not extend to third parties, nor does it apply to defects caused by abnormal conditions of working, accident, misuse, neglect or wear and tear.

7.15 Maintenance

7.15.1 Cleaning

The body of the equipment can be cleaned with a damp lint-free cloth. Should it be required, weak detergents can be used. No water must enter the equipment. Do not attempt to wash down internal parts.

7.15.2 Safety Checks

Each year the equipment should be given a simple safety check.

7.15.2.1 Equipment Required

25A ground bond tester (e.g. Megger PAT 2)

Insulation tester @ 500V DC (e.g. Megger BM 7)

7.15.2.2 Tests

- 1) **DISCONNECT THE INSTRUMENT FROM THE AC POWER SUPPLY!**
- 2) Inspect the unit and associated wiring for damage, e.g. dents or missing parts which might impair the safety or function of the equipment. Look for any signs of overheating or evidence that objects might have entered the unit.
- 3) **Ground Bond:** Ensure that 25A DC can flow from exposed metal parts of the unit (not connectors) to ground with an impedance of less than 100mΩ.
- 4) **Insulation Test:** Connect the Live and Neutral of the power cable together and test the insulation between this point and the ground at 500V DC. Readings greater than 1MΩ are acceptable.

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