



## TESCO THE EASTERN SPECIALTY COMPANY

THE EASTERN SPECIALTY COMPANY

Canal Street and Jefferson Avenue  
Bristol, PA 19007

### OPERATING INSTRUCTIONS – CATALOG NO. 1047 CT RATIO/BURDEN TESTER V2018-09-26

#### Description

The CAT 1047 is a hand-held CT (current transformer) tester capable of indicating % change of ratio or secondary current while applying known burden resistances.

Available burdens are 0.1, 0.2, 0.5, 1.0, 2.0, 4.0, and 8.0 Ohms. Ratio measurement requires a suitable current transducer such as an Amp-clamp for the measurement of primary current.

The unit simultaneously measures primary and secondary current under “unburdened” and “burdened” conditions. It displays the primary and secondary currents and ratio, for both unburdened and burdened conditions. The change in ratio is computed and displayed if both primary and secondary measurements are available. If the primary measurement is not available, then the change in secondary current is displayed.

The unit can also automatically perform a burden scan. In scan mode the device makes measurements from no burden to a user selectable maximum burden (8 ohms max). Each burden measurement is recorded and can be reviewed in detail.

All test data can be saved to internal flash memory. Up to 550 measurements can be stored. Data can be uploaded to a PC using a the USB connection. On the PC data can be saved to a “csv” file or “pdf” test reports may be generated.

A standard DEMAG sequence is also provided which gradually ramps the burden from 0 to 10 Ohms to saturate the CT, dwells at 10 ohms, and then smoothly ramps back down to 0 Ohms.

The unit is powered by an internal rechargeable battery pack which provides for about 10 hours of run time per charge.





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#### Connections (Left Side Panel)

Top connector is a 9 pin circular connector (compatible with Tesco CAT J-1044-50T duck bill cable) for CT secondary current input. The range for this input is 0.1 – 20 Amps. **CAUTION:** this input is a current loop and normally short circuited inside the unit. **DO NOT** connect a Voltage (potential) source to this input, immediate damage will result. Prolonged currents greater than 21.0A may damage the unit.



CT secondary  
current input

Primary Current  
Probe

Battery Charging  
Connector

Center connectors (red and black) are safety banana connectors for a primary current Amp-clamp or similar probe having a Voltage interface of 0.1, 1.0, 10, or 100 mV/A. The signal level range for this input is 10mV - 3Vrms. Signal levels greater than 5Vrms may damage the unit.

The right most connector is a barrel connector for the 9.6V lithium battery pack charger supplied with the unit. Charging a fully depleted pack takes 4-5 hours. Use of any charger not specified or supplied from Tesco is prohibited, as other chargers may destroy the internal battery pack.



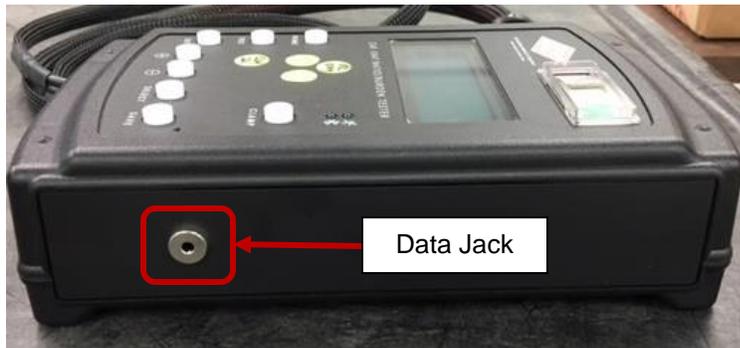
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### Connections (Right Side Panel)



To download data from the 1047 to a PC, connect the USB-to-UART cable supplied with the unit to the Data port on the 1047 and a USB port on your computer.

### Front Panel Button Functions:



- **HOME** – Press and hold to turn the unit on/off. Press briefly to take the screen to **HOME** screen (instantaneous values displayed) at any time. The unit always powers up in the **HOME** screen.
- **TEST** – While in the home screen, press this button to run the selected test such as a single burden test of indicated the indicated burden value, a scan of all the values, or a **DMAG** sequence. The test selection is shown after **B:** on the third row of the screen.



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- **SET** – Moves to the settings adjustment screen, so you may make adjustments such as: a) analog meter full scale %, b) Max Burden for Scan mode, c) Auto-power down (sleep timer) duration, c) Screen Brightness, d) Setting date and time (necessary for time-stamping saved test results), e) Delete ID, f) Measurement Reps. (See Set-Ups at the End of this section for further Explanation)

Note: + moves the cursor down; - moves the cursor up.

- **+/- BUTTONS** – While in the **HOME** screen, these two buttons adjust the selected test to be performed when the **TEST** button is pressed. In other menus these buttons navigate up and down.
- **SELECT** – While in the **HOME** screen, this toggles the clamp selector function on the screen, between W (wraps) and C (current probe scale factor). The **CLAMP** selector function is displayed with an asterisk preceding parameter to be changed, such as “\*C” to change current probe scale factor or “\*W” to change number of wraps.
- **CLAMP** – Press to adjust the current probe scale factor or number of wraps on the current probe. Use the **SELECT** button to choose which parameter is being adjusted.
- **SAVE** – Press to save the burden test result to internal memory.



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V2018-09-26

**Powering on the unit**

<p><b>TESCO 1047 CT RATIO/BURDEN TESTER(V2.001)</b> ----&gt;Initializing&lt;-- -</p>	<p>Flash screen presented on power up. Displays version of the software. Please include this code on any support request.</p>
<p>1047 ■■■□*C: 1mV/A PA: 80.657 W: 1TURN SA: 8.0567 B: 0.1Ω RT: 50.056:5, PH: 1°</p>	<p>After the flash screen is briefly displayed, you will immediately see the home screen. The home screen displays the primary current, secondary current and ratio. These values are with no burden applied. Also displayed are the mV/A for the primary current transducer, the number of turns going through the CT, and the burden that will be applied when a burden test is performed. The phase angle displayed is the angle between the primary and secondary currents. This is intended to allow you to see if the connections are correct or 180 degrees out of phase.</p>

Main Screen Key Functionality

KEY	FUNCTION
Home	Hold for greater than 0.8 seconds to power down.
Test	Runs a burden test if burden (B:) is 0.1 to 8.0 ohms. Runs a burden scan if burden is "SCAN". Runs a demagnetization cycle if burden is "DEMAG".
Set	Takes you to the user setup menu. See SETUP below.
Plus	Changes the burden setting between: 0.1, 0.2, 0.5, 1.0, 2.0, 4.0, 8.0, SCAN, DEMAG
Minus	Changes the burden setting between: 0.1, 0.2, 0.5, 1.0, 2.0, 4.0, 8.0, SCAN, DEMAG
Select	Toggles function of CLAMP button
Save	No function on Home screen.
Clamp	With Home screen indication "*C:", changes the clamp setting between: 0.1mV/A, 1.0mV/A, 10.0 mV/A and 100mV/A. With Home screen indication "*W", changes number of turns (applicable to rope-type sensors).



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### Burden Test

From the main screen press the **TEST** key with a burden between 0.1 and 8.0 ohms selected. The system will switch to the burden data screen. The burden test is performed a user pre-settable number of times. The results for each individual test are displayed and the overall answer displayed at the end. During each test the analog indicator will show what fraction of the user selectable acceptance limit the measurement represents.

CH: -0.12%	Burden: 0.2
PA: 75.326	W/B: 75.025
SA: 1.8828	W/B: 1.8775
RT: 200.04	W/B: 199.80



### Burden Screen Key Functionality

KEY	FUNCTION
Home	Return to home screen
Test	No function
Set	No function
Plus	No function
Minus	No function
Select	No function
Save	Brings up the SAVE menu.
Clamp	No function

### Theory of Operation

The primary and secondary current are simultaneously measured by two single channel metering ICs. At the hardware level the currents are averaged over four cycles. These values are then averaged in software for 8 measurements. The result is the single measurement value. This measurement process can be repeated a user defined number of times, determined in the settings menu. If the test is repeated a user specified number of times, a statistical analysis is applied to the data looking for outliers. This can be particularly important when using secondary current change, rather than ratio change, since the secondary current can change because the load changed.



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### Burden Scan

From the main screen press the **TEST** key with a burden (B:) SCAN selected. The system will switch to the burden scan data screen. The system will begin a sequence of burden measurements starting at 0.1 ohms and ending with the maximum burden selected in the setup menu. As the test at each burden is performed the results are displayed and the overall answer displayed at the end. During each test the analog indicator will show what fraction of the user selectable acceptance limit the measurement represents.

B Scan	1.	****%	
0.1	-0.12%	2.	****%
0.2	-0.17%	4.	****%
0.5	****%	8.	****%

When all tests are completed you can **SAVE** the data with the save button or press **HOME** to return to the main menu.

If you press **SAVE**, when you return from the **SAVE** menu a > will appear next to the first measurement. The keys have the following functionality at this point.

B Scan	1.	****%	
0.1	>-0.12%	2.	****%
0.2	-0.17%	4.	****%
0.5	****%	8.	****%

### Burden Scan Data Review Screen Button Functionality

KEY	FUNCTION
Home	Return to home screen
Test	No function
Set	No function
Plus	Move cursor to next measurement
Minus	Move cursor to previous measurement
Select	Show the detailed measurement data for the selected burden value.
Save	Brings up the <b>SAVE</b> menu.
Clamp	No function

When examining the data look for a smooth curve with monotonically increasing slope. As additional burden is applied to a CT the ratio should stay nearly constant until its burden class is exceeded. The CT output will then drop increasingly rapidly as more burden is applied. If the curve values bounce around you probably have fluctuating loads. Ratio measurements are quite immune to this issue, but secondary only measurements require multiple measurements and the estimation of average performance.



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#### Notes:

- 1) V2018-09-26 Operating Instructions are applicable to 1047 Firmware V2.009.