Troubleshooter Information and Waveform References Operator's Manual

August 2008

EAZ0019P00A Rev. E

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- modifies or alters in any way the standard terms and conditions of the purchase, lease or rental agreement under the terms of which the equipment to which this manual relates was acquired,
- increases in any way the liability to the customer or to third parties.

TO THE READER

Whilst every effort has been made to ensure that the information contained in this manual is correct, complete and up-to date, the right to change any part of this document at any time without prior notice is reserved.

Warning:
Before installing, maintaining or operating this unit, please read this manual carefully, paying extra attention to the safety warnings and precautions.

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1 Troubleshooter Information

1.1 Safety Information

All Safety Precautions relevant to the unit are described in the Safety Precautions Booklet, P/N: EAZ0007E04A

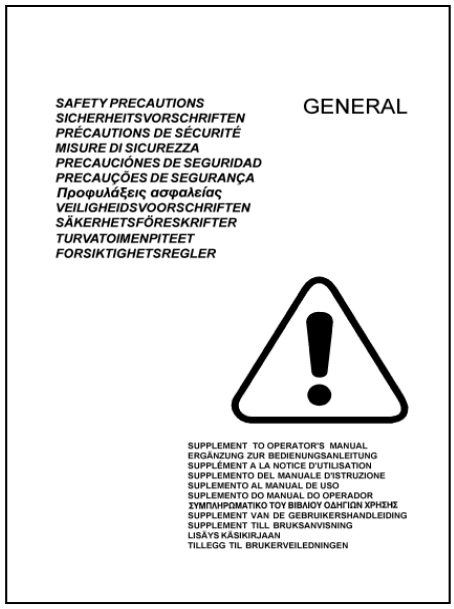


Figure 1-1 Safety Precautions Booklet P/N: EAZ0007E04A

The Safety Precautions Booklet should be fully understood by every operator. We suggest to store (a copy) of the Safety Precautions booklet near the unit, in sight of the operator.

The Operator's Manual will contain specific warnings and cautions when possible dangerous situations may be encountered during the described procedures.

1.2 Fast-Track Troubleshooter

Simplifies the time consuming part of diagnosis. The *Troubleshooter* system consists of two parts:

1. A cartridge/software for the scanner. The cartridge/software contains an on-line checklist of troubleshooting tips for diagnostic codes, datastream and common problems.

2. Waveform references that graphically support many *Troubleshooter* tips.

Note:
The Fast-Track Troubleshooter system contains information on the most code problems and driveability complaints. It does not, however, contain information for every possible code and every possible problem that could occur in all vehicles.

1.3 What is covered

The *Fast-Track Troubleshooter* tips deal with engine electronic systems and controls. Many tips also contain directions to check fuel, ignition, and other electrical components. As a general rule, basic fuel system, ignition, and electrical tests, as well as a thorough inspection, should be made before performing pinpoint tests on electronic components. Always ensure that the following systems and components are in proper operating condition:

- Fuel delivery
- Battery condition
- Ignition primary and secondary circuits
- Electrical connectors and wiring harnesses
- Vacuum lines and connectors
- General engine mechanical condition

The checks in each *Troubleshooter* tip begin with the most likely cause of a problem or with the tests that should be made first. The checks then progress through other possible causes and tests. For the most effective use of the *Troubleshooter* tips, follow the checks in the order in which they are given.

1.4 How to use *Troubleshooter*

Follow these steps to use the *Fast-Track Troubleshooter* system:

1. Apply power and enter vehicle identification. Use the Quick ID button or connect the Scanner to vehicle power. After start-up, the following will be displayed, (Example):

```
FORD (TO 2000)V 4.0
WITH FORD TROUBLESHOOTER    V 4.0
PRESS Y TO CONTINUE    PRESS N FOR HELP
```

Press **Y** to select the primary cartridge/software. Then enter the vehicle identification in the usual way for vehicle testing.

Note:
For instructions on navigation in Troubleshooter using other hardware platforms, refer to the relevant Scanner software related manual. For example, refer to the Modis Manual, that states Confirm (Y) or Cancel (N) in most of these cases.

2. Select TROUBLESHOOTER from the MAIN MENU.

When a *Troubleshooter* is available, the MAIN MENU will be displayed, (Example):

```
MAIN MENU - FORD     OTHER SYSTEMS
 SERVICE CODES       DATA (NO CODES)
 FUNCTIONAL TESTS
 CUSTOM SETUP        TROUBLESHOOTER
```

To select *Troubleshooter*, scroll to TROUBLESHOOTER and press **Y**.

Upon communication with the Scanner if the Troubleshooter does not contain specific Vehicle information, a generic Troubleshooter may be displayed containing generic information.

3. Review the category selection display.

The first screen of the *Troubleshooter* menu will be displayed:

```
SCROLL AND PRESS Y TO SELECT
* HELP
* CODES & TIPS
* PARAMETER DEFINITIONS
* COMPONENT TESTS
* ECU PIN DATA
* FINAL PROCEDURES
```

This display allows the selection of the required troubleshooting information category.

4. After selecting the desired category, the *Troubleshooter* now displays a list of sub-menus and tips. Tip titles can be distinguished from sub-menus by the type of bullet point used, a sub-menu uses a * and a tip title uses a ●.

   For example:
   * SUB-MENU 1
   * SUB-MENU 2
   ● TIP TITLE 1
   ● TIP TITLE 2

   Scroll to move the cursor and view the entire tip menu. Code tips and ECU pin data are organised numerically, all other tips are arranged alphabetically.

5. After reviewing the *Troubleshooter* tip menu (see full details of *Troubleshooter* Menus below), select a tip that most closely matches the problem with the vehicle.

   The CODE SUMMARY line is displayed at the top of each tip menu, regardless of the selected category. The CODE SUMMARY line does not scroll. It lists any codes that may be present in the vehicle at the time of testing.

   If no codes are present in a vehicle at the time, the CODE SUMMARY line displays:

   ```
   CODE SUMMARY: NO CODES PRESENT
   ```

6. Scroll to view the individual checks in each tip.

   Each tip listed on the tip menu contains one or more checks to be made on the vehicle. The checks may include instructions to take voltage measurements, or to inspect various components. The checks within a tip generally are presented in the order in which components should be checked or tests performed. Some tips may present only one or two checks. Others may present several checks. Each individual check starts with a number in the upper left corner of the scanner display. The following line is displayed at the end of each tip:

   ```
   [END] PRESS N FOR PREVIOUS TIP OR MENU
   ```

   Scroll up and down to view all the checks in a tip from start to finish as many times as necessary.

7. Press **N** to exit from any tip. Press **N** at any point to return to the tip menu. If the same tip is selected from the menu by pressing **Y** again, the display will return to the same check from which was exited.

8. Scroll and press **Y** to select any other tip listed on the menu for the vehicle being tested. The tip menu lists **all** tips and information available for the vehicle being tested (in the selected category). It is not limited in any way by codes that may or may not be present. Press **N** at any time to return to the category selection display.

9. Press **N** to leave the category selection display and return to the primary cartridge MAIN MENU. The primary cartridge/software and the *Troubleshooter* cartridge work interactively. The *Troubleshooter* and the primary cartridge/software MAIN MENU can be switched back and forth to perform any available diagnostic reading or test function.

1.5 *Troubleshooter* Menus

*** HELP**	
	*** CONVERSION CHARTS**
	Different reference tables for converting units of measure.
	*** MECHANICAL CHECKS**
	Basic vehicle diagnostic check-list. Basic vehicle electrical test procedures. Initial diagnostic test procedures.
	• ABBREVIATIONS
	Article listing common abbreviations and descriptions.
	• TROUBLESHOOTER HELP
	Description of how to use cartridge.
	• VEHICLE SYSTEM HELP
	Article describing specific engine management system.
*** CODES & TIPS**	
	List of vehicle specific codes, which upon selection gives vehicle specific tips or general description/tip for specific code.
	*** SYMPTOM BASED TESTS**
	Experienced based repair information for known symptoms.
*** PARAMETER DEFINITIONS**	
	A list of concise definitions supported in some cases with live data.
*** COMPONENTS & TESTS**	
	*** COMPONENT TESTS**
	Vehicle specific component test procedures with expected values.
	*** COMPONENT LOCATIONS**
	A list of common engine management components and where they are located on the vehicle. (Certain manufacturers only)
*** ECU PIN DATA**	
	*** PIN DATA BY COMPONENT**
	A list of ECU pin data, sorted by components.
	*** PIN DATA BY PIN NUMBER**
	A list of ECU pin data, sorted by pin number. (Certain manufacturers only).
*** FINAL PROCEDURES**	
	• ECU RE-LEARN PROCEDURES
	Procedure for resetting the ECU.
	• KEY PROGRAMMING PROCEDURES
	Procedure for setting ignition key security.
	• SERVICE INDICATOR RESET PROCEDURES
	Procedure for resetting maintenance reminder lights.

1.6 *Troubleshooter* Features

Besides the operating functions explained previously, the *Fast-Track Troubleshooter* provides the following features.

1.6.1 Functional tests available from Troubleshooter tips

Some checks will direct the operator to perform an actuator test from the primary cartridge/software to check a component. In most cases, the check will contain an instruction similar to the following:

```
PRESS Y FOR ACTUATOR TEST
```

Press **Y** to go directly to that functional test. After performing the test, press **N** to return to the same check in the *Troubleshooter* tip.

In a few cases, the *Troubleshooter* tip may direct the operator to exit from the *Troubleshooter* and return to the primary cartridge/software menus to perform the functional test.

1.6.2 Automatic tip finder

Many Troubleshooter tips will direct the operator to see another related tip for additional information to solve a particular problem. For example, the tip may tell the operator to see another tip for a TPS test on a given vehicle. In this case, the check will contain an instruction similar to the following:

```
PRESS Y FOR TPS TEST PROCEDURE
```

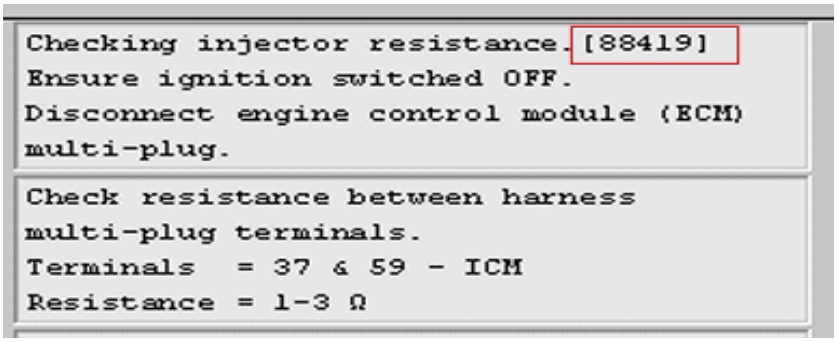
Press **Y** to go directly to that related tip or test. After reading the information in that tip and performing any recommended tests, press **N** to return to the same check in the original *Troubleshooter* tip.

This feature lets the operator jump quickly from one tip to a related tip without having to return to the menu, scroll, and select another item.

1.6.3 Interaction with S.A.I.S

From V2.16 of the S.A.I.S Vehicle Information CD product, subscribers will be able to use the Troubleshooter and interact with the programme. Components tests will include a reference number than can be entered into the S.A.I.S programme and return a full size image on the personal computer where S.A.I.S. is installed. See Figure 1-2: ‘Interactive Component test example screen’.

Figure 1-2 Interactive Component test example screen



Note:
If you do not have S.A.I.S installed, a trial CD is available from your dealer or direct from sales and marketing.

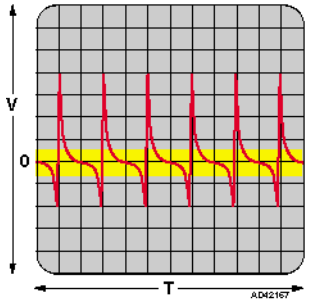
1.6.4 References

When a *Troubleshooter* tip can be enhanced with a picture of a oscilloscope Waveform, the check contains an instruction similar to below:

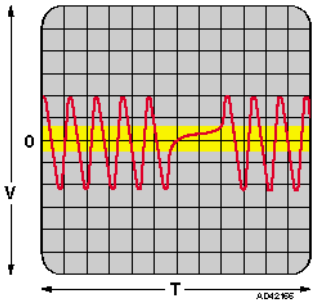
(SEE Waveform 11 IN OPERATOR'S MANUAL FOR TYPICAL SCOPE OUTPUT)

2 Waveforms

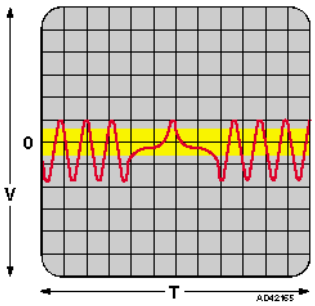
Waveform 1 Analogue, AC, frequency modulated.



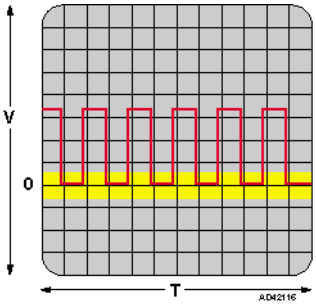
Waveform 2 Analogue, AC, frequency modulated.



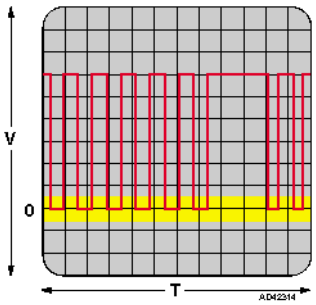
Waveform 3 Analogue, AC, frequency modulated



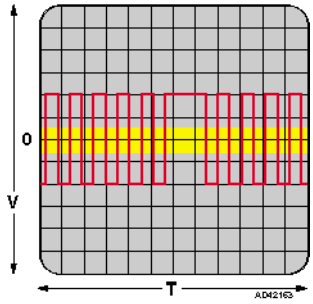
Waveform 4 Digital, DC, frequency modulated



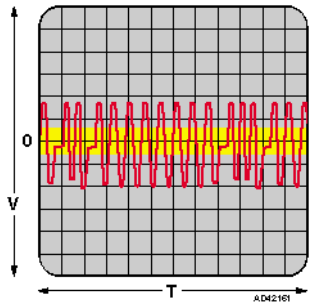
Waveform 5 Digital, DC, frequency modulated.



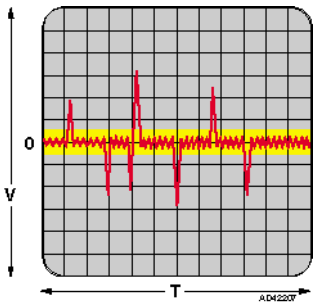
Waveform 6 Digital, AC, frequency modulated.



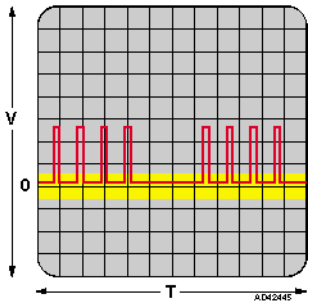
Waveform 7 Analogue, AC, frequency modulated.



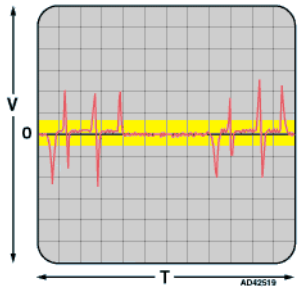
Waveform 8 Analogue, AC, frequency modulated.



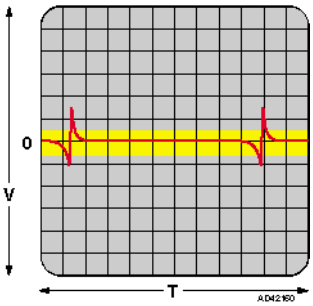
Waveform 9 Digital, DC, frequency modulated.



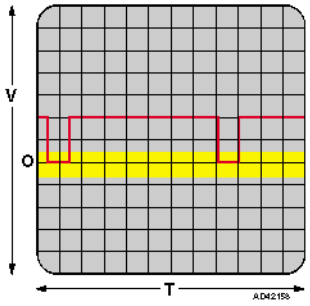
Waveform 10 Analogue, AC, frequency modulated.



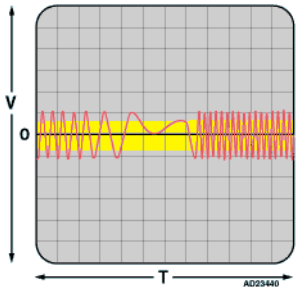
Waveform 11 Analogue, AC, frequency modulated.



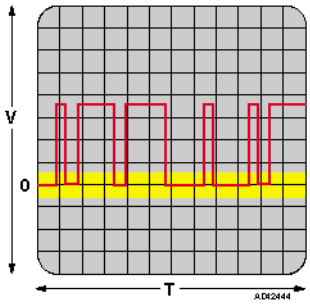
Waveform 12 Digital, DC, frequency modulated.



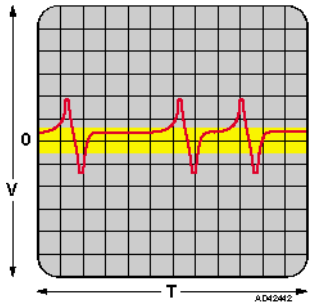
Waveform 13 Analogue, AC, frequency modulated.



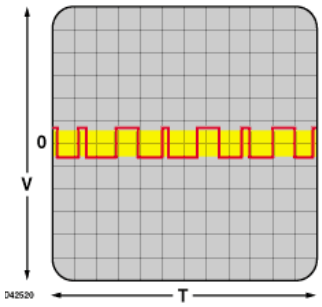
Waveform 14 Digital, DC, frequency modulated.



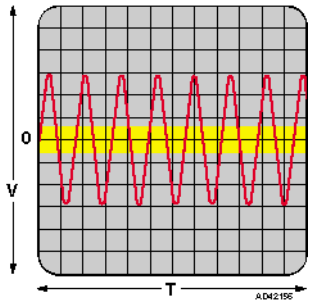
Waveform 15 Analogue, AC, frequency modulated.



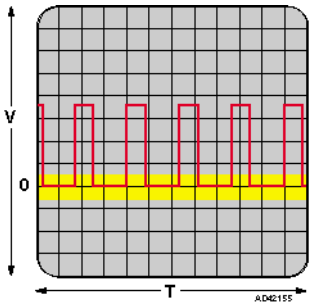
Waveform 16 Digital, DC, frequency modulated.



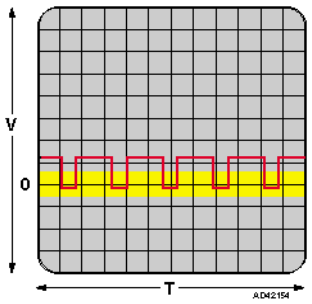
Waveform 17 Analogue, AC, frequency modulated.



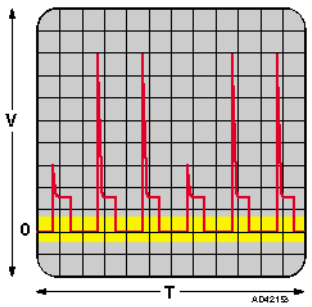
Waveform 18 Digital, DC, frequency modulated.



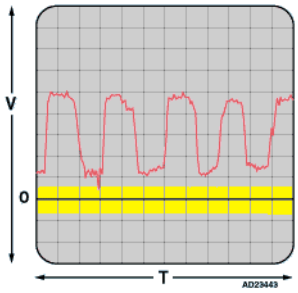
Waveform 19 Digital, DC, pulse width modulated or digital, DC frequency modulated.



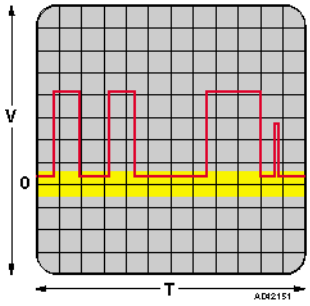
Waveform 20 Digital, DC, pulse width modulated or digital, DC frequency modulated.



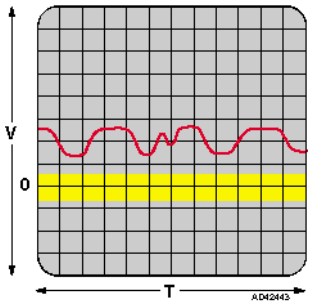
Waveform 21 Analogue, DC.



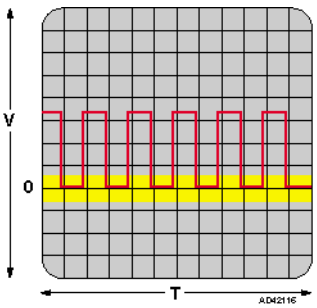
Waveform 22 Digital, DC.



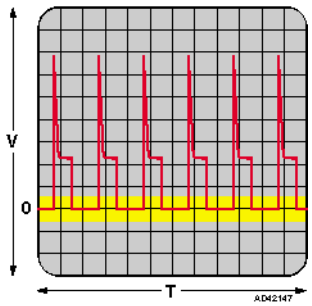
Waveform 23 Analogue, DC.



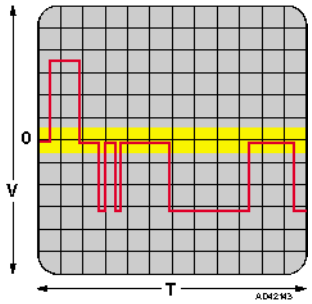
Waveform 24 Digital, DC, pulse width modulated or digital, DC, frequency modulated.



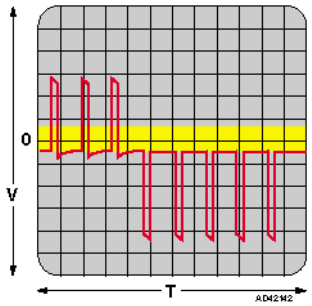
Waveform 25 Digital, DC, pulse width modulated or digital, DC, frequency modulated.



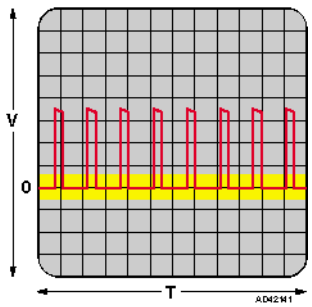
Waveform 26 Digital, DC, pulse width modulated or digital, DC, frequency modulated.



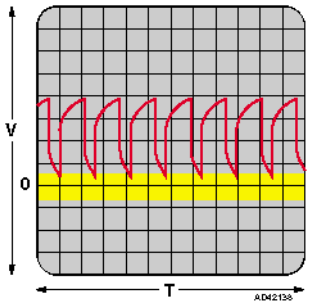
Waveform 27 Digital, DC, pulse width modulated or digital, DC, frequency modulated.



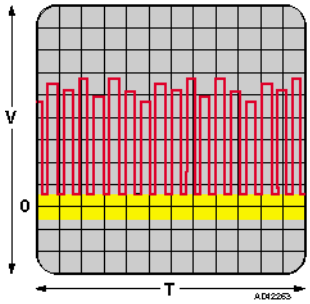
Waveform 28 Digital, DC, pulse width modulated or digital, DC, frequency modulated.



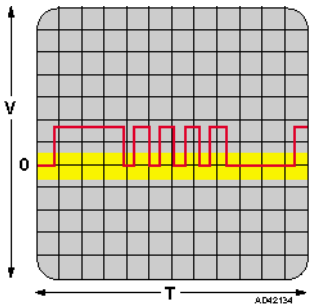
Waveform 29 Digital, DC, pulse width modulated or digital, DC, frequency modulated.



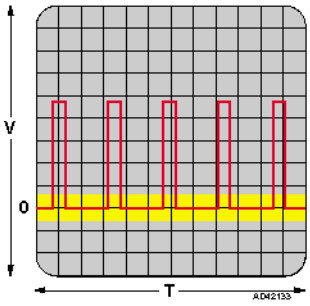
Waveform 30 Digital, DC, pulse width modulated or digital, DC, frequency modulated.



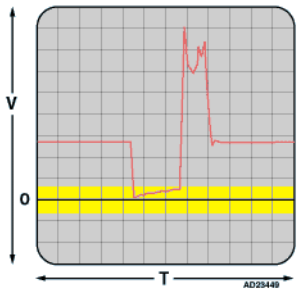
Waveform 31 Digital, DC, pulse width modulated.



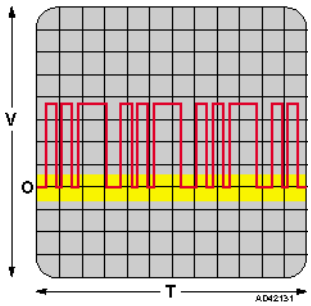
Waveform 32 Digital, DC, frequency modulated.



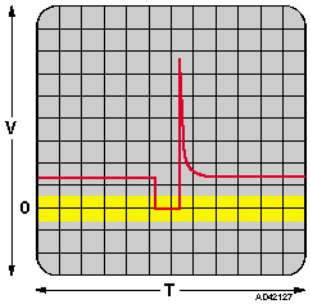
Waveform 33 Digital, DC, frequency modulated.



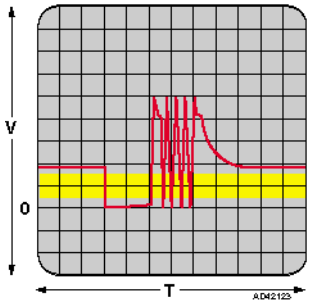
Waveform 34 Digital, DC.



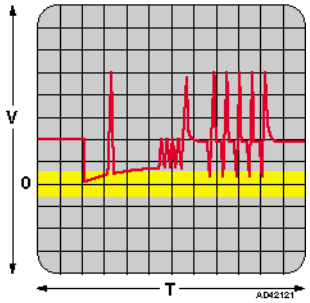
Waveform 35 Digital, DC, pulse width modulated.



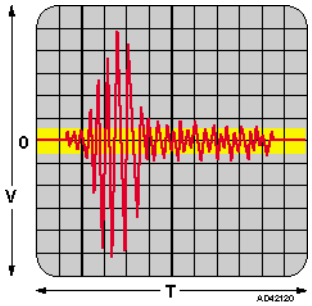
Waveform 36 Digital, DC, pulse width modulated.



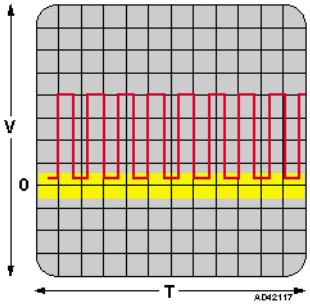
Waveform 37 Digital, DC, pulse width modulated.



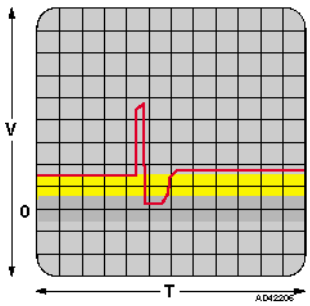
Waveform 38 Analogue, AC.



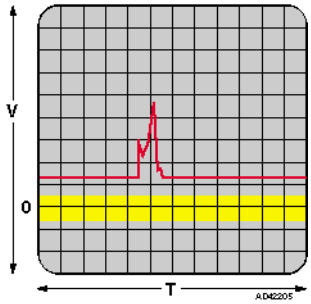
Waveform 39 Digital, DC, frequency modulated.



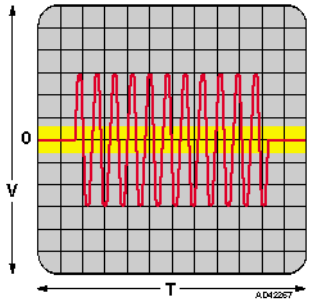
Waveform 40 Analogue, DC.



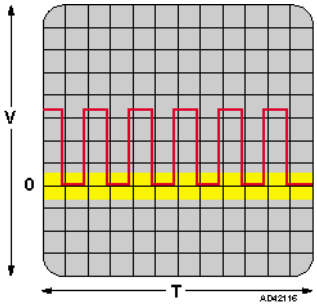
Waveform 41 Analogue, DC



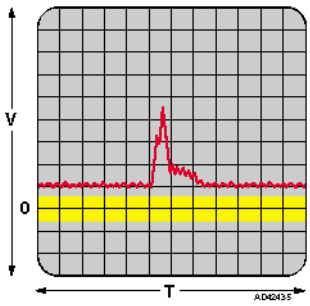
Waveform 42 Analogue, AC, frequency modulated.



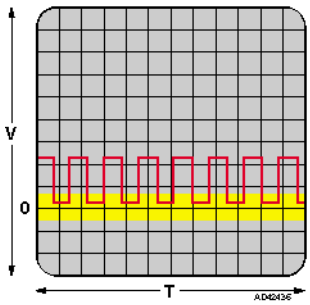
Waveform 43 Digital, DC, frequency modulated.



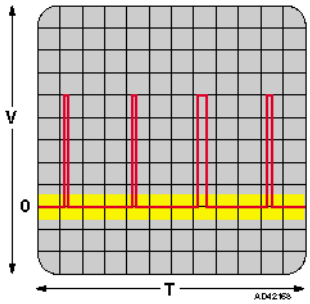
Waveform 44 Analogue, DC.



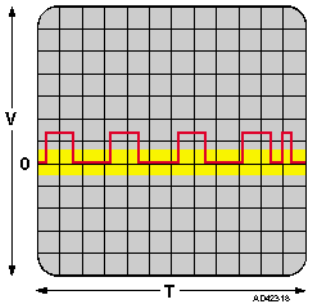
Waveform 45 Digital, DC, frequency 38; pulse width modulated.



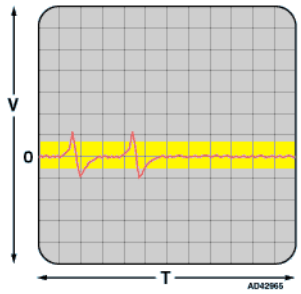
Waveform 46 Digital, DC, frequency modulated.



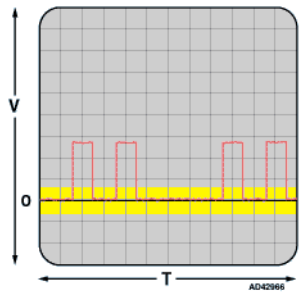
Waveform 47 Digital, DC, frequency modulated.



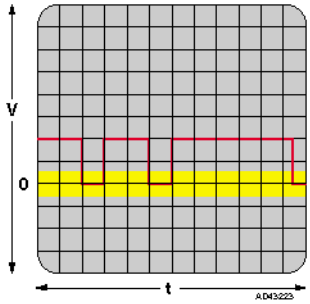
Waveform 48 Analogue, AC, frequency modulated.



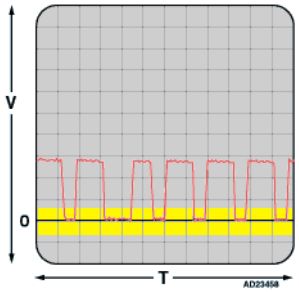
Waveform 49 Digital, DC, frequency modulated.



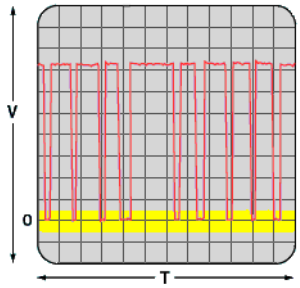
Waveform 50 Digital, DC, frequency modulated.



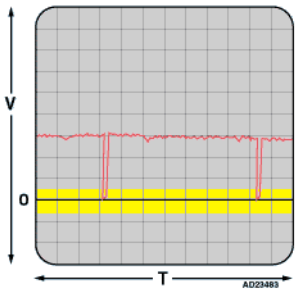
Waveform 51 Digital, DC, frequency modulated.



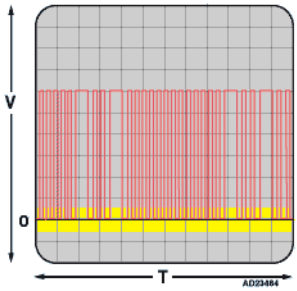
Waveform 52 Digital, DC, pulse width modulated or digital, DC, frequency modulated.



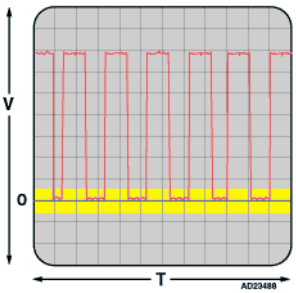
Waveform 53 Digital, DC, frequency modulated.



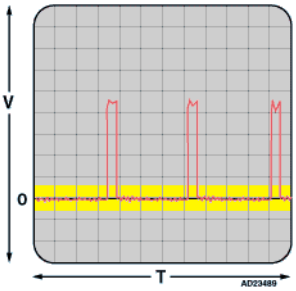
Waveform 54 Digital, DC, frequency modulated.



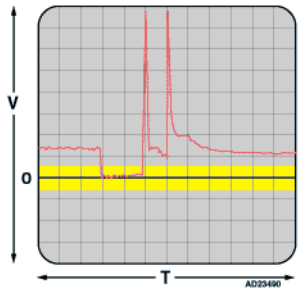
Waveform 55 Digital, DC, frequency modulated.



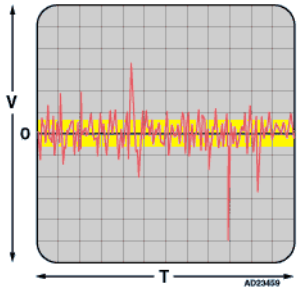
Waveform 56 Digital, DC, frequency modulated.



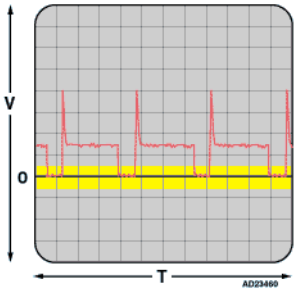
Waveform 57 Digital, DC, pulse width modulated.



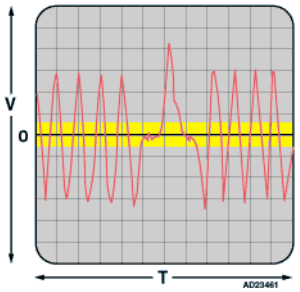
Waveform 58 Analogue, AC.



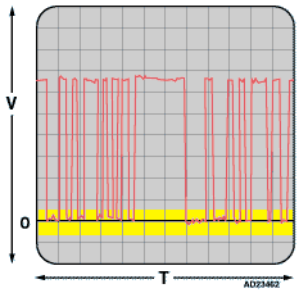
Waveform 59 Digital, DC, pulse width modulated or digital, DC, frequency modulated.



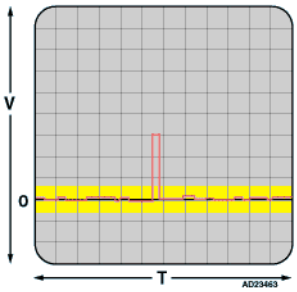
Waveform 60 Analogue, AC, frequency modulated.



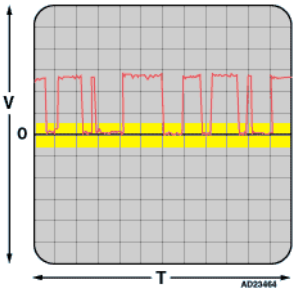
Waveform 61 Digital, DC.



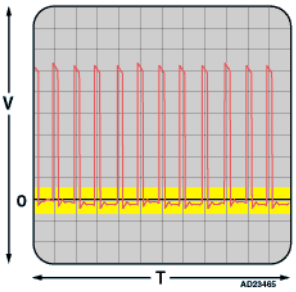
Waveform 62 Digital, DC.



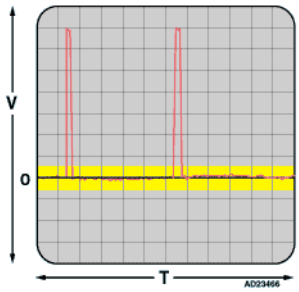
Waveform 63 Digital, DC, frequency modulated.



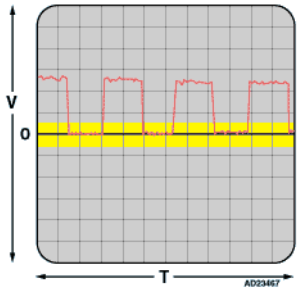
Waveform 64 Digital, DC, frequency modulated.



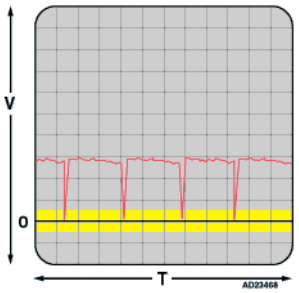
Waveform 65 Digital, DC.



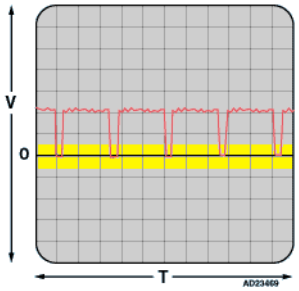
Waveform 66 Digital, DC, frequency modulated.



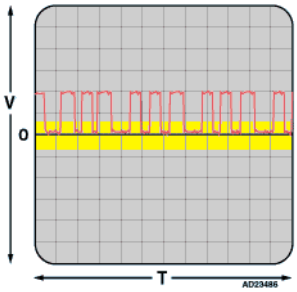
Waveform 67 Digital, DC, pulse width modulated or digital, DC, frequency modulated.



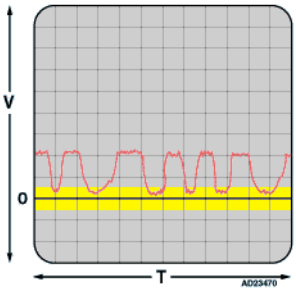
Waveform 68 Digital, DC, pulse width modulated or digital, DC, frequency modulated.



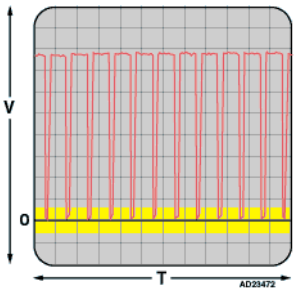
Waveform 69 Digital, DC, frequency modulated.



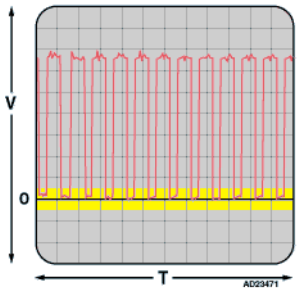
Waveform 70 Analogic.



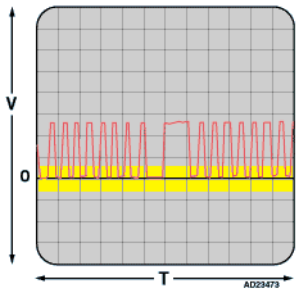
Waveform 71 Digital, DC, pulse width modulated.



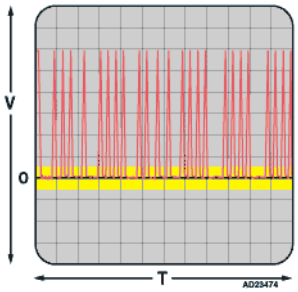
Waveform 72 Digital, DC.



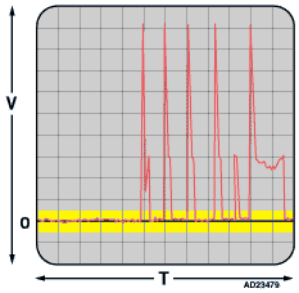
Waveform 73 Digital, DC, frequency modulated.



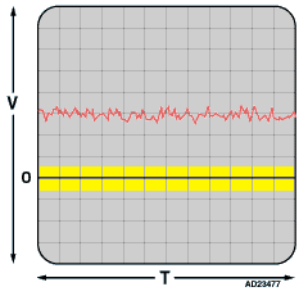
Waveform 74 Analogue, DC, frequency modulated.



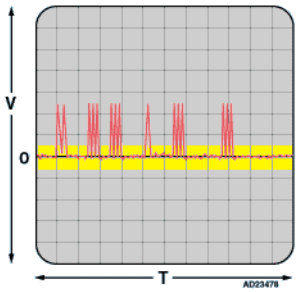
Waveform 75 Digital, DC, frequency modulated.



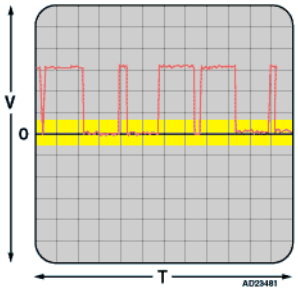
Waveform 76 Analogue, DC.



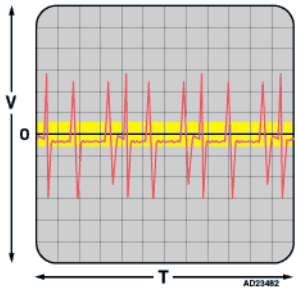
Waveform 77 Analogue, DC, frequency modulated.



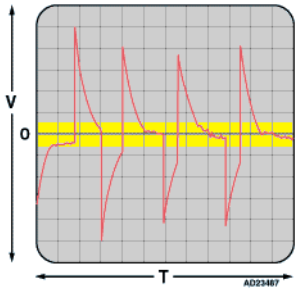
Waveform 78 Digital, DC, frequency modulated.



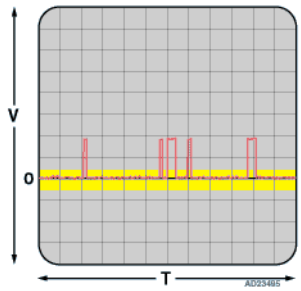
Waveform 79 Analogue, AC, frequency modulated.



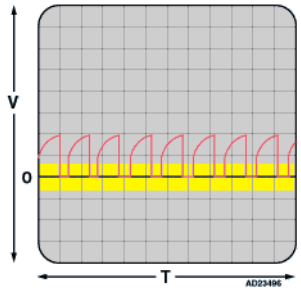
Waveform 80 Digital, DC.



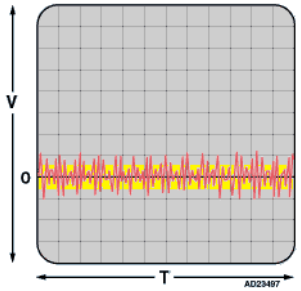
Waveform 81 Digital, DC.



Waveform 82 Digital, DC, pulse width modulated or digital, DC, frequency modulated.



Waveform 83 Analogue, AC, frequency modulated.



Waveform 84 Digital, DC, frequency modulated.