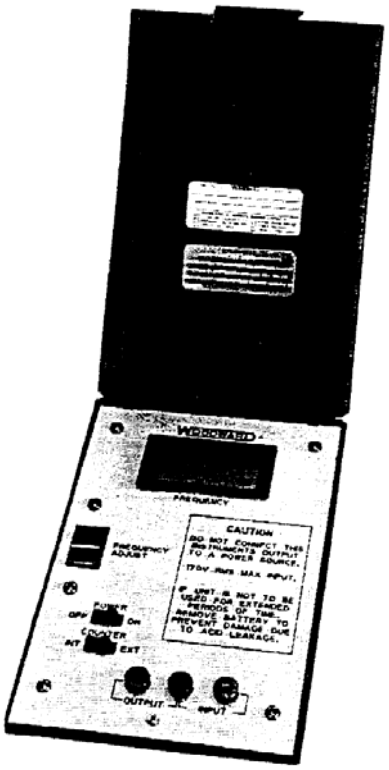
WOODWARD

Product Manual 82012
(Revision NEW, 1989)
Original Instructions



Frequency Counter/Generator

Hand-Held Test Instrument

Operation Manual

General Precautions

Read this entire manual and all other publications pertaining to the work to be performed before installing, operating, or servicing this equipment.

Practice all plant and safety instructions and precautions.

Failure to follow instructions can cause personal injury and/or property damage.

Revisions

This publication may have been revised or updated since this copy was produced. To verify that you have the latest revision, check manual *26311* , *Revision Status & Distribution Restrictions of Woodward Technical Publications*, on the *publications page* of the Woodward website:

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Proper Use

Any unauthorized modifications to or use of this equipment outside its specified mechanical, electrical, or other operating limits may cause personal injury and/or property damage, including damage to the equipment. Any such unauthorized modifications: (i) constitute "misuse" and/or "negligence" within the meaning of the product warranty thereby excluding warranty coverage for any resulting damage, and (ii) invalidate product certifications or listings.

Translated Publications

If the cover of this publication states "Translation of the Original Instructions" please note:

The original source of this publication may have been updated since this translation was made. Be sure to check manual *26311* , *Revision Status & Distribution Restrictions of Woodward Technical Publications*, to verify whether this translation is up to date. Out-of-date translations are marked with ⚠. Always compare with the original for technical specifications and for proper and safe installation and operation procedures.

Revisions—Changes in this publication since the last revision are indicated by a black line alongside the text.

Manual 82012

Warnings and Notices

Important Definitions

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

- **DANGER**—Indicates a hazardous situation which, if not avoided, will result in death or serious injury.
- **WARNING**—Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
- **CAUTION**—Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
- **NOTICE**—Indicates a hazard that could result in property damage only (including damage to the control).
- **IMPORTANT**—Designates an operating tip or maintenance suggestion.

⚠WARNING

Overspeed / Overtemperature / Overpressure

The engine, turbine, or other type of prime mover should be equipped with an overspeed shutdown device to protect against runaway or damage to the prime mover with possible personal injury, loss of life, or property damage.

The overspeed shutdown device must be totally independent of the prime mover control system. An overtemperature or overpressure shutdown device may also be needed for safety, as appropriate.

⚠WARNING

Personal Protective Equipment

The products described in this publication may present risks that could lead to personal injury, loss of life, or property damage. Always wear the appropriate personal protective equipment (PPE) for the job at hand. Equipment that should be considered includes but is not limited to:

- **Eye Protection**
- **Hearing Protection**
- **Hard Hat**
- **Gloves**
- **Safety Boots**
- **Respirator**

Always read the proper Material Safety Data Sheet (MSDS) for any working fluid(s) and comply with recommended safety equipment.

⚠WARNING

Start-up

Be prepared to make an emergency shutdown when starting the engine, turbine, or other type of prime mover, to protect against runaway or overspeed with possible personal injury, loss of life, or property damage.

⚠WARNING

Automotive Applications

On- and off-highway Mobile Applications: Unless Woodward's control functions as the supervisory control, customer should install a system totally independent of the prime mover control system that monitors for supervisory control of engine (and takes appropriate action if supervisory control is lost) to protect against loss of engine control with possible personal injury, loss of life, or property damage.

NOTICE

Battery Charging Device

To prevent damage to a control system that uses an alternator or battery-charging device, make sure the charging device is turned off before disconnecting the battery from the system.

Electrostatic Discharge Awareness

NOTICE

Electrostatic Precautions

Electronic controls contain static-sensitive parts. Observe the following precautions to prevent damage to these parts:

- **Discharge body static before handling the control (with power to the control turned off, contact a grounded surface and maintain contact while handling the control).**
- **Avoid all plastic, vinyl, and Styrofoam (except antistatic versions) around printed circuit boards.**
- **Do not touch the components or conductors on a printed circuit board with your hands or with conductive devices.**

To prevent damage to electronic components caused by improper handling, read and observe the precautions in Woodward manual *82715*, *Guide for Handling and Protection of Electronic Controls, Printed Circuit Boards, and Modules*.

Follow these precautions when working with or near the control.

1. Avoid the build-up of static electricity on your body by not wearing clothing made of synthetic materials. Wear cotton or cotton-blend materials as much as possible because these do not store static electric charges as much as synthetics.
2. Do not remove the printed circuit board (PCB) from the control cabinet unless absolutely necessary. If you must remove the PCB from the control cabinet, follow these precautions:
   - Do not touch any part of the PCB except the edges.
   - Do not touch the electrical conductors, the connectors, or the components with conductive devices or with your hands.
   - When replacing a PCB, keep the new PCB in the plastic antistatic protective bag it comes in until you are ready to install it. Immediately after removing the old PCB from the control cabinet, place it in the antistatic protective bag.

Frequency Counter/Generator

Description

The Woodward hand-held Frequency Counter/Generator replaces a function generator and a frequency counter when testing or calibrating Woodward electronic control systems. The test device may be used to test any control which uses a magnetic speed pickup.

The frequency generator is used to simulate the MPU signal to the governor. This permits open-loop speed and response testing in a static condition.

The frequency counter provides readout of an MPU frequency without disturbing engine operation.

The counter/generator uses a negligible amount of current and can be used indoors or outdoors. The counter may be used to measure frequencies generated by all magnetic pickup devices. The unit will also count pulses from a proximity switch or from any alternating current.

The counter updates twice each second and the reading is in Hz (cycles per second).

The frequency generator mode provides an accurate square-wave output with the frequency adjustable from 0 to 20 000 Hz. The frequency signal is used to replace MPU input or inputs to a unit being tested. The frequency being generated is displayed on the screen of the unit.

When loaded with 600 Ω, the output is 15 V peak-to-peak. When loaded with 50 Ω, the unit generates a 10 V peak-to-peak signal.

Output voltage drops at frequencies below 300 Hz.

Operating Instructions

NOTICE

The Frequency Generator output MUST NOT be connected to a power source. The device will be damaged or destroyed if the output is attached to a power source.

To Use as a Frequency Generator

Turn on power, set the counter switch in INT (internal) generator position. Turn the frequency-adjust knob to the desired frequency as read in the Liquid Crystal Display (LCD).

Attach the connecting leads, red to OUTPUT (positive), black to common. Use the signal to replace MPU input or inputs to unit being tested. Vary frequency with the knob as necessary.

To Use as a Frequency Counter

Set the counter switch to EXT (external).

NOTICE **Do not attach leads from output jack to a voltage source.**

Attach leads from the INPUT jack to the frequency source, red is (+), black is common (–). DO NOT attach to a frequency source in excess of 170 Vrms. Read the frequency on the display.

IMPORTANT **The counter may be attached directly to the terminal lugs of a magnetic pickup device. The current drawn by the counter is negligible.**

Care of the Frequency Generator

If the device is not to be used for an extended period of time, remove the batteries to prevent damage due to acid leakage.

Replace batteries when a low-battery signal appears in the display area.

NOTICE **Electronic components in the counter/generator can be damaged by static electricity discharge. Do not touch the elements on the printed circuit board. Discharge any possible charge in your body by grounding yourself to a large object or a water pipe before opening the faceplate to service the batteries.**

To replace batteries, remove only the retaining screw located below the three banana jacks at the bottom of the front of the unit. Pry the faceplate up with a small screwdriver. Note the retention lugs at the top of the faceplate.

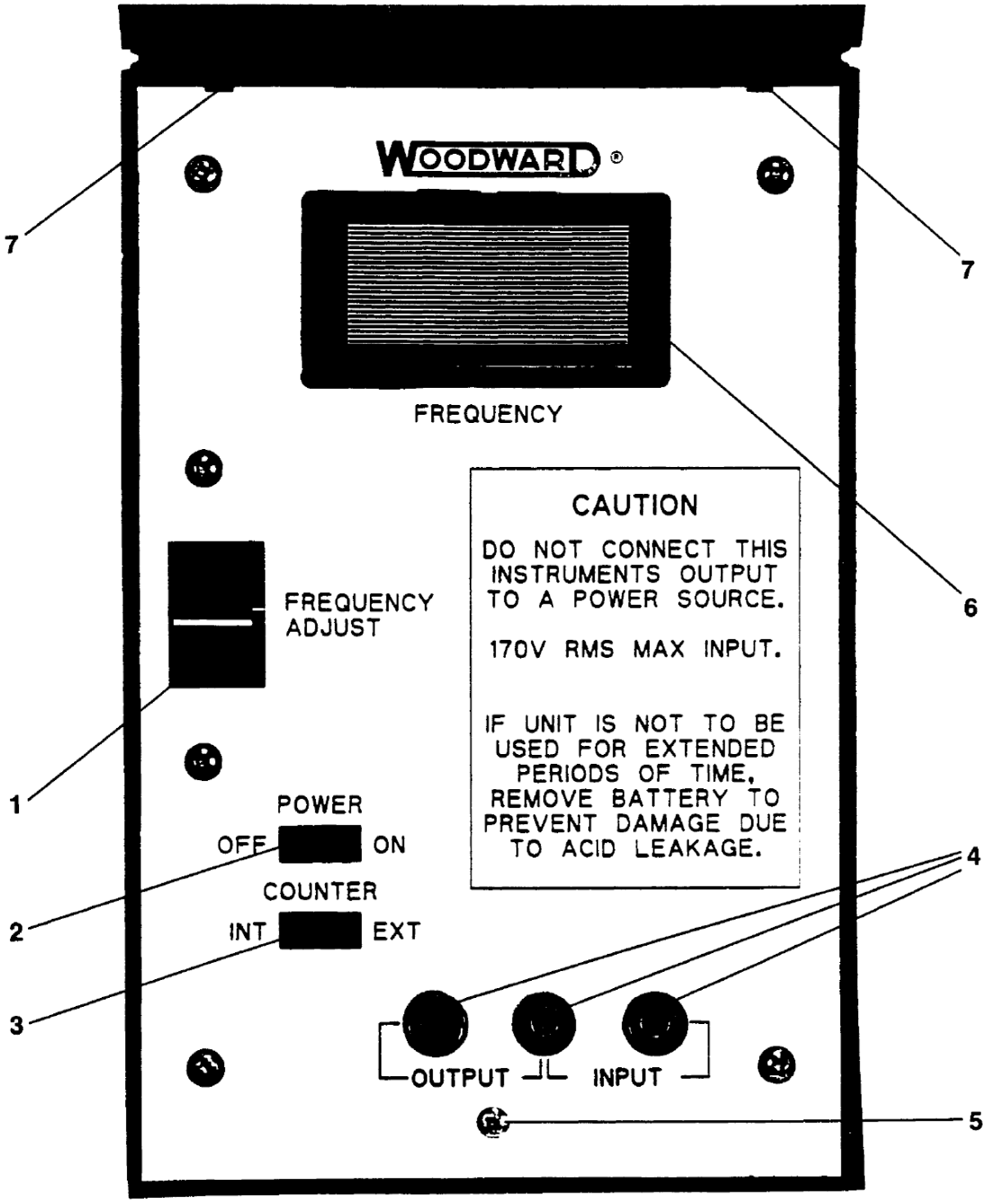
The display unit is protected by a plastic lens. Clean only with mild detergent and soft wipe. Avoid scratching the lens.

Keep the unit clean, store away from extreme temperatures, high moisture, dust, or other contaminated environments.

Calibration Check and Maintenance

Check the hand-held unit against a known good frequency generator and frequency counter. Accuracy should be within ±1 percent, plus one digit. No calibration adjustments are available.

A fault in the frequency generator does not necessarily affect the operation of the counter. A fault in the counter will not necessarily affect the operation of the frequency generator.



Frequency Counter/Generator

1. Frequency adjust knob to set output frequency
2. Power On-Off switch
3. Counter switch (selects counter function)
4. Input-Output connectors. Black is common. Output is for generator function. Input is for signal from MPU
5. Remove this screw to replace 9 V batteries
6. Liquid Crystal Display of either function
7. Clips to retain faceplate

We appreciate your comments about the content of our publications.

Send comments to: icinfo@woodward.com

Please reference publication 82012.

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