WOODWARD

Product Manual 55036
(Revision B)
Original Instructions

LVDT Test Device

Testing and Calibration of LVDT Feedback Devices on PG Governors

Operation Manual

IMPORTANT

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.

DEFINITIONS

- **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

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.

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.

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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.

NOTICE

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.

NOTICE

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*.

LVDT Test Device
Testing and Calibration of LVDT Feedback Devices on PG Governors

Description

The LVDT Test Device provides accurate calibration and checking of LVDTs (Linear Variable Differential Transformers) used on PG rail governors. The device can only test governors which can have governor racks set in stationary positions.

A 6-foot (1.8 m) cable to connect the test device to the governor is included with the test equipment.

Properly used, the device permits setting up the LVDT to the exact specifications used at the factory.

Operation

The test device contains a power supply which converts 115 Vac, 50 or 60 Hz power to +20 and –20 Vdc. Circuits in the device convert the dc power to 2500 Hz at an adjustable amplitude of 0 to 10 Vrms.

A 4.5 digit ac volt meter in the test device is used to read the amplitude of the frequency output from the device to the LVDT and the voltage output of the LVDT for the various positions. The selection of output or input is made with the DVM-1 switch on the test device.

A phase lamp is used to check the primary and secondary wiring of the LVDT. When the LVDT is wired correctly the primary and secondary signals are in phase. At this time the lamp on the front panel lights. The lamp does not light if the wiring is wrong or open.

Figure 1. LVDT Test Device

Operating Instructions

Plug the power cord into a 115 V, 50 or 60 Hz outlet.

Plug the 6-foot (1.8 m) connecting cable into the front panel of the test device and into the proper connector on the side of the governor. The cable assembly is marked "J-1" on the test device end and "Governor" on the end which should plug into the governor. The plugs are identical and should the cable be plugged in incorrectly the test could be inaccurate due to noise or other interference.

Turn on the power with the On-Off switch. Select EXCITATION on the DVM-1 switch. Adjust the excitation amplitude pot for the desired excitation voltage as specified for the governor being tested. The pot adjustment locks to assure that the excitation output is not accidentally changed. Turn the lock clockwise to lock, counterclockwise to unlock. The frequency of excitation will be at the desired 2500 Hz and cannot be adjusted.

Switch to Feedback Return and read the LVDT feedback on the digital volt meter. Set up the LVDT for the proper feedback voltage for the specified governor positions.

Check to see that the polarity OK lamp is lit on the front panel.

Turn off the power to the test box and disconnect the cable from the governor and then from the test device. Unplug the device from the power supply, if desired

Test Device Specifications

Power Used:	115 V, 50/60 Hz
Power Supplies:	±0.5 Vdc
Excitation:	2500 Hz ±25 Hz
Meter:	4.5 Digit, 3 Decimal Places AC RMS, 20 Vac Maximum Range Input
Physical Dimensions:	11.00 x 10.00 x 5.75 inches 279.4 x 254.0 x 146.0 mm 7 ft (2.1 m) power cord 6 ft (1.8 m) cable included with device

Calibration and Adjustment of the Test Device

Equipment Required:

- Frequency counter
- AC voltmeter, 20 V range, 1 mV resolution
- DC voltmeter, 200 V range

NOTICE

Portions of this control are subject to damage by static electricity. Discharge body static before handling the device (contact a grounded surface and maintain contact while handling the device.) Avoid all plastic, vinyl and styrofoam (except antistatic plastics) around the printed circuit board. Do not touch the printed circuit board with your hands or with conductive devices.

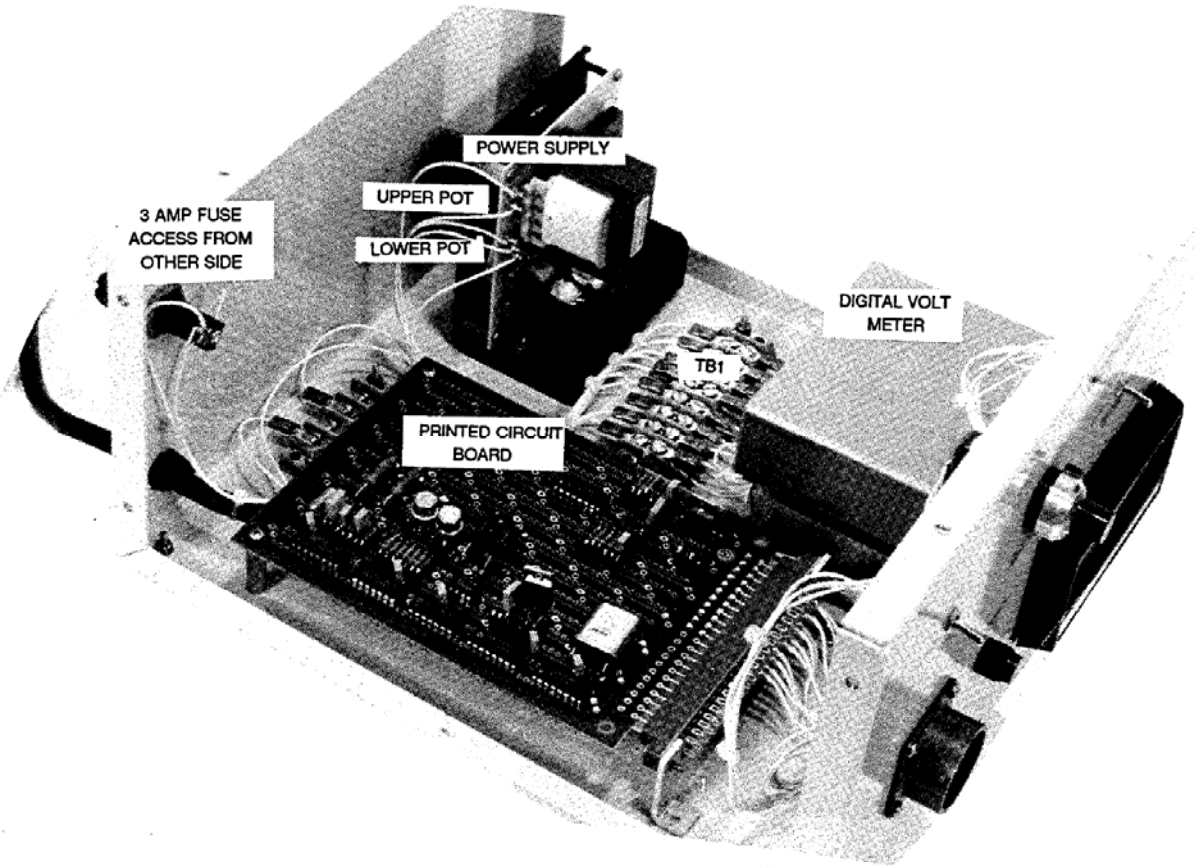

Figure 2. Interior of the LVDT Test device

Calibration Procedure

1. Turn the On-Off switch to OFF.

2. Remove the cover from the test device.

3. Plug the power cord into a 115 V, 60 or 50 Hz. power source. Turn the On-Off switch to ON.

4. Measure the power-supply output at TB 1. Terminal 4 (+) to terminal 5 (common) must measure +20.0 ±0.5 Vdc. Adjust the lower pot on the power supply, if necessary.

5. Measure the power-supply output at TB 1. Terminal 6 (–) to terminal 5 (common) must measure –20.0 ±0.5 Vdc. Adjust the upper pot on the power supply, if necessary.

6. Select Excitation on the switch and adjust excitation amplitude all the way clockwise. (Unlock the pot by turning the lock counterclockwise.)

7. Connect the counter to pins H and G on the device's plug. Read 2500 ±25 Hz. The frequency is not adjustable and the device must be returned to the factory if this frequency is not within the tolerance listed. Remove the frequency counter connections.

8. Connect the ac meter to pins H and G on the device's plug.

9. Make sure the switch is set for EXCITATION. Adjust the Excitation Amplitude pot for 10.00 V on the external meter. The external and front panel meters should both read 10.000 ±0.100 Vac. The meter is not adjustable and the unit must be returned to the factory for repair if the meters do not read the same.

10. Connect pin H to pin M and pin G to pin J. The phase lamp should light. Remove the jumper wires and the lamp should go out.

11. Test the continuity in the cable by attaching the cable to the test device and then repeating the tests from step 10 on the governor end of the cable.

12. Remove the external meter, shutoff the power and unplug the power cord and 6-foot long cable. Replace the top cover.

This completes the calibration procedure.

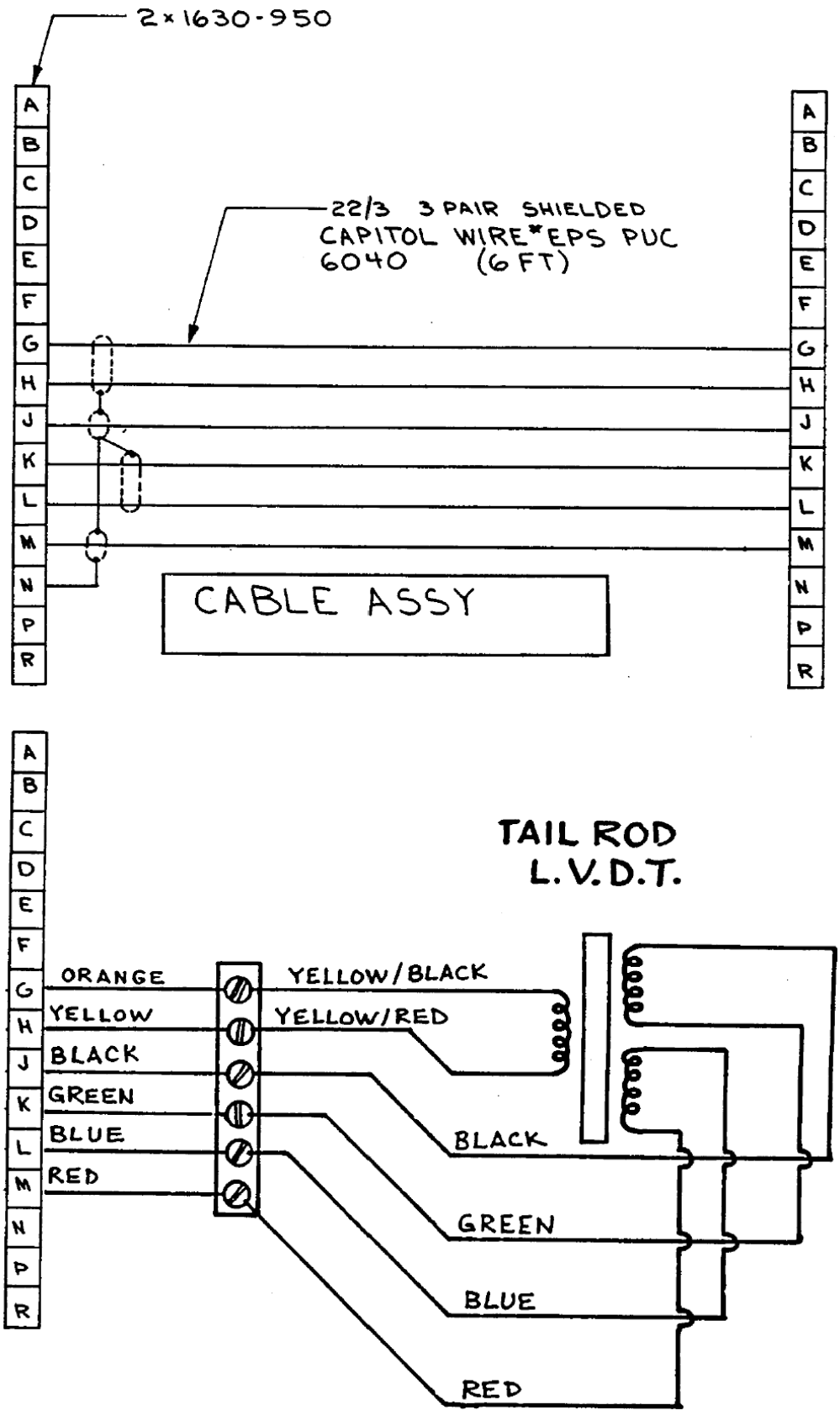

Figure 3. Cable Assembly Wiring Diagram

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Please reference publication 55036B.

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