

TRANSITION TEST SET

MODEL GP-1200

Revision B

OPERATING MANUAL

734A1020P3

Revision C

General Component Design, Inc.

Electronic Design & Manufacture

Minneapolis, MN. 55316

These instructions do not purport to cover all details or variations in equipment or to provide for every possible contingency to be met in connection with the operation or maintenance. Should further information be desired or should particular problems arise which are not covered sufficiently for the user's purposes, the matter should be referred to General Component Design, Inc. Any applicable Federal, State or local regulations or company safety or operating rules must take precedence over any instructions given in this manual.

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MODEL GP-1200
Table Of Contents

<u>SECTION</u>	<u>PAGE</u>
Table Of Contents	2
Specifications	3
Safety	4
General Description	5
Receiving, Handling And Storage	6
Functional Descriptions	7
DC POWER cable, Section 1	7
OUTPUT leads, Section 2	7
SAFETY GROUND, Section 3	7
POWER rocker switch, Section 4	7
POWER ON lamp, Section 5	7
ALARM rocker switch, Section 6	7
OUTPUT rocker switch, Section 7	8
STANDBY push-button switch, Section 8	8
STANDBY lamp, Section 9	8
TEST push-button Switch, Section 10	8
OUTPUT ENABLE lamp, Section 11	8
VOLTAGE CONTROL, Section 12	9
VOLTS & MILLIAMPERE, meters, Section 13	9
General Testing Procedure	10, 11
Revision changes	12
Warranty & Service	13

TRANSITION TEST SET
MODEL GP-1200
Specifications

- Meter type: Digital, 3 ½ digit LED type
- Meter Accuracy: $<\pm 1\%$ reading + 1 digit (system accuracy)
- Meter Volts display: Resolution to 1 Volt.
- Meter Current display: Resolution to 1 Milliampere.
- Operating Temperature: 0 to +50° Celsius, de-rated above 25°
- Storage Temperature: -40° to +85° Celsius
- Warm-up Time: None, but allow 5 minutes for better stability.
- Humidity: 0 - 95% R.H. @ 0 to 40° C, non-condensing
- Voltage, Output: 0 to 1250 VDC Nominal, open-circuit
- Current, Output: 500 Milliamperes, nominal
- Current, over, Trip Time: Instantaneous
- External capacitance discharge time: 0.32 Seconds per μF from 1,250 to 50 VDC.
- DC Power Cord: 6' Long, 2-Conductors, 600 volt rated
- Output Leads: 6' Long, 2-Conductors
- Output Lead Ratings: 10 Kilovolt Working, Rubber Insulated
- Weight: 20.3 Lbs
- Size: 11.5" x 9.5" x 13.5"

TRANSITION TEST SET MODEL GP-1200 SAFETY

Personal Safety Instructions

Only qualified personnel should work on or around this equipment. To ensure the highest degree of personal safety, all who use this equipment are required to become thoroughly familiar with all safety instructions contained in this document. Successful and safe operation of this equipment depends upon proper handling, operation, maintenance and application of local company procedures.

- Any non-authorized modifications, tampering or physical damage will void the warranty. Elimination of any connections in the safety earth grounding system or bypassing any safety systems will void this warranty.
- A Transition Tester produces voltages and currents, which can cause a harmful or fatal electric shock. To prevent accidental injury or death, these safety procedures must be strictly observed when operating and using this instrument.
- Service & Maintenance: To prevent electric shock do not remove the instrument cover. There are no user serviceable parts inside.
- Do not perform high voltage tests in a combustible atmosphere or in any area where combustible materials are present.
- Never perform a Transition Test on energized circuitries or equipment.
- When HIGH VOLTAGE is present, the OUTPUT ENABLE red lamp is solid on.

TRANSITION TEST SET
MODEL GP-1200
General Description

Warning!

Hazardous voltages available from of this Unit with respect to personal safety.

The GP-1200 is an industry specialized, custom built unit, which contains all the necessary controls, metering, electronics and chassis enclosure to safely generate, monitor and deliver voltages necessary to test and calibrate Transition Control panels. This all contained in an easy to carry and portable package. It is built to withstand a reasonable rough handling environment and is reasonably resistant to foreign materials but should still be handled with care as with any delicate instrument.

This test-set requires 74-volt D.C. (direct current) from the locomotive. It can draw several hundred watts of power when realizing its full capabilities. This level of power is simply not available with portable battery operation.

An internal switch-mode power supply converts locomotive power to a variable voltage link and is adjusted by the operator “voltage control” potentiometer located on the front panel. This variable link is semi-regulated in nature and can be affected by large variations in the locomotive battery level. This link feeds a power transformer operating in a push-pull switch-mode topology modulated at 50 Kilohertz, converting low voltage D.C. to a high voltage high frequency A.C. power. Special rectifiers then convert this source back into D.C. again.

The high-voltage output is galvanically isolated from chassis ground allowing the entire output to “float” separately from the locomotive system if necessary. Digital meters monitor the output circuit directly. If the user load is capacitive in nature and retains any electrical charge after the GP-1200 power has been removed, in the standby mode, the digital voltmeter will indicate likewise, allowing the operator to safely see any residual charge. Additionally, if any user load charges exist, an internal load resistor will automatically discharge them quickly. A typical value of voltage decay may be a nominal 0.3 seconds per each μ Farad of external capacitance. Voltage decay can be defined as decay from a full voltage of 1,250 volts down to 50 volts all within this stated time. Note: Transition control panels are not capacitive in nature.

Logic circuits control and allow the unit to produce an output only if certain conditions exist and have been executed in the proper sequence. They are: Power switch on, Voltage Control operator potentiometer full counterclockwise rotation and finally, the Test push-button is depressed. If these conditions are met and in that sequence, the unit will now be armed and ready to produce an output. The Voltage Control potentiometer can now be rotated to the desired value. If a trip occurs by either over current or simply shutdown, this start-up procedure must be followed before an output is once again available. Again, all done in the name of safety.

Internal circuits monitor and shutdown the unit if the output exceeds 1,250 volts (nominal) or if the output current exceeds 500 milliamperes (nominal). Additional internal circuits monitor and will not allow the unit to become ready if the input power leads are reversed or the digital meters are inoperative.

High quality test probe wires are used to give an operator flexibility, thick rubber insulation for durability and exceptionally high voltage insulation rating.

TRANSITION TEST SET
MODEL GP-1200
Receiving, Handling and Storage

Immediately upon receipt, examine this equipment for any damage that might have been sustained in transit. If damage or rough handling is evident, please contact the General Component Design Company. This unit was built to withstand rough handling, but reasonable care should be exercised when handling or transporting this equipment as with all electronic equipment. Store in cool dry place when not using.

TRANSITION TEST SET
MODEL GP-1200
Functional Descriptions

1. DC POWER cable:

Warning! This instrument uses standard 74-volt nominal DC locomotive power sources. Test-lead type connections are to be connected only to locomotive 74 volt DC source. They are color-coded for polarity: Red for positive and Black for negative.

2. OUTPUT leads:

Warning! There are hazardous voltages available at the output terminals of this unit. Up to 1,250 volts can be present. Output test leads are color-coded for polarity: Red for positive and Black for negative. Exceptionally thick rubber insulation adds an extra safety margin from wire abrasion and damage.

3. SAFETY GROUND lead:

Warning! This industry standard green colored Safety Ground lead must be connected and secured to a clean and known reliable earth ground. This will bond the GP-1200 control box to the earth ground system for operator personal protection.

4. POWER Rocker Switch:

This rocker switch is labeled with International standard symbols 0 or 1 meaning power off and power on respectively. This switch applies the main control power to the unit and illuminates the digital meters. Upon power up, the unit defaults in the standby mode with the Power On and Output Standby lamp illuminated and zero readings on the Volt and milliamperage digital meters.

5. POWER ON lamp:

This lamp is illuminated when main control Power On switch is depressed to the ON direction. The main control unit is powered-up and ready for the next enable operation.

6. ALARM Rocker Switch:

This rocker switch is labeled with International standard symbols 0 or 1 meaning alarm off and alarm_on respectively. This switch controls the audible safety beeper device. Under normal circumstances and testing scenarios, the Alarm switch should be moved to the ON or “1” position for warning of testing in progress for personal protection. Under special testing circumstances, the audible alarm can be silenced. Simply depress the Alarm switch downward to the Silence position. The alarm audible mode is recommended.

7. OUTPUT Rocker Switch:

This rocker switch is labeled with International standard symbols 0 or 1 meaning output momentary or output continuous respectively. Under normal circumstances and testing scenarios, the Output switch should be left in the downward or Momentary position. This means that an operator must depress and hold the Test switch all the time that an output is desired. (Full CCW rotation of the Voltage Control knob required). The switch is acting like a “dead man” type of switch. If the switch is released for any reason, the output ceases immediately. This also requires both hands to be used by the operator. This mode of operation is recommended.

In the Continuous mode of operation, once the Test push-button is depressed (Full CCW rotation of the Voltage Control knob required) the output is activated and is made available on a continuous basis whether or not the Test switch is depressed. The black colored Standby push-button switch must be depressed to deactivate the output. Important: Several other factors will also shutdown the output. They are: rotate the Voltage Control knob full CCW, Depress the Power switch to the “0” position, over-voltage or over-current mode. Any of these actions will cause the unit to revert to the standby or power off mode.

8. STANDBY Push-Button:

Warning! This black colored push-button switch can be pushed at any time to disable the output if necessary. This push-button switch will switch the unit from any operating mode to the standby mode. Upon first power up, the unit defaults in the Standby mode, also the Output Standby lamp is illuminated indicating likewise.

9. OUTPUT STANDBY lamp:

When in the standby mode, the Output Standby lamp is illuminated.

10. TEST Push-Button:

This is an industry-standard safety-guarded push-button switch will enable the output signal. This means depressing this switch will activate the output circuit but only when the voltage control potentiometer is turned fully counterclockwise. Zero output voltage start-up setting is required. Upon successful activation, the Output Enable lamp is illuminated. Notice that this is step one of a two-step procedure required to enable the output after main control power has been established.

11. OUTPUT ENABLE lamp:

When in the Test mode, the Output Standby lamp is illuminated. Caution: When this lamp is illuminated, the output is armed and ready for an output. Whether or not there is an output is dependent on the Voltage Control operator setting.

12. VOLTAGE CONTROL rotary knob:

This control directly adjusts the available output voltage. The arc shown around this control is a representation only and does not purport to actual voltages. This control represents 0 to 100% in a ten-turn manner. Multiple turns are needed to provide a reasonable resolution, which is not achievable, by a single turn device. As previously stated, this operator control must be returned full counterclockwise to transition the unit from a standby mode to an operate (enabled) mode. The methodology for requiring a zero-start is safety related for personal protection. Notice that this is step two of the two-step process required to enable the output after main control power has been established.

13. VOLT & MILLIAMPERE meters:

Digital panel meters are employed. They are the 3½ digit industry type using an LED display which are highly visible in low-light conditions. They are configured for direct-reading units, meaning that there are no operator conversions to make. The volts are displayed with a resolution of one volt. The Milliamperes, likewise are displayed with a resolution to one Milliampere.

TRANSITION TEST SET
MODEL GP-1200
General Testing Procedure

SAFETY NOTICE:

The STANDBY button can be depressed at any time during testing if an emergency arises.

WARNING!

Prior to any testing procedures, ensure all user circuitries are powered down and disconnected for personal safety.

Procedures described here are to be generic in nature and may not specifically apply to user application. Any applicable Federal, State or local regulations or company safety or operating rules must take precedence over any instructions given in this manual.

Hereinafter, the Transition control panel under test will be known as Unit Under Test or U.U.T.

Perform the following sample test in this order:

1. Observe and follow all safety regulations prior to beginning test.
2. Disconnect or remove the U.U.T. from service.
3. Ensure GP-1200 unit power switch is OFF.
4. Connect the green SAFETY GROUND conductor to an appropriate earth or chassis ground.
5. Connect the Output black (-) test lead to the U.U.T. electrical return.
6. Connect the Output red (+) test lead to the U.U.T. high side point-under-test.
7. Connect the Input black (-) test lead to the locomotive (-) 74 volt (return).
8. Connect the Input red (+) test lead to the locomotive (+) 74 volt (power). (Last connection).
9. Depress the Alarm rocker switch to the ON or "1" position. (Alarm will be audible).
10. Depress the Output rocker switch to the Momentary or "0" position. (Momentary output).
11. Depress the Power switch to the ON or "1" position.
12. Observe unit Power On and Output Standby lamps illuminate.
13. Rotate the Voltage Control knob full counterclockwise. (Required to start).
14. Depress and hold the Test push-button switch.
15. Notice that output is active only when Test switch is depressed indicating Momentary mode.
16. Slowly rotate the Voltage Control knob clockwise to the desired output voltage.
17. Record or test U.U.T. as necessary.
18. Rotate the Voltage Control knob fully counterclockwise to the zero volts position.

19. Depress the Standby push-button forcing all outputs OFF.
20. Ensure digital voltmeter reads zero. (See warning note below).
21. **Warning:** Some types of user loads can be capacitive in nature and can store a small charge.
22. Depress the Power toggle switch to the OFF or “0” position when finished.
23. Disconnect the Input red (+) 74 Volt power test lead to the locomotive. (First removed).
24. Disconnect all remaining test leads as necessary.
25. End of test.

TRANSITION TEST SET
MODEL GP-1200
Revision Changes

The following paragraphs briefly describe the changes made in the GP-1200 from the original revision A to the newer revision B.

- a). **Rocker Switch Style:**
The toggle switch was changed to a rocker type switch.

- b). **Added Switches:**
Alarm switch and output mode switch functions added for safety.

- c). **Safety Alarm:**
Audible beeper alarm added for safety.

- d). **Voltage Adjustment Potentiometer:**
Changed from a triple gang, dual-knob, single-turn device to a single, 10-turn device.

- e). **Polycarbonate front operating panel:**
The front panel has been changed from traditional silkscreen type to a Lexan® layer. The text is sub-surface printed meaning the text is printed on the back and will never wear out compared to previous technology.

- f). **Non-detachable test leads:**

- g). **Brighter panel lamps:**

Lexan is a registered trademark of General Electric Company.

TRANSITION TEST SET
MODEL GP-1200
Warranty & Service

Warranty.

This unit is provided with a one-year limited warranty for both parts and labor. Damaged or broken items may not be covered.

Calibration:

To ensure the accuracy of calibration, it is recommended to check the performance of this instrument every 12 months.

Service.

To obtain service or additional manuals, please contact the following:

General Component Design, Inc.

Electronic Design & Manufacture

10909 Independence Ave. North

Champlin, Minnesota. 55316-3113

Or e-mail a request to:

generalcomponentdesign@comcast.net