INSTRUCTIONS

FOR
ENERGY STORAGE DEVICE
Model: ESD 201
Part Number: 9110600101

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INTRODUCTION

The Energy Storage Device ESD 201 is used where a station battery source is not available to provide circuit breaker trip power. The ESD 201 converts ac bus voltage to dc and stores enough energy to trip a circuit breaker one time for up to 72 hours after ac power has been interrupted.

WARNING!

To prevent personal injury or equipment damage, only qualified technicians or operators should install, operate, or service this device.

CAUTION

The ESD 201 is not a power supply and can be damaged by continuous current draw on the output.

ELECTRICAL SPECIFICATIONS

Output Power

330 to 450 Vdc

27 joules minimum at 330 Vdc

36 joules minimum at 380 Vdc

50 joules minimum at 450 Vdc

This output is maintained for 72 hours after the internal battery is fully charged.

Power Input

Operating Range:	120 or 240 Vac, ±10% 1-phase, 50/60 Hz
Burden:	10.0 VA maximum

Charging Rate

Varies nonlinearly from 90 volts/cycle down to 2.8 volts/min. as capacitor approaches 90% full charge after breaker trip event.

Power Dissipation

2.0 W, maximum continuous

PHYSICAL SPECIFICATIONS

Operating Temperature

-25°C to 65°C (-13°F to 149°F)

Storage Temperature

-40°C to 85°C (-40°F to 185°F)

Vibration

Withstands 2 G at 10 to 200 Hz in each of three mutually perpendicular axes.

Shock

Withstands 15 G in each of three mutually perpendicular axes.

Dimensions

Refer to Figure 3.

Weight

0.59 kg (1.3 lb)

Agency Certification/Recognition

Meets CSA C22.2, Number 14, *Industrial Control Equipment.*

Meets UL 508, *Industrial Control Equipment* as tested by CSA NRTL.

THEORY OF OPERATION

ESD 201 operation is illustrated in Figure 1.

Power input to the ESD 201 is 120 or 240 Vac. This input is rectified and used to charge the output capacitor (C1) to approximately 170 Vdc for 120 Vac input, 340 Vdc for 240 Vac input. As long as the ac input is applied, C1 continues to be charged in this manner. However, the failure of the ac input is what the ESD 201 is designed to protect against. Therefore, when the ac input fails, a battery powered oscillator circuit and an associated step-up transformer act as the C1 charging source. (The ESD 201 can be interconnected to the system so that the oscillator circuits function only when the breaker being controlled is closed. See Figure 2.) A battery charger charges the battery as long as the ac input is applied to the ESD 201.

CONTROLS AND INDICATORS

The pushbutton and LED indicator are used to determine if the ESD 201 is operationally ready. When the button is pushed, the LED lights if the capacitor has the minimum charge of 180 Vdc required to trip the breaker. The pushbutton and LED do not indicate whether the ac input is being applied.

NOTE

The test circuit acts as a discharge path to the output capacitor. Therefore, the pushbutton should be depressed only long enough to observe if the LED lights.

INSTALLATION

The ESD 201 should be connected as shown in Figure 2. In order for the ESD 201 internal, battery-operated, capacitor-charging circuits to operate, terminal 1 must be connected to terminal 4. This can be accomplished by permanently jumpering the two terminals together. Using this approach however, the oscillator circuits will continually be in operation if the battery is in place. This will result in premature discharge of the battery if ac input power is not being applied. An alternate (and preferable) approach involves the use of the breaker auxiliary "a" contact. The intent of the "a" contact is to inhibit operation of the oscillator circuit (and thereby eliminate battery drain) until the circuit breaker is closed.

Each breaker should be equipped with its own ESD 201. The use of a single ESD 201 to provide a tripping output for more than one breaker (or other device) is not recommended. Such configurations should be considered only when it can be demonstrated, through independent testing, that combinations of breakers (or devices) can be reliably operated from a single ESD 201.

OPERATION

When the ESD 201 is properly interconnected and 120 or 240 Vac input power is applied, the unit is ready for operation. This can be verified by using the pushbutton as described in the *Controls and Indicators* paragraph. No adjustments of any type should be necessary.

Ac power must be applied continually for a minimum of two hours before the ESD 201 is capable of developing full charge on the output capacitor with a sustained interruption in ac input.

If the batteries are fully discharged (terminal voltage of 3.6 volts or less), it will take approximately 48 hours to recharge the batteries from the ac source. In such situations, it is suggested that the battery be removed and recharged with a high rate charger (not to exceed a 0.1-ampere charging rate). During this time, standard "AA" size cells should be substituted in the ESD 201.

NOTE

Read the paragraphs under *Discharging* before changing batteries.

DISCHARGING

Since more than 400 Vdc can be present on the ESD 201 output terminals, the storage capacitors should be discharged before working on the unit. The following procedure can be used for discharging the storage capacitors.

WARNING!

Lethal voltage may be present at ESD 201 terminals and within the ESD 201. Only qualified persons should install, operate, or service this device.

1. Connect a few inches of 14 AWG, 600 V insulated wire to each end of a 470 Ω, 5 W, wire-wound resistor.
2. Remove ac input power from ESD 201 terminals 1, 5, and 2.

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3. To discharge the capacitors, carefully touch one of the resistor wires to terminal 1 and the other wire to terminal 3. Hold the wires on the terminals for at least five seconds.

4. Ensure that the capacitors are discharged by connecting a dc voltmeter across terminals 3 (+) and 1 (–).

REPAIRS

The ESD 201 is not field repairable. Should the device require repairs, return it to Basler Electric for service.

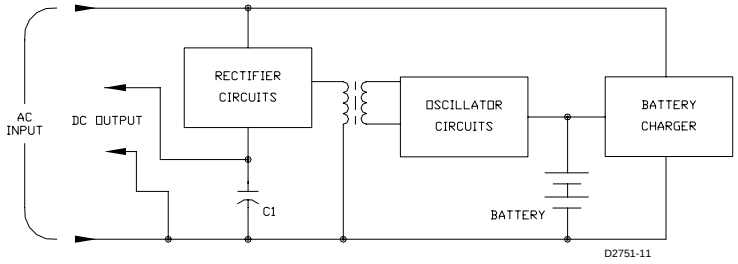

Figure 1. Function Block Diagram

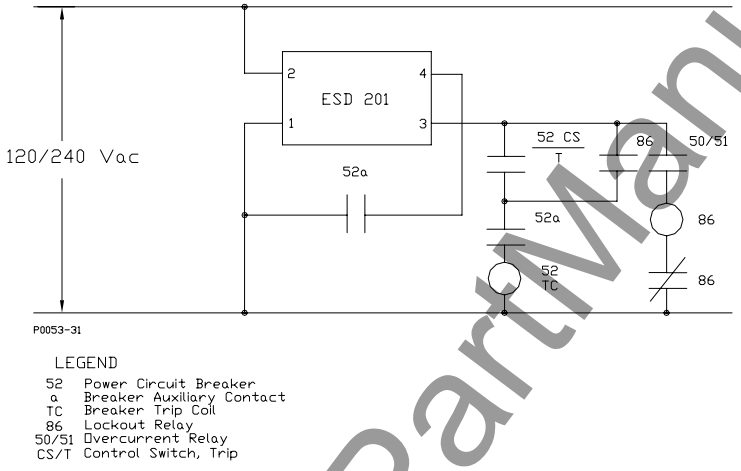

Figure 2. Interconnection Diagram

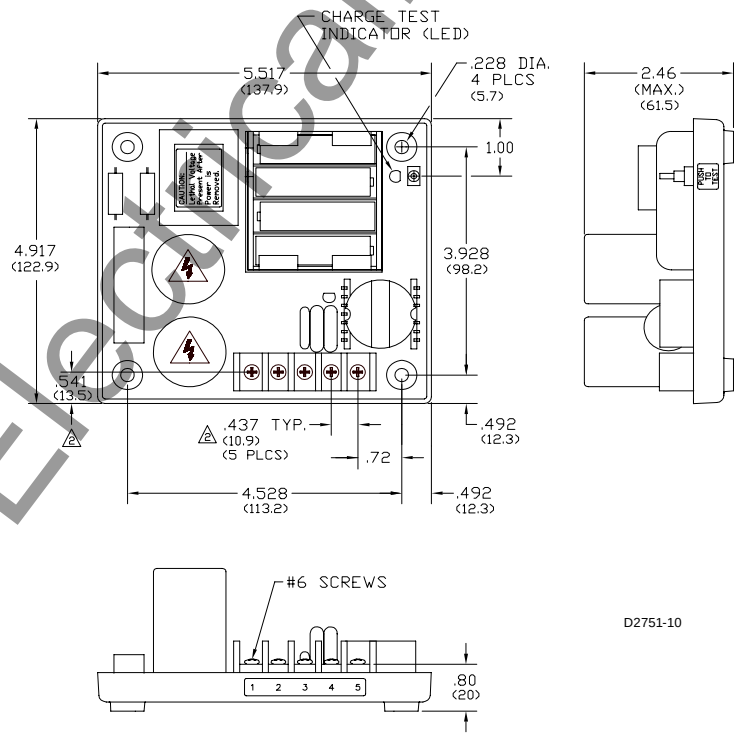

Figure 3. Outline Drawing