

Beckwith Electric Co., Inc.

Tapchanger Control

M-0067E

General Purpose LTC Transformer Control or
Replaces Westinghouse SVC and SVR Controls



- Adaptable to any LTC Transformer — old or new
- Meets ANSI Class 1 (1%) Accuracy Requirement
- Fully Transient Protected
- Now in Use by Leading Manufacturers as Standard Equipment

INPUTS

Power: A two wire input, requiring less than 3 W at 90 to 140 V ac, provides all power requirements. The unit should be powered from a potential transformer or from the voltage to be controlled.

Line Current: Line drop compensation is provided by a C.T. input with a 0.2 A nominal full scale rating. The burden imposed by this input on the current source is 0.03 VA. A Beckwith Electric model M-0121 (5 A to 0.2 A) or M-0169 (5 A or 8.66 A to 0.2 A) Auxiliary Current Transformer is available when required.

Circulating Current: Parallel operation of transformers is provided by a second C.T. input with a 0.2 A nominal full scale rating. The burden imposed by this input on the current source is 0.005 VA. A paralleling input with a 0.2 A full scale rating gives approximately 24 V correction at approximately 90° for parallel operation with other transformers.

OUTPUTS

Two outputs drive a raise and lower motor starter relay. The starters may be any voltage up to 240 V ac. The output contacts are rated at 2.5 A inrush current and will handle a NEMA size 1 starter or smaller.

CONTROLS

VOLTAGE CENTER OF BAND: The center of the control band may be set to any voltage from 105 to 135 V ac. The scale calibration accuracy is ± 0.5 V at 120 V ac.

TOTAL BANDWIDTH: The bandwidth control can be adjusted from 1.0 to 6.0 V. The scale calibration accuracy is ± 0.3 V.

TIME: The timer is adjustable from 0 to 120 sec. with a scale calibration accuracy of $\pm 10\%$ of setting or ± 2 sec., whichever is greater. The timer starts when the voltage goes outside the band and resets within a few milliseconds upon return to the band or when reset by an external contact in the Non-Sequential mode.

LINE DROP COMPENSATOR: The resistance compensation provides 24 V compensation for 0.2 A input in phase with the input voltage. The reactance compensation provides 24 V compensation for 0.2 amps input at a phase angle of $\pm 90^\circ$ as chosen by the **DIRECT/REVERSE** switch. The magnitude and angle of each circuit is individually set by a pair of trimpots to any accuracy limited only by the instruments used in setting. The factory setting of magnitude will be within $\pm 5\%$ and the phase angles within $\pm 2\%$. The voltage and two current circuits are isolated from each other and do not interact.

TEST/OPERATE: When this switch is in the **TEST** position, the Line Drop Compensator is deactivated and the voltage may be raised and lowered by means of an uncalibrated voltage control. An external voltmeter with a burden of 500 Ω per V or higher can be connected to test the band limits by observing when the **RAISE** and **LOWER** LEDs light. No special test voltage source required.

LED INDICATORS

The **RAISE** and **LOWER** LEDs light to indicate a voltage outside the band and a forthcoming tapchanger operation as soon as the timer times out. With a slowly varying input, operation of the LEDs and initiation of timing is very sharp with 0.2 V hysteresis. The LEDs have an expected life of 25 years.

MODES OF OPERATION

Either of the following modes are available as determined by presence or absence of a cam switch which is closed while the LTC is in transition.

Non-Sequential Mode: The timer resets after a tapchange, regardless of voltage.

Sequential Mode: The timer resets only after the sensed voltage is back within the control band.

LOW VOLTAGE PROTECTION

Outputs are blocked from operating at input voltages below approximately 60 V ac. A proper raise output will be obtained down to this threshold.

RESPONSE

The M-0067E will respond to 5/8% voltage change in 0.2 sec. ensuring freedom from hunting on minimum bandwidth.

STANDARDS

The unit meets the requirements of accuracy class 1 as defined in ANSI standards C57.12.30-1977 paragraph 9.3 and C57.15-4.2 when tested according to C57.15-1986 paragraph 9.4.1.

OPTIONS

Voltage Reduction

1. One- or two-step voltage reduction: Resistors for one or two pre-selected steps of voltage reduction will be mounted on the printed circuit board at the factory.
2. Three-step voltage reduction: Resistors for a maximum of three pre-selected steps, will include the internally-mounted resistors mentioned above, plus an additional externally-mounted resistor sized by the factory.
3. Instantaneous (non-time delayed) voltage reduction: Circuitry is added at the factory.

50 Hz Operating Frequency

This option is available for use in countries outside the continental United States and Canada. The unit will be shipped with the standard 60 Hz operating frequency unless otherwise specified.

TRANSIENT PROTECTION

Input and output circuits are protected against system transients. The M-0067E will pass all requirements of ANSI/IEEE C37.90.1-1989 defining oscillatory surge withstand capability. All inputs and outputs will withstand 1500 V ac to chassis or instrument ground for one minute. Voltage inputs are electrically isolated from each other, from other circuits, and from ground.

MOUNTING

1. Standard vertical
2. Horizontal
3. 19" rack mount

ENVIRONMENTAL

Temperature: The voltage band limits will vary no more than 0.5 V from -50° to $+80^{\circ}$ C. The timer will vary no more than $\pm 10\%$ of setting or ± 2 sec., whichever is greater.

Humidity: Stated accuracies are maintained at up to 95% relative humidity (non-condensing).

Fungus Resistance: A conformal printed circuit board coating inhibits fungus growth.

PHYSICAL

Size and Mounting: Overall dimensions are 6-3/8" x 16-1/2" (16.2 cm x 41.9 cm); requires a panel cutout of 5-7/8" x 15-1/8" (14.9 cm x 38.4 cm).

Approximate Weight: 6 lbs (2.7 kg).

Approximate Shipping Weight: 9 lb (4.1 kg).

PATENTS

U.S. Patent 3,721,894; Canadian Patent 985,368; British Patent 1,432,607; Swedish Patent 7,301,667-7; and other foreign patents applied for.

WARRANTY

The M-0067E Tapchanger Control is covered by a two year warranty from date of shipment.

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