The 659EN Line Fault Monitor is designed for connection across incoming telephone lines on systems using telephone dialers (e.g., 612) or digital communicators (e.g., 678, 678UL-B, 793 or 794) or control/communicators. It will cause a signal to be generated if the telephone line between dialer or communicator and the central station is cut or shorted, or if incoming service is otherwise interrupted. The signal can be in the form of sounding the on-premises protective system's alarm bell (when the system is ON), or the lighting of a trouble indication lamp on an optional accessory tester (such as the 664 for non-UL Listed applications).

**ULC**

For ULC installations, the 659EN shall be mounted within a ULC Listed control unit or a ULC Listed enclosure.

**UL**

For UL Listed applications, the power must be supplied by a Listed control unit or power supply.

**ULC**

For ULC installations, the power shall be supplied by a ULC Listed control unit or a ULC Listed power supply.

**Definition of Fault**

The 659EN allows its on-hook voltage trip threshold to be selectable via a BLUE jumper on its circuit board.

- With the BLUE jumper intact, the 659EN will recognize a fault condition when DC voltage between tip and ring of the telephone line (which normally is approximately 48VDC) is less than approximately 25 VDC and/or the handset/communicator current is less than approximately 10mA.

- With the BLUE jumper cut, a fault condition will be recognized when this voltage is less than approximately 13VDC and/or the handset/communicator current is less than approximately 10mA.

Cut the BLUE jumper and insulate its ends when the 659EN is used to monitor a telephone line which has a telephone company’s MTU (Maintenance Termination Unit) installed. Consult the telephone company providing service in the area if you are not sure whether this device is installed.

The MTU is a device that some telephone companies are now installing on the telephone wires at the point where these wires enter the customer's premises. The telephone company uses this device to run a periodic check from the telco central office to determine if a wiring fault exists between the central office and the customer's premises. With the MTU installed, the tip to ring voltage will normally exceed 37VDC. This voltage will fall to approximately 20VDC (with reversed polarity) while the telephone company is performing its wiring check. For this reason, the 659EN's 13V trip threshold must be used instead of the 25V trip threshold, to prevent the occurrence of false line cut signals (i.e. false alarms in most cases).

**Possible Extra Detection Delay Time**

Some types of handsets (those using electromechanical bells) may prevent the voltage between tip and ring from rapidly decreasing after a line is cut. For example, the Type 500 Telephone Handset, because of its large bell circuit capacitor (2 microfarad), will hold the tip-to-ring voltage above the 25V threshold (BLUE jumper intact) for about 18 seconds and above the 13V threshold (BLUE jumper cut) for about 36 seconds. These times will double if two headsets are on line, triple if three are used, etc., before the line cut is recognized and the 659EN's built-in 25 second delay is initiated. This extra delay time must be added to the built-in delay (which is not affected by the BLUE jumper) to determine the overall maximum line cut detection time.

If, however, the communicator is tripped subsequent to the line having been cut, one of the following events will take place:

- a) If line seize is used, the handsets will be disconnected by the line seize relay
- b) If line seize is not used, the capacitor will be immediately discharged by the communicator's internal signaling resistance and the monitor will sense the cut within its normal delay time after the communicator trip.

If it is desired that the monitor function without the extra delay (caused by the bell circuit capacitors used in handsets with electromechanical bells), it is recommended that:

- a) Electronic telephones which do not contain the bell ringing capacitors be used, or
- b) Some handsets be disabled, or
- c) Some or all of the handsets be disconnected when the system is armed, or
- d) A separate phone line without handsets be used for alarm communication only.
Output Relay

Any fault condition which exists for a nominal 25 seconds will cause the relay to be energized.

The energizing of the relay can, at the option of the installer, be either of the following:

a) Momentary (with BLACK jumper CUT), where the relay will be energized for only about one second and then be turned off. When the fault is cleared, the monitor circuit will automatically reset and be ready for another one-second energization should a fault appear.

This option is normally used when the contacts of the relay are wired into the protective circuit of the control to sound the alarm.

b) Maintained (with BLACK jumper INTACT), for as long as the telephone line fault persists. When the fault is cleared the relay will automatically be de-energized.

This option may be used for special applications such as to sound an electronic siren when no alarm control panel is used. If it is desired to ring a bell, see the Output Relay caution note under SPECIFICATIONS.

Local Latching Indication

If desired, for non-UL Listed applications, a 664 Digital Communicator Tester can be used with the 659EN as a monitor lamp and reset switch to indicate whether the telephone line is or has been out of service. After approximately 25 seconds of the 659’s sensing of line fault, the LED indicator in the 664 will light and remain lit until the line fault has cleared and the 664’s switch is depressed. This latching and reset action is independent of the output relay option chosen above.

Note: For UL Listed applications, if this option is used, an appropriate Listed switch/indicator lamp unit must be used.

Logic Level Signal

This output is for use with the 674 Select-A-Line (which permits a dialer, digital communicator, or control/communicator to be used with two telephone lines for increased reliability of transmission). Information as to its use is provided with the 674.

WIRING (See Diagram)

1. Ground (GREEN Lead)

Extend the 659EN’s GREEN flying lead to a good earth ground. Proper grounding provides protection against externally induced transient voltages in the telephone lines and ensures reliable operation of the 659EN. The following are examples of good earth grounds available at most installations:

- **Metal Cold Water Pipe**: Use a non-corrosive metal strap firmly secured to the pipe to which the ground lead is electrically connected and secured.
- **AC Power Outlet Ground**: Available from 3-prong, 120VAC power outlets only. To test the integrity of the ground terminal, use a three-wire circuit tester with neon lamp indicators, such as the UL Listed Ideal Model 61-035, or equivalent, available at most electrical supply stores.

2. Voltage Trip Threshold (BLUE Jumper)

Determine the Voltage Trip Threshold to be used, by referring to the Definition of Fault section under OPERATION.

a) For 13VDC Trip Threshold (Telco MTU installed): CUT BLUE JUMPER that protrudes from front of circuit board, and insulate its ends.

b) For 25VDC Trip Threshold (no Telco MTU installed): LEAVE BLUE JUMPER UNCUT.

3. Output Relay Contacts (Terminals 4, 5, 6 and BLACK Jumper)

The COM and N.O. terminals (4 and 6) are for connection in series with the positive leg of a protective loop of an alarm control. If the contacts are to be connected across a protective loop, use the COM and N.O. terminals (4 and 5).

Note: Upon sensing of a telephone line fault and expiration of the built-in delay by the 659EN, the output relay’s COM and N.O. contacts will close and its COM and N.C. contacts will open, in accordance with the Output Option selected below.

**UL**:

If such indication is desired on a UL Listed installation, an appropriate Listed switch/indicator lamp unit must be used.

5. Telephone Line (Terminals 7, 8)

Connect the incoming telephone line pair to terminals 7 and 8, disregarding polarity.

6. Dialer or Communicator (YELLOW & ORANGE leads)

Follow the instructions provided with the dialer or communicator.

7. Handsets

Follow the instructions provided with the dialer or communicator.

8. Logic Level Signal Post

Information on the use of this post in connection with telephone line selector units (such as the 674 Select-A-Line) is provided with the particular unit to be used.

9. DC Power (RED and BLACK leads)

Connect the RED (+) and BLACK (-) leads of the 659EN to any 6 to 14VDC source such as: that of the communicator or dialer, a standard 6 or 12V lantern battery, or 6 or 12VDC rechargeable power supply.

**UL**:

For UL Listed applications, the power must be supplied by a Listed control unit or power supply.

**ULC**:

For ULC installations, the power shall be supplied by a ULC Listed control unit or a ULC Listed power supply.
BLACK "OUTPUT RELAY" JUMPER
AT FRONT OF CIRCUIT BOARD.
For "Maintained" Output on Fault, DO NOT CUT JUMPER.
For "Momentary" Output on Fault, CUT JUMPER.

BLUE "VOLTAGE TRIP THRESHOLD" JUMPER
AT FRONT OF CIRCUIT BOARD.
For 25VDC Trip Threshold, DO NOT CUT JUMPER.
For 13VDC Trip Threshold, CUT JUMPER.

YELLOW ORANGE GREEN
TO DIGITAL COMMUNICATOR OR DIALER
TO EARTH GROUND (MUST BE CONNECTED. SEE TEXT FOR PROPER GROUNDING.)
INCOMING PHONE LINE PAIR (DISREGARD POLARITY)

LOCAL LATCHING INDICATION (OPTIONAL)

LOGIC LEVEL SIGNAL POST FOR 674 SELECT-A-LINE.
FOR CONNECTION AND WIRING, SEE INSTALLATION INSTRUCTIONS FOR 674.

RED BLACK WHT
NORMAL: 5mA TRIPPED: 45 mA MAX.
(SEE SPECIFICATIONS)

* USE LEAD WITH QUICK DISCONNECT (FURNISHED)
EXTEND AS REQUIRED

INSTALLATION AND WIRING

-3-
SPECIFICATIONS

PHYSICAL
2-1/2” (64mm) W
6” (152mm) H
1-1/2” (38mm) D

POWER
Operation Voltage: 6 to 14VDC, from battery, or 6 or 12VDC rechargeable power supply

Current Drain
Standby, Telephone Line Intact: 5mA
Telephone Line Fault;
“Maintained” Output Option Selected: 35mA
Telephone Line Fault;
“Momentary” Output Option Selected: 5mA
(Non-UL Listed installation only)

Note: If a 664 is used as a Remote Indicator (non-UL Listed installations only), an additional 10mA will flow when the indicator is illuminated.

PHONE LINE
Sensed Voltage and Current
The 659EN defines a “good” line as one having:
a) A tip-to-ring voltage in excess of about: 25VDC (BLUE jumper intact) or 13VDC (BLUE jumper cut).
b) A tip-to-ring voltage less than these values, but having a loop current (tip-to-ring) in excess of about 10mA.

The 659EN defines a “bad” line as one having a tip-to-ring voltage of less than about: 25VDC (BLUE jumper intact) or 13VDC (BLUE jumper cut), and a loop current of less than about 10mA.

Polarity
Insensitive to phone line polarity.

Input Impedance at Phone Line Terminals
Greater than 10 Megohms between lines.

Impedance between Telephone Lines and Ground or Battery
Greater than 100 Megohms, 1500V breakdown.

OUTPUT RELAY
SPDT Contacts, 1Amp, 28VDC maximum.

Caution: If it is desired to ring a bell with these contacts, an intermediate relay should be used between the 659EN and the bell, so that the pulsating bell current does not pass through the 659EN and possibly cause interference with the latter's operation. (The 659EN, in compliance with FCC regulations, incorporated a very high input impedance circuit which can be affected by the bell electrical noise).

REFER TO THE INSTALLATION INSTRUCTIONS FOR THE CONTROL PANEL WITH WHICH THIS DEVICE IS USED FOR WARRANTY INFORMATION AND LIMITATIONS OF THE ENTIRE ALARM SYSTEM.

For the latest warranty information, please go to: http://www.security.honeywell.com/hsc/resources/wa/index.html

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