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About Watlow Winona
Watlow Winona is a U.S. division of Watlow Electric Mfg. Co., St. Louis, Missouri, a manufacturer of industrial electric heating products since 1922. Watlow products include electric heaters, sensors, controllers and switching devices. The Winona operation has been designing solid-state electronic control devices since 1962, and has earned the reputation as an excellent supplier to original equipment manufacturers. These OEMs and end users depend upon Watlow Winona to provide compatibility engineered controls that they can incorporate into their products with confidence. Watlow Winona resides in a 100,000-square-foot marketing, engineering and manufacturing facility in Winona, Minnesota.

Warranty
The Watlow E-Safe Relay is warranted to be free of defects in material and workmanship for 18 months after delivery to the first purchaser for use, providing that the units have not been misapplied. Since Watlow has no control over their use, and sometimes misuse, we cannot guarantee against failure. Watlow’s obligations hereunder, at Watlow’s option, are limited to replacement, repair or refund of purchase price, and parts which upon examination prove to be defective within the warranty period specified. This warranty does not apply to damage resulting from transportation, alteration, misuse, or abuse.

Returns
- Call or fax your distributor or the nearest Watlow sales office for best information about returns. (See outside back cover.)
- To return directly to Watlow Winona in the U.S., first call or fax Customer Service for a Return Material Authorization (RMA) number (telephone: +1 (507) 454-5300; fax: +1 (507) 452-4507).
- Put the RMA number on the shipping label, along with a written description of the problem.
- A restocking charge of 20% of the net price is charged for all standard units returned to stock.

Safety Information
We use note, caution and warning symbols throughout this book to draw your attention to important operational and safety information.

A “NOTICE” marks a short message to alert you to an important detail.

A “CAUTION” safety alert appears with information that is important for protecting your equipment and performance. Be especially careful to read and follow all cautions that apply to your application.

A “WARNING” safety alert appears with information that is important for protecting you, others and equipment from damage. Pay very close attention to all warnings that apply to your application.

The safety alert symbol, ! (an exclamation point in a triangle) precedes a general CAUTION or WARNING statement. The electrical hazard symbol, ⚡ (a lightning bolt in a triangle) precedes an electric shock hazard CAUTION or WARNING statement.

Technical Assistance
If you encounter a problem with your Watlow controller, review your configuration information to verify that your selections are consistent with your application: inputs, outputs, alarms, limits, etc. If the problem persists after checking the configuration of the controller, you can get technical assistance from your local Watlow representative (see back cover), or in the U.S., dial +1 (507) 454-5300. For technical support, ask for an Applications Engineer.

Please have the following information available when calling:
- Complete model number
- User’s Manual

Your Comments
We welcome your comments or suggestions on this user’s manual. Please send them to: Technical Writer, Watlow Winona, 1241 Bundy Blvd., P.O. Box 5580, Winona, Minnesota, USA 55987-5580; telephone: +1 (507) 454-5300; fax: +1 (507) 452-4507 © Copyright 2003 by Watlow Winona, Inc. (2143) All rights reserved.

E-SAFE Relay
User’s Manual

Hybrid Relay
Unit Dimensions

E-SAFE Relay in Operation

CAUTION: Provide proper enclosure ventilation to maintain an operating environment ≤55°C maximum ambient rating. Failure to do so could cause damage to equipment and property.
Input and Output Wiring

**WARNING:**
Wiring must conform to National Electric Code (NEC) safety standards, as well as locally applicable codes. Failure to do so could result in personal injury or death.

**WARNING:**
Only authorized and qualified personnel should install and service the E-SAFE relay. Failure to comply with these recommendations may result in damage to equipment and property and injury to personnel.

Torque Guidelines:
- Properly torqued line & load terminals to 3.95 nm (35 in-lbs)
- Retorque after 48 hours to minimize wire cold flow.
- Re-torque line & load terminals every 36 months.

System Wiring Example
## Specifications

### Control Mode
- Zero cross switching output
- Form A outputs, without arcing
- Cycle rate: 30 cycles per minute, maximum

### Input Command Signal
- 24V- (+10% / -10%) @ 0.375 Amperes
- 120V- (+10% / -10%) @ 0.075 Amperes
- 220V- (+15% / -20%) @ 0.041 Amperes
- 50/60 Hz

### Input Surge current and pulse characteristics
- 24 volt input = 24 Amp surge, less than 10VA required (0.41 A)
- 120 volt input = 16 Amp surge, less than 12VA required (0.101 A)
- 220 volt input = 8 Amp surge, less than 14VA required (0.063 A)

### Power factor
- Power factor approximately 0.58, 100 uSec pulse width or surge.

### Note:
- Do not use a RC snubber on the Esafe input or the temperature control command signal output

### Output Rating
- 20 to 40A max. per pole into a resistive load, model number dependent
- 208/240V, 50/60 Hz, phase to phase
- 3-pole
- Leakage current: 0.5mA max.

### Operating Life
- 1,000,000 switching cycles at maximum rating

### Weight/Dimensions
- Weight: 0.560 Kg (1.25 lb)
- 96.0 mm (3.78 in) high x 62.3 mm (2.44 in) wide x 90.2 mm (3.55 in) deep

### Terminals
- Control input: Compression, accept 0.2 to 6 mm² (#22 -10 AWG) wire, torque to 0.8 Nm (7 in-lbs) maximum
- Output: Compression, accept 2.5 to 16 mm² (#14-6 AWG) wire, torque to 3.95 Nm (35 in-lbs) maximum

### Operating Environment
- Operating temperature, -30 to 55°C/22 to 130°F
- 5 to 85% RH, non-condensing
- Storage temperature, -40 to 85°C/-40 to 185°F

### Mounting
- Fits footprint of definite purpose relays and most 30 to 50 amp mercury relays

### Agency Approvals
- UL® 508 listed, C-UL, File #E213822

### Declaration of Conformity

### Ordering Information

<table>
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<tr>
<th>Part Number</th>
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<tr>
<td>Amperage</td>
<td>20 amp</td>
<td>40 amp</td>
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### Quality and Mission Statement:

Watlow Winona will be the world’s best supplier of superior thermal solutions by exceeding the expectations of our customers, shareholders, and employees.

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**Your Authorized Watlow Distributor:**

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### Watlow Winona

1241 Bundy Blvd.

Winona, MN 55987 USA

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**Declaration of Conformity**

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**Meets the essential requirements of the following European Union Directives by using the relevant standards shown below to indicate compliance.**

### 89/336/EEC Electromagnetic Compatibility Directive

**EN 60947-4-3**
- Low-voltage switchgear and controlgear—Contactors and motor-starters—AC semiconductor controllers and contactors for non-motor loads. Industrial immunity, Class B emissions.
- EN 61000-4-2 1995 Electromagnetic Discharge Immunity
- EN 61000-4-3 1996 Radiated Field Immunity
- EN 61000-4-4 1996 Electrical Fast-Transients / Burst Immunity
- EN 61000-4-5 1995/1996 Surge Immunity
- EN 61000-4-6 1996 Conducted Immunity
- EN 61000-4-11 1994 Voltage Dips, Short Interruptions and Voltage Variations Immunity
- EN 61000-3-5 2000 Harmonics: Current Emissions

### 73/23EEC Low-Voltage Directive

**EN 60947-4-3**
- Low-voltage switchgear and controlgear—Contactors and motor-starters—AC semiconductor controllers and contactors for non-motor loads.

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**Raymond D. Feiler III**

Winona, Minnesota, USA

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**Name of Authorized Representative**

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**Title of Authorized Representative**

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**Signature or Name and Title of Representative**

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