

# Power Control Application Guide

| Load Type  | Load Characteristics   | Line Power Configuration | Load Configuration                                      | Phase-Angle Control                       | Zero-Fire Control            | On/Off Control |
|--|--|--------------------------|---|---|------------------------------|----------------|
| <b>Constant Resistance Elements:</b><br>-NICHROME<br>-KANTHAL<br>-CALROD                                       | <b>Resistance Nominally Constant</b><br><br><50% change versus temperature.                      | Single-Phase             | Line-to-line or Line-to-neutral                         | <b>18D</b><br><b>18TB</b><br><b>18TBP</b> | <b>18DZ</b><br><b>11DZ-P</b> | <b>11D</b>     |
|  |  | Three-Phase              | Balanced or Delta Connected loads, isolated from ground | <b>18E</b>                                | <b>18EZ</b><br><b>11EZ-P</b> | <b>11E</b>     |
|  |  |                          | Grounded and/or Unbalanced loads                        | <b>18E-SW</b>                             | NA                           | NA             |
| <b>Variable Resistance Elements:</b><br>Quartz tubes,<br>T-3 Lamps,<br>some infrared panels                    | <b>High hot:cold resistance ratio</b><br><br>causes high inrush currents when elements are cold. | Single-Phase             | Line-to-line or Line-to-neutral                         | <b>18D-H</b>                              | NA                           | NA             |
|  |  | Three-Phase              | Balanced or Delta Connected loads, isolated from ground | <b>18E-H</b>                              | NA                           | NA             |
|  |  |                          | Balanced or Delta Connected loads, isolated from ground | <b>18E-SW</b>                             | NA                           | NA             |
| <b>Silicon-Carbide Elements:</b><br>"GLO-BAR"<br>(direct coupled)  | <b>Resistance increases as elements age.</b>   | Single-Phase             | Line-to-line or Line-to-neutral                         | <b>18D-H</b>                              | NA                           | NA             |
|  |  | Three-Phase              | Balanced or Delta Connected loads, isolated from ground | <b>18E-H</b>                              | NA                           | NA             |
|  |  |                          | Balanced or Delta Connected loads, isolated from ground | <b>18E-SW</b>                             | NA                           | NA             |
| <b>Transformer-Coupled Loads:</b><br><br>(heating elements driven from the secondary winding of a transformer) | <b>Inductive Load</b><br>with initial current inrush.  | Single-Phase             | Line-to-line or Line-to-neutral                         | <b>18D-SW</b>                             | NA                           | NA             |
|  |  | Three-Phase              | Balanced three-phase transformers                       | <b>18E-SW</b>                             | NA                           | NA             |
|  |  |                          | Scott-T connected/unbalanced transformers               | <b>18E-SW</b>                             | NA                           | NA             |
| <b>Inductive or Resistive DC Loads:</b><br>magnets, fields, electrolytic cells                                 | <b>Resistive:</b><br>load resistance nominally constant. Inductive and DC fields                 | Single-Phase             | DC Power required                                       | <b>36D</b>                                | NA                           | <b>36D</b>     |
|  |  | Three-Phase              | DC Power required                                       | <b>36E</b>                                | NA                           | <b>36E</b>     |

| <b>Application</b>   | <b>Type of control</b>   | <b>Load Configuration</b>                   | <b>Product</b>       |
|--|--|---|----------------------|
| Replace Mercury relays<br>Replace SSRs<br>Extruders<br>Moulding machines | On/Off Control of<br>Constant resistance<br>Electric Heating<br>Elements | Single-Phase<br>Constant Resistance<br>Load | Model<br><b>11DZ</b> |
|  |  | Three-Phase<br>Constant Resistance<br>Load  | Model<br><b>11EZ</b> |

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