Agency Approval Index

Watlow Electric Manufacturing Co.
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Winona, Minnesota 55987-5580 USA
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Drawn By: L. Glentz

Watlow Controls Product Information

This list includes all Watlow, Winona Location catalog products that are UL Recognized or Listed, CSA Certified, FM Approved, VDE Certified, NSF Certified, CE Approved or other agency approvals. For other part numbers, specials, or modifications, consult factory.

All approvals are contingent on products being installed in proper enclosures and in compliance with local and national electrical codes.

UL, CSA, VDE, NSF, FM and ODVA have searchable databases online. Please see the web pages for these agencies for the most current listing of Watlow Products.

UL  http://www.ul.com/
VDE  http://www.vde.com/EN/Pages/Homepage.aspx
FM  http://www.fmglobal.com/
CSA  http://www.csa-international.org
NSF  http://www.nsf.org/
ODVA  http://www.odva.org/

AGENCY STANDARDS used at Watlow’s Winona MN Location:

<table>
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<tr>
<th>UL CCN</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>(XXXX)</td>
<td>Listed Product</td>
</tr>
<tr>
<td>(XXXX2)</td>
<td>Recognized Component</td>
</tr>
<tr>
<td>(XXXX7)</td>
<td>Listed Product approved for use in Canada</td>
</tr>
<tr>
<td>(XXXX8)</td>
<td>Recognized Component approved for use in Canada</td>
</tr>
<tr>
<td>CCN</td>
<td>Title of Category</td>
</tr>
<tr>
<td>(NKCR)</td>
<td>Auxiliary Devices</td>
</tr>
<tr>
<td>(NLDX)</td>
<td>Magnetic</td>
</tr>
<tr>
<td>(NMFT)</td>
<td>Motor Controllers, Miscellaneous</td>
</tr>
<tr>
<td>(NRAQ)</td>
<td>Programmable Controllers</td>
</tr>
<tr>
<td>(NRNT)</td>
<td>Switches, Industrial Control</td>
</tr>
<tr>
<td>(QUZW)</td>
<td>Process Control Equipment for use in Hazardous Locations</td>
</tr>
<tr>
<td>(QUXY)</td>
<td>Process Control Equipment, Electrical</td>
</tr>
<tr>
<td>(WGZR)</td>
<td>Switches, Clock-operated</td>
</tr>
<tr>
<td>(XAPX)</td>
<td>Temperature-Indicating and Regulating Equipment</td>
</tr>
<tr>
<td>(XATJ)</td>
<td>Temperature-Indicating and Regulating Equipment</td>
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</table>

UL50 - Type 4X Watertight and Corrosion Resistant Indoor. Equivalent to NEMA 4X
UL197 - Commercial Cooking Appliances
UL508 - Industrial Control Equipment
UL873 - Temperature Indicating and Regulating Equipment
UL916 - Energy Management Equipment
UL917 - Clock Operated Switches
UL 991 - Test for Safety Related Controllers Employing Solid State Devices
ANSI/ISA.12.12.01 – Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations
UL 61010-1 – Process Control Equipment
CSA Standard C22.2 NO. 14 - Industrial Control Equipment - Miscellaneous Apparatus
CSA Standard C22.2 NO. 24 - Temperature Indicating and Regulating Equipment
ANSI Z21.23 - Gas Appliance Thermostats
FM Standard 3545 - Temperature Limit Switches

NSF Standard 2 – Cooking equipment – Calibration Accuracy
CE (Conformite Europeenne) European Conformity
<table>
<thead>
<tr>
<th>Symbol #</th>
<th>Symbol</th>
<th>Requirements for Symbol Use</th>
<th>Agency Files Using This Symbol</th>
</tr>
</thead>
</table>
| 1a      | UL approved 03/30/2015 | • Only used on Models manufactured conforming with Approved Components and Agency Files shown on right.  
• If the overall diameter of the UL Mark is less than 3/8 of an inch, the ® symbol may be omitted if it is not legible to the naked eye i.e. < 3/64". | Underwriters Laboratories Inc.  
Control # 948Y  
E73741 Vol 2 Sec 4 Dinamite C Standard  
E73741 Vol 2 Sec 5 Dinamite A  
E73741 Vol 2 Sec 6 Dinamite B  
E73741 Vol 2 Sec 7 Dinamite D  
E73741 Vol 3 Sec 2 Power Series  
E73741 Vol 3 Sec 1 Qpac |
| 2       | Obsolete, used on Q-pac prior to 10/24/07 Use symbol #1 instead. | | |
| 3a      | UL approved 03/30/2015 | • Only used on Models manufactured conforming with Approved Components and Agency Files shown on right.  
• If the overall diameter of the UL Mark is less than 3/8 of an inch, the ® symbol may be omitted if it is not legible to the naked eye i.e. < 3/64". | Underwriters Laboratories Inc.  
Control # 2S81  
E184390 Vol 1 Sec 1 Dinamite C Throughwall  
E184390 Vol 1 Sec 2 EZ-Zone PM  
E184390 Vol 1 Sec 3 EZ-Zone RM |
| 4a      | UL approved 2-19-2015 | • Only used on Models manufactured conforming with Approved Components and Agency Files shown on right.  
• If the overall diameter of the UL Mark is less than 3/8 of an inch, the ® symbol may be omitted if it is not legible to the naked eye i.e. < 3/64". | Underwriters Laboratories Inc.  
Control # 93RL  
E185611 Vol 2 Sec 1 Series F4  
E185611 Vol 2 Sec 5 CLS, D8,  
E185611 Vol 2 Sec 5 TLM-B  
E185611 Vol 2 Sec 6 EZ-Zone PM  
E185611 Vol 2 Sec 7 MLS, TB50  
E185611 Vol 2 Sec 8 DAC, SDAC  
E185611-X1-A1 EZ-Zone RM  
E185611-X1-A6 Series F4T |
| 5a      | UL approved 03/30/2015 | • Only used on Models manufactured conforming with Approved Components and Agency Files shown on right.  
• If the overall height of the UL Mark is less than 3/8 of an inch, the ® symbol may be omitted if it is not legible to the naked eye i.e. < 3/64". | Underwriters Laboratories Inc.  
Control # 88CM  
E102269 Vol 2 Sec 4 Series EZ-Zone ST  
E102269 Vol 2 Sec 5 Series EZ-Zone RUI |
| 6       | Obsolete, used on E102269 Vol 2 Sec 3 Series PD prior to 10-24-05 | | |
| 7       | UL label department does not control this mark | • Only used on Models manufactured conforming with Approved Components and Agency Files shown on right.  
• If the overall height of the UL Mark is less than 3/8 of an inch, the ® symbol may be omitted if it is not legible to the naked eye i.e. < 3/64". | Underwriters Laboratories Inc.  
E43684 Vol 2 Sec 28 A007-1732  
E151484 – SSR’s  
E73741 – SSR’s  
E73741 – CZR’s |
<table>
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</table>
| 8        | ![UL logo](image) | - Only used on Models manufactured conforming with Approved Components and Agency Files shown on right.  
- If the overall height of the UL Mark is less than 3/8 of an inch, the ® symbol may be omitted if it is not legible to the naked eye i.e. < 3/64". | Underwriters Laboratories Inc.  
E43684 Vol 1 Sec 43 Series N7  
E43684 Vol 1 Sec 44 Series C, L, TM  
E43684 Vol 1 Sec 45 Smartheat  
E43684 Vol 2 Sec 29 MiniChef  
E185611 Vol 3 Sec 1 D8  
E102269 Vol 1 Sec 5 EZ-Zone ST Components.  
E73741 Vol 4 Sec 1 E-Safe II  
E185611 X2-A3 EZ-Zone FM (Flex Modules)  
E43684 Vol 1 Sec 49 LSF4 |
| 9        | Obsolete CSAus 158031 Series 142 5-12-05 OBS Log# 163 |
| 10       | ![CSA logo](image)  
Small  
Medium  
Large | - Only used on Models manufactured conforming with Approved Components and Agency Files shown on right.  
- Symbol Changes by size on product to properly scale ® symbol to the CSA mark.  
- Small = 0.125 to 0.25 inches  
- Medium = 0.25 to 0.625 inches  
- Large = 0.625 or larger | Canadian Standards Association (CSA)  
700195 – SSR’s  
700195 – CZR’s  
158031 Series L  
158031 Series C, TM  
30586 Series N7  
158031 Series EZ-Zone ST  
158031 Series EZ-Zone RU1  
158031 Series EZ-Zone PM |
| 11       | ![NSF logo](image)  
Or  
NSF | - Only used on Models manufactured conforming with Agency Files shown on right.  
- Manufacturers name needs to be on product, Watlow logo alone is not sufficient. | National Sanitation Foundation (NSF)  
49660-0001-000 Series F2 (MiniChef)  
49660-0003-000 Series N7 |
| 12       | ![VDE logo](image)  
REG-Nr. 10143 | - Only used on Models manufactured conforming with Agency Files shown on right. | VDE File  
Solid State Relays |
<table>
<thead>
<tr>
<th>Symbol #</th>
<th>Symbol</th>
<th>Requirements for Symbol Use</th>
<th>Agency Files Using This Symbol</th>
</tr>
</thead>
</table>
| 13       | ![CE]  | - Only used on Models manufactured conforming with Agency Files shown on right.  
- Minimum size to appear on label is 5 mm height. | European Certification (CE)  
Series N7, C, L, TM, Smartheat, F2 (MiniChef), F4, Gateways, SSR's, CZR's, Din A, Din B, Din C, Din C Throughwall, Din D, Power Series, CLS, TLM-6, D8, SDAC, MLS, TB50, EHG2, EZ-ZONE ST, EZ-Zone RUI, EZ-Zone PM, E-Safe II, EZ-Zone RM, Series LS |
| 14       | ![FM Approved] | - Only used on Models manufactured conforming with FM Approved Documents and Agency Files shown on right. | Factory Mutual (FM)  
J.I. 3017239 Series L  
J.I. 3031690 Series TLM-8  
J.I. 3026112 Series EZ-Zone ST  
J.I. 3029084 Series EZ-Zone PM  
J.I. 3033513 Series EZ-Zone RM  
J.I. 3048381 Series FM (Flex Modules) |
| 15       |        | Obsolete use symbol 4 after 1-1-08 MLS and SDAC |
| 16       |        | Obsolete previously used on CLS, CPC, CAS and D8 Listed models. 12-11-06 |
| 17       |        | Obsolete use symbol 4 after 1-1-08 TB50 |
| 18       |        | Obsolete previously used on TLM-8 models. 12-11-06 |
| 19       |        | Obsolete as of 4-1-04, used to be used for ML mercury relays. |
| 20       |        | Obsolete as of 4-1-04, used for ML mercury relays. |
| 21       |        | Obsolete August 2010, used on DPAC(S) Listed models |
| 22       |        | Obsolete as of 12/31/07 Used on PPC-2000 Control # 53LJ |
| 23       |        | Obsolete as of 12-31-07 Used on E-Safe 1 relays |
| 24       |        | Obsolete as of 12-08-06 Used on File 207942 HPS Models 47 |
| 25       |        | Obsolete VDE CZR's |
| 26       | ![DeviceNet] | - Only used on Models manufactured conforming with Agency Files shown on right. | Open Devicenet Vendor Association (ODVA)  
Devicenet Conformance Tested.  
Series SD6C  
Series D8  
Series EZ-Zone PM  
Series EZ-Zone RM  
Series EZ-Zone EZK |
| 27       | ![EtherNet/IP] | - Only used on Models manufactured conforming with Agency Files shown on right. | Open Devicenet Vendor Association (ODVA)  
Ethernet/IP Conformance Tested  
Series EZ-Zone PM  
Series EZ-Zone RM  
Series EZ-Zone EZK |
<table>
<thead>
<tr>
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<th>Symbol</th>
<th>Requirements for Symbol Use</th>
<th>Agency Files Using This Symbol</th>
</tr>
</thead>
</table>
| 29a     | ![Symbol Image] | - Only used on Models manufactured conforming with Approved Components and Agency Files shown on right.  
- If the overall diameter of the UL Mark is less than 3/8 of an inch, the ® symbol may be omitted if it is not legible to the naked eye i.e. < 3/64". | Underwriters Laboratories Inc. Control #56Y8 E43684 Vol 8 Sec 1 EHG2 SL10 E185611 Vol 2 Sec 4 EHG2 SL10 |
| 30      | ![Symbol Image] | - Only used on Models tested for High Fault Short Circuit test conditions, see SCCR White Paper for details. | Short Circuit Current Rating  
SCCR UL Approval Letter  
SCCR White Paper |
| 31      | No Symbol | - Profibus DP card used on EZ-Zone Product  
- A007-2815-000B Card. | PROFIBUS DP 0C70 Hex |
| 32      | ![Symbol Image] | - EtherCAT card used on RMZ models  
- A007-3009-0000 Card | EZ-ZONE RMZ4 |
## MODELS  
### Agency Approval Index

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<th>Models Approved</th>
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<tr>
<td>Series N7</td>
<td>Symbol 8 (cURus)</td>
<td>E43684 Vol 1 Sec 43 XAPX2, XAPX8</td>
<td>N7(any two alphanumeric characters) – (1-6)(0-6)(0-7)(0 or 1) – (0-5)(1, 2, 3, 4, 5 or 6)(any two alphanumeric characters)</td>
<td></td>
</tr>
<tr>
<td>Symbol 10 (CSA)</td>
<td>CSA E60730-1</td>
<td>LR 30586 Class 4823-51</td>
<td>Same as cURus File listing.</td>
<td></td>
</tr>
<tr>
<td>Symbol 11 (NSF)</td>
<td>NSF Standard 2</td>
<td>49660-0003-000</td>
<td>N7(any two letters or numbers) – (1-6)(0-6)(0-7)(any number) – (0-5)(any number)(any two letters or numbers)</td>
<td></td>
</tr>
<tr>
<td>Symbol 13 (CE)</td>
<td>See declaration</td>
<td>CE Declaration</td>
<td>Same as UL</td>
<td></td>
</tr>
<tr>
<td>Series C</td>
<td>Symbol 8 (cURus)</td>
<td>E43684 Vol 1 Sec 44 XAPX2, XAPX8</td>
<td>CF(B, C, D, E, F or G) – (1, 2, 3, 4, 5, 6, 7, 8, A or C)(any alphanumeric character)(C or H) – (any four numbers)(additional alphanumeric characters) CV(B, C, D, E, F or G) – (1, 2, 5, 6, A, B, C or D)(any alphanumeric character)(C or H) – (any four numbers)(any four numbers)(additional alphanumeric characters) TM(B, D or F) – (any four numbers)(any four numbers)(additional alphanumeric characters)</td>
<td></td>
</tr>
<tr>
<td>Symbol 10 (CSA)</td>
<td>CSA C22.2 No. 24</td>
<td>LR 30586 Class 4813-02</td>
<td>Series C</td>
<td></td>
</tr>
<tr>
<td>Symbol 13 (CE)</td>
<td>See declaration RoHS, WEEE</td>
<td>CE Declaration</td>
<td>Same as cURus</td>
<td></td>
</tr>
<tr>
<td>Series LS</td>
<td>Symbol 8 (cURus)</td>
<td>E43684 Vol 1 Sec 49 XAPX2, XAPX8</td>
<td>Series LSF4 (X) W (###) (###) (XX) Where X = any number or letter, # = Any number.</td>
<td></td>
</tr>
<tr>
<td>Symbol 13 (CE)</td>
<td>See declaration RoHS, WEEE</td>
<td>CE Declaration</td>
<td>Same as cURus</td>
<td></td>
</tr>
<tr>
<td>Series L</td>
<td>Symbol 8 (cURus)</td>
<td>E43684 Vol 1 Sec 44 XAPX2, XAPX8</td>
<td>LF(C, E or G) – (1, 2, 3, 4, 5, 6, 7, 8, A or C)(any alphanumeric character)(U, W, Y or Z) – (any four numbers) – (additional alphanumeric characters) LV(C, E or G) – (1, 2, 5, 6, A, B, C or D)(any alphanumeric character)(U, W, Y or Z) – (any four numbers) – (any four numbers)(additional alphanumeric characters)</td>
<td></td>
</tr>
</tbody>
</table>
## MODELS

### Approval Marks

#### Symbol 8 (cURus)

- Smartheat Symbol 8 (cURus)
  - UL 873
  - E43684 Vol 1 Sec 45
  - WCSV – (0120 or 0240) – (additional letters or numbers)
  - XAPX2, XAPX8

#### Symbol 13 (CE)

- See declaration
  - CE Declaration
  - Same as cURus

#### Series F2 Minichef

- Symbol 8 (cURus)
  - UL 873, UL 197, UL 60730, UL/ANSI Z21.23
  - E43684 Vol 2 Sec 29
  - F2(H or U)(A or C) – (0-4)(0-3)(0-3)(0 or 1) – (0 or 1)(0 or 1)(AA-ZZ)
  - XAPX2, XAPX8

- Symbol 11 (NSF)
  - NSF Standard 2
  - 49660-0001-000
  - F2(H or U)(A or C) – (1-4)(1-3)(1-3)1 – (0 or 1)(0 or 1)(any two letters or numbers)

#### Symbol 13 (CE)

- See declaration
  - CE Declaration
  - Same as UR

#### EHG2 (SL10)

- Symbol 29(cULus)
  - Control # 56Y8
  - UL 60730, UL 197, UL 60730, UL/ANSI I Z21.23
  - E43684 Vol 8 Sec 1
  - E185611 Vol 2 Sec 4
  - XATJ, XATJ7
  - QUYX, QUYX7

#### Symbol 13 (CE)

- See declaration
  - CE Declaration
  - Same as UL above.

#### Series CZR Contactor CR series obsolete 5/16/07.

- Symbol 7 (UR)
  - UL 508
  - E73741
  - NRNT2
  - (CR or CZ)(24, 34, 42 or 50) – A (24, 48 or 60) V – (AC10, AC20, or DC10)
  - (CR or CZ) 18 – A (24, 48 or 60) V – (AC10, AC20 or DC10)

- Symbol 10 (CSA)
  - CSA C22.2 #14
  - 700195
  - Class 3211-07
  - (CR or CZ)(24, 34, 42 or 50) – with suffixes
  - (CR or CZ) 18 – A (24, 48 or 60) V – (AC10, AC20 or DC10)

- Symbol 25 (VDE)
  - VDE Category 4941
  - 1995500
  - 1995500
  - Same as UR

- Symbol 13 (CE)
  - See declaration
  - CE Declaration
  - Same as VDE

#### Solid State Relays SSR

- Symbol 7 (UR)
  - UL 508
  - E151484
  - NMFT2
  - Cross-Reference
  - E73741
  - NRNT2, NRNT8
  - 0003-0195-60(11, 16, 17, 19, 23 or 38)
  - 0003-0195-6100, 0003-0195-6101

- Symbol 10 (CSA)
  - CSA C22.2 #14
  - 700195
  - Class 3211-07
  - 18-60(01-06, 11, 13, 14, 16-21, 23, 25 or 38-41)
  - 0003-0195-60(0000, 6005, 6006, 6013)
  - 0003-0221-(0001, 0002, 0003, 0004)

- Symbol 12 (VDE)
  - VDE Category 4941
  - 1995500
  - 18-60(01-06, 11, 13, 14, 16-19, 21, 23, 25, 38, 39)
  - 0003-0195-(0000, 6005, 6006, 6011, 6013, 6016, 6017, 6019, 6023 or 6038)

- Symbol 13 (CE)
  - See declaration
  - CE Declaration
  - Same as VDE
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<tr>
<td>DIN-A-Mite A</td>
<td>Symbol 1 (cULus)</td>
<td>UL 508</td>
<td>E73741 Vol 2 Sec 5 NRNT, NRNT7</td>
<td>DA10 – (02, 24 or 60)(CX, FX, K1, k2 or K3) – 0(any 3 numbers or letters)</td>
</tr>
<tr>
<td></td>
<td>Control # 948Y SCCR Note</td>
<td></td>
<td></td>
<td>(where X = any number 0-9)</td>
</tr>
<tr>
<td></td>
<td>Symbol 13 (CE)</td>
<td></td>
<td>CE Declaration</td>
<td>Same as cULUs</td>
</tr>
<tr>
<td>DIN-A-Mite B</td>
<td>Symbol 1 (cULus)</td>
<td>UL 508</td>
<td>E73741 Vol 2 Sec 6 NRNT, NRNT7</td>
<td>DB(1, 2, 3, 4, 8 or 9) 0 – (02, 24 or 60)(CX, FX, K1, K2, K3) – (0 or S)(any three letters or numbers)</td>
</tr>
<tr>
<td></td>
<td>Control # 948Y SCCR Note</td>
<td></td>
<td></td>
<td>(where X = any number 0-9)</td>
</tr>
<tr>
<td></td>
<td>Symbol 13 (CE)</td>
<td></td>
<td>CE Declaration</td>
<td>Same as cULUs</td>
</tr>
<tr>
<td>DIN-A-Mite C</td>
<td>Symbol 1 (cULus)</td>
<td>UL 508</td>
<td>E73741 Vol 2 Sec 4 NRNT, NRNT7</td>
<td>DC(1, 2, 3, 4, 8 or 9)(0, 1, 2 or 3) – (02, 12, 20, 24, 27, 40, 48 or 60)(CX, FX, LX, PX, SX, K1, K2 or K3) – (0, C, D, H or S)(any three numbers or letters)</td>
</tr>
<tr>
<td></td>
<td>Control # 948Y SCCR Note</td>
<td></td>
<td></td>
<td>(where X = any number 0-9)</td>
</tr>
<tr>
<td></td>
<td>Symbol 13 (CE)</td>
<td></td>
<td>CE Declaration</td>
<td>Same as cULUs</td>
</tr>
<tr>
<td>DIN-A-Mite C Throughwall</td>
<td>Symbol 3 (cULus)</td>
<td>UL 508</td>
<td>E184390 Vol 1 Sec 1 QUZW, QUZW7</td>
<td>DC(1, 2, 3, 4, 8 or 9) T – (02, 12, 20, 24, 27, 40, 48, or 60)(CX, K1, K2, K3, FX, LX, PX or SX) – (0, C, D, H or S)(any three numbers or letters)</td>
</tr>
<tr>
<td></td>
<td>Control # 2S81 SCCR Note</td>
<td>Ul 1604, Ul 50 (Nema 4X) ISA12.12.01</td>
<td></td>
<td>(where X = any number 0-9)</td>
</tr>
<tr>
<td></td>
<td>Symbol 13 (CE)</td>
<td></td>
<td>CE Declaration</td>
<td>Same as cULUs</td>
</tr>
<tr>
<td>DIN-A-Mite D</td>
<td>Symbol 1 (cULus)</td>
<td>UL 508</td>
<td>E73741 Vol 1 Sec 7 NRNT, NRNT7</td>
<td>DD10 – (02, 24, 48 or 60)(CX, K1, K2, K3 or FX) – (0, 1 or S)(any three numbers or letters), (where X = any number 0-9)</td>
</tr>
<tr>
<td></td>
<td>Control # 948Y SCCR Note</td>
<td></td>
<td></td>
<td>E-RRL4CSSAA248E , E-RRL4CSSAA48X, (X = any letter or number)</td>
</tr>
<tr>
<td></td>
<td>Symbol 13 (CE)</td>
<td></td>
<td>CE Declaration</td>
<td>Same as cULUs</td>
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<tr>
<td>QPAC</td>
<td>Symbol 1 (cULus)</td>
<td>UL 508</td>
<td>E73741 Vol 3 Sec 1 NRNT, NRNT7</td>
<td>Q(01, 32, 33) – (12, 20, 24, 27, 38, 40, 41, 48 or 57)(0, 1 or 2) – (030, 050, 075, 100, 150, 200, 300) – (CA, CD, BF, BV, AF or AL)(may be followed by additional numbers or letters)</td>
</tr>
<tr>
<td></td>
<td>Control # 948Y SCCR Note</td>
<td></td>
<td></td>
<td>Q(01, 32) – (12, 20, 24, 27, 38, 40, 41 or 48)(0, 1 or 2) – (400, 500, 600, 800, 01K) – (CA, CD, BF, BV, AF or AL)(may be followed by additional numbers or letters)</td>
</tr>
<tr>
<td>Series PC Power Series</td>
<td>Symbol 1 (cULus)</td>
<td>UL 508</td>
<td>E73741 Vol 3 Sec 2 NRNT, NRNT7</td>
<td>PC(1-9)(0-9) – (N or F)(20, 25, 30 or 35) or (0-9)(00 or any two letters)</td>
</tr>
<tr>
<td></td>
<td>Control # 948Y SCCR Note</td>
<td></td>
<td></td>
<td>Same as cULUs</td>
</tr>
</tbody>
</table>

<p>| E-Safe II | Symbol 8 (cURus) | UL 508 | E73741 Vol 4 Sec 1 NRNT2, NRNT8 | ES2(1, 2, 3) – (1, 2, 3)(LV or HV) 0 – 0(any three letters or numbers) |
|          | Symbol 13 (CE) | EN 60947-4-3 | CE Declaration | Same as cURus |</p>
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<th>MODELS</th>
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<tr>
<td>Series EZ-ZONE ST Tower</td>
<td>Symbol 5 (cULus) Control # 88CM SCCR Note</td>
<td>UL 508, UL 61010</td>
<td>E102269 Vol 2 Sec 4 NKCR, NKCR7 QUYYX, QUYY7</td>
<td>ST(K, B, P, E, D, H, J or C)(A, L or B) – (A, B or F)(L, H, 1, 2 or 3)(Any letter or number)(B, C, D, E, F, G, H, J, K, L, M, N, P, R, S or T) – (B, C, D, E or F)(Any three letters or numbers)</td>
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<td>UL 508, UL 61010</td>
<td>E102269 Vol 1 Sec 5 NKCR2, NKCR8</td>
<td>STRT-HS (AA or CB) – (any three letters or numbers)(B, C, D, E or F) STRT-BASE (0000 or DP(A, B or F)(L, H, 1, 2 or 3)) STRC - (Any letter or number)(K, B, P, E, H, D, J or C)(A, B or L)(L, H, 1, 2 or 3) – (any four letter or number)</td>
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<td>Symbol 14 (FM)</td>
<td>Factory Mutual Class 3545</td>
<td>3026112</td>
<td>ST(K, B, P, E, D, H, J or C) L – (A, B or F)(L, H, 1, 2 or 3)(Any letter or number)(A to H, J to M, P, R, S or T) – (A, B, C, D, E or F)(Any three letters or numbers) STRC – 0(K, B, P, E, H, D, J or C) L (L, H, 1, 2 or 3) – (Any four letters or numbers)</td>
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<td>Symbol 10 (CSA)</td>
<td>C22.2 No 14-05</td>
<td>158031 Class 3211 07</td>
<td>ST(K, B, P, E, D, H, J or C)(A, L or B) – (A, B or F)(L, H, 1, 2 or 3)(Any letter or number)(B, C, D, E, F, G, H, J, K, L, M, N, P, R, S or T) – (B, C, D, E or F)(Any three letters or numbers) STRT-HS (AA or CB) – (any three letters or numbers)(B, C, D, E or F) STRT-BASE (0000 or DP(A, B or F)(L, H, 1, 2 or 3)) STRC - (Any letter or number)(K, B, P, E, H, D, J or C)(A, B or L)(L, H, 1, 2 or 3) – (any four letter or number)</td>
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<td>CE Declaration Declaration of Incorporation</td>
<td>ST(K, B, P, E, D, H, J or C)(A, L or B) – (A, B or F)(L, H, 1, 2 or 3)(Any letter or number)(A to H, J to N, P, R, S or T)(A, B, C, D, E or F)(Any three letters or numbers)</td>
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<td>Symbol 5 (cULus) Control # 88CM</td>
<td>UL 508, UL 61010 IP66, Nema 4X</td>
<td>E102269 Vol 2 Sec 5 NKCR, NKCR7 QUYYX, QUYY7</td>
<td>EZK (A, B) – (A, L or H) (A)(any two alphanumeric characters) – A A (any two alphanumeric characters) See EZ-ZONE PM for long case models.</td>
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<td>C22.2 No 24 long case C22.2 No 14 short case</td>
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<td>EZK (A, B or C) – (A, L or H) A, or 0 to 9 (any two alphanumeric characters) – A A (any two alphanumeric characters)</td>
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<td>Symbol 27 ODVA</td>
<td>ODVA Ethernet/IP</td>
<td>ODVA Declaration</td>
<td>EZ-Zone EZKX-X3XX-XXXX models that use A007-2779-0000 Rev C</td>
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<td>Symbol 26 Devicenet</td>
<td>ODVA Devicenet</td>
<td>Devicenet Declaration</td>
<td>EZ-Zone EZKX-X5XX-XXXX models that use A007-2814-0000 Revision A or B PCB</td>
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<td>TLM-8</td>
<td><strong>Symbol 4 (cULus)</strong> Control # 93RL</td>
<td>UL 61010-1</td>
<td>E185611 Vol 2 Sec 5 QUYYX, QUYYX7</td>
<td>TLM (C, E or P) – (0-9)(0 or 1)(any number)(additional alphanumeric characters)</td>
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<td>Symbol 14 (FM) Factory Mutual Class 3545</td>
<td>E43684 Vol 4 Sec 27 XAPX2, XAPX8</td>
<td>Temperature Limit Switch non-indicating TLM (C or E)(0 – 6) 1 (any number)(additional alphanumeric characters)</td>
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<td>CLS200 1/8 DIN</td>
<td><strong>Symbol 4 (cULus)</strong> Control # 93RL</td>
<td>UL 61010-1</td>
<td>E185611 Vol 2 Sec 5 QUYYX, QUYYX7</td>
<td>CLS2 – (00 to 16) X (0, 1 or 3) (additional alphanumeric characters)</td>
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<td>Series D8</td>
<td><strong>Symbol 4 (cULus)</strong> Control # 93RL</td>
<td>UL 916</td>
<td>E185611 Vol 2 Sec 5 QUYYX, QUYYX7</td>
<td>D8(4 or 8) 0 followed by any numbers or letters</td>
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<td><strong>Symbol 8 (cURus)</strong></td>
<td>UL 916</td>
<td>E185611 Vol 3 Sec 1 QUYYX2, QUYYX8</td>
<td>D8(4 or 8)1-0000-(0, 1, 2, 3, 4 or 5)(0 or 1) 0 (any number or letter)</td>
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<td><strong>Symbol 26 (Devicenet)</strong> ODVA Composite Test Revision 17</td>
<td>ODVA DOC</td>
<td>Watlow D88</td>
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<td>MLS300</td>
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<td>E185611 Vol 2 Sec 7 QUYYX, QUYYX7</td>
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<td>TB50 (Interface module)</td>
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<td>UL 916</td>
<td>E185611 Vol 2 Sec 8 QUYYX, QUYYX7</td>
<td>SDAC and Series DAC(Serial Digital to Analog Converter)</td>
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<td>UL 916, UL 50 (Nema 4X)</td>
<td>E185611 Vol 2 Sec 1 QUYYX, QUYYX7</td>
<td>F4(S, D or P)(H or L) – (C, E, F or K)(A, C, E, F or K)(A, C, F, K or any number or letter)(A, C, K, F, 0 or 6 or any letter or number) – (0, 1 or 2)(any three letters or numbers) Auxiliary input or output modules, Models Z100-0745-(0001 to 0007)</td>
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<td>EZ-Zone PM</td>
<td>Symbol 4 (cULus)</td>
<td>UL 61010-1 2nd edition</td>
<td>E185611 Vol 2 Sec 6</td>
<td>PM (3, 4, 6, 8 or 9)(Any letter or number)(1, 2, 3 or 4)(A, C, E, F or K)(A, C, H, J or K) – (Any letter or number)(A, C, J, L, M, P, R or T)(A, C, E, F or K)(A, C, H, J or K) – (Any three letters or numbers) EZK (B, C, D, or E) – (L or H)(0 – 9)(XX) – (AA)(XX)</td>
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<td>UL 50 4X, IP66</td>
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<td>Control # 2S81</td>
<td>ANSI/ISA 12.12.01-2001</td>
<td>E184390 Vol 1 Sec 2</td>
<td>PM (3, 4, 6, 8 or 9)(Any letter or number)(1, 2, 3 or 4)(A, C, E, F or K)(A, C, H, J or K) – (Any letter or number)(A, C, J, L, M, P, R or T)(A, C, F or K)(A, C, H, J or K) Any letter or number (12 or any two numbers or letters) EZK (B, C, D or E) – (L or H)(0 – 9)(XX) – AA (XX)</td>
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<td>ODVA Ethernet/IP</td>
<td>ODVA Declaration</td>
<td>EZ-Zone PM or EKZ models that use A007-2779-0000 Rev C</td>
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<td>Symbol 26 Devicenet</td>
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<td>Devicenet Declaration</td>
<td>EZ-Zone PM or EKZ models that use A007-2814-0000 Revision A or B PCB</td>
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<td>PM (3, 4, 6, 8 or 9)(Any letter or number)(1, 2, 3 or 4)(A, C, E, F or K)(A, C, H, J or K) – (Any letter or number)(A, C, J, L, M, P, R or T)(A, C, E, F or K)(A, C, H, J or K) – (Any three letters or numbers) EZK (B, C, D or E) – (L or H)(0 to 9)(XX) – AA (XX)</td>
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<td>Symbol 14 (FM)</td>
<td>FM Class 3545</td>
<td>J.I. 3029084</td>
<td>PM (3, 6, 8, 9 or 4)(L, M or D)(1, 2, 3 or 4)(A, C or E) J – (Any letter or number) A (A, C, E, F or K)(A, C, J or K) (A, B, C, D or F) (Any two letters or numbers) PM(6, 8, 9 or 4)(Any letter or number)(1, 2, 3 or 4)(A, C, E, F or K)(A, C, H, J or K) – (Any letter or number)(L, M or D)(A, C or E) J, (A, B, C, D or F), (Any two letters or numbers)</td>
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<td>CE Declaration</td>
<td>All Models, See CE Declaration.</td>
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<td>Series F4T 1/4 DIN</td>
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<td>UL 61010 (Nema 4X) IP65</td>
<td>E185611 Vol X1 Sec A6</td>
<td>F4T X – X (1 – 8) X A – A XX X - XXX</td>
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<td>High Density Module FMHA – (B, C, F, J, K, L, P or R) AAA – A (A, B, F or G) XX</td>
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<td>Limit Module FMLA – (LAJ, LCJ, LEJ, MAJ, MCJ, MJ, MEJ or YEB) A – A (A, B, F or G) XX</td>
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<td>Communications Module FMCA – X AAA – A (A, B, F or G) XX</td>
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<td><strong>RMC</strong> (1-7 or 9)(A,B, D-H, J-N, P, R, S, T, U, Y or Z) (A or 1.2.5.6.7 or 9) (A,B, D-H, J-N, P, R, S, T, U, Y or Z) (A or 1.2.5.6.7 or 9) (A,B, D-H, J-N, P, R, S, T, U, Y or Z) (A or 1.2.5.6.7 or 9) (A-H, J-N, P, R, S, T, U, Y or Z) (A or 1.2.5.6.7 or 9) (A-H, J-N, P, R, S, T, U, Y or Z) (A or 1) Any two letters or numbers. (Need a 5 or 6 in at least one positions 4, 6, 8 or 10 of model number to be a Limit.) <strong>RML</strong> (A, F or S) - (5, 6)(A, 5, 6, J, C, B)(A, 5, 6, J, C, B)(A, 5, 6, J, C, B)(A, 5, 6, J, C, B) - A (A, 1) any two letters or numbers</td>
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<td>Symbol 27 ODVA</td>
<td>ODVA Ethernet/IP</td>
<td>ODVA Declaration</td>
<td>EZ-Zone RMA models using A007-2779-000 Rev C – Ethercat board.</td>
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<td>ODVA Devicenet</td>
<td>Devicenet Declaration RMZ Devicenet DOC</td>
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### OBSOLETE FILES

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<tr>
<td>Series 142</td>
<td>OBS Files 101, 103, 164</td>
<td>E43684 Vol 2 Sec 12</td>
<td>All models</td>
</tr>
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</table>

Series 360  | Obsolete 12/2/96 | ? |
Series 1500 | Obsolete 5/16/96 | ? |
Series 140A | Obsolete 2-17/00 | E43684 Vol 2 Sec 14 |
Augustine Medical | Obsolete Aug, 2010 | E43684 Vol 2 Sec 24 A007-1900-(any four numbers), A007-2133-(any four numbers) |
Series 160  | Obsolete Aug, 2010 | E43684 Vol 2 Sec 26 160(A or B) – (1 or 2)(A, B or C)(01 – 24) – (1 or 2)(0 – 9)(00 or AA–ZZ) |
Groen      | LOG 232          | E43684 Vol 1 Sec 36 GRON – RELY – (XXXX) GRON-DISP models obs. File 165 |
Series 998  | Obsolete 5/23/2014 | CE Declaration 982 CE Declaration 988 CE Declaration 998 All Models |

HAL        | OBS may 2012     | E43684 Vol 1 Sec 48 HAL |
DPAC       | Obsolete Aug, 2010 | E43684 Vol 4 Sec 2 D01, 32, 43 all models, D01S, D32S, D43S all models |
DPAC-S     | Obsolete Aug, 2010 | E43684 Vol 5 Sec 1 |

Various files.

<table>
<thead>
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<th>Agency Approval Index</th>
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</table>

Series V4  | LOG 170          | Obsolete 8/2/06 All models |
PPC-2000   | Obsolete 12/31/07 | CE Declaration All models |
Mercury Relay | Obsolete 4/1/04 | |
E-Safe 1   | Obsolete 12-31-07 | E213822 All models |

E43684 Vol 7 Sec 1

Series 80M6 | Obsolescence log 182 | Obsolete 4/23/08 All models |

E185611

<table>
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</table>

Series SD | NSF  | NSF Standard 2 Closed 10/31/13 | 49660-0002-000 SD(3, 4, 6, 8 or 9)(any alphanumeric character) – (H or L)(C, F, J or K)(A, C, J, K or U)(A, C, E, F or K) – (any four alphanumeric characters) |
CAS200 CPC200 | OBS Log 216 10/14/2014 | UL 61010-1 E185611 Vol 2 Sec 5 CAS200 (0, 1 or 3) (additional alphanumeric characters) CPC40 (1 to 8) (0-9) (0, 1 or 3) (additional alphanumeric characters) |
CPC obs 4/30/2007 | Companion Recognition to UL 916 | E43684 Vol 4 Sec 27 |
Symbol 13 (CE) | See declaration CE CAS Same as cULus |

E102269

<table>
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Series µD MicroDIN | OBS log 174 | Obsolete 12/07/06 E102269 Vol 1 Sec ? All models |

Various files.

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Series SD | NSF  | NSF Standard 2 Closed 10/31/13 | 49660-0002-000 SD(3, 4, 6, 8 or 9)(any alphanumeric character) – (H or L)(C, F, J or K)(A, C, J, K or U)(A, C, E, F or K) – (any four alphanumeric characters) |
CAS200 CPC200 | OBS Log 216 10/14/2014 | UL 61010-1 E185611 Vol 2 Sec 5 CAS200 (0, 1 or 3) (additional alphanumeric characters) CPC40 (1 to 8) (0-9) (0, 1 or 3) (additional alphanumeric characters) |
CPC obs 4/30/2007 | Companion Recognition to UL 916 | E43684 Vol 4 Sec 27 |
Symbol 13 (CE) | See declaration CE CAS Same as cULus |

E102269

<table>
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Series µD MicroDIN | OBS log 174 | Obsolete 12/07/06 E102269 Vol 1 Sec ? All models |

Various files.

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</table>

Series SD | NSF  | NSF Standard 2 Closed 10/31/13 | 49660-0002-000 SD(3, 4, 6, 8 or 9)(any alphanumeric character) – (H or L)(C, F, J or K)(A, C, J, K or U)(A, C, E, F or K) – (any four alphanumeric characters) |
CAS200 CPC200 | OBS Log 216 10/14/2014 | UL 61010-1 E185611 Vol 2 Sec 5 CAS200 (0, 1 or 3) (additional alphanumeric characters) CPC40 (1 to 8) (0-9) (0, 1 or 3) (additional alphanumeric characters) |
CPC obs 4/30/2007 | Companion Recognition to UL 916 | E43684 Vol 4 Sec 27 |
Symbol 13 (CE) | See declaration CE CAS Same as cULus |
<table>
<thead>
<tr>
<th>Series 935 1/32 DIN</th>
<th>OBS log 220</th>
<th>Obsolete 4/30/10</th>
<th>E102269 Vol 2 Sec 1 NKCR, NKCR7</th>
<th>935(A-Z) – (0-9) C (C, D or K)(0 or 1) – (any four letters or numbers)</th>
<th>CE Declaration</th>
<th>Same as cULus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Series 94</td>
<td>Symbol 14 (FM) OBS 223 3/2/12</td>
<td>Factory Mutual Class 3545 Nema 4X, Nema 12</td>
<td>J.I. 0D5A1.AF</td>
<td>94(A or B)(A or B) – 1D (A, C, D or K)(0 or 1) – (any four letters or numbers)</td>
<td>CE Declaration</td>
<td>94(A or B) B – 1D (A, C, D or K) (0 or 1) – (any four letters or numbers)</td>
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</table>

<table>
<thead>
<tr>
<th>Revision</th>
<th>Date</th>
<th>Description</th>
<th>Agency Review of Symbols Required?</th>
<th>Change Due to:</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>7-15-08</td>
<td>Adjusted format and corrected agency symbols to comply with UL Label Marking department requirements. Symbols 1, 3, 5, 10, 13, 14, 21, 29 updated.</td>
<td>No</td>
<td>Yes Approved by UL 7-11-08</td>
</tr>
<tr>
<td>B</td>
<td>9/26/08</td>
<td>Obsolete Series 942/945, Corrected DIN C standard model UL logo callout by removing Throughwall model. FM now has an online searchable database.</td>
<td>No symbols changed. N/A</td>
<td>Obs Log 186</td>
</tr>
<tr>
<td>C</td>
<td>10/23/08</td>
<td>Initial Release of EZ-Zone RM series product, UL Ordinary locations, UL Hazardous locations, FM, CE, and ODVA Ethernet. Add clarification for PM models ODVA Ethernet and devicenet approval.</td>
<td>No symbols changed N/A</td>
<td>Milestone 5</td>
</tr>
<tr>
<td>D</td>
<td>1/30/09</td>
<td>EZ-ZONE PM Limited Feature update, EZK long case CSA approval and other typographical corrections</td>
<td>No symbols changed N/A</td>
<td>Updated approvals received.</td>
</tr>
<tr>
<td>E</td>
<td>3/17/09</td>
<td>Devicenet approval received A007-2814-000B card used on RM and PM models. Put Logo ON units. Obsolete Hannibal Optical trip sensor. No product ever produced.</td>
<td>No symbols changed N/A</td>
<td>ODVA test 10584.02</td>
</tr>
<tr>
<td>F</td>
<td>7/24/09</td>
<td>Series PM8, 9, 4 UL and FM approval received. Added thermistor input to PM6 and Profibus comm.</td>
<td>No symbols change N/A</td>
<td>FM 3035726, UL 09NK05591</td>
</tr>
<tr>
<td>G</td>
<td>11/02/09</td>
<td>Updated RM File to allow future expansion, UL file update to describe by modules allowed not by model number. Also some clarifications of EZK models due to adding long case models to PM file.</td>
<td>No symbols change N/A</td>
<td>UL 09NK05591</td>
</tr>
<tr>
<td>H</td>
<td>3/19/2010</td>
<td>Updated EZ-Zone ST due to release of Phase angle models.</td>
<td>No symbols change N/A</td>
<td>UL 09NK15933 FM 3037883 IM 484 UL SR5713714-T001</td>
</tr>
<tr>
<td>J</td>
<td>7/30/10</td>
<td>Updated RM FM file to add High density Limits, removed T321 UL approval due to standards change.</td>
<td>No symbols change N/A</td>
<td>FM 3039786 IM 472</td>
</tr>
<tr>
<td>Revision</td>
<td>Date</td>
<td>Description</td>
<td>Agency Review of Symbols Required?</td>
<td>Change Due to:</td>
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<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>-----------------------------------</td>
<td>--------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>K</td>
<td>9/24/10</td>
<td>EM00-GATE-0000 obsolete, Obs. CZ50 and –AC20 options CZRs, 0303-CG00-0301 obs., Augustine Medical, Series 160, DPAC and DPACS Obsolete., Updated EZ-Zone PM 4, 8, 9 models with CSA</td>
<td>Updated NSF logos to wider Component box and created inverse logo.</td>
<td>OBS log 198, 211 ECO 14374, ECO 14429, ECO 14402</td>
</tr>
<tr>
<td>L</td>
<td>2/18/11</td>
<td>Series 935 Obsolete. Updated symbol 29 to enhance UL logo information on label.</td>
<td>Symbol 29 approved 2-10-11</td>
<td>ECO 14448, OBS Log 220, ECO 14549</td>
</tr>
<tr>
<td>M</td>
<td>07/08/2011</td>
<td>Power series F35 model addition. Typographical corrections on DIN B and D. Series 988 OBS, EZ-Zone RM updates</td>
<td>N/A</td>
<td>IM 581, IM 572, ECO 14575, IM 623, OBS 227, IM 625, IM 626, IM 630</td>
</tr>
<tr>
<td>N</td>
<td>3-20-13</td>
<td>EZ-Zone PM 11 Update alternate micro, ST phase angle achieving CSA approval 12/16/2011, Updated EHG DOC, updated EHG SL10 DOC and models., Series 94 OBS, Series 988 Reinstated, EHG CL10 AAAA model added.</td>
<td>N/A</td>
<td>IM 640, ECO 14749, ECO 14819, OBS log 223, IM 675, 676, 679, IM 637, ECO 14892, IM 773, 774</td>
</tr>
<tr>
<td>P</td>
<td>04/02/2015</td>
<td>SD NSF file closed 10/31/13, Series 988 OBS, added F4T UL and CE approval, RMF and RMZ approvals. CAS200 OBS, CPC200 and HAL OBS., Series LS launch. Updated UL symbols 1, 3, 4, 5 and 29.</td>
<td>Symbols 1a, 3a, 4a, 5a, 29a Approved 03-30-15</td>
<td>IM 781, OBS 188, ECO 15350, OBS 227, OBS 216, OBS 232, IM 1016</td>
</tr>
</tbody>
</table>
Effective April, 2006 through UL508A, the National Electric Code (NEC®) requires that electrical panel assemblies be marked with the available fault current or Short-Circuit Current Rating (SCCR). See Article 409.110 of the 2008 edition of NEC®. The SCCR rating must be marked on all industrial electrical panels and will be rated at the level of the lowest SCCR component.

What Is Short-Circuit Current Rating (SCCR)?
SCCR is a safety consideration that gives a rating, that a circuit or piece of equipment will survive without producing a dangerous arc flash. An arc flash results in an explosion caused by an insulation failure or air ionization from an over voltage event. An arc flash with 1,000 amperes or more can cause substantial damage, fire or injury. The massive energy released in the fault rapidly vaporizes the metal conductors involved, blasting molten metal and expanding plasma outward with extreme force. The reason behind the code change is to prevent fire, injury or death.

The SCCR rating represents the maximum level of short-circuit current that the component or assembly can withstand and is used for determining compliance with NEC® Article 110.10. Although this rating can be marked on individual components or assemblies the assembly rating takes into account all components contained within the equipment. Do not make the mistake to assume that the interrupting rating of the over current protective device protecting the circuit represents the SCCR for the entire circuit. Interrupting ratings apply solely to the over current protective device and are used for compliance with NEC® Article 110.9.

All industrial electrical systems have a known “Fault Current” which is available from the utility that serves the building. If the incoming power and the buss power are rated at 68,000 amps, then any new control panel installed in that area must have a SCCR rating of at least 68,000 amps.

Every component within the power switching circuit must meet or exceed the available fault current where the panel is to be installed. If a device has not been tested for a SCCR, then the generic rating of 5,000 amperes is assigned for a switch (Silicon Controlled Rectifiers are switches). Most installed panel locations will require a higher SCCR rating than 5,000 A.

Who Is Affected By The SCCR Markings?
The 2005 NEC® has requirements for anyone building UL508A listed equipment to be marked with an SCCR. Therefore facility, process and consulting engineers need to specify the correct equipment. Electrical contractors need to correctly install equipment and electrical inspectors need to ensure equipment compliance.

What does this mean to you?
If on-site power supply available fault current is higher than your SCCR panel rating, additional mitigation measures will be required in order to meet the lower SCCR rating of the electrical panel. See document references listed at the end of this white paper. This may mean installing a transformer on location to limit the available fault current. By selecting power components such as Watlow DIN-A-MITE®, Power Series and Q-Pac which have been tested to 200,000 A, the additional mitigation measures may not be required reducing the panel installation cost for you and your customer.
Watlow has tested the following power controls for short-circuit current rating (SCCR). These devices have a rating of 200,000 amperes when used with the listed fuse in each hot leg. SCCR defaults to 5,000 amperes per UL508A guidelines and the United States National Electric Code (NEC®) with any other untested combination. Semiconductor fuses do not meet branch circuit requirements per NEC®. The combination DFJ fuse does provide branch circuit protection and will protect the semiconductor device. Use either the Watlow Semiconductor Fuse and Semiconductor Fuse holder with branch circuit protection or the Bussmann Combination Fuse and Combination Fuse Holder.

Semiconductor fuses do not provide branch circuit protection. Branch fuses or circuit breakers are required to protect the load and the wire. The “Short circuit current rating” only applies with the exact fuse listed, or a smaller fuse of the same family. SCCR Ratings are not valid when the line voltage is greater than 480 VAC.

<table>
<thead>
<tr>
<th>Model</th>
<th>Fuse Rating 125% of load</th>
<th>Watlow Semiconductor or Fuse Part No.</th>
<th>Watlow Semiconductor Fuse Holder Part No.</th>
<th>*Bussmann Semiconductor Fuse Part No.</th>
<th>Bussmann/ *Watlow Combination Fuse Part No.</th>
<th>Bussmann/ *Watlow Fuse Holder for Combination Fuse</th>
<th>SCCR in Amperes</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIN-A-MITE® A, B, C</td>
<td>20 A</td>
<td>17-8020</td>
<td>17-5110</td>
<td>FWC-20A10F</td>
<td>DFJ-20</td>
<td>CH30J1i</td>
<td>200,000</td>
</tr>
<tr>
<td></td>
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<td></td>
<td>0808-0325-0020</td>
<td>0808-0326-1530</td>
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</tr>
<tr>
<td>DIN-A-MITE® A, B, C</td>
<td>25A</td>
<td>17-8025</td>
<td>17-5110</td>
<td>FWC-25A10F</td>
<td>DFJ-25</td>
<td>CH30J1i</td>
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<tr>
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<td></td>
<td>No Watlow P/N</td>
<td>0808-0326-1530</td>
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<tr>
<td>DIN-A-MITE® A¹, B, C</td>
<td>30 A</td>
<td>17-8030</td>
<td>17-5114</td>
<td>FWP-30A14F</td>
<td>DFJ-30</td>
<td>CH30J1i</td>
<td>200,000</td>
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<td>0808-0325-0030</td>
<td>0808-0326-1530</td>
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<tr>
<td>DIN-A-MITE® A¹, B, C</td>
<td>40 A</td>
<td>17-8040</td>
<td>17-5114</td>
<td>FWP-40A14F</td>
<td>DFJ-40</td>
<td>CH60J1i</td>
<td>200,000</td>
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<td>0808-0325-0040</td>
<td>0808-0326-3560</td>
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<tr>
<td>DIN-A-MITE® B¹, C</td>
<td>50 A</td>
<td>17-8050</td>
<td>17-5114</td>
<td>FWP-50A14F</td>
<td>DFJ-50</td>
<td>CH60J1i</td>
<td>200,000</td>
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<td>0808-0325-0050</td>
<td>0808-0326-3560</td>
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<tr>
<td>DIN-A-MITE® B¹, C</td>
<td>63 A</td>
<td>17-8063</td>
<td>17-5122</td>
<td>FWP-63A22F</td>
<td>DFJ-60</td>
<td>CH60J1i</td>
<td>200,000</td>
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<td>0808-0326-0060</td>
<td>0808-0326-3560</td>
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<tr>
<td>DIN-A-MITE® C</td>
<td>80 A</td>
<td>17-8080</td>
<td>17-5122</td>
<td>FWP-80A22F</td>
<td>DFJ-80</td>
<td>J601001CR</td>
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<td>0808-0326-7010</td>
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<tr>
<td>DIN-A-MITE® C</td>
<td>100 A</td>
<td>17-8100</td>
<td>17-5122</td>
<td>FWP-100A22F</td>
<td>DFJ-100</td>
<td>J601001CR</td>
<td>200,000</td>
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<td></td>
<td>0808-0325-0100</td>
<td>0808-0326-7010</td>
<td></td>
</tr>
<tr>
<td>DIN-A-MITE® D²,³</td>
<td>65 A x 2</td>
<td>0808-0096-0000</td>
<td>Not Applicable</td>
<td>170N3437</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
<td>200,000</td>
</tr>
</tbody>
</table>

¹FPW series can be used up to this rating to protect the SCR. DFJ series cannot as it must follow the Branch circuit 125% rating rule.
² DINA_MITE® D uses two 65A fuses in parallel.
³ DINA_MITE® D, Power Series and QPAC have on board semiconductor fuses.
### Short-Circuit Current Rating - SCCR

**Watlow Power Controllers**

*The Watlow Semiconductor Fuse is equivalent to the Bussmann Semiconductor Fuse Part.*

<table>
<thead>
<tr>
<th>Model</th>
<th>Fuse Rating 125% of Load</th>
<th>Watlow Semiconductor Fuse Part No.</th>
<th>Watlow Semiconductor Fuse Holder Part No.</th>
<th><em>Bussmann Semiconductor Fuse Part No.</em></th>
<th>*Bussmann/ <em>Watlow Combination Fuse Part No.</em></th>
<th>Bussmann/ *Watlow Fuse Holder for Combination Fuse</th>
<th>SCCR in Amperes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Power Series</strong>³</td>
<td>100 A</td>
<td>0808-0102-0100</td>
<td>Not Applicable</td>
<td>170M1317</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
<td>200,000</td>
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<tr>
<td><strong>Power Series</strong></td>
<td>125 A</td>
<td>0808-0102-0125</td>
<td>Not Applicable</td>
<td>170M1318</td>
<td>Not Applicable</td>
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<tr>
<td><strong>Power Series</strong></td>
<td>160 A</td>
<td>0808-0102-0160</td>
<td>Not Applicable</td>
<td>170M1319</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
<td>200,000</td>
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<tr>
<td><strong>Power Series</strong></td>
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<td>0808-0102-0200</td>
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<td>170M1320</td>
<td>Not Applicable</td>
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<tr>
<td><strong>Power Series</strong></td>
<td>250 A</td>
<td>0808-0102-0250</td>
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<td>170M1321</td>
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<td>Not Applicable</td>
<td>200,000</td>
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<tr>
<td><strong>Power Series</strong></td>
<td>315 A</td>
<td>0808-0102-0315</td>
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<td>170M1322</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
<td>200,000</td>
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<tr>
<td><strong>QPAC</strong>³</td>
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<td>17-7053</td>
<td>Not Applicable</td>
<td>FWH-200A</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
<td>200,000</td>
</tr>
<tr>
<td><strong>QPAC</strong>³</td>
<td>250 A</td>
<td>17-7054</td>
<td>Not Applicable</td>
<td>FWH-250A</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
<td>200,000</td>
</tr>
<tr>
<td><strong>QPAC</strong>³</td>
<td>400 A</td>
<td>17-7056</td>
<td>Not Applicable</td>
<td>FWH-400A</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
<td>200,000</td>
</tr>
<tr>
<td><strong>QPAC</strong>³</td>
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<td>17-7057</td>
<td>Not Applicable</td>
<td>FWH-500A</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
<td>200,000</td>
</tr>
<tr>
<td><strong>QPAC</strong>³</td>
<td>600 A</td>
<td>17-7058</td>
<td>Not Applicable</td>
<td>FWH-600A</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
<td>200,000</td>
</tr>
<tr>
<td><strong>QPAC</strong>³</td>
<td>800 A</td>
<td>17-7059</td>
<td>Not Applicable</td>
<td>FWH-800A</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
<td>200,000</td>
</tr>
<tr>
<td><strong>QPAC</strong>³</td>
<td>1000 A</td>
<td>17-7082</td>
<td>Not Applicable</td>
<td>170M6714²</td>
<td>Not Applicable</td>
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<td>200,000</td>
</tr>
<tr>
<td><strong>QPAC</strong>³</td>
<td>1250 A</td>
<td>17-7081</td>
<td>Not Applicable</td>
<td>170M6766²</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
<td>200,000</td>
</tr>
</tbody>
</table>

¹FPW series can be used up to this rating to protect the SCR. DFJ series cannot as it must follow the Branch circuit 125% rating rule.
³ DIN-A_MITE® D, Power Series and QPAC have on board semiconductor fuses.
⁴ 170M6764 indicator version allowed in place of 170M6714, 170M6716 non-indicator version allowed in place of 170M6766.
## Short-Circuit Current Rating - SCCR

### Watlow Power Controllers

<table>
<thead>
<tr>
<th>Model</th>
<th>Fuse Rating 125% of load</th>
<th>Watlow Semiconductor Fuse Part No.</th>
<th>Watlow Semiconductor Fuse Holder Part No.</th>
<th>*Bussmann Semiconductor Fuse Part No.</th>
<th>Bussmann/ *Watlow Combination Fuse Part No.</th>
<th>Bussmann/ *Watlow Fuse Holder for Combination Fuse</th>
<th>SCCR in Amperes</th>
</tr>
</thead>
<tbody>
<tr>
<td>EZ-ZONE® ST ≤ 25A</td>
<td>30 A</td>
<td>17-8030</td>
<td>17-5114</td>
<td>FWP-30A14F</td>
<td>DFJ-30 0808-0325-0030</td>
<td>CH30J1i 0808-0326-1530</td>
<td>200,000</td>
</tr>
<tr>
<td>EZ-ZONE® ST ≤ 25A</td>
<td>40 A¹</td>
<td>17-8040</td>
<td>17-5114</td>
<td>FWP-40A14F</td>
<td>DFJ-30 is max size 125% rating</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EZ-ZONE® ST ≤ 50A</td>
<td>50 A at 480 Vac</td>
<td>17-8050</td>
<td>17-5122</td>
<td>FWP-50A22F</td>
<td>DFJ-50 0808-0326-0050</td>
<td>CH60J1i 0808-0326-3560</td>
<td>200,000</td>
</tr>
<tr>
<td>EZ-ZONE® ST ≤ 50A</td>
<td>63 A at 480 Vac</td>
<td>17-8063</td>
<td>17-5122</td>
<td>FWP-63A22F</td>
<td>DFJ-50 is max size for I²T at 480V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EZ-ZONE® ST ≤ 50A</td>
<td>63 A at 240 Vac</td>
<td>17-8063</td>
<td>17-5122</td>
<td>FWP-63A22F</td>
<td>DFJ-60 0808-0326-0060</td>
<td>CH60J1i 0808-0326-3560</td>
<td>200,000</td>
</tr>
<tr>
<td>EZ-ZONE® ST ≤ 75A</td>
<td>80 A at 480 Vac</td>
<td>17-8080</td>
<td>17-5122</td>
<td>FWP-80A22F</td>
<td>DFJ-80 0808-0325-0080</td>
<td>J60100-1CR 0808-0326-7010</td>
<td>200,000</td>
</tr>
<tr>
<td>EZ-ZONE® ST ≤ 75A</td>
<td>90 A at 480 Vac</td>
<td></td>
<td></td>
<td>No FWP-90 available</td>
<td>DFJ-90 No Watlow P/N</td>
<td>J60100-1CR 0808-0326-7010</td>
<td>200,000</td>
</tr>
<tr>
<td>EZ-ZONE® ST ≤ 75A</td>
<td>100 A at 240 Vac</td>
<td>17-8100</td>
<td>17-5122</td>
<td>FWP-100A22F</td>
<td>DFJ-100 0808-0325-0100</td>
<td>J60100-1CR 0808-0326-7010</td>
<td>200,000</td>
</tr>
</tbody>
</table>

¹FPW series can be used up to this rating to protect the SCR. DFJ series cannot as it must follow the Branch circuit 125% rating rule.

**Definitions from EN 60947-4-3**

<table>
<thead>
<tr>
<th>Type 1 Protection</th>
<th>Coordination requires that, under short-circuit conditions, the device shall cause no danger to persons or to the installation and may not be suitable for further service without repair and replacement of parts.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Type 2 Protection</th>
<th>Coordination requires that, under short-circuit conditions, the device shall cause no danger to persons or to the installation and shall be suitable for further use.</th>
</tr>
</thead>
</table>

When fused per the combinations listed above, products comply with Type 2 Protection.
The following outputs on Watlow Models have been tested for SCCR at 10kA for 240 Vac systems.

<table>
<thead>
<tr>
<th>Model</th>
<th>Fuse Rating 125% of max load</th>
<th>Watlow Semiconductor Fuse Part No.</th>
<th>Watlow Semiconductor Fuse Holder Part No.</th>
<th>*Bussmann Semiconductor Fuse Part No.</th>
<th>*Bussmann Branch Fuse Part No.</th>
<th>Watlow Branch Fuse Holder Part No.</th>
<th>SCCR in Amperes</th>
</tr>
</thead>
<tbody>
<tr>
<td>EZ-Zone RM, Dual 10A SSR</td>
<td>12.5A</td>
<td>17-8012</td>
<td>17-5110</td>
<td>FWC12A10F</td>
<td>0808-0235-0000</td>
<td>10,000</td>
<td></td>
</tr>
</tbody>
</table>

When the Semiconductor fuse is used, complies with Type 2 Protection. When the Branch circuit fuse is used units comply with Type 1 Protection.

<table>
<thead>
<tr>
<th>Model</th>
<th>Fuse Rating 125% of max load</th>
<th>Semiconductor fuse.</th>
<th>*Bussmann Branch Fuse Part No.</th>
<th>Watlow Branch Fuse Holder Part No.</th>
<th>SCCR in Amperes</th>
</tr>
</thead>
<tbody>
<tr>
<td>EZ-Zone RM, PM No-arc 15A relay</td>
<td>20A</td>
<td>Not tested with this output</td>
<td></td>
<td></td>
<td>0808-0235-0000</td>
</tr>
</tbody>
</table>

EZ-Zone RM, PM 5A Mechanical Relay

<table>
<thead>
<tr>
<th>Model</th>
<th>Fuse Rating 125% of max load</th>
<th>Semiconductor fuse.</th>
<th>*Bussmann Branch Fuse Part No.</th>
<th>Watlow Branch Fuse Holder Part No.</th>
<th>SCCR in Amperes</th>
</tr>
</thead>
<tbody>
<tr>
<td>EZ-Zone RM, Quad 2A SSR output</td>
<td>2.5A</td>
<td>Not tested with this output</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
5 NOTE: Watlow tested worst case 20A umbrella fuse based on wire size typically used in panels. While this fuse will provide the stated Type 1 Protection, it is suggested to use a fuse based on the NEC 125% rating of the load.

UL 508 Section 52 High-Available Fault Current Tests

Notes:
- Tests performed with worst case fuse rating of product and smallest SCR module size.
- Fuses designated as Semiconductor only do not have Branch Circuit Ratings and a Separate Branch Circuit Fuse is required in the system.
- The Series DFJ fuse is rated as both a Semiconductor Fuse and Branch Circuit Fuse. UL File E4273 JDDZ, CSA File 53787 Class 1422-02.
- Tests performed with Semiconductor FWP series fuses representative of FWC series fuses.
- Fuses of similar family style (FWP, FWC, FWH, 170M, DFJ) as those tested but of smaller amperage rating are considered compliant.

Document References

NEC® 2008
NFPA 70™ : National Electrical Code®
International Electrical Code® Series
http://www.nfpa.org

UL508 – Industrial Control Equipment
UL508A – Industrial Control Panels
Underwriters Laboratories Inc. (UL)
333 Pfingsten Road
Northbrook, IL 60062-2096
**NOTE:** BUSS BAR CAN BE PROTECTED WITH A STANDARD BRANCH CIRCUIT

FUSE RATED AT 125% OF LOAD.

SCCR FUSE PLACEMENT

SINGLE PHASE  SINGLE PHASE  THREE PHASE  THREE PHASE
PHASE TO  PHASE TO  TWO LEG  THREE LEG
NEUTRAL  PHASE  THREE FUSES  THREE FUSES
ONE FUSE  TWO FUSES  REQUIRED  REQUIRED
REQUIRED  REQUIRED
1/10/2007

Mr. Larry Glentz
Watiow Winona Inc
1241 Bundy Blvd Po Box 5580
Winona, MN 55987
United States

Our Reference: File E73741 Project 06NK25814
Your Reference: WN010508
Subject: Witness Testing at Bussmann Facilities on Din-A-Mite, Power Series, EZ-Zone ST and Q-Pac Controllers

Dear Mr. Glentz:

We have completed our investigation, and this letter will serve as our report. For the file record, Project No. 06NK25814 was opened to investigate the Din-A-Mite, Power Series, EZ-Zone ST and Q-Pac controllers to the short circuit requirements in UL 508, the Standard for Industrial Control Equipment.

Tests were conducted to Sec. 52, High-Available Current Circuits, only. The tests were conducted on the following dates: July 19, 2006, October 9, 2006, November 20, 2006, December 20, 2006, and were witnessed by Brian Pegg from the UL St. Louis LES.

The results of the high-fault testing were reviewed and found compliant to the requirements in UL508. The test data is attached to this letter. This data is for informational purposes only. These high fault ratings will not be added to your UL report.

We are now closing Project 06NK25814, should you have any additional questions, please feel free to contact us.

Any information and documentation involving UL Mark services are provided on behalf of Underwriters Laboratories Inc. (UL) or any authorized licensee of UL.

Very truly yours,

Jeff Zwieschowski
Senior Project Engineer
3011ANBK
Tel: 847-664-3459
Fax: 847-313-6258
Email: Jeff.Zwieschowski@us.ul.com

George Golding
Staff Engineer
3011ANBK
Tel: 847-664-3465
Fax: 847-313-3465
Email: George.R.Golding@us.ul.com
Confirmation
Registration of a PROFIBUS Device

Model name: Watlow EZ-ZONE
Release: 1.00
Manufacturer: WATLOW

The following details have been registered by PNO for the device mentioned above:

Device type: ☑ Slave
Protocol type: ☑ DP ☑ DP Extensions

ID Number: 0C70 HEX
GSD file: WATL0C70.GSD

Contact person:
WATLOW
Mr Larry Glentz
NP&BD
1241 Bundy Blvd
55987 Winona
USA
Tel.: 507 494 5318
Fax: 507 452 4507
E-Mail: LGlentz@watlow.com

Karlsruhe, 2009-07-14
Place, Date

WATL0C70

Business office of the PROFIBUS Nutzerorganisation e.V.
File E43684  
Project 02NK41830  

March 5, 2003  
Revised: August 18, 2006  

REPORT  

on  

COMPONENT - Temperature-Indicating and Regulating Equipment, Electrical  

Watlow Winona Inc.  
Winona, MN  

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DESCRIPTION

PRODUCT COVERED:

USR, CNR  Component – Temperature control, Series N7, followed by any two alphanumeric characters, followed by 1, 2, 3, 4, 5 or 6, followed by 0, 1, 2, 3, 4, 5 or 6, followed by 0, 1, 2, 3, 4, 5 or 6 or 7, followed by 0 or 1, followed by 0, 1, 2, 3, 4 or 5, followed by 1, 2, 3, 4, 5 or 6 followed by any two alphanumeric characters.

GENERAL CHARACTER:

These devices are temperature controllers incorporating either a mechanical relay process voltage or current, DC open collector, or solid state relays. The sensor terminals are intended for connection to a thermocouple, RTD, or process transducer.

The solid state temperature-regulating control covered in this Report is intended for use in commercial cooking appliances.

This control was subjected to 100,000 c endurance without calibration verification test.

RATINGS (for more information about client declarations for these products refer to the Constructional Data Form, ILL. 1):

*
INPUTS:

<table>
<thead>
<tr>
<th>Control Input Item</th>
<th>Input Rating</th>
<th>Terminals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply</td>
<td>24 V ac, SELV</td>
<td>J12, 1 (AC1), 9 (AC2)</td>
</tr>
<tr>
<td>Process Thermocouple</td>
<td>SELV, Limited Energy (Class 2)</td>
<td>J5 (1-6), J6 (1-6)</td>
</tr>
<tr>
<td>Process RTD</td>
<td>SELV, Limited Energy (Class 2)</td>
<td>J5 (1-6), J6 (1-6)</td>
</tr>
<tr>
<td>Event Input</td>
<td>3-30V (high), -0.5-0.5 V (low)</td>
<td>J12 (7,15,8,16,5,6,13,17)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>J3 (6,13,7,14,5,12,2,9)</td>
</tr>
<tr>
<td>Process Voltage Input</td>
<td>0-12V</td>
<td>J5 (1-6), J6 (1-6)</td>
</tr>
<tr>
<td>Process Current Input</td>
<td>0-22mA</td>
<td>J5 (1-6), J6 (1-6)</td>
</tr>
<tr>
<td>Dual Display</td>
<td>SELV, Limited Energy (Class 2)</td>
<td>J11</td>
</tr>
</tbody>
</table>

COMMUNICATION:

<table>
<thead>
<tr>
<th>Type</th>
<th>Rating</th>
<th>Terminal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connection to User</td>
<td>SELV, Limited Energy (Class 2)</td>
<td>J10</td>
</tr>
<tr>
<td>Interface (keypad/overlay)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Connection EIA-485</td>
<td>SELV, Limited Energy (Class 2)</td>
<td>J2 (4 +, 6 -, 5 Gnd)</td>
</tr>
<tr>
<td>Connection to EIA-232</td>
<td>SELV, Limited Energy (Class 2)</td>
<td>J2 (2TXD, 3 RXD, 5 Gnd)</td>
</tr>
<tr>
<td>Ethernet</td>
<td>SELV, Limited Energy (Class 2)</td>
<td>J2 (1-12) on A007-2659-0000 Module</td>
</tr>
</tbody>
</table>

OUTPUTS:

<table>
<thead>
<tr>
<th>Type</th>
<th>Rating</th>
<th>Terminal</th>
</tr>
</thead>
<tbody>
<tr>
<td>SWDC</td>
<td>5V @ 30mA maximum</td>
<td>J12 (3,11,4,12,5,6,13,14)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>J13 (6,13,7,14,5,12,2,9)</td>
</tr>
<tr>
<td>Voltage Output</td>
<td>0-12V @ 50mA maximum</td>
<td>J13 (10,11,4,3)</td>
</tr>
<tr>
<td>Current Output</td>
<td>0-22mA @ 20V maximum</td>
<td>J13 (10,11,4,3)</td>
</tr>
<tr>
<td>Mech Relay</td>
<td>8A @ 120/240Vac</td>
<td>J14 (1-6), J15 (1-6)</td>
</tr>
<tr>
<td>SSR Relay</td>
<td>0.4A @ 120/240Vac</td>
<td>J14 (1-6), J15 (1-6)</td>
</tr>
</tbody>
</table>

TEMPERATURE:

Maximum 80°C ambient.
DESIGNATION SYSTEM:

<table>
<thead>
<tr>
<th>N7</th>
<th>XX</th>
<th>-</th>
<th>X</th>
<th>X</th>
<th>X</th>
<th>-</th>
<th>X</th>
<th>X</th>
<th>XX</th>
</tr>
</thead>
</table>

I. Basic series designation.
N7

II. Customer name.
Any two alphanumeric characters.

III. Inputs 1 and 2.
1 - 1-thermocouple, 2-thermocouple
2 - 1-thermocouple, 2-process
3 - 1-thermocouple, 2-RTD
4 - 1-process, 2-process
5 - 1-RTD, 2-process
6 - 1-RTD, 2-RTD

IV. Inputs 3 and 4.
0 - None
1 - 3-thermocouple, 4-thermocouple
2 - 3-thermocouple, 4-process
3 - 3-thermocouple, 4-RTD
4 - 3-process, 4-process
5 - 3-RTD, 4-process
6 - 3-RTD, 4-RTD

V. Process outputs 1 and 2, event inputs 5 to 8, control outputs 3 and 4.
0 - None
1 - 3 and 4 open collector output, event inputs and outputs.
2 - 1-current output, 3 and 4 open collector output, event inputs and outputs.
3 - 1 and 2 current output, 3 and 4 open collector output, event inputs and outputs.
4 - 1-current output, 2 V output, 3 and 4 open collector output, event inputs and outputs.
5 - 1 V output, 3 and 4 open collector output, event inputs and outputs.
6 - 1 and 2 V output, 3 and 4 open collector output, event inputs and outputs.
7 - 1 V output, 2-current output, event inputs and outputs.

VI. Ethernet add-on module.
0 - None
1 - Ethernet

VII. High voltage add-on module.
0 - None
1 - 2 solid state relays
2 - 2 solid state relays, 4 mechanical relays
3 - 6 solid state relays
4 - 4 solid state relays, 2 mechanical relays
5 - 2 solid state relays, 4 no arc relays

VIII. Horizontal or vertical display.
1 - Vertical
2 - Horizontal Left
3 - Horizontal Right
4 - vertical with dual display module
5 - horizontal left with dual display module
6 - horizontal right with dual display module

IX. Software and customer options.
Any two alphanumeric characters.

Note: AJ and AL models are dual display models for specific customers.
ENGINEERING CONSIDERATIONS (NOT FOR FIELD REPRESENTATIVE USE):

* Use - For use only in products where the acceptability of the combination is determined by Underwriters Laboratories Inc.


This control is considered Incorporated and was specified by the applicant for installation in a Pollution Degree 2 environment with an Installation Category (Overvoltage Category) II rating.

The units are for use in an extended environment: 0°C to 80°C. They are not intended for field wiring.

Conditions of Acceptability - When installed in the final use equipment, etc., the following are among the considerations to be made:

1. The terminals are not acceptable for field connection. The acceptability of the connections to these terminals, including temperature and secureness, shall be determined in the ultimate application.

2. These devices shall be installed in compliance with the enclosure, mounting, spacing and segregation requirements of the ultimate application.

3. All mains outputs are intended to be supplied from the same side of the same source, and are therefore considered same polarity.

4. These devices have not been investigated for safety or limiting applications.

5. The action of this device is classified as “Type 1 Action” (non-safety).

6. A communications port is used to remotely monitor and/or change the temperature set-point, the relay contact state and/or other data. However, the potential hazards inherent to this type of remote control were not investigated.

7. The Relay (K2, K3, K4, K6) contacts are considered to provide micro-disconnection. A dielectric test of 500 V was conducted across the contacts.
Certificate of Compliance

Certificate: 1517981  Master Contract: 158031
Project: 2726552  Date Issued: May 14, 2014
Issued to: Watlow Winona, Inc.
1241 Bundy Blvd
WINONA, MN 55987
USA
Attention: Mr. Larry Glentz

The products listed below are eligible to bear the CSA Mark shown

Joseph Kwong
Issued by: Joseph Kwong, P. Eng.

PRODUCTS
CLASS 4823 51 - TEMPERATURE INDICATING AND REGULATING EQUIPMENT -
Appliance Type Controls - Limit Type

Temperature control model N7 series, followed by any two alpha numeric characters, followed by 1 through
6, followed by 0 through 6, followed by 0 through 7, followed by 0 or 1, followed by 0 through 5, followed by
1.2, 3, 4, 5 or 6, followed by any alphanumeric characters, input rated 24V, 50/60 Hz, 15VA, class-2; output
rated mechanical relay contacts 120/240V ac, 8A (resistive), 250VA (P.D.), solid state relay 120/240V ac, 0.4A
(resistive), 0.4A (P.D.), 100,000 cycles, maximum ambient temperature 80°C.

Notes:
1. Above model is Certified as a component of other CSA Certified equipment (for OEM), where the suitability
of the combination is to be evaluated by CSA-International.
2. Suitability of the keypad assembly is subject to evaluation in the end application.

APPLICABLE REQUIREMENTS
CAN/CSA E 60730-1-02 - Automatic Electrical Controls for Household and Similar Use
CAN/CSA E 60730-2-9-01 - Automatic Electrical Controls for Household and Similar Use
Series N7

WATLOW Electric Manufacturing Company
1241 Bundy Blvd.
Winona, MN 55987 USA

Declares that the following product:
Designation: Series N7
Model Numbers: N7(any two letters or numbers) – (1 to 6)(0 to 6)(0 to 7)(0 or 1) – (0 to 5)(1, 2 or 3) (any two letters or numbers)
Classification: Incorporated control, Installation Category II, Pollution degree 2, IP00 open board
Rated Supply: 24 V- ac, 50/60 Hz
Rated Power: 15 VA maximum

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

- EN 60730-1:2011 Automatic electrical controls for household and similar use – Part 1 General requirements. Clause H.26 EMC requirements
- EN 61000-4-2:2009 Electrostatic Discharge Immunity
- EN 61000-4-3:2010 Radiated Field Immunity
- EN 61000-4-4:2012 Electrical Fast-Transient / Burst Immunity
- EN 61000-4-5:2006 Surge Immunity (Reviewed to IEC 61000-4-5 2014)
- EN 61000-4-6:2014 Conducted Immunity
- EN 61000-4-11:2004 Voltage Dips, Short Interruptions and Voltage Variations Immunity
- EN 61000-3-2:2009 Harmonic Current Emissions (Reviewed to IEC 61000-3-2 2014)
- EN 61000-3-3:2013 Voltage Fluctuations and Flicker
- SEMI F47:2000 Specification for Semiconductor Sag Immunity Figure R1-1

*Class B emissions contingent upon use of A Steward Ferrite (28A2029-0A0) to Ethernet Cable at main board.

**2006/95/EC Low-Voltage Directive**

Per **2012/19/EU WEEE Directive** Please Recycle Properly

Compliant with **2011/65/EU RoHS2 Directive**

Joe Millanes
Name of Authorized Representative
Winona, Minnesota, USA
Place of Issue

Director of Operations
Title of Authorized Representative
September 2014
Date of Issue

Signature of Authorized Representative
OFFICIAL LISTING

NSF International Certifies that the products appearing on this Listing conform to the requirements of NSF/ANSI Standard 2 - Food Equipment

This is the Official Listing recorded on October 30, 2014.

Watlow Electric Manufacturing Company
1241 Bundy Boulevard
Winona, MN 55987-5580
507-454-5300

Facility: Winona, MN

COMPONENTS:
Mini-Chef Controller [1]
F2HA-(1)(2)1-(4)(5)(6) F2UA-(1)(2)1-(4)(5)(6)
F2HC-(1)(2)1-(4)(5)(6) F2UC-(1)(2)1-(4)(5)(6)
N7 Digital Thermometer - without Input Sensors [2] [3]
N7(1)-(2)3(4)(5)-(6)(7)(8)

[1] (1) 1, 2, 3 or 4 indicate input type
(2) 1, 2, or 3 indicate output type 1
(3) 1, 2, or 3 indicate output type 2
(4) 0 or 1 indicate the presence of a battery
(5) 0 or 1 indicate the presence of an alarm
(6) Two digit alpha-numeral suffix indicating custom software options

[2] The following options are available
(1) Customer designation (any 2 letters or numbers)
(2) Sensor 1 and 2 input options (1, 2, 3, 4, 5, or 6)
(3) Sensor 3 and 4 input options (0, 1, 2, 3, 4, 5, or 6)
(4) Process output 1 & 2, Event inputs 5 to 8, Control outputs
3 & 4 (0, 1, 2, 3, 4, 5, 6, or 7)
(5) Ethernet communications (any number)
(6) High voltage output module (0, 1, 2, 3, 4, or 5)
(7) Display options (any number)
(8) Custom firmware and other cosmetic options (any 2 letters or numbers)

[3] Approved for use with the following input sensors in equivalent degrees C:
Type J thermocouple -25° to 600°F
Type K thermocouple -25° to 600°F
Type E thermocouple -25° to 600°F

Note: Additions shall not be made to this document without prior evaluation and acceptance by NSF International.
File E43684
Project 03NK12886

June 15, 2003
Revised: November 17, 2010

REPORT

on

COMPONENT - TEMPERATURE-INDICATING AND REGULATING EQUIPMENT

Watlow Winona Inc.
Winona, MN

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Underwriters Laboratories Inc. authorizes the above named company to reproduce the latest pages of that portion of this Report consisting of this Cover Page through Page 7.
DESCRIPTION

PRODUCT COVERED:

**USR, CNR**
Appliance temperature-limiting control, Model LF followed by C, E or G; followed by 4 or 8; followed by any alphanumeric character; followed by U, W, Y or Z; followed by any four numbers; followed by additional alphanumeric characters.

Appliance temperature-regulating control, Model LF followed by C, E or G; followed by 1, 2, 3, 5, 6, 7, A or C; followed by any alphanumeric character; followed by U, W, Y or Z; followed by any four numbers; followed by additional alphanumeric characters.

**Appliance temperature-regulating control**
Model CF followed by B, C, D, E, F or G; followed by 1, 2, 3, 4, 5, 6, 7, 8, A or C; followed by any alphanumeric character; followed by C or H; followed by any four numbers; followed by additional alphanumeric characters.

**Appliance temperature-regulating control**
Model LV followed by C, E or G; followed by 1, 2, 5, 6, A, B, C or D; followed by any alphanumeric character; followed by U, W, Y or Z; followed by any four numbers; followed by any four numbers; may be followed by additional alphanumeric characters.

**Appliance temperature-regulating control**
Model CV followed by B, C, D, E, F or G; followed by 1, 2, 5, 6, A, B, C or D; followed by any alphanumeric character; followed by C or H; followed by any four numbers; followed by any four numbers; may be followed by additional alphanumeric characters.

Appliance temperature-indicator; Model TM followed by B, D or F; followed by 1, 2, 5, 6, A or C; followed by any alphanumeric character; followed by additional alphanumeric characters.
GENERAL:

These devices are adjustable or non-adjustable electronic temperature controllers intended for use in commercial cooking appliances with a relay or switched DC signal controlling an external load. Units have a single sensor input either thermocouple or RTD. This sensor is considered a class 2 circuit.

These devices come in several package options including panel mount 1/8 DIN square, DIN rail sub-panel mount, open board sub-panel mount, and a potted sub-panel mount configuration.

Models LF(X)4 and 8 controls were subjected to a component investigation and were judged to be equivalent to 100,000 cycle temperature-limiting control with calibration verification tests.

All models other than the Indicator and LF(X)4 and 8 controls were judged to be equivalent to 100,000 cycle temperature regulating with calibration verification and recalibration. However the absence of the potting material prevent use within limiting applications.

These manual reset devices (see designation) are type M1 manual reset.

relay outputs were tested to ANSI Z21.23 Gas appliance thermostat tests.

The front face and gasket were evaluated per the requirements of UL 50, the Standard for Enclosures for Electrical Equipment, and rated Type 4X for indoor applications. In addition, the front face and gasket were also tested to EN 60529 IP65 Dust tight. This applies to Models XXX(A or C) only.
RATINGS:
- Terminals L1 and L2 - 10 VA, 24 or 100-/120 or 200/240 V ac, 50/60 Hz.
- Terminals TC+ and TC- or S1 and S2 - Class 2 sensor input.

Outputs - Mechanical relay models (N.O. contacts) - 8 A Resistive 100/120/240 V ac or 30 V dc. 250 VA pilot duty at 120/240 V ac, 100,000 cycles; PD 208VA 100/200Vac, 100K cycles
- N.C. contacts: Resistive 1A, 120/240Vac, 100K cycles; Resistive 1A, 30 Vdc, 100K cycles

- Switched DC models - non-isolated (class 2) output.

Temperature - Maximum operating ambient of 70°C (158°F).

Maximum set point limits of LFx4 limiting controls are as specified in LF nomenclature position IV.

NOMENCLATURE:

<table>
<thead>
<tr>
<th>LF</th>
<th>X</th>
<th>X</th>
<th>X</th>
<th>X</th>
<th>XXXX</th>
<th>AAAA</th>
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<tr>
<td>I</td>
<td>II</td>
<td>III</td>
<td>IV</td>
<td>V</td>
<td>VI</td>
<td>VII</td>
<td>VIII</td>
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<td>I</td>
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<td>II</td>
<td>Power Supply</td>
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<tr>
<td>C</td>
<td>100/120 V ac 50/60 Hz, Mechanical Relay output</td>
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<td>E</td>
<td>200/240 V ac 50/60 Hz, Mechanical Relay output</td>
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<tr>
<td>G</td>
<td>24 V ac 50/60 Hz, Mechanical Relay output</td>
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<tr>
<td>III</td>
<td>Package Type, Terminal Options</td>
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<td>I</td>
<td>Panel mount 1/8 DIN Square (Regulating control), Terminal 1</td>
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<td>8</td>
<td>Potted sub-panel mount (Limit control), Terminal 2</td>
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<tr>
<td>A</td>
<td>Panel mount 1/8 DIN Square, Terminal 1, NEMA 4X, IP65 Approved</td>
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<tr>
<td>C</td>
<td>Panel mount 1/8 DIN Square, Terminal 2, NEMA 4X, IP65 Approved</td>
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<tr>
<td>Terminal 1 = ¼ in. Quick Connect Appliance Terminals</td>
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<tr>
<td>Terminal 2 = Pluggable Terminal Block Connector</td>
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</tbody>
</table>

IV - Sensor Type and Scale
| H | Type J °F: -346 to 1900°F range |
| J | Type J °C: -210 to 1038°C range |
| K | Type K °F: -454 to 2500°F range |
| L | Type K °C: -270 to 1371°C range |
| M | Type T °F: -454 to 750°F range |
| N | Type T °C: -270 to 399°C range |
| P | 100 ohm Platinum RTD °F 385 curve: -328 to 1472°F range |
| Q | 100 ohm Platinum RTD °C 385 curve: -200 to 800°C range |
| S | Type E °F: -328 to 1470°F range |
| T | Type E °C: -200 to 799°C range |

V - Limit action
| U | High Limit Manual Reset |
| W | High Limit Auto Reset on power loss |
| Y | Low Limit manual Reset |
| Z | Low Limit Auto Reset on power loss |

VI - Fixed setpoint value
Four digit number indicating temperature setpoint including negative temperature indicated with (-) in first of four digits.

VII - Place Holder for model numbers.
AAAA = Standard Product

VIII - Custom Overlay/software - may be any alphanumeric characters
NOMENCLATURE:

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<th>III</th>
<th>IV</th>
<th>V</th>
<th>VI</th>
<th>VII</th>
<th>VIII</th>
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<tr>
<td></td>
<td>I -</td>
<td>CF - ON/OFF Temperature Control Fixed setpoint</td>
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<td>Power Supply</td>
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<td>B = 100/120 V ac 50/60 Hz, Switched DC output</td>
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<td>D = 200/240 V ac 50/60 Hz, Switched DC output</td>
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<td>E = 200/240 V ac 50/60 Hz, Mechanical Relay output</td>
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<td>F = 24 V ac 50/60 Hz, Switched DC output</td>
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<td>G = 24 V ac 50/60 Hz, Mechanical Relay output</td>
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<tr>
<td>III</td>
<td>Package Type, Terminal Options.</td>
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<td></td>
<td>I = Panel mount 1/8 DIN Square, Terminal 1</td>
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<td>2 = DIN Rail sub-panel mount, Terminal 1</td>
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<td>3 = Open board sub-panel mount, Terminal 1</td>
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<td>4 = Potted sub-panel mount, Terminal 1</td>
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<td>5 = Panel Mount 1/8 DIN Square, Terminal 2</td>
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<td>6 = DIN Rail sub-panel mount, Terminal 2</td>
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<td>7 = Open board sub-panel mount, Terminal 2</td>
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<td>8 = Potted sub-panel mount, Terminal 2</td>
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<td></td>
<td>A = Panel mount 1/8 DIN Square, Terminal 1, NEMA 4X, IP65 Approved</td>
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<td></td>
<td>C = Panel mount 1/8 DIN Square, Terminal 2, NEMA 4X, IP65 Approved</td>
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<td>Terminal 1 = ¼ in. Quick Connect Appliance Terminal</td>
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<td>Terminal 2 = Pluggable Terminal Block Connector</td>
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<tr>
<td>IV</td>
<td>Sensor Type and Scale</td>
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<td></td>
<td>H = Type J °F: -346 to 1900°F range</td>
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<td>J = Type J °C: -210 to 1038°C range</td>
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<td>K = Type K °F: -454 to 2500°F range</td>
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<td>L = Type K °C: -270 to 1371°C range</td>
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<td>M = Type T °F: -454 to 750°F range</td>
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<td>N = Type T °C: -270 to 399°C range</td>
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<td>P = 100 ohm Platinum RTD °F 385 curve: -328 to 1472°F range</td>
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<td>R = 100 ohm Platinum RTD °C 385 curve: -200 to 800°C range</td>
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<td>S = Type E °F: -328 to 1470°F range</td>
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<td>T = Type E °C: -200 to 799°C range</td>
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<td>V</td>
<td>Control Type</td>
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<td></td>
<td>C = Cooling</td>
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<tr>
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<td>H = Heating</td>
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<tr>
<td>VI</td>
<td>Fixed setpoint value</td>
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<td>Four digit number indicating temperature setpoint including negative temperature indicated with (-) in first of four digits.</td>
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<td>Place Holder for model numbers.</td>
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<td>AAAA = Standard Product</td>
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<td>VIII</td>
<td>Custom Overlay/software = may be any alphanumeric characters</td>
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</table>
NOMENCLATURE:

LV  X  X  X  X  XXXX  XXXX  X

I  LV - Temperature Regulator Control Variable Setpoint

II  Power Supply
C = 100/120 V ac 50/60 Hz, Mechanical Relay output
E = 200/240 V ac 50/60 Hz, Mechanical Relay output
G = 24 V ac 50/60 Hz, Mechanical Relay output

III  Package Type, Terminal Options, User Interface Options
I = Panel mount 1/8 DIN Square, Terminal 1, Optical Encoder
2 = DIN Rail sub-panel mount, Terminal 1, Optical Encoder
5 = Panel mount 1/8 DIN Square, Terminal 2, Optical Encoder
6 = DIN Rail sub-panel mount, Terminal 2, Optical Encoder
A = Panel mount 1/8 DIN Square, Terminal 1, Tactile Keys, NEMA 4X, IP65 Approved
B = DIN Rail sub-panel mount, Terminal 1, Tactile Keys
C = Panel mount 1/8 DIN Square, Terminal 2, Tactile Keys, NEMA 4X, IP65 Approved
D = DIN Rail sub-panel mount, Terminal 2, Tactile Keys

Terminal 1 = ¼ in. Quick Connect Appliance Terminal
Terminal 2 = Pluggable Terminal Block Connector

IV  Sensor Type and Scale
H = Type J °F: -346 to 1900°F range
J = Type J °C: -210 to 1038°C range
K = Type K °F: -454 to 2500°F range
L = Type K °C: -270 to 1371°C range
M = Type T °F: -454 to 750°F range
N = Type T °C: -270 to 399°C range
P = 100 ohm Platinum RTD °F 385 curve: -328 to 1472°F range
R = 100 ohm Platinum RTD °C 385 curve: -200 to 800°C range
S = Type E °F: -328 to 1470°F range
T = Type E °C: -200 to 799°C range

V  Limit action
U = High Limit Manual Reset
W = High Limit Auto Reset on power loss
Y = Low Limit manual Reset
Z = Low Limit Auto Reset on power loss

VI  Setpoint range - Minimum Setpoint temperature
Four digit number indicating temperature setpoint including negative temperature indicated with (−) in first of four digits.

VII  Setpoint range - Maximum setpoint temperature
Four digit number indicating temperature setpoint including negative temperature indicated with (−) in first of four digits.

VIII  Custom part number options - (Class 2 options)
May be any alphanumeric characters
NOMENCLATURE:

**CV**

<table>
<thead>
<tr>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
<th>V</th>
<th>VI</th>
<th>VII</th>
<th>VIII</th>
</tr>
</thead>
</table>

I - CV - ON/OFF Temperature Control Variable setpoint

II - Power Supply
- B = **100/120** V ac 50/60 Hz, Switched DC output
- C = **100/120** V ac 50/60 Hz, Mechanical Relay output
- D = **200/240** V ac 50/60 Hz, Switched DC output
- E = **200/240** V ac 50/60 Hz, Mechanical Relay output
- F = **24** V ac 50/60 Hz, Switched DC output
- G = **24** V ac 50/60 Hz, Mechanical Relay output

III - Package Type, Terminal Options, User Interface Options
- I = Panel mount 1/8 DIN Square, Terminal 1, Optional Encoder
- 2 = DIN Rail sub-panel mount, Terminal 1, Optional Encoder
- 5 = Panel mount 1/8 DIN Square, Terminal 2, Optional Encoder
- 6 = DIN Rail sub-panel mount, Terminal 2, Optional Encoder
- A = Panel mount 1/8 DIN Square, Terminal 1, Tactile Keys, NEMA 4X, IP65 Approved
- B = DIN Rail sub-panel mount, Terminal 1, Tactile Keys
- C = Panel mount 1/8 DIN Square, Terminal 2, Tactile Keys, NEMA 4X, IP65 Approved
- D = DIN Rail sub-panel mount, Terminal 2, Tactile Keys
- Terminal 1 = ¼ in. Quick Connect Appliance Terminal
- Terminal 2 = Pluggable Terminal Block Connector

IV - Sensor Type and Scale
- H = Type J °F: -346 to 1900°F range
- J = Type J °C: -210 to 1038°C range
- K = Type K °F: -454 to 2500°F range
- L = Type K °C: -270 to 1371°C range
- M = Type T °F: -454 to 750°F range
- N = Type T °C: -270 to 399°C range
- P = **100 ohm Platinum RTD °F 385 curve**: -328 to 1472°F range
- R = **100 ohm Platinum RTD °C 385 curve**: -200 to 800°C range
- S = Type E °F: -328 to 1470°F range
- T = Type E °C: -200 to 799°C range

V - Control type
- C = Cooling
- H = Heating

VI - Setpoint range - Minimum Setpoint temperature
- Four digit number indicating temperature setpoint including negative temperature indicated with (-) in first of four digits.

VII - Setpoint range - Maximum setpoint temperature
- Four digit number indicating temperature setpoint including negative temperature indicated with (-) in first of four digits.

VIII - Custom part number options - (Class 2 options)
- May be any alphanumeric characters
NOMENCLATURE:

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<th>X</th>
<th>A</th>
<th>AAAA</th>
<th>AAAA</th>
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<tr>
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<td>II</td>
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<td>VI</td>
<td>VII</td>
<td>VIII</td>
</tr>
</tbody>
</table>

I - TM - Indicator Only

II - Power Supply
B = 100-120 V ac 50/60 Hz - no output
D = 200-240 V ac 50/60 Hz - no output
F = 24 V ac 50/60 Hz - no output

III - **Package Type, Terminal Options**
1 = Panel mount 1/8 DIN Square, Terminal 1
2 = DIN Rail sub-panel mount, Terminal 1
5 = Panel mount 1/8 DIN Square, Terminal 2
6 = DIN Rail sub-panel mount, Terminal 2
A = Panel mount 1/8 DIN Square, Terminal 1, NEMA 4X, IP65 Approved
C = Panel mount 1/8 DIN Square, Terminal 2, NEMA 4X, IP65 Approved

Terminal 1 = ¼ in. Quick Connect Appliance Terminal
Terminal 2 = Pluggable Terminal Block Connector

IV - Sensor Type and Scale
H = Type J °F
J = Type J °C
K = Type K °F
L = Type K °C
M = Type T °F
N = Type T °C
P = 100 ohm Platinum RTD °F 385 curve
R = 100 ohm Platinum RTD °C 385 curve
S = Type E °F
T = Type E °C

V - Model number place holder
A = Standard Model

VI - Model number place holder
AAAA = Standard product

VII - Model number place holder
AAAA = Standard product

VIII - Custom part number options - (Class 2 options)
May be any alphanumeric characters

ENGINEERING CONSIDERATIONS (NOT FOR FIELD REPRESENTATIVE'S USE):

USR indicates investigation to UL Standard for Temperature-Indicating and -Regulating Equipment, UL 873.

CNR indicates investigation to Canadian Standard C22.2 No. 24-93.

Use - For use only in products where the acceptability of the combination is determined by Underwriters Laboratories Inc.
Conditions of Acceptability -

1. The terminals are not acceptable for field connection. The acceptability of the connections to these terminals, including temperature and secureness, shall be determined in the ultimate application.

2. This component has been judged on the basis of the required spacings in the Standard for Temperature-Indicating and -Regulating Equipment, Table 32.1, Column F (0-300 V), dated December 22, 1994, and CSA C22.2 No. 24-93, Table 3, Column F.

3. When panel mounted the front panel of the device is considered to be acceptable as an enclosure.

4. These devices were investigated for indoor use only.

5. These devices are not provided with sensors. The acceptability of the sensor including calibration, shall be determined in the ultimate application.

6. The transformer core is not grounded. Testing of transformer illustrated that the coil is unlikely to become energized from an internal fault. All wiring should be reliably maintained away from this transformer in the end-use application.

7. These devices shall be installed in compliance with the enclosure, mounting, spacing and segregation requirements of the ultimate application.

8. With regards to the LFx4 limiting controls, the devices have been investigated for single component failures and the effects these failures have on the following function:

   Critical Function - The calibration of the system (control and sensor) is allowed ± 5% tolerance. During investigation of these limit controls, the calibration of the control did not change by more than ± 1% of the maximum set point temperature. This allows for a sensor tolerance of ± 4%.

9. The Electrostatic Discharge test was conducted on points located on the front display face only. When LFx4 devices are installed in the end product application, additional points which are conductively connected to this control, such as the reset device or temperature sensor, may be determined to be accessible. Any such points should be subjected to the Electrostatic Discharge test.
Certificate of Compliance

Certificate: 1472335 (LR 30586)  
Project: 2677774  
Issued to: Watlow Winona, Inc.  
1241 Bundy Blvd  
WINONA, MN 55987  
USA  
Attention: Larry Glentz

Master Contract: 158031  
Date Issued: March 5, 2014

The products listed below are eligible to bear the CSA Mark shown

Vajira Sarathchandra  
Issued by: Vajira Sarathchandra

PRODUCTS

CLASS 4813 02 - TEMPERATURE-INDICATING AND REGULATING EQUIPMENT -  
Other Than Appliance Type

Temperature control model C series, input rated 24V, 0.2A, or 100-120V, 0.04A, or 200-240V, 0.02A, 50/60Hz; output mechanical relay contacts rated 120/240V ac, 8A (resistive), 30V dc, 8A, 120V/240V ac, 250VA (pilot duty), 100,000 cycles, switched dc output, 24V, class-2; maximum ambient temperature 70C.

Temperature indicator model TM series, input rated 24V, 0.15A or 100-120V, 0.03A, or 200-240V, 0.015mA, 50/60Hz; maximum ambient temperature 70C.

Notes:
1. Above DIN mount type model is Certified as a component to be panel mounted in the end application.
2. Models CXX (A or C) and TMX (A or C) NEMA 4X approved for indoor use for front panel when properly mounted.

APPLICABLE REQUIREMENTS

CSA C22.2 No. 24-93 - Temperature-Indicating and -Regulating Equipment - Eighth edition (UPD 2)
Series C and Series TM

WATLOW Electric Manufacturing Company
1241 Bundy Blvd.
Winona, MN 55987 USA

ISO 9001 since 1996.

Declares that the following product:

Designation: Series C and Series TM
Model Numbers: CF — (B, C, D, E, F or G)(1, 2, 3, 4, 5, 6 or 7)(any letter)(H or C) – (any four numbers or – and three numbers) – (AAAA) – may be followed by additional numbers or letters
CV — (B, C, D, E, F or G)(1, 2, 5, 6, A, B, C or D)(any letter)(H or C) – (any four numbers or – and three numbers) – (any four numbers) – may be followed by additional numbers or letters
TM — (B, D or F)(1, 2, 5 or 6)(any letter)(A) – (AAAA) – (AAAA) – may be followed by additional numbers or letters

Classification: CF and CV = Temperature control, TM = Indicator
Installation Category II, Pollution degree 2, Front Panel IP20, certain model IP65
Rated Voltage: 24 V, 120 V, 230/240 V~ (ac) 50/60 Hz
Rated Power Consumption: 10 VA maximum

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


| EN 61326-1:2013 | Electrical equipment for measurement, control and laboratory use – EMC requirements, Industrial Immunity, Class B Emissions. |
| EN 61000-4-2:2009 | Electrostatic Discharge Immunity |
| EN 61000-4-3:2010 | Radiated Field Immunity |
| EN 61000-4-4:2012 | Electrical Fast-Transient / Burst Immunity |
| EN 61000-4-5:2006 | Surge Immunity (Reviewed to IEC 61000-4-5 2014) |
| EN 61000-4-6:2014 | Conducted Immunity |
| EN 61000-4-11:2004 | Voltage Dips, Short Interrupts and Variations - Immunity |
| EN 61000-3-2:2009 | Harmonic Current Emissions – (Reviewed to IEC 61000-3-2 2014) |
| EN 61000-3-3:2013 | Voltage Fluctuations and Flicker |
| SEMI F47:2000 | Specification for Semiconductor Sag Immunity Figure R1-1 |

**2006/95/EC Low-Voltage Directive**

| EN 60730-1:2011 | Automatic electric controls for household and similar use: Particular requirements for temperature sensing controls. |
| EN 60730-2-9:2010 | CXX4 units |
| EN 61010-1:2011 | All other units |
| EN 61010-1:2011 | Safety Requirements of electrical equipment for measurement, control and laboratory use. Part 1: General requirements |

Compliant with 2011/65/EU RoHS2 Directive
Per 2012/19/EU WEEE Directive Please Recycle Properly

Joe Millanes
Name of Authorized Representative
Winona, Minnesota, USA
Place of Issue

Director of Operations
Title of Authorized Representative
September 2014
Date of Issue

Signature of Authorized Representative
Certificate of Compliance

Certificate: 1472337 ((LR30586))  
Project: 2707164  
Issued to: Watlow Winona, Inc.
1241 Bundy Blvd
WINONA, MN 55987
USA
Attention: Larry Glentz

The products listed below are eligible to bear the CSA Mark shown

Vajira Sarathchandra
Issued by: Vajira Sarathchandra

PRODUCTS
CLASS 4813 02 - TEMPERATURE-INDICATING AND REGULATING EQUIPMENT -  
Other Than Appliance Type

Temperature control model L series, input rated 24V or 100-120V or 200-240V, 50/60Hz; output mechanical relay contacts rated 120/240V ac, 8A (resistive), 30V dc, 8A, 120V/240V ac, 250VA (pilot duty), 100,000 cycles,
Switched dc output, 24V, class-2; maximum ambient temperature 70°C.

Notes:
1. Above DIN mount type model is Certified as a component to be panel mounted in the end application.
2. Models LXX3 and LXX4 series that are not provided with enclosures, are Certified as components of other CSA Certified equipment where the suitability of the combination is to be evaluated by CSA International.
3. Models LXXA and LXXC Nema 4X for indoor use, front panel when properly mounted.

APPLICABLE REQUIREMENTS
CSA C22.2 No. 24-93 - Temperature-Indicating and -Regulating Equipment - Eighth edition (UPD 2)
Basics and Limits Series L CE

Series L

WATLOW Electric Manufacturing Company
1241 Bundy Blvd.
Winona, MN 55987 USA

Declares that the following product:
Designation: Series L
Model Numbers:
- LF (C, E or G)(1, 2, 3, 4, 5, 6 or 7)(any letter)(U, W, Y or Z) (##### or –#####) (AAAAA) X
- LV (C, E or G)(1, 2, 5 or 6)(any letter)(U, W, Y or Z) (##### or –#####) (#####) X
- LSF4 (H, J, K or L) W (##### indicating Limit trip point) (##### indicating hysteresis) XX
Where X = Any number or letter, and # = Any number
Classification: Series LF, LV Temperature Regulator, Front panel IP20, IP65 optional
Series LS, Electronic Temperature Limiter with Protective Function Software Class B, Output Type 2.B.K IP10
All – Installation Category II, Pollution Degree 2 Incorporated equipment
Rated Voltage:
- LF, LV 24 V, 100 to 120 V, 200 to 240 V~ (ac), 50/60 Hz
- LS, 100 to 240 V~ (ac) 50/60 Hz
Rated Power Consumption: 10 VA maximum

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

EN 61326-1:2013 LF, LV Electrical equipment for measurement, control and laboratory use – EMC requirements, Industrial Immunity, Class B Emissions.
EN 60730-1:2011 LS Automatic electric controls for household and similar use: Particular requirements for temperature sensing controls, Class B Emissions.
EN 60730-2-9:2010 LS Electrostatic Discharge Immunity
EN 61000-4-2:2009 Radiated Field Immunity
EN 61000-4-3:2010 Electrical Fast-Transient / Burst Immunity
EN 61000-4-5:2006 Surge Immunity (Reviewed to IEC 61000-4-5 2014)
EN 61000-4-6:2014 Conducted Immunity
EN 61000-4-8:2010 Magnetic Field Immunity
LS
EN 61000-4-11:2004 Voltage Dips, Short Interrupts and Variations – Immunity
EN 61000-4-28:2009 Variation of power frequency immunity – Level 2
LS
EN 61000-3-2:2009 Harmonic Current Emissions (Reviewed to IEC 61000-3-2 2014)
EN 61000-3-3:2013 Voltage Fluctuations and Flicker
SEMI F47:2000 Specification for Semiconductor Sag Immunity Figure R1-1

2006/95/EC Low-Voltage Directive
EN 60730-1:2011 LS Automatic electric controls for household and similar use: Particular requirements for temperature sensing controls.
EN 60730-2-9:2010 Safety Requirements of electrical equipment for measurement, control and laboratory use, Part 1: General requirements
EN 60101-1:2011 LF, LV Compliant with 2011/65/EU RoHS Directive
Per 2012/19/EU WEEE Directive Please Recycle Properly

Joe Millanes
Name of Authorized Representative
Winona, Minnesota, USA
Place of Issue

Director of Operations
Title of Authorized Representative
January 2015
Date of Issue

Signature of Authorized Representative
TEMPERATURE SUPERVISORY SWITCHES

These switches can be used as temperature interlocks in safety-control circuits for boilers, burners, furnaces and other heating or cooling equipment. They may also be used as high or low temperature alarms or as on-off temperature controls. Some of the switches shown under TEMPERATURE LIMIT SWITCHES, Indicating and Non-indicating, may also be suitable as some manufacturers provide supervisory or control functions in conjunction with the limit functions.

Watlow Electric Manufacturing Co., 1241 Bundy Blvd, Box 5580, Winona MN 55987

<table>
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<tr>
<th>TLM</th>
<th>C</th>
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<tr>
<td>I</td>
<td>TLM – Model Series Designator</td>
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<td>II</td>
<td>Setpoint Precision</td>
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<td>E – Standard Setpoint Selection</td>
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<td>C – High Precision Setpoint</td>
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<td>III</td>
<td>Sensor Type</td>
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<td>0 – RTD</td>
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<td>1 – Type E Thermocouple</td>
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<td>2 – Type J Thermocouple</td>
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<td>5 – Type S Thermocouple</td>
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<td>6 – Type T Thermocouple</td>
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<td>IV</td>
<td>Alarm Relays</td>
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<td>0 – Global relays Only</td>
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<td>V</td>
<td>Mounting Style</td>
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<td></td>
<td>0 – Panel mount</td>
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<td></td>
<td>1 – DIN Rail Mount</td>
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<td>Additional numbers – one of the above mounting styles with grounding straps</td>
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<td>VI</td>
<td>Trip Point Code</td>
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<td>Any combination of letters or numbers indicating individual setpoint codes for each channel.</td>
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<td>May be 3-8 digits.</td>
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For operation at 10 to 26 V dc. Limit contacts rated for 1A at 30 V dc.

TEMPERATURE LIMIT SWITCHES

These devices are intended to be used with industrial heating equipment to prevent excess temperature if the temperature-controlling equipment fails. It is preferable that temperature-limit switch action automatically shut down the heating system, and to do this, switch contacts that are closed during the normal operation of the equipment are generally used.

In the event of excess temperature, a manual action is required to restore the switch contacts.

TEMPERATURE LIMIT SWITCHES, Indicating

Watlow Electric Manufacturing Co., 1241 Bundy Blvd, Box 5580, Winona MN 55987

Series LF, Microprocessor Based Limit Controller Fixed Setpoint; LF followed by C, E or G; followed by 1, 2, 3, 4, 5, 6 or 7 (indicating package type); followed by any alphanumeric character; followed by U, W, Y or Z; followed by four numbers indicating temperature setpoint; followed by additional alphanumeric characters.

Series LV, Microprocessor Based Limit Controller Variable Setpoint; LV followed by C, E or G; followed by 1, 2, 5 or 6 (indicating package type); followed by any alphanumeric character; followed by U, W, Y or Z; followed by any four numbers indicating minimum setpoint; followed by any four numbers indicating maximum setpoint; may be followed by additional alphanumeric characters.
### EZ-ZONE, PM Series, Microprocessor Based Limit Controller Variable Set Point

#### Limit and Enhanced Limit Options

<table>
<thead>
<tr>
<th>PM</th>
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<th>Z</th>
<th>J</th>
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</table>

I  PM – Series Model Designation
II DIN Panel Size
   3 = 1/32 DIN *Outputs 3 and 4 not available with this option.
   6 = 1/16 DIN
   8 = 1/8 DIN Vertical
   9 = 1/8 DIN Horizontal
   4 = 1/4 DIN
III Unit Primary Function
   L = Limit Control Universal input
   M = Limit Control Thermistor Input
   D = Custom Limit Firmware (Confined to Custom default parameters or minor changes only)
IV Voltage and Digital I/O Options
   1 = HV 100-240 Vac no Digital I/O
   2 = HV 100-240 Vac two Digital I/O
   3 = LV 12 Vdc / 24-28 Vac/dc no Digital I/O
   4 = LV 12 Vdc / 24-28 Vac/dc two Digital I/O
V Output 1 Options
   A = None
   C = Switched DC
   E = Mechanical Relay Form C – 5 Amps
VI Output 2 (Limit Output) Options
   J = Mechanical Relay Form A – 5 Amps
VII Communications Options
   A = None
   C = 6 Digital I/O
   D = 6 Digital I/O with EIA 485 Modbus RTU Communications
   1 = 485 Modbus RTU Communications
   2 = RS232 or 485 Modbus RTU Communications
   3 = Ethernet
   5 = Devicenet Communications
   6 = Profibus Communications
   X = Any letter or number – future communications options.
VIII Auxiliary Control Functions
   A = None
IX Output 3 Options
   A = None
   C = Switched DC
   E = Mechanical Relay Form C – 5 Amps
   F = Universal Process Output
   K = Solid State Relay – 0.5 Amp
X Output 4 Options
   A = None
   C = Switched DC
   J = Mechanical Relay Form A – 5 Amps
   K = Solid State Relay – 0.5 Amp
XI Firmware Features
   A = Standard Firmware, non-isolated input 1
   B = PM Express Firmware, non-isolated input 1
   C = Enhanced Firmware, non-isolated input 1
   D = Standard Firmware, isolated input 1
   F = Enhanced Firmware, isolated input 1
XII Customer firmware/Overlay Options
   AA = Standard Product
   XX = Any two letters or numbers indicating custom non-critical options.
## Hybrid Control Limit Model Option

| PM | 6 | Z | - | Z | Z | Z | Z | L | Z | J | A | - | ZZ |
|----|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| I  |  |   |   |   |   |   |   |   |   |   |   |   |   |   |
| II | DIN Panel Size |
| 6  | 1/16 DIN |
| 8  | 1/8 DIN Vertical |
| 9  | 1/8 DIN Horizontal |
| 4  | 1/4 DIN |
| III| Unit Primary Function |
| C  | Control |
| R  | Ramping Control |
| X  | Any letter (Other than L, M or D) – designates custom Control firmware. |
| IV | Voltage and Digital I/O Options |
| 1  | HV 100-240 Vac no Digital I/O |
| 2  | HV 100-240 Vac two Digital I/O |
| 3  | LV 12 Vdc / 24-28 Vac/dc no Digital I/O |
| 4  | LV 12 Vdc / 24-28 Vac/dc two Digital I/O |
| V  | Output 1 Options |
| A  | None |
| C  | Switched DC |
| E  | Mechanical Relay Form C – 5 Amps |
| F  | Universal Process Output |
| K  | Solid State Relay – 0.5 Amp |
| VI | Output 2 Options |
| A  | None |
| C  | Switched DC |
| H  | No-Arc Relay output 15 Amps |
| J  | Mechanical Relay Form A – 5 Amps |
| K  | Solid State Relay – 0.5 Amp |
| VII| Communications Options (PM6 only offers options A and 1) |
| A  | None |
| C  | 6 Digital I/O |
| D  | 6 Digital I/O with EIA 485 Modbus RTU Communications |
| 1  | 485 Modbus RTU Communications |
| 2  | RS232 or 485 Modbus RTU Communications |
| 3  | Ethernet |
| 5  | Devicenet Communications |
| 6  | Profibus Communications |
| X  | Any letter or number – future communications options. |
| VIII| Auxiliary Control Functions |
| L  | Integrated Limit Controller with universal input. |
| M  | Integrated Limit Controller with thermistor input. |
| D  | Integrated Limit with custom firmware defaults. |
| IX | Output 3 Options |
| A  | None |
| C  | Switched DC |
| E  | Mechanical Relay Form C – 5 Amps |
| X  | Output 4 (Limit Output) Options |
| J  | Mechanical Relay Form A – 5 Amps |
| XI | Firmware Features |
| A  | Standard Firmware, non-isolated input 1 |
| B  | PM Express Firmware, non-isolated input 1 |
| C  | Enhanced Firmware, non-isolated input 1 |
| D  | Standard Firmware, isolated input 1 |
| F  | Enhanced Firmware, isolated input 1 |
| XII| Customer firmware/Overlay Options |
| AA | Standard Product |
| XX | Any two letters or numbers indicating custom non-critical options. |
TEMPERATURE LIMIT SWITCHES, Non-indicating

Watlow Electric Manufacturing Co., 1241 Bundy Blvd, Box 5580, Winona MN 55987

Series LV, Microprocessor Based Limit Controller Variable Setpoint; LV followed by C, E or G; followed by 1, 2, 5 or 6 (indicating package type); followed by any alphanumeric character; followed by U, W, Y or Z; followed by any four numbers indicating minimum setpoint; followed by any four numbers indicating maximum setpoint; may be followed by additional alphanumeric characters.

Series LF, Microprocessor Based Limit Controller Fixed Setpoint; LF followed by C, E or G; followed by 1, 2, 3, 4, 5, 6 or 7 (indicating package type); followed by any alphanumeric character; followed by U, W, Y or Z; followed by four numbers indicating temperature setpoint; followed by additional alphanumeric characters.

Series EZ-Zone, Microprocessor Based Limit Controller Variable Setpoint,

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<th>TLM</th>
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<td>TLM – Model Series Designator</td>
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<td>Setpoint Precision</td>
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<td>E – Standard Setpoint Selection</td>
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<td>C – High Precision Setpoint</td>
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<td>Sensor Type</td>
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<td>0 – RTD</td>
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<td>1 – Type E Thermocouple</td>
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<td>6 – Type T Thermocouple</td>
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<td>IV</td>
<td>Alarm Relays</td>
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<td>1 – Global relays and 8 channel alarm relays</td>
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<td>V</td>
<td>Mounting Style</td>
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<td>0 – Panel mount</td>
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<td>1 – DIN Rail Mount</td>
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<td>VI</td>
<td>Trip Point Code</td>
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<td></td>
<td>Any combination of letters or numbers indicating individual setpoint codes for each channel. May be 3-8 digits.</td>
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<td></td>
<td>For operation at 10 to 26 V dc. Limit contacts rated for 1 A at 30 V dc.</td>
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Series EZ-Zone, Microprocessor Based Limit Controller Variable Setpoint,

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<tbody>
<tr>
<td>I</td>
<td>ST – Series Designator</td>
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<tr>
<td>II</td>
<td>Controller Options – All units come with Universal Sensor Input, Switched DC to Drive SSR, PID control.</td>
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<td></td>
<td>K = Output 2 0.5A SSR</td>
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<td></td>
<td>B = Output 2 0.5A SSR, 2 Digital I/O</td>
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<td></td>
<td>P = Output 2 0.5A SSR, Current measurement</td>
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<td></td>
<td>E = Output 2 0.5A SSR, 2 Digital I/O, Current measurement</td>
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<td></td>
<td>H = Output 2 5A Mechanical Relay</td>
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<td></td>
<td>D = Output 2 5A Mechanical Relay, 2 digital I/O</td>
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<td></td>
<td>J = Output 2 5A Mechanical Relay, Current measurement</td>
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<td></td>
<td>C = Output 2 5A Mechanical Relay, 2 digital I/O, Current measurement</td>
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<td>III</td>
<td>Limit Control Options</td>
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<td></td>
<td>L = Limit module, Output 3 - 5A Mechanical Relay Form C, Output 4 - 2A Mechanical Relay Form A</td>
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<td></td>
<td>B = No Limit module but access to contactor coil.</td>
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<tr>
<td>IV</td>
<td>Mechanical Limit Contactor Options</td>
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<td></td>
<td>A = No contactor</td>
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<td></td>
<td>B = 40A Contactor Single Pole</td>
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<td></td>
<td>F = 40A Contactor Dual Pole</td>
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</table>
**Series EZ-Zone, Microprocessor Based Limit Controller Variable Setpoint, cont.**

### V Power Supply Options
- **L** = Low voltage 24-28 Vac/dc universal supply (Item IV must be A)
- **H** = High voltage 100-240 Vac/dc universal supply (Item IV must be A)
- **1** = 24 Vac – Contactor Voltage
- **2** = 110/120 Vac – Contactor Voltage
- **3** = 208/240 Vac – Contactor Voltage

### VI Communications Options
- Any Letter or Number

### VII SSR Options*
- **A** = None – user provided (R/C option only)
- **B** = 10A (24 to 240 Vac output) Zero Cross
- **C** = 25A (24 to 240 Vac output) Zero Cross
- **D** = 40A (24 to 240 Vac output) Zero Cross
- **E** = 50A (24 to 240 Vac output) Zero Cross
- **K** = 75A (24 to 240 Vac output) Zero Cross
- **F** = 90A (24 to 240 Vac output) Zero Cross
- **G** = 25A (48 to 600 Vac output) Zero Cross
- **H** = 40A (48 to 600 Vac output) Zero Cross
- **L** = 75A (48 to 600 Vac output) Zero Cross
- **J** = 90A (48 to 600 Vac output) Zero Cross
- **M** = 25A (100 to 240 V ac output) Phase angle
- **N** = 40A (100 to 240 V ac output) Phase angle
- **P** = 75A (100 to 240 V ac output) Phase angle
- **R** = 25A (260 to 600 V ac output) Phase angle
- **S** = 40A (260 to 600 V ac output) Phase angle
- **T** = 75A (260 to 600 V ac output) Phase angle

*Unit load current rating depending on heatsink selected.

### VIII Heat Sink Option
- **A** = None (R/C only)
- **B** = 25A
- **C** = 40A
- **D** = 75 A, 24 V dc fan cooled heatsink*
- **E** = 75 A, 120 V ac fan cooled heatsink*
- **F** = 75 A, 240 V ac fan cooled heatsink*

*not available with contactor model. Option IV must be “A”

### IX Firmware Options
- Any letter or number

### X Custom Options
- Any two letters or numbers – Custom firmware, logo’s (Watlow Logo to be on Label).

---

**Series EZ-Zone Control Module, STRC**

<table>
<thead>
<tr>
<th>STRC</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
<th>V</th>
<th>VI</th>
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</table>

### I STRC – Series Designator

### II Current Module

### III Control Output #2 and I/O Options
- **K** = 0.5A SSR
- **B** = 0.5A SSR, Two Digital I/O
- **P** = 0.5A SSR, Current Measurement
- **E** = 0.5A SSR, Two Digital I/O, Current Measurement
- **H** = 5A Relay
- **D** = 5A Relay, Two Digital I/O
- **J** = 5A Relay, Current Measurement
- **C** = 5A Relay, Two Digital I/O, Current Measurement

### IV Limit Card Options
- **A** = No Limit Card
- **L** = Limit Card
- **B** = No Limit function, field access to contactor coil
All Products FM Class 3545 Temperature Limit Approval

V  Power Supply Options
L = Low voltage universal 24-28 Vac/dc, 50/60 Hz.
H = High voltage universal 100-240 Vac/dc, 50/60 Hz.
1 = 24 Vac – Contactor Voltage, 50/60 Hz
2 = 120 Vac – Contactor Voltage, 50/60 Hz
3 = 208/240 Vac – Contactor Voltage, 50/60 Hz

VI  Customization
Any four letters or numbers for communications, firmware and other non-critical cosmetic options.

Series EZ-Zone RMC FM approved 10-15-08

At least one of the following items II, IV, VI, or VIII must be a 5 or 6 to be considered a limit.

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<thead>
<tr>
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<tbody>
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<td>I</td>
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<tr>
<td>II</td>
<td>RMC = Multi-Loop Control Module</td>
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<td>III</td>
<td>Zone 1 Primary Function</td>
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<td>1 = Control with Universal Input</td>
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<td>2 = Control with Thermistor Input</td>
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<td>3 = Ramp/Soak with Universal Input</td>
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<td>4 = Ramp/Soak with Thermistor Input</td>
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<td>5 = Limit with Universal Input (Output 1, 2 must be B, F or L)</td>
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<td>6 = Limit with Thermistor Input (Output 1, 2 must be B, F or L)</td>
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<td>7 = Current transformer input (Not valid with outputs N, P, R or S)</td>
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<td>9 = Custom</td>
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<td>IV</td>
<td>Zone 2 Primary Function</td>
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<td>1 = Control with Universal Input</td>
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<td>2 = Control with Thermistor Input</td>
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<td>5 = Limit with Universal Input (Output 3, 4 must be B, F or L)</td>
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<td>6 = Limit with Thermistor Input (Output 3, 4 must be B, F or L)</td>
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<td>7 = Current transformer input (Not valid with outputs N, P, R or S)</td>
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<td>9 = Custom</td>
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<table>
<thead>
<tr>
<th>Zone 1 Output 1 Options</th>
<th>Output 2 Options</th>
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<tbody>
<tr>
<td>A = None</td>
<td>None</td>
</tr>
<tr>
<td>B = None</td>
<td>Mechanical relay 5A form A</td>
</tr>
<tr>
<td>U = Switched DC/Open Collector</td>
<td>None</td>
</tr>
<tr>
<td>D = Switched DC/Open Collector</td>
<td>NO-ARC 15A Relay</td>
</tr>
<tr>
<td>E = Switched DC/Open Collector</td>
<td>Switched DC</td>
</tr>
<tr>
<td>F = Switched DC/Open Collector</td>
<td>Mechanical relay 5A form A</td>
</tr>
<tr>
<td>G = Switched DC/Open Collector</td>
<td>Solid State Relay 0.5A</td>
</tr>
<tr>
<td>H = Mechanical Relay 5A form C</td>
<td>None</td>
</tr>
<tr>
<td>J = Mechanical Relay 5A form C</td>
<td>NO-ARC 15A Relay</td>
</tr>
<tr>
<td>K = Mechanical Relay 5A form C</td>
<td>Switched DC</td>
</tr>
<tr>
<td>L = Mechanical Relay 5A form C</td>
<td>Mechanical relay 5A form A</td>
</tr>
<tr>
<td>M = Mechanical Relay 5A form C</td>
<td>Solid State Relay 0.5A</td>
</tr>
<tr>
<td>N = Universal Process</td>
<td>None</td>
</tr>
<tr>
<td>P = Universal Process</td>
<td>Switched DC</td>
</tr>
<tr>
<td>R = Universal Process</td>
<td>Mechanical relay 5A form A</td>
</tr>
<tr>
<td>S = Universal Process</td>
<td>Solid State Relay 0.5A</td>
</tr>
<tr>
<td>T = None</td>
<td>Solid State Relay 0.5A</td>
</tr>
<tr>
<td>Y = Solid State Relay 0.5A</td>
<td>NO-ARC 15A Relay</td>
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<tr>
<td>Z = Solid State Relay 0.5A</td>
<td>Solid State Relay 0.5A</td>
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<table>
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</thead>
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<tr>
<td>B = None</td>
<td>Mechanical relay 5A form A</td>
</tr>
<tr>
<td>U = Switched DC/Open Collector</td>
<td>None</td>
</tr>
<tr>
<td>D = Switched DC/Open Collector</td>
<td>NO-ARC 15A Relay</td>
</tr>
<tr>
<td>E = Switched DC/Open Collector</td>
<td>Switched DC</td>
</tr>
<tr>
<td>F = Switched DC/Open Collector</td>
<td>Mechanical relay 5A form A</td>
</tr>
<tr>
<td>G = Switched DC/Open Collector</td>
<td>Solid State Relay 0.5A</td>
</tr>
<tr>
<td>H = Mechanical Relay 5A form C</td>
<td>None</td>
</tr>
<tr>
<td>J = Mechanical Relay 5A form C</td>
<td>NO-ARC 15A Relay</td>
</tr>
<tr>
<td>K = Mechanical Relay 5A form C</td>
<td>Switched DC</td>
</tr>
<tr>
<td>L = Mechanical Relay 5A form C</td>
<td>Mechanical relay 5A form A</td>
</tr>
<tr>
<td>M = Mechanical Relay 5A form C</td>
<td>Solid State Relay 0.5A</td>
</tr>
<tr>
<td>N = Universal Process</td>
<td>None</td>
</tr>
<tr>
<td>P = Universal Process</td>
<td>Switched DC</td>
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<tr>
<td>R = Universal Process</td>
<td>Mechanical relay 5A form A</td>
</tr>
<tr>
<td>S = Universal Process</td>
<td>Solid State Relay 0.5A</td>
</tr>
<tr>
<td>T = None</td>
<td>Solid State Relay 0.5A</td>
</tr>
<tr>
<td>Y = Solid State Relay 0.5A</td>
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## Zone 2 Output 3 Options

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<tr>
<td>B</td>
<td>None</td>
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<tr>
<td>U</td>
<td>Switched DC/Open Collector</td>
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<td>D</td>
<td>Switched DC/Open Collector</td>
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<td>E</td>
<td>Switched DC/Open Collector</td>
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<td>F</td>
<td>Switched DC/Open Collector</td>
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<td>G</td>
<td>Switched DC/Open Collector</td>
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<td>H</td>
<td>Mechanical Relay 5A form C</td>
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<td>J</td>
<td>Mechanical Relay 5A form C</td>
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<td>K</td>
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<td>M</td>
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<tr>
<td>N</td>
<td>Universal Process</td>
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<tr>
<td>T</td>
<td>None</td>
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<tr>
<td>Y</td>
<td>Solid State Relay 0.5A</td>
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<td>Z</td>
<td>Solid State Relay 0.5A</td>
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## Output 4 Options

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<td>B</td>
<td>None</td>
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<tr>
<td>U</td>
<td>Switched DC/Open Collector</td>
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<td>D</td>
<td>Switched DC/Open Collector</td>
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<tr>
<td>H</td>
<td>Mechanical Relay 5A form C</td>
</tr>
<tr>
<td>J</td>
<td>Mechanical Relay 5A form C</td>
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<tr>
<td>K</td>
<td>Mechanical Relay 5A form C</td>
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<tr>
<td>L</td>
<td>Mechanical Relay 5A form C</td>
</tr>
<tr>
<td>M</td>
<td>Mechanical Relay 5A form C</td>
</tr>
<tr>
<td>N</td>
<td>Universal Process</td>
</tr>
<tr>
<td>P</td>
<td>Universal Process</td>
</tr>
<tr>
<td>R</td>
<td>Universal Process</td>
</tr>
<tr>
<td>S</td>
<td>Universal Process</td>
</tr>
<tr>
<td>T</td>
<td>None</td>
</tr>
<tr>
<td>Y</td>
<td>Solid State Relay 0.5A</td>
</tr>
<tr>
<td>Z</td>
<td>Solid State Relay 0.5A</td>
</tr>
</tbody>
</table>

## Zone 3 Primary Function

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>None</td>
</tr>
<tr>
<td>1</td>
<td>Control with Universal Input</td>
</tr>
<tr>
<td>2</td>
<td>Control with Thermistor Input</td>
</tr>
<tr>
<td>5</td>
<td>Limit with Universal Input (Output 3, 4 must be B, F or L)</td>
</tr>
<tr>
<td>6</td>
<td>Limit with Thermistor Input (Output 3, 4 must be B, F or L)</td>
</tr>
<tr>
<td>7</td>
<td>Current transformer input (Not valid with outputs N, P, R or S)</td>
</tr>
<tr>
<td>9</td>
<td>Custom</td>
</tr>
</tbody>
</table>

## Zone 3 Output 5 Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>None</td>
</tr>
<tr>
<td>B</td>
<td>None</td>
</tr>
<tr>
<td>U</td>
<td>Switched DC/Open Collector</td>
</tr>
<tr>
<td>D</td>
<td>Switched DC/Open Collector</td>
</tr>
<tr>
<td>E</td>
<td>Switched DC/Open Collector</td>
</tr>
<tr>
<td>F</td>
<td>Switched DC/Open Collector</td>
</tr>
<tr>
<td>G</td>
<td>Switched DC/Open Collector</td>
</tr>
<tr>
<td>H</td>
<td>Mechanical Relay 5A form C</td>
</tr>
<tr>
<td>J</td>
<td>Mechanical Relay 5A form C</td>
</tr>
<tr>
<td>K</td>
<td>Mechanical Relay 5A form C</td>
</tr>
<tr>
<td>L</td>
<td>Mechanical Relay 5A form C</td>
</tr>
<tr>
<td>M</td>
<td>Mechanical Relay 5A form C</td>
</tr>
<tr>
<td>N</td>
<td>Universal Process</td>
</tr>
<tr>
<td>P</td>
<td>Universal Process</td>
</tr>
<tr>
<td>R</td>
<td>Universal Process</td>
</tr>
<tr>
<td>S</td>
<td>Universal Process</td>
</tr>
<tr>
<td>T</td>
<td>None</td>
</tr>
<tr>
<td>Y</td>
<td>Solid State Relay 0.5A</td>
</tr>
<tr>
<td>Z</td>
<td>Solid State Relay 0.5A</td>
</tr>
</tbody>
</table>

## Output 6 Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>None</td>
</tr>
<tr>
<td>B</td>
<td>None</td>
</tr>
<tr>
<td>U</td>
<td>Switched DC/Open Collector</td>
</tr>
<tr>
<td>D</td>
<td>Switched DC/Open Collector</td>
</tr>
<tr>
<td>E</td>
<td>Switched DC/Open Collector</td>
</tr>
<tr>
<td>F</td>
<td>Switched DC/Open Collector</td>
</tr>
<tr>
<td>G</td>
<td>Switched DC/Open Collector</td>
</tr>
<tr>
<td>H</td>
<td>Mechanical Relay 5A form C</td>
</tr>
<tr>
<td>J</td>
<td>Mechanical Relay 5A form C</td>
</tr>
<tr>
<td>K</td>
<td>Mechanical Relay 5A form C</td>
</tr>
<tr>
<td>L</td>
<td>Mechanical Relay 5A form C</td>
</tr>
<tr>
<td>M</td>
<td>Mechanical Relay 5A form C</td>
</tr>
<tr>
<td>N</td>
<td>Universal Process</td>
</tr>
<tr>
<td>P</td>
<td>Universal Process</td>
</tr>
<tr>
<td>R</td>
<td>Universal Process</td>
</tr>
<tr>
<td>S</td>
<td>Universal Process</td>
</tr>
<tr>
<td>T</td>
<td>None</td>
</tr>
<tr>
<td>Y</td>
<td>Solid State Relay 0.5A</td>
</tr>
<tr>
<td>Z</td>
<td>Solid State Relay 0.5A</td>
</tr>
</tbody>
</table>

## Zone 4 Primary Function

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>None</td>
</tr>
<tr>
<td>1</td>
<td>Control with Universal Input</td>
</tr>
<tr>
<td>2</td>
<td>Control with Thermistor Input</td>
</tr>
<tr>
<td>5</td>
<td>Limit with Universal Input (Output 3, 4 must be B, F or L)</td>
</tr>
<tr>
<td>6</td>
<td>Limit with Thermistor Input (Output 3, 4 must be B, F or L)</td>
</tr>
<tr>
<td>7</td>
<td>Current transformer input (Not valid with outputs N, P, R or S)</td>
</tr>
<tr>
<td>9</td>
<td>Custom</td>
</tr>
</tbody>
</table>

## Output 7 Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>None</td>
</tr>
<tr>
<td>B</td>
<td>None</td>
</tr>
<tr>
<td>U</td>
<td>Switched DC/Open Collector</td>
</tr>
<tr>
<td>D</td>
<td>Switched DC/Open Collector</td>
</tr>
<tr>
<td>E</td>
<td>Switched DC/Open Collector</td>
</tr>
<tr>
<td>F</td>
<td>Switched DC/Open Collector</td>
</tr>
<tr>
<td>G</td>
<td>Switched DC/Open Collector</td>
</tr>
<tr>
<td>H</td>
<td>Mechanical Relay 5A form C</td>
</tr>
<tr>
<td>J</td>
<td>Mechanical Relay 5A form C</td>
</tr>
<tr>
<td>K</td>
<td>Mechanical Relay 5A form C</td>
</tr>
<tr>
<td>L</td>
<td>Mechanical Relay 5A form C</td>
</tr>
<tr>
<td>M</td>
<td>Mechanical Relay 5A form C</td>
</tr>
<tr>
<td>N</td>
<td>Universal Process</td>
</tr>
<tr>
<td>P</td>
<td>Universal Process</td>
</tr>
<tr>
<td>R</td>
<td>Universal Process</td>
</tr>
<tr>
<td>S</td>
<td>Universal Process</td>
</tr>
<tr>
<td>T</td>
<td>None</td>
</tr>
<tr>
<td>Y</td>
<td>Solid State Relay 0.5A</td>
</tr>
<tr>
<td>Z</td>
<td>Solid State Relay 0.5A</td>
</tr>
</tbody>
</table>
IX Zone 4 Output 7 Options

A = None
B = None
U = Switched DC/Open Collector
D = Switched DC/Open Collector
E = Switched DC/Open Collector
F = Switched DC/Open Collector
G = Switched DC/Open Collector
H = Mechanical Relay 5A form C
J = Mechanical Relay 5A form C
K = Mechanical Relay 5A form C
L = Mechanical Relay 5A form C
M = Mechanical Relay 5A form C
N = Universal Process
P = Universal Process
R = Universal Process
S = Universal Process
T = None
Y = Solid State Relay 0.5A
Z = Solid State Relay 0.5A

C = 6 digital inputs/outputs (valid only if item VIII = A)

Output 8 Options

None
Mechanical relay 5A form A
NO-ARC 15A Relay
Switched DC
None
Switched DC
Mechanical relay 5A form A
Solid State Relay 0.5A
None
Solid State Relay 0.5A

X Connector Style
A = Right Angle Screw Connectors
F = Front access Screw Connectors

XI Enhanced Options
A = Standard bus communications
1 = Standard bus and Modbus 485 RTU communications

XII Custom Options
AA = Standard Product
AB = Replacement connector hardware for the entered model number.
XX = Any other letters or numbers = custom overlays, firmware, defaults.

Series EZ-Zone RMC FM approved June 17, 2010

RML X X X X X - X X XX
I II III IV V VI VII VIII IX

I RML = High Density Limit Module

II Connector Style
A = Right angle screw connector
F = Front screw connector
S = Custom

III Slot A – Board function
5 = 4 universal inputs (thermocouple, two wire RTD, process input) with limit control
6 = 4 thermistor inputs with limit control

IV Slot B – Board Function
A = None
5 = 4 universal inputs (thermocouple, two wire RTD, process input) with limit control
6 = 4 thermistor inputs with limit control
J = 4 mechanical relays 5A Form A
C = 6 Digital Inputs/outputs
B = 1 Digital input, 2 mechanical relay outputs 5A

V Slot D – Board Function
A = None
5 = 4 universal inputs (thermocouple, two wire RTD, process input) with limit control
6 = 4 thermistor inputs with limit control
J = 4 mechanical relays 5A Form A
### EZ-Zone Temperature Controller Modules

<table>
<thead>
<tr>
<th>FM</th>
<th>L</th>
<th>A</th>
<th>-</th>
<th>LCJ</th>
<th>A</th>
<th>-</th>
<th>A</th>
<th>A</th>
<th>AA</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>II</td>
<td>III</td>
<td>IV</td>
<td>V</td>
<td>VI</td>
<td>VII</td>
<td>VIII</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**I**
FM – Series Designation – Flex Module

**II**
Module Type
L = Limit Module

**III**
Place holder Future Options
A = Standard Product

**IV**
Input/Output Functions
LAJ = Universal input, No output 1, 5A mechanical relay form A output 2 Limit
LCJ = Universal input, Switched DC output 1, 5A mechanical relay form A output 2 Limit
LEJ = Universal input, 5A mechanical relay form C output 1, 5A mechanical relay form A output 2 Limit
MAJ = Thermistor input, no output 1, 5A mechanical relay form A output 2 Limit
MCJ = Thermistor input, switched DC output 1, 5A mechanical relay form A output 2 Limit
MEJ = Thermistor input, 5A mechanical relay form C output 1, 5A mechanical relay form A output 2 Limit
YEB = Universal input, 5A mechanical relay form C output 1 Limit, no output 2, digital input – Food service compliant dielectrics and spacings.

**V**
Place holder Future Options
A = Standard Product

**VI**
Place holder Future Options
A = Standard Product
<table>
<thead>
<tr>
<th>VII</th>
<th>Connector and conformal coating options</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Right angle screw connector</td>
</tr>
<tr>
<td>B</td>
<td>Right angle screw connector and conformal coated boards</td>
</tr>
<tr>
<td>F</td>
<td>Front side screw connector</td>
</tr>
<tr>
<td>G</td>
<td>Front side screw connector and conformal coated boards</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>VIII</th>
<th>Custom Options – overlay, preset parameters, locked code etc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>AA</td>
<td>Standard product</td>
</tr>
<tr>
<td>XX</td>
<td>any other two letters or numbers for custom options.</td>
</tr>
</tbody>
</table>
Series LS UL®

CERTIFICATE OF COMPLIANCE

Certificate Number 20150212-E43684
Report Reference E43684-20150201
Issue Date 2015-FEBRUARY-12

Issued to: Watlow Electric Manufacturing Co
1241 Bundy Blvd
PO BOX 5580
Winona MN 55987-4873

This is to certify that representative samples of COMPONENT - TEMPERATURE-INDICATING AND -REGULATING EQUIPMENT, COMPONENT - AUXILIARY DEVICES, COMPONENT - SWITCHES, INDUSTRIAL CONTROL Models LSF4; followed by any letter or number; followed by W; followed by a four digit high (limit temperature); followed by a three digit (hysteresis); followed by any two letters or numbers.

Have been investigated by UL in accordance with the Standard(s) indicated on this Certificate.

Standard(s) for Safety: “See Next page for Standards”
Additional Information: See the UL Online Certifications Directory at www.ul.com/database for additional information

Only those products bearing the UL Certification Mark should be considered as being covered by UL's Certification and Follow-Up Service.

Recognized components are incomplete in certain constructional features or restricted in performance capabilities and are intended for use as components of complete equipment submitted for investigation rather than for direct separate installation in the field. The final acceptance of the component is dependent upon its installation and use in complete equipment submitted to UL LLC.

Look for the UL Certification Mark on the product.

Bruce Milhaupt, Assistant Chief Engineer, Global Inspection and Field Services
UL LLC

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Series LS UL®

CERTIFICATE OF COMPLIANCE

Certificate Number 20150212-E43684
Report Reference E43684-20150201
Issue Date 2015-FEBRUARY-12

This is to certify that representative samples of the product as specified on this certificate were tested according to the current UL requirements.

UL60730-1 - Automatic Electrical Controls for Household and Similar Use, Part 1
CAN/CSA-E60730-1:13 - Automatic Electrical Controls for Household and Similar Use, Part 1
UL60730-2-9 - Automatic Electrical Controls for Household and Similar Use, Part 2 - Particular requirements for temperature sensing controls
CAN/CSA-E60730-2-9:01 - Automatic Electrical Controls for Household and Similar Use, Part 2 - Particular requirements for temperature sensing controls

Bruce Mahrenholz, Assistant Chief Engineer, Global Inspection and Field Services
UL LLC

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UL LLC

Presents This

MAINTENANCE REVIEW LETTER REPORT

File: E43684
Project: 4786654193
Report Number: 15PSC00007

To

Watlow Electric Manufacturing Co.
1241 Bundy Blvd.
P.O. Box 5580
Winona, MN 55987-4873 USA

The following Programmable System was found in compliance with the applicable requirements in ANSI/UL 60730-1, Fourth Edition, CSA E60730-1:13, Fourth Edition, and IEC 60730-1, Fourth Edition:

**LSF4 Electronic Thermal Cutouts with software version 1.00.04 (firmware part number 0500-3018-0005)**

Jason R. Smith
Issued by: Jason R. Smith
Issued on: January 27, 2015
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1. Scope of the Review

The scope of the Maintenance Review was limited to the software in Watlow Electric Manufacturing Co.’s LSF4 Electronic Thermal Cutouts. The Review will determine compliance or non-compliance to the applicable requirements in ANSI/UL 60730-1, Fourth Edition, CSA E60730-1:13, Fourth Edition, and IEC 60730-1, Fourth Edition. The safety requirements are either directly specified in the end-product standard, or are derived and specified by the manufacturer on the basis of risk analysis for the end-product and its intended use.

1.1. Product Overview

The LSF4 models are encapsulated electronic thermal cutouts. They monitor temperature by virtue of two thermocouple inputs using either to initiate the limit trip point, or a deviation between the two to initiate the temperature limiting functionality. Once “tripped” as the result of an overtemperature condition, reset can only be achieved by cycling power to the control. These models do not have any operator interface other than LED indicators for tripped condition or errors and have a fixed setpoint and limit hysteresis set by the factory.

These controls incorporate two microprocessors in a dual channel homogenous architecture. The system is set up in a master/slave configuration where U8 is the master microprocessor. The safety limit relay is controlled by both processors (U2 and U8). In order for the limit relay to be energized both processors need to have the same logic value and satisfy a logic “AND” configuration of two transistors.

1.2. Critical Microelectronic Hardware Components

Table 1 below lists the microelectronic hardware components that provide safety-related functionality to the LSF4 Electronic Thermal Cutouts:

<table>
<thead>
<tr>
<th>Microelectronic Hardware</th>
<th>Function</th>
<th>Manufacturer</th>
<th>Model/Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>U8</td>
<td>Master Microcontroller</td>
<td>Atmel</td>
<td>ATmega168</td>
</tr>
<tr>
<td>U2</td>
<td>Slave Microcontroller</td>
<td>Atmel</td>
<td>ATmega168</td>
</tr>
</tbody>
</table>

Table 1.
1.3. Critical and Supervisory Software Components

Table 2 below lists the software components (including processes, modules, and threads) that provide safety-related functionality to the LSF4 Electronic Thermal Cutouts:

<table>
<thead>
<tr>
<th>Software</th>
<th>Module</th>
<th>Firmware Part No.</th>
<th>Software Version</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Master (U8)</td>
<td>0500-3018-0005</td>
<td>1.00.04</td>
</tr>
<tr>
<td></td>
<td>Slave (U2)</td>
<td>0500-3018-0005</td>
<td>1.00.04</td>
</tr>
</tbody>
</table>

Table 2.

The software versions in the table above can be verified with the assistance of a Watlow Electric Manufacturing Co. engineer.

1.4. Safety-Related Functionality of the Software

Based on Hazard and Risk Analysis information, the following safety-related functions of the software were identified:

1. The software shall monitor for and detect an over temperature condition and shut down the relay outputs to the heating element:
   - Setpoint temperature range as specified in the UL 60730-1 report
   - Deviation tolerance: ±6°C
   - Drift tolerance: ±6°C

2. The software shall ensure that, once “tripped” as the result of an overtemperature condition, reset can only be achieved by cycling power to the control.

3. The software shall detect a hardware or software malfunction and place the device in a safe state as indicated per the “Risks Addressed State” definition.

The precise risks addressed by the software components are identified in the Software FMEA. During the review of the documents no additional safety-related functionality was identified.
1.5. **End Product Considerations / Impact to Product Testing**

The LSF4 Electronic Thermal Cutouts are based on the design of the existing EHG2 Electronic Thermal Cutouts described in E43684, Vol. 8, Sec. 1, report date 2006-03-14 (which includes the original software Detailed Design Review Report and subsequent software Maintenance Review Reports). Compliance details of the new models are largely based on the Detailed Design Review Report and Maintenance Review Reports referenced in Section 4.3 of this report. Modifications resulting in the new models are described further in Section 2 of this report.

The LSF4 Electronic Thermal Cutouts have undergone an abbreviated test program to the ANSI/UL 60730-1, CSA E60730-1:13, and IEC 60730-1 standards under UL project 4786654193. No other impacts to product testing are anticipated as a result of this Maintenance Review.

2. **Change Description**

The scope of this Maintenance Review includes modifications made to the existing EHG2 Electronic Thermal Cutouts described in E43684, Vol. 8, Sec. 1, report date 2006-03-14 resulting in the LSF4 Electronic Thermal Cutouts. The primary differences between the EHG2 software and the LSF4 software are described below:

- A test code has been added to do the calibration and to set the part number; the part number is written into the “HP Limit” as a subset of the order part number; the “HP Limit” has 12 characters indicating:
  - Limit type (Fixed or Variable) – currently only Fixed has been implemented
  - Sensor type (J or K-type thermocouple) and scale (Fahrenheit or Celsius) (in the prior EHG2, there was no selection type for sensor type or scale)
  - Reset type (Auto or Manual)
  - Limit High Setpoint (stored as integer)
  - Hysteresis (stored as integer)
  - Custom parameters (currently not implemented)
- The Limit Reset Setpoint is defined as the Limit High Setpoint – Hysteresis (in the prior EHG2, there was no hysteresis)
- Auto Reset Method: on a power cycle, if the first temperature read is less than the Limit Reset Setpoint, then the limit is cleared; on a power cycle, if the first temperature read is higher than the Limit Reset Setpoint, then the limit remains set
- The prior EHG2 had a limited amount of codespace left over (only about 100 bytes of codespace left), so the code responsible for HMI communications was removed since this is not used in this product

3. **Requirements Checklists**


<table>
<thead>
<tr>
<th>UL 60730-1; CSA E60730-1:13; IEC 60730-1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clause</td>
</tr>
<tr>
<td>--------</td>
</tr>
</tbody>
</table>

ULS-01998-UZQM-MiscForm-2002
Maintenance Review Report Rev. 2.1
Copyright © 2015 UL LLC
### UL 60730-1; CSA E60730-1:13; IEC 60730-1

<table>
<thead>
<tr>
<th>Clause</th>
<th>Requirement + Test</th>
<th>Result – Remark</th>
<th>Verdict</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>H.11.12.3.4 .2</strong></td>
<td>Management of software versions: All versions are uniquely identified for traceability</td>
<td>New version identifier assigned to the software</td>
<td>Pass</td>
</tr>
<tr>
<td><strong>H.11.12.3.4 .3</strong></td>
<td>Software modification</td>
<td></td>
<td>Pass</td>
</tr>
<tr>
<td><strong>H.11.12.3.4 .3.1</strong></td>
<td>Software modifications are based on a modification request which details the following:</td>
<td>See “Code Changes from EHG II and General Operation” and “Firmware Updates”</td>
<td>Pass</td>
</tr>
<tr>
<td>• the hazards which may be affected</td>
<td>(See above)</td>
<td>Pass</td>
<td></td>
</tr>
<tr>
<td>• the proposed change</td>
<td>(See above)</td>
<td>Pass</td>
<td></td>
</tr>
<tr>
<td>• the reasons for change</td>
<td>(See above)</td>
<td>Pass</td>
<td></td>
</tr>
<tr>
<td><strong>H.11.12.3.4 .3.2</strong></td>
<td>An analysis is carried out to determine the impact of the proposed modification on functional safety.</td>
<td>See H.11.12.3.4.3.1</td>
<td>Pass</td>
</tr>
<tr>
<td><strong>H.11.12.3.4 .3.3</strong></td>
<td>A detailed specification for the modification is generated including the necessary activities for verification and validation, such as a definition of suitable test cases</td>
<td>Modifications made are documented in “Code Changes from EHG II and General Operation” and “Firmware Updates”</td>
<td>Pass</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Selected cases from the validation plan were repeated; see “LSF4 Firmware Validation” and “LSF4 Watchdog Tests”</td>
<td></td>
</tr>
<tr>
<td><strong>H.11.12.3.4 .3.4</strong></td>
<td>The modification are carried out as planned</td>
<td>See H.11.12.3.4.3.3</td>
<td>Pass</td>
</tr>
<tr>
<td><strong>H.11.12.3.4 .3.5</strong></td>
<td>The assessment of the modification is carried out based on the specified verification and validation activities. This may include:</td>
<td>Selected cases from the validation plan were repeated; see “LSF4 Firmware Validation” and “LSF4 Watchdog Tests”</td>
<td>Pass</td>
</tr>
<tr>
<td>• a reverification of changed software modules</td>
<td>(See above)</td>
<td>Pass</td>
<td></td>
</tr>
<tr>
<td>• a reverification of affected software modules</td>
<td>(See above)</td>
<td>Pass</td>
<td></td>
</tr>
<tr>
<td>• a revalidation of the complete system</td>
<td>(See above)</td>
<td>Pass</td>
<td></td>
</tr>
<tr>
<td>Clause</td>
<td>Requirement + Test</td>
<td>Result – Remark</td>
<td>Verdict</td>
</tr>
<tr>
<td>--------------</td>
<td>-------------------------------------</td>
<td>---------------------------------------------------------------------------------</td>
<td>---------</td>
</tr>
<tr>
<td>H.11.12.3.4</td>
<td>All details of modification activities are documented</td>
<td>Modifications made are documented in “Code Changes from EHG II and General Operation” and “Firmware Updates”</td>
<td>Pass</td>
</tr>
<tr>
<td>.3.6</td>
<td></td>
<td>Selected cases from the validation plan were repeated; see “LSF4 Firmware Validation” and “LSF4 Watchdog Tests”</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>As part of the modification, the “EHG II Extended Version Firmware Requirements” and “Software Requirements Specification for Series LS” were updated</td>
<td></td>
</tr>
</tbody>
</table>
4. References

4.1 Watlow Electric Manufacturing Co.'s Documentation

1. Code Changes from EHG II and General Operation, dated November 19, 2014
2. EHG II Extended Version Firmware Requirements, dated November 11, 2014
3. Firmware Updates, dated October 22, 2014
4. LSF4 Firmware Validation, dated January 22, 2015
5. LSF4 Watchdog Tests, dated January 26, 2015

4.2 Reference Standards


4.3 Report Revision History

<table>
<thead>
<tr>
<th>Report Type</th>
<th>Issue Date</th>
<th>PSC Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detailed Design Review</td>
<td>January 25, 2006</td>
<td>06PSC00007</td>
</tr>
<tr>
<td>Maintenance Review</td>
<td>December 11, 2006</td>
<td>06PSC00104</td>
</tr>
<tr>
<td>Maintenance Review</td>
<td>February 19, 2007</td>
<td>07PSC00018</td>
</tr>
<tr>
<td>Maintenance Review</td>
<td>January 23, 2012</td>
<td>11PSC00102</td>
</tr>
</tbody>
</table>
5. **Statement of Compliance**


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Any information and documentation involving UL Mark services are provided on behalf of UL LLC or any authorized licensee of UL.

Sincerely,

**Jason R. Smith**

Jason R. Smith
Staff Engineer
REPORT

on

COMPONENT - TEMPERATURE-INDICATING AND REGULATING EQUIPMENT

Watlow Winona Inc.
Winona, MN

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DESCRIPTION

PRODUCT COVERED:

*USR, CNR Component - **Thermostat (In-Line Heater Control)**, Models WCSH-0120 and WCSH-0240 may be followed by additional numbers or letters.

GENERAL CHARACTER:

The device is a temperature controller incorporating a mechanical relay to control an external load.

*These solid state thermostats are intended for use in Listed Heaters. The thermostats are intended to function during normal operation of the application to maintain process temperatures within an anticipated range (between "trip" and reset temperature setpoints). The anticipated application of these thermostats is considered equivalent to that of a Temperature Regulating control investigated in accordance with UL873, The Standard for Temperature-Indicating and -Regulating Equipment.*

These controls do not incorporate a line-to-low voltage transformer. The power supply for these controls feature impedance-limiting components to reduce the working voltage to logic levels. Accordingly, all circuitry is considered line-connected.

*These controllers were evaluated as Type 1 controls. No calibration tolerance was declared; No calibration verification (Deviation and Drift testing was conducted). These controls have not been evaluated for performing any safety/protective functions.

These devices are provided in a polymeric housing/enclosure. The enclosure is intended to ultimately accept a cord for the sensor and one for the load. Neither cord is supplied as part of the equipment certified by this report.
**RATINGS:**

Electrical -

*Supply:

<table>
<thead>
<tr>
<th>Model</th>
<th>Terminals</th>
<th>Supply Voltage, Vac</th>
</tr>
</thead>
<tbody>
<tr>
<td>WCSH-0120</td>
<td>J4 – J5</td>
<td>100-120</td>
</tr>
<tr>
<td>WCSH-0240</td>
<td>J4 – J5</td>
<td>200-240</td>
</tr>
</tbody>
</table>

Sensor (Terminals J1-J2): Thermocouple Input – 5Vdc, non-isolated, line-connected

Output (Terminal J3): 10 A resistive, 240 V ac, 100,000 c.

Environmental –

Temperature - Maximum ambient temperature of 70°C.

**DESIGNATION SYSTEM:**

<table>
<thead>
<tr>
<th>WCSH</th>
<th>XXXX</th>
<th>XXXX</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>II</td>
<td>III</td>
</tr>
</tbody>
</table>

*  

I - Basic model number.
WCSH

II - Voltage Rating
0120 = 100 to 120 Vac
0240 = 200 to 240 Vac

III – Custom options
Any four digits including non-critical configurations.
ENGINEERING CONSIDERATIONS (NOT FOR FIELD REPRESENTATIVE'S USE):

*USR indicates investigation to UL 60730-1, Standard for Automatic Electrical Controls for Household and Similar Use, Part 1: General Requirements; and UL 60730-2-9: Particular Requirements for Temperature Sensing Controls.

CNR indicates investigation to Canadian Standard for Automatic Electrical Controls for Household and Similar Use, Part 1: General Requirements CAN/CSA-E60730-1:02; CAN/CSA-E60730-2-9:01: Particular requirements For Temperature Sensing Controls

These controls are considered to be INCORPORATED within a product and has been specified by the applicant for installation in:

- **a)** A Pollution Degree 2 environment - Normally, only nonconductive pollution. However, a temporary conductivity caused by condensation may be expected.
- **b)** An Installation Category (Overvoltage Category) II rating – Cord and Plug connected equipment application.
- **c)** Maximum Phase to Ground voltage of the supply source – 240 Vac
- **d)** Extended Environment/Shipping and Storage: -40°C to 85°C, 10 percent to 85 percent relative humidity.
- **e)** Protection against electric shock Class: Class II - Double Insulated Equipment Applications.

Use - For use only in products where the acceptability of the combination is determined by Underwriters Laboratories Inc. Conditions of Acceptability - When installed in the final use equipment, etc., the following are among the considerations to be made:

1. The terminals are not acceptable for field connection. The acceptability of the connections to these terminals, including temperature and secureness, shall be determined in the ultimate application.

2. Reinforced insulation is provided from live circuits to the outer surface of the enclosure.

3. The housing was subjected to Impact testing for hand held portable devices. Additional enclosure evaluation may be necessary as part of the ultimate enclosure in the end use application.

4. These devices shall be installed in compliance with the enclosure, mounting, spacing and segregation requirements of the ultimate application.

5. Per the Manufacturer’s declaration, this electronic control was investigated as an OPERATING, Type 1 action (non-safety) control, and is not intended to provide any safety or protective functionality.

6. These controls do not incorporate a line-to-low voltage transformer. The power supply for these controls feature impedance-limiting components to reduce the working voltage to logic levels. Accordingly, all circuitry, including the sensor input circuit is considered line-connected. The device connected to the sensor terminals shall be guarded, insulated and enclosed as a line-connected component

7. These controls are intended to accept cords/conductors in the end-use application. Insulation displacement terminals are provided to accept factory installed conductors. The cords/conductors are not considered part of the controls described in this report. Accordingly, no strain relief testing or termination testing was conducted during the investigation of these controls.
SMARTHEAT (EHG)

WATLOW Electric Manufacturing Company
1241 Bundy Blvd.
Winona, MN 55987 USA

ISO 9001 since 1996.

Declares that the following product:
Designation: Smartheat
Model Numbers: WCSH-(0120 or 0240)-(Any four letters or numbers)
Classification: Incorporated Thermostat (In-line heater control), Installation Category II, Pollution degree II, IP20, $T_{\text{min}} = 0 \degree C$, $T_{\text{max}} = 70 \degree C$, Type 1.Y output.
Rated Supply: 100 to 120 V~ (ac) or 200 to 240 V~ (ac), 50/60 Hz
Rated Power: 10 A maximum

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

### 2004/108/EC Electromagnetic Compatibility Directive

<table>
<thead>
<tr>
<th>Standard</th>
<th>Year</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 61326-1</td>
<td>2013</td>
<td>Electrical equipment for measurement, control and laboratory use – EMC requirements (Industrial Immunity, Class A* Emissions).</td>
</tr>
<tr>
<td>EN 61000-4-2</td>
<td>2009</td>
<td>Electrostatic Discharge Immunity</td>
</tr>
<tr>
<td>EN 61000-4-3</td>
<td>2010</td>
<td>Radiated Field Immunity</td>
</tr>
<tr>
<td>EN 61000-4-4</td>
<td>2012</td>
<td>Electrical Fast-Transient / Burst Immunity</td>
</tr>
<tr>
<td>EN 61000-4-5</td>
<td>2006</td>
<td>Surge Immunity (Reviewed to IEC 61000-4-5 2014)</td>
</tr>
<tr>
<td>EN 61000-4-6</td>
<td>2014</td>
<td>Conducted Immunity</td>
</tr>
<tr>
<td>EN 61000-4-11</td>
<td>2004</td>
<td>Voltage Dips, Short Interruptions and Voltage Variations Immunity</td>
</tr>
<tr>
<td>EN 61000-3-2</td>
<td>2009</td>
<td>Harmonic Current Emissions (Reviewed to IEC 61000-3-2 2014)</td>
</tr>
<tr>
<td>EN 61000-3-3</td>
<td>2013</td>
<td>Voltage Fluctuations and Flicker</td>
</tr>
<tr>
<td>SEMI F47</td>
<td>2000</td>
<td>Specification for Semiconductor Sag Immunity Figure R1-1</td>
</tr>
</tbody>
</table>

*NOTE: Not appropriate for use in commercial or residential applications without additional filtering.

### 2006/95/EC Low-Voltage Directive

<table>
<thead>
<tr>
<th>Standard</th>
<th>Year</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 60730-1</td>
<td>2011</td>
<td>Automatic Electrical Controls for Household and Similar Use, Part 1: General Requirements</td>
</tr>
<tr>
<td>EN 60730-2-9</td>
<td>2010</td>
<td>Particular Requirements for Temperature Sensing Controls</td>
</tr>
</tbody>
</table>

Compliant with 2011/65/EU RoHS2 Directive

Per 2012/19/EU WEEE Directive

Please Recycle Properly

Joe M. Millanes
Name of Authorized Representative
Winona, Minnesota, USA
Place of Issue

Director of Operations
September 2014
Date of Issue

Signature of Authorized Representative
File E43684
Project 96NK31915

June 6, 1997

REPORT

on

COMPONENT - TEMPERATURE INDICATING AND
REGULATING EQUIPMENT

Watlow Winona Inc.
Winona, MN

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DESCRIPTION

PRODUCT COVERED:

USR, CNR Component - Temperature control, "Mini Chef 2000"
Series Models F2, followed by H or U, followed by A or C,
followed by 1 through 4 or 0, followed by 1, 2, 3 or 0
followed by 1, 2, 3 or 0, followed by 1 or 0, followed by 0
or 1, followed by 0 or 1,
followed by AA through ZZ.

GENERAL CHARACTER:

These devices are temperature controllers incorporating either voltage
or current, DC open collector, or solid state relays. The sensor terminals
are intended for connection to a thermocouple, RTD, or process transducer.
The controller turns the load on or off depending on the set point or time.

* RATINGS:

Input – 6 VA maximum, 24 V ac, Class 2 source.

Output – Solid State Relay Output – Rated 100,000 c, at 95 mA (rms)
steady-state, 160 mA (Peak) Inrush, 120 V ac; and 53 mA (rms) and steady-
state, 105 mA (Peak) Inrush, 240 V ac; 0.4 A, 240 V ac.

Alarm and DC open collector outputs rated as Class 2 circuits.

TEMPERATURE:

Maximum 80°C ambient.
DESIGNATION SYSTEM:

<table>
<thead>
<tr>
<th>F2</th>
<th>H or U</th>
<th>A or C</th>
<th>X</th>
<th>X</th>
<th>X</th>
<th>1</th>
<th>X</th>
<th>X</th>
<th>AA</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>II</td>
<td>III</td>
<td>IV</td>
<td>V</td>
<td>VI</td>
<td>VII</td>
<td>VIII</td>
<td>IX</td>
<td>X</td>
</tr>
</tbody>
</table>

I. Base Model Number - Mini Chef 2000

II. Unit Orientation
   H = Horizontal
   U = Vertical

III. Conformal Coating
   A = Not Coated
   C = Coated

IV. Inputs
   1 = Dual thermocouple, Type J, K or E
   2 = Dual RTD, 100 ohm, curve selectable
   3 = Dual RTD, 500 ohm, curve selectable
   4 = Dual RTD, 1000 ohm, curve selectable
   0 = No Input
   (Note: All models include two event inputs, switched DC logic signal, non-isolated.)

V. Output Number 1
   1 = Switched DC, 30 mA, non-isolated
   2 = Solid state relay, Form A, 0.4 A, without RC suppression
   3 = Solid state relay, Form A, 0.4 A, with RC suppression
   0 = No Output

VI. Output Number 2
   1 = Switched DC, 30 mA, non-isolated
   2 = Solid state relay, Form A, 0.4 A, without RC suppression
   3 = Solid state relay, Form A, 0.4 A, with RC suppression
   0 = No Output

VII. Output Numbers 3 and 4
   1 = 2 event outputs, switched DC, 30 mA, non-isolated
   0 = No Event Outputs

VIII. Battery and Real-Time Clock
   0 = None
   1 = Includes battery and real-time clock
IX. Audible Alarm

0 = Alarm signal available at connector, switched DC, 30 mA, non-isolated
1 = Internal alarm included

X Software

AA = Standard Food Equipment Application Software Set
AB through ZZ = Custom Application Software

ENGINEERING CONSIDERATIONS (NOT FOR FIELD REPRESENTATIVE USE):

CNR indicates investigation to Canadian Standard C22.2 No. 24-93.

USR indicates investigation to UL Standard for Temperature-Indicating and -Regulating Equipment, UL 873.

Use - For use only in products where the acceptability of the combination is determined by Underwriters Laboratories Inc.

Conditions of Acceptability - When installed in the final use equipment, etc., the following are among the considerations to be made:

1. The terminals are not acceptable for field connection. The acceptability of connections to these terminals, including temperature and secureness, shall be determined in the ultimate application.

2. This component has been judged on the basis of the required spacings in the Standard for Temperature Indicating and Regulating Equipment, Paragraph/Table 32.1, Column F (0-300 V), dated December 22, 1994 and CSA C22.2 No. 24-1993.

3. When panel mounted, the front panel of the device is not considered to be acceptable as an enclosure.

4. These devices have not been investigated for safety or temperature limiting applications.

*5. This component has been evaluated and found to comply with the Standard for Gas Appliance Thermostats, ANSI Z21.23.
Series MINICHEF® 2000 (F2)

WATLOW Electric Manufacturing Company
1241 Bundy Blvd.
Winona, MN 55987 USA

ISO 9001 since 1996.

Declares that the following product:
Designation: Series MINICHEF® (F2)
Model Numbers: F2(H or U)(A or C) – (0, 1, 2, 3 or 4)(0, 1, 2 or 3)(0 or 1)(any two numbers or letters)
Classification: Electronic Incorporated Class III Temperature controller, Type 2C action, Installation Category II, Pollution degree 2, IP10
Rated Supply: 24 V~ (ac) SELV input, 50/60 Hz
Rated Power: 15 VA maximum

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

EN 61326-1 2013 Electrical equipment for measurement, control and laboratory use – EMC requirements Light Industry Immunity, Class B Emissions.
EN 61000-4-2:2009 Electrostatic Discharge Immunity
EN 61000-4-3:2010 Radiated Field Immunity
EN 61000-4-4:2012 Electrical Fast-Transient / Burst Immunity
EN 61000-4-5:2006 Surge Immunity (Reviewed to IEC 61000-4-5 2014)
EN 61000-4-6:2014 Conducted Immunity
EN 61000-4-8:2010 Power Frequency Magnetic Field Immunity
EN 61000-4-11:2004 Voltage Dips, Short Interruptions and Voltage Variations Immunity
EN 61000-3-2:2009 Harmonic Current Emissions (Reviewed to IEC 61000-3-2 2014)
EN 61000-3-3:2013 Voltage Fluctuations and Flicker

2006/95/EC Low-Voltage Directive
EN 60730-1:2011 Automatic electrical controls for household and similar use – Part 1 General requirements
EN 60730-2-9:2010 Part 2 – Temperature Sensing Controls

Compliant with 2011/65/EC RoHS2 Directive
Per 2012/19/EC WEEE Directive Please Recycle Properly

Joe Millanes
Name of Authorized Representative
Winona, Minnesota, USA
Place of Issue

Director of Operations
Title of Authorized Representative
September 2014
Date of Issue

Signature of Authorized Representative
File E43684
Project 05NK13596

March 14, 2006

REPORT

on

TEMPERATURE-INDICATING AND REGULATING EQUIPMENT, ELECTRICAL

Watlow Winona Inc.
Winona, MN

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DESCRIPTION

PRODUCT COVERED:

USL, CNL - Electronic Thermal-Cutout, Models EHG2-CNTL, EHG2-EXTR, and EHG2-AAAA followed by any alpha-numeric character between 0-9 and A-Z.

GENERAL CHARACTER:

The EHG2-CNTL-xxxx, EHG2-EXTR-xxxx and EHG2-AAAA-xxxx are In-Line Cord, combination action controls intended to be used with I/O cable, part # A002089.

*These controls are temperature regulating/limit devices with a thermal cutout feature. They are primarily intended to be used in the semiconductor manufacturing industry but also could be used in other temperature limiting applications. They monitor temperature by virtue of two thermocouple inputs. One thermocouple is used for the operating control functionality (PID algorithm) and the other is used for the temperature limiting functionality.

*These controls were investigated as a Type 2 (safety) action device with Software Class B.

*These controls may be assembled with the optional user interface module, communications module, or combination user interface module with communications. The user interface will display the settings, allow the user to change temperature limits, display error messages, etc. The changes that could be made by the user are controlled and limited by the boundary parameters set by the software. The communication function allows remote programming via RJ45 connectors.

*These controls incorporate two microprocessors in a dual channel homogenous architecture. The system is set up in a master/slave configuration where U8 is the master microprocessor.

The temperature limit thermocouple signal is fed into the ADC of processor U8 and the process control thermocouple signal is fed into the ADC of processor U2 via independent linearization circuits. The ADC of both processors is fed a fixed reference voltage with a 1% tolerance to monitor the proper operation of the A/D converter.

The temperature limit thermocouple signal is compared against the process control thermocouple signal. If the Actual Process value is greater than the Process Comparison Value (configurable between 5°C and 30°C for EHG2-CNTL-XXXX and between 5°C and 50°C for EHG2-EXTR-XXXX and EHG2-AAAA-XXXX), the control will initiate a Safety Limit Shutdown. The comparison will activate after initial valid A/D input readings.

The operating relay is control by processor U2. The operating relay is switched in parallel with a triac to prevent arcing across the relay contacts. The operating relay contacts are operated in a first on last off sequence to maximize the life of the contacts. The operating relay and the triac are both controlled by static logic signals.
The safety limit relay is controlled by both processors (U2 and U8). In order for the limit relay to be energized both processors need to have the same logic value and satisfy a logic “AND” configuration of two transistors. Processor U8 controls transistor Q4 via pin 2 and processor U2 controls transistor Q9 via pin 27. Both processors need to have the same logic value to energize the safety relay but each processor can independently de-energize the limit relay.

The unit is powered by a Switch Mode Power Supply, which provides the rest of the circuitry with SELV, Limited Energy signal.

RATINGS (for more information about client declarations for these products refer to the Constructional Data Form, ILL. 1 and ILL. 7):

Electrical -

INPUTS:

<table>
<thead>
<tr>
<th>Control Input</th>
<th>Input Rating</th>
<th>Terminals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply</td>
<td>100-240 V ac, 50/60 Hz</td>
<td>J1 - 1/5 (L2) to 2/6(L1)</td>
</tr>
<tr>
<td>Process Thermocouple</td>
<td>SELV, Limited Energy (Class 2)</td>
<td>J3 - 3 to 7</td>
</tr>
<tr>
<td>Temperature Limit</td>
<td>SELV, Limited Energy (Class 2)</td>
<td>J3 - 4 to 8</td>
</tr>
</tbody>
</table>

COMMUNICAiton:

<table>
<thead>
<tr>
<th>Type</th>
<th>Rating</th>
<th>Terminal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connection to the user interface and RS 485</td>
<td>SELV, Limited Energy (Class 2)</td>
<td>J2</td>
</tr>
</tbody>
</table>

OUTPUTS:

<table>
<thead>
<tr>
<th>Type</th>
<th>Rating</th>
<th>Terminal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alarm Relay*</td>
<td>2 A, 30 V ac/dc</td>
<td>J1 - 4 to 8</td>
</tr>
<tr>
<td>Heater Relay</td>
<td>10 A, 100-240 V ac, 50/60 Hz</td>
<td>J3 - 1 to 5</td>
</tr>
</tbody>
</table>

Temperature - Maximum ambient operating temperature 70°C

* Alarm relay not populated on EHG2-AAAA-XXXX models.

The declared drift values for each protective/safety function are noted below: 1. Thermal-Cutout has a ±3°C Deviation & Drift for EHG2-CNTL-XXXX and ±6°C Deviation and Drift for EHG2-EXTR-XXXX and EHG2-AAAA-XXXX. Time to trip is controlled by the software and set at 3 seconds.
MODEL NOMENCLATURE FOR BASE MODULE:

\[ \text{EHG2} \ - \ \text{CNTL} \ - \ xxxx \]

I - Basic model

II -
* CNTL - 0 - 200°C range
EXTR - 0 - 438°C range
AAAA - 0 - 438°C range without alarm relay.

III - xxxx
1 - 0000 basic control (base module)
2 - DISP with display module
3 - COMS with communications module
4 - DSCM with display & communications module

Other combinations possible indicating custom screening on dust cover for customer name only.
File E185611
Project 05NK13596
March 14, 2006

REPORT

on

PROCESS CONTROL EQUIPMENT, ELECTRICAL

Watlow Winona Inc.
Winona, MN
DESCRIPTION

PRODUCT COVERED:

* USL, CNL - Process Controller, Base Module EHG2-(CNTL,EXTR, or AAAA), followed by any alpha-numeric character between 0-9 and A-Z;

GENERAL CHARACTER:

* The EHG2-(CNTL,EXTR or AAAA)-xxxx are intended for use with Unlisted Component - wiring harness, Cat. No. A002089.

* The EHG2-(CNTL,EXTR or AAAA)-xxxx are Process controllers with temperature regulating/limit functionality. A thermal cutout feature is also provided. The device is primarily intended for use in the semiconductor manufacturing industry and other similar process applications. The device monitors temperature by virtue of two thermocouple inputs. One thermocouple is used for the operating control functionality (PID algorithm) and the other is used for the temperature limiting functionality.

*The EHG2-(CNTL,EXTR, or AAAA)-xxxx were additionally investigated as a Type 2 (safety) action device with Software Class B. Information regarding this investigation is included in the manufacturer’s file E43684, Report dated 2006-03-14 (Vol. 8, Sec. 1)

*The EHG2-(CNTL,EXTR, or AAAA) -xxxx may be assembled with the optional EHG2-MODU-xxxx user interface. The user interface will display the settings, allow the user to change temperature limits, display error messages, etc. The changes that could be made by the user are controlled and limited by the boundary parameters set by the software.

*The EHG2-(CNTL,EXTR, or AAAA) -xxxx incorporates two microprocessors in a dual channel homogenous architecture. The system is set up in a master/slave configuration where U8 is the master microprocessor.

The temperature limit thermocouple signal is fed into the ADC of processor U8 and the process control thermocouple signal is fed into the ADC of processor U2 via independent linearization circuits. The ADC of both processors is fed a fixed reference voltage with a 1% tolerance to monitor the proper operation of the A/D converter.

The temperature limit thermocouple signal is compared against the process control thermocouple signal. If the Actual Process value is greater than the Process Comparison Value (configurable between 5°C and 30°C for EHG2-CNTL-xxxx models and between 5°C and 50°C for EHG2-EXTR-xxxx and EHG2-AAAA-XXXX models), the control will initiate a Safety Limit Shutdown. The comparison will activate after initial valid A/D input readings.

The operating relay is controlled by processor U2. The operating relay is switched in parallel with a triac to prevent arcing across the relay contacts. The operating relay contacts are operated in a first on last off sequence to maximize the life of the contacts. The operating relay and the triac are both controlled by static logic signals.
The safety limit relay is controlled by both processors (U2 and U8). In order for the limit relay to be energized both processors need to have the same logic value and satisfy a logic “AND” configuration of two transistors. Processor U8 controls transistor Q4 via pin 2 and processor U2 controls transistor Q9 via pin 27. Both processors need to have the same logic value to energize the safety relay but each processor can independently de-energize the limit relay.

The unit is powered by a Switch Mode Power Supply, which provides the rest of the circuitry with SELV, Limited Energy signal.

RATINGS:

Electrical -

INPUTS:

<table>
<thead>
<tr>
<th>Control Input</th>
<th>Input Rating</th>
<th>Terminals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply</td>
<td>100-240 V ac, 6 VA 50/60 Hz</td>
<td>J1 - 1/5 (L2) to 2/6 (L1)</td>
</tr>
<tr>
<td>Process Thermocouple</td>
<td>SELV, Limited Energy (Class 2)</td>
<td>J3 - 3 to 7</td>
</tr>
<tr>
<td>Temperature Limit Thermocouple</td>
<td>SELV, Limited Energy (Class 2)</td>
<td>J3 - 4 to 8</td>
</tr>
</tbody>
</table>

COMMUNICATION:

<table>
<thead>
<tr>
<th>Type</th>
<th>Rating</th>
<th>Terminal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connection to the user interface and RS 485</td>
<td>SELV, Limited Energy (Class 2)</td>
<td>J2</td>
</tr>
</tbody>
</table>

OUTPUTS:

<table>
<thead>
<tr>
<th>Type</th>
<th>Rating</th>
<th>Terminal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alarm Relay (K4)*</td>
<td>SELV, Limited Energy (Class 2)</td>
<td>J1 - 7 to 8</td>
</tr>
<tr>
<td>Alarm Relay (K3)</td>
<td>10 A, 100-240 V ac, 50/60 Hz</td>
<td>J3 - 1 to 2</td>
</tr>
<tr>
<td>Heater Relay (K1)</td>
<td>10 A, 100-240 V ac, 50/60 Hz</td>
<td>J3 - 1 to 2</td>
</tr>
</tbody>
</table>

Temperature - Maximum ambient operating temperature 70°C

**Alarm Relay K4 not populated on EHG2-AAAA-xxxx models.**

The declared drift values for each protective/safety function are noted below:

1. Thermal-Cutout has a ±3°C Deviation & Drift for EHG2-CNTL-xxxx models and ±6°C Deviation and Drift for EGH2-EXTR-xxxx and EHG2-AAAA-xxxx models.

Time to trip is controlled by the software and set at 3 seconds.
MODEL NOMENCLATURE:

EHG2 - CNTL - xxxx
I     II     III

I - Basic model

II -
*   CNTL - Base Module 0 - 200°C range silicone rubber heaters
   EXTR - Base Module 0 - 438°C range other heaters (Extended Range)
   AAAA - Base Module 0 - 438°C range without LTA alarm relay.

III - xxxx
   1 - 0000 basic control
   2 - DISP with display module
   3 - COMS with communications module
   4 - DSCM with display & communications module

Other combinations possible indicating custom screening on dust cover.

ENGINEERING CONSIDERATIONS (NOT FOR FIELD REPRESENTATIVE'S USE):

Use - For use only in products where the acceptability of the combination is determined by Underwriters Laboratories Inc.

USL/CNL indicates evaluation to CAN/CSA-C22.2 NO. 61010-1◆ISA-82.02.01 (IEC 61010-1 MOD)◆UL 61010-1, Second Edition.

Per the manufacturer’s declaration, this control was evaluated for installation in a Pollution Degree II environment with an Installation Category (Overvoltage Category) III rating.

The units are for use in an extended environment: 0°C to 70°C, 0% to 95% relative humidity. They are intended for field wiring and provided with a specialized wiring harness.

The device was subjected to a complete environmental stress test sequence and software safety evaluation. Tests were conducted in accordance with UL 60730-1, Annex H. It was deemed that the aforementioned requirements of UL 60730-1 satisfies the requirements outlined in the Semi S2-0200, the Environmental, Health and Safety Guidelines for Semiconductor Manufacturing, Par. 11.6 and Note 26. This control is suitable for temperature limiting applications. The operating and/or protective functions that are examined in accordance with the UL 60730-1, Annex H and declared by the manufacturer are as follows:

1. Temperature Limiting (normal operation)
2. Thermal-Cutout (abnormal operation) - Deviation & Drift of ±3°C for EHG2-CNTL-xxxx models, ±6°C Deviation & Drift for EHG2-EXTR-xxxx and EHG2-AAAA-xxxx models.
3. Time to trip - controlled by the software and set at 3 seconds.
Series EHG® SL10

WATLOW Electric Manufacturing Company

1241 Bundy Blvd.
Winona, MN 55987 USA

ISO 9001 since 1996.

Declares that the following product:

Designation: **Series EHG® SL10**

Model Numbers: EHG2-(CNTL or EXTR)- additional number or letters.

Classification: Electronic Thermostat with Integrated Temperature Limiter Protective Control,
Control Relay = 2CK, Limit Relay = 2BJ, TA Relay = 2B
Installation Category II, Pollution degree 2, Software Class B

Rated Supply Source: 100 to 240 V~ (ac), 50 or 60 Hz

IP Code: IP20

Rated Power: 5 VA Unit power, 10 A Resistive Heater Load

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

### 2004/108/EC Electromagnetic Compatibility Directive

<table>
<thead>
<tr>
<th>Standard</th>
<th>Year</th>
<th>Edition</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 60730-1</td>
<td>2011</td>
<td>Edition 4</td>
<td>Automatic electrical controls for household and similar use – Temperature Sensing Controls, Class B Emissions</td>
</tr>
<tr>
<td>EN 60730-2-9</td>
<td>2010</td>
<td>Edition 4</td>
<td>Electrostatic Discharge Immunity</td>
</tr>
<tr>
<td>EN 61000-4-2</td>
<td>2009</td>
<td>Edition 4</td>
<td>Radiated Field Immunity</td>
</tr>
<tr>
<td>EN 61000-4-3</td>
<td>2010</td>
<td>Edition 4</td>
<td>Electrical Fast-Transient / Burst Immunity</td>
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<tr>
<td>EN 61000-4-5</td>
<td>2006</td>
<td>Edition 4</td>
<td>Surge Immunity</td>
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<td>EN 61000-4-6</td>
<td>2014</td>
<td>Edition 4</td>
<td>Conducted Immunity</td>
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<tr>
<td>EN 61000-4-8</td>
<td>2010</td>
<td>Edition 4</td>
<td>Power frequency magnetic field immunity</td>
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<tr>
<td>EN 61000-4-11</td>
<td>2004</td>
<td>Edition 4</td>
<td>Voltage Dips, Short Interruptions and Voltage Variations Immunity</td>
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<tr>
<td>EN 61000-4-28</td>
<td>2009</td>
<td>Edition 4</td>
<td>Variation of power frequency immunity – Level 2</td>
</tr>
<tr>
<td>EN 61000-3-2</td>
<td>2009</td>
<td>Edition 4</td>
<td>Harmonic Current Emissions</td>
</tr>
<tr>
<td>EN 61000-3-3</td>
<td>2013</td>
<td>Edition 4</td>
<td>Voltage Fluctuations and Flicker</td>
</tr>
<tr>
<td>SEMI F47</td>
<td>2000</td>
<td>Edition 4</td>
<td>Specification for Semiconductor Processing Equipment Voltage Sag Immunity – Figure R1-1</td>
</tr>
</tbody>
</table>

### 2006/95/EC Low-Voltage Directive

<table>
<thead>
<tr>
<th>Standard</th>
<th>Year</th>
<th>Edition</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 61010-1</td>
<td>2010</td>
<td>Edition 3</td>
<td>Safety Requirements of electrical equipment for measurement, control and laboratory use. Part 1: General requirements</td>
</tr>
<tr>
<td>EN 60730-1</td>
<td>2011</td>
<td>Edition 4</td>
<td>Automatic electrical controls for household and similar use – Temperature Sensing Controls</td>
</tr>
<tr>
<td>EN 60730-2-9</td>
<td>2010</td>
<td>Edition 4</td>
<td>Temperature Sensing Controls</td>
</tr>
</tbody>
</table>

Compliant with **2011/65/EU RoHS Directive**

Per **2012/19/EU WEEE Directive** Please Recycle Properly

Joe M. Millanes

Name of Authorized Representative

Winona, Minnesota, USA

Place of Issue

Directory of Operations

Sept. 2014

Title of Authorized Representative

Date of Issue

Signature of Authorized Representative
Series EHG® CL

WATLOW Electric Manufacturing Company
1241 Bundy Blvd.
Winona, MN 55987 USA

ISO 9001 since 1996.

Declares that the following product:

Designation: Series EHG® CL
Model Numbers: EHG2-AAAA- additional number or letters.
Classification: Electronic Thermostat with Integrated Temperature Limiter Protective Control, Control Relay = 2CK, Limit Relay = 2BJ
Installation Category II, Pollution degree 2, Software Class B
Rated Supply Source: 100 to 240 V~ (ac), 50 or 60 Hz
IP Code: IP20
Rated Power: 5 VA Unit power, 10 A Resistive Heater Load

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


| EN 60730-1 | 2011 | Edition 4 | Automatic electrical controls for household and similar use – Temperature Sensing Controls, Class B Emissions |
| EN 60730-2-9 | 2010 | | Electrostatic Discharge Immunity |
| EN 61000-4-2 | 2009 | | Radiated Field Immunity |
| EN 61000-4-3 | 2010 | | Electromagnetic fields – Immunity |
| EN 61000-4-4 | 2012 | | Electrical Fast-Transient / Burst Immunity |
| EN 61000-4-5 | 2006 | | Surge Immunity (Reviewed to IEC 61000-4-5 2014) |
| EN 61000-4-6 | 2014 | | Conducted Immunity |
| EN 61000-4-8 | 2010 | | Power frequency magnetic field immunity |
| EN 61000-4-11 | 2004 | | Voltage Dips, Short Interruptions and Voltage Variations Immunity |
| EN 61000-4-28 | 2009 | | Variation of power frequency immunity – Level 2 |
| EN 61000-3-2 | 2009 | | Harmonic Current Emissions (Reviewed to IEC 61000-3-2 2014) |
| EN 61000-3-3 | 2013 | | Voltage Fluctuations and Flicker |
| SEMI F47 | 2000 | | Specification for Semiconductor Processing Equipment Voltage Sag Immunity – Figure R1-1 |

2006/95/EC Low-Voltage Directive

| EN 61010-1 | 2011 | Edition 3 | Safety Requirements of electrical equipment for measure-ment, control and laboratory use. Part 1: General requirements |
| EN 60730-1 | 2011 | Edition 4 | Automatic electrical controls for household and similar use – Temperature Sensing Controls |
| EN 60730-2-9 | 2010 | Edition 3.1 | Temperature Sensing Controls |

Compliant with 2011/65/EU RoHS Directive

Per 2012/19/EU WEEE Directive

Joe M. Millanes
Name of Authorized Representative
Winona, Minnesota, USA
Place of Issue

Directory of Operations
Sept. 2014

Title of Authorized Representative
Date of Issue

Signature of Authorized Representative
Series CZR & SSR UL®

NRNT2.E73741
Switches, Industrial Control – Component

WATLOW ELECTRIC MANUFACTURING CO
1241 Bundy Blvd
PO BOX 5580
Winona, MN 55987-4873 USA

Investigated to ANSI/UL 508

Open type, for industrial applications Model(s) 0003-0195-6101

Solid state relays Model(s) CR or CZ, followed by 18, followed by A, followed by 24 or 48, followed by V, followed by AC10, AC20 or DC10.

CR or CZ, followed by 24, 34, 42 or 50, followed by A, followed by 24, 48 or 60, followed by V, followed by AC10, AC20 or DC10.

Solid state relays, for use in industrial applications Model(s) 0003, followed by 0195, followed by 6011, 6016, 6017, 6019, 6023, 6038 or 6100.

Solid state relays, for use in industrial control applications Model(s) CR18-A60V-AC10, CR18-A60V-AC20, CR18-A60V-DC10, CZ18-A60V-AC10, CZ18-A60V-AC20, CZ18-A60V-DC10

Motor Controllers, Mechanically Operated and Solid-state - Component

WATLOW ELECTRIC MANUFACTURING CO
1241 Bundy Blvd
PO BOX 5580
Winona, MN 55987-4873 USA

Motor controllers for use in industrial control equipment, Models 18-6001, -6002, -6003, -6004, -6005, -6006, -6011, -6013, -6014, -6016, -6017, -6018, -6019, -6020, -6021, -6023, -6025, -6038, -6039, -6040, -6041.

Model 0003-0195, followed by (-0000, 6005, 6006 or 6013).

ENGINEERING CONSIDERATIONS (NOT FOR FIELD REPRESENTATIVE’S USE):

Use - For use only in (or with) complete equipment where the acceptability of the combination is determined by Underwriters Laboratories Inc.

These components have been judged on the basis of the required spacings in the Standard for Industrial Control Equipment (UL 508), Paragraph 180, which would cover the components themselves if submitted for unrestricted Listing. These models have also been evaluated to Canadian Standard C22.2 No. 14.

Conditions of Acceptability -

1. These devices should be used within Recognized ratings as specified above.

2. These devices should be mounted in the intended manner in enclosures having adequate strength and thickness and with acceptable spacings being provided.

3. The ratings specified depend on temperatures in the end-use not exceeding those indicated on the rating curves, if provided. If not provided, 10 to 40°C is to be used.

4. Devices with ratings of 40 A and 75 A were tested with a Heat Sink pictured in Fig. 5. Consideration for a temperature test should be made if another Heat Sink is used in the end-use product.

5. These devices are suitable for factory wiring only and the suitability of these connections should be judged in the final installation. Particular attention should be paid to temperatures on terminals and leads.

6. Since these devices are rated greater than 1 hp, short circuit tests shall be considered in the end-product evaluation. No short circuit tests were conducted in these units.

7. The following temperatures were measured in a 25°C ambient at rated current; use of higher temperatures will require conducting a Temperature Test in the end-use product.

<table>
<thead>
<tr>
<th>Model</th>
<th>Location</th>
<th>Temp °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-6041</td>
<td>On Attached Heat Sink</td>
<td>57</td>
</tr>
<tr>
<td>18-6003, 18-6006</td>
<td>On Attached Heat Sink</td>
<td>53</td>
</tr>
<tr>
<td>18-6023</td>
<td>On Attached Heat Sink</td>
<td>82</td>
</tr>
<tr>
<td>18-6018, 18-6013</td>
<td>On Attached Heat Sink</td>
<td>40</td>
</tr>
</tbody>
</table>

The terminals are to be factory wired only and the suitability of the connection (including spacings between factory connectors) shall be determined.

The spacings from the exposed live-metal parts to the enclosure walls shall be in accordance with the requirements of the overall equipment.
These devices have several termination methods. Some of which are supplied by the user. Consideration should be given to the termination means and if necessary specified in the end-use equipment Report.

8. The optical isolators used in these products are suitable for minimum 4000 V ac rms isolation.

9. Models 18-6011, 18-6016 and 18-6021 were tested for 100,000 cycle endurance, general use ratings on a HE150 heatsink, measuring 7-1/16 by 4-5/16 by 5-15/16 in. overall. Use with a smaller heatsink will need to be determined.

Watlow’s Derating Curve
Not Present in UL’s Conditions of Acceptability
Series CZR & SSR CSA®

Certificate of Compliance

Certificate: 700195
Project: 1749930

Master Contract: 700195
Date Issued: February 14, 2006

Issued to: Watlow Electric Manufacturing Co.
1241 Bundy Blvd.
P.O. Box 5580
Winona, MN 55987
U.S.A.
Attention: Mr. Larry Glentz
Agency Coordinator

The products listed below are eligible to bear the CSA Mark shown

Issued by: Lina Bartolottta

Authorized by: Gabriel Lippa
Product Group Manager

PRODUCTS

CLASS 3211 07 INDUSTRIAL CONTROL EQUIPMENT Miscellaneous Apparatus

- Solid state relays, open type, Models 18-6003, 18-6006, 18-6013, 18-6018, 18-6023, 18-6014, 240V ac max, 90A max (incandescent), 41 FLA max (motor), Models 18-6040, 18-6041, 480V ac max, 12A max (incandescent), 7 FLA max (motor), Models 18-6038, 18-6011, 480V ac max, 25A max (incandescent), 10 FLA max (motor), Models 18-6021, 18-6016, 18-6019, 480V ac max, 50A max (general use), 40A max (incandescent), 20 FLA max (motor), Models 18-6025, 18-6017, 18-6039, 480V ac max, 90A max (incandescent), 41 FLA max (motor).

- Solid state relays, open type, Models 18-6001, 18-6004, output 240V ac, 10A, 4.5 FLA, control 3-32V dc; Models 18-6002, 18-6005, output 240V ac, 25A max (incandescent), 10 FLA, 60 LRA max, control 3-32V dc or 90-280V ac.

Note: Open type devices are Certified, as components, for use only in other Certified equipment where the suitability of the combination is determined by CSA International.
Series CZR & SSR CSA®

Solid state relays, Series CR, CZ, open type, with suffixes, models and ratings as follows:

<table>
<thead>
<tr>
<th>Models</th>
<th>Input Voltage</th>
<th>Output Voltage</th>
<th>Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>CR24xx, CZ24xx, CZ34xx, CR34xx, CR42xx, CR50xx, CZ50xx</td>
<td>3-32V dc</td>
<td>24-280V ac</td>
<td>35-65A</td>
</tr>
<tr>
<td>CR24xx, CZ24xx, CZ34xx, CR34xx, CR42xx, CR50xx, CZ50xx</td>
<td>90-140V ac</td>
<td>24-280V ac</td>
<td>35-65A</td>
</tr>
<tr>
<td>CR24xx, CZ24xx, CZ34xx, CR34xx, CR42xx, CR50xx, CZ50xx</td>
<td>90-140V ac</td>
<td>48-530V ac</td>
<td>35-65A</td>
</tr>
<tr>
<td>CR24xx, CZ24xx, CZ34xx, CR34xx, CR42xx, CR50xx, CZ50xx</td>
<td>4-32V dc</td>
<td>48-530V ac</td>
<td>35-65A</td>
</tr>
<tr>
<td>CR24xx, CZ24xx, CZ34xx, CR34xx, CR42xx, CR50xx, CZ50xx</td>
<td>4-32V dc</td>
<td>48-660V ac</td>
<td>35-65A</td>
</tr>
<tr>
<td>CR24xx, CZ24xx, CZ34xx, CR34xx, CR42xx, CR50xx, CZ50xx</td>
<td>90-140V ac</td>
<td>48-660V ac</td>
<td>35-65A</td>
</tr>
</tbody>
</table>

Note: XX should be output voltage rating.

<table>
<thead>
<tr>
<th>Models</th>
<th>Input (Control) Voltage</th>
<th>Output Voltage</th>
<th>Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>CR18-A24V-AC20</td>
<td>90-280V ac</td>
<td>24-280V ac</td>
<td>10-30A</td>
</tr>
<tr>
<td>CZ18-A24V-AC20</td>
<td>90-280V ac</td>
<td>24-280V ac</td>
<td>10-30A</td>
</tr>
<tr>
<td>CR18-A24V-AC10</td>
<td>90-280V ac</td>
<td>24-280V ac</td>
<td>10-30A</td>
</tr>
<tr>
<td>CZ18-A24V-AC10</td>
<td>90-280V ac</td>
<td>24-280V ac</td>
<td>10-30A</td>
</tr>
<tr>
<td>CR18-A24V-DC10</td>
<td>4.5-32V dc</td>
<td>24-280V ac</td>
<td>10-30A</td>
</tr>
<tr>
<td>CZ18-A24V-DC10</td>
<td>4.5-32V dc</td>
<td>24-280V ac</td>
<td>10-30A</td>
</tr>
<tr>
<td>CR18-A48V-AC20</td>
<td>90-280V ac</td>
<td>48-480V ac</td>
<td>10-30A</td>
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<tr>
<td>CZ18-A48V-AC20</td>
<td>90-280V ac</td>
<td>48-480V ac</td>
<td>10-30A</td>
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<tr>
<td>CR18-A48V-AC10</td>
<td>90-280V ac</td>
<td>48-480V ac</td>
<td>10-30A</td>
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<tr>
<td>CZ18-A48V-AC10</td>
<td>90-280V ac</td>
<td>48-480V ac</td>
<td>10-30A</td>
</tr>
<tr>
<td>CR18-A48V-DC10</td>
<td>4.5-32V dc</td>
<td>48-480V ac</td>
<td>10-30A</td>
</tr>
<tr>
<td>CZ18-A48V-DC10</td>
<td>4.5-32V dc</td>
<td>48-480V ac</td>
<td>10-30A</td>
</tr>
<tr>
<td>CR18-A60V-DC10</td>
<td>4.5-32V dc</td>
<td>600V ac</td>
<td>10-30A</td>
</tr>
<tr>
<td>CZ18-A60V-DC10</td>
<td>4.5-32V dc</td>
<td>600V ac</td>
<td>10-30A</td>
</tr>
<tr>
<td>CR18-6030-AC10</td>
<td>90-280V ac</td>
<td>600V ac</td>
<td>10-30A</td>
</tr>
<tr>
<td>CZ18-6030-AC10</td>
<td>90-280V ac</td>
<td>600V ac</td>
<td>10-30A</td>
</tr>
<tr>
<td>CR18-A60V-AC20</td>
<td>90-280V ac</td>
<td>600V ac</td>
<td>10-30A</td>
</tr>
<tr>
<td>CZ18-A60V-AC20</td>
<td>90-280V ac</td>
<td>600V ac</td>
<td>10-30A</td>
</tr>
</tbody>
</table>

Notes:
1. Certified as components for use only in other Certified equipment where the suitability of the combination is determined by Canadian Standards Association.
2. Sold only to manufacturers for factory assembly of Certified electrical equipment.
3. These devices are not provided with electrical isolation between control and power circuits.
• Solid state relays, Series 0003-0195, open type, with suffixes, models and ratings as follows:

<table>
<thead>
<tr>
<th>Models</th>
<th>Input Voltage</th>
<th>Output Voltage</th>
<th>Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>0003-0195-0000</td>
<td>90-280V ac</td>
<td>48-660V ac</td>
<td>10A, 70 deg C</td>
</tr>
<tr>
<td></td>
<td>3-32V dc</td>
<td>48-660V ac</td>
<td></td>
</tr>
<tr>
<td>0003-0195-6005</td>
<td>90-280V ac</td>
<td>48-660V ac</td>
<td>25A, 70 deg C</td>
</tr>
<tr>
<td>0003-0195-6011</td>
<td>3-32V dc</td>
<td>48-660V ac</td>
<td></td>
</tr>
<tr>
<td>0003-0195-6038</td>
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<td></td>
</tr>
<tr>
<td>0003-0195-6006</td>
<td>90-280V ac</td>
<td>48-660V ac</td>
<td>50A, 60 deg C</td>
</tr>
<tr>
<td>0003-0195-6013</td>
<td>3-32V dc</td>
<td>48-660V ac</td>
<td></td>
</tr>
<tr>
<td>0003-0195-6016</td>
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</tr>
<tr>
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Note: Open type devices are Certified, as components, for use only in other Certified equipment where the suitability of the combination is determined by CSA International.

**APPLICABLE REQUIREMENTS**

CSA Standard C22.2 No 14-95

**MARKINGS**

The CSA Mark, the company name or tradename/trademark or file number 700195, model designation and any “Cautions” or other information as specified in the Certification Report.
Certificate no. 40021401

Product: Solid state relay
Product group: Solid state relays
Company: Watlow Electric Manufacturing Company
          PO Box 5580
          WINONA MN 55987-5580
          USA

Certification mark: VDE Reg.- Nr.
VDE Reg-No.: 10143

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Solid State Relay

WATLOW Electric Manufacturing Company
1241 Bundy Blvd.
Winona, MN 55987 USA

Declares that the following product:

Designation: Solid State Relays and Series CZR
Model Numbers: 18 – 60(01 to 06, 11, 13, 14, 16 to 21, 23, 25, 38, 39, 40 or 41)
0003-0195-(0000, 6005, 6006, 6011, 6013, 6015, 6016, 6017, 6019, 6023 or 6038)
CZ(18, 24, 34, or 42) – A(24, 48 or 60)V – (AC10 or DC10)
Classification: Solid State Relay, Installation Category II, Pollution degree 2
Rated Voltage: 24 to 240 V~(ac) or 48 to 480 V~(ac) or 48 to 600 V~(ac)
Rated Frequency: 50 or 60 Hz

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

2006/95/EC Low-Voltage Directive

PER 2012/19/EU WEEE Directive Please Recycle Properly

Compliant with 2011/65/EU RoHS 2 Directive via High lead content solder exemption.

Joe Millanes
Name of Authorized Representative
Winona, Minnesota, USA
Place of Issue

Director of Operations
September 2014
Date of Issue

Signature of Authorized Representative
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File E73741
Project 94NK32682

February 14, 1995

REPORT

on

SWITCHES, INDUSTRIAL CONTROL

Watlow Winona, Inc.
Winona, MN

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DESCRIPTION

PRODUCT COVERED:

Solid State Power Controller without cooling fan, Part No. DA10 followed by 02, 24 or 60; followed by CX, FX, K1, K2 or K3 (where X = any number 0 to 9); followed by 0; followed by any three numbers or letters.

RATINGS:

* These devices are single phase devices only and rated as shown below:

Input Command Signal Ratings – 24 V ac, 120 V ac or 240 V ac, 13 mA, 50/60 Hz or 32 V dc, 7 mA or linear dc current up to 20 mA.

*Output Ratings – 24 to 48 V ac, 100 to 240 V ac or 277-600 V ac, 50/60 Hz.

Models Without Cooling Fan

25.5 A – 1 pole at 25°C

Control Mode Rating – 24 V ac
120 V ac
240 V ac
4-20 mA
4.5 – 32 V dc

These devices may be used in ambient found as part of the de-rating curves in ILL. 1. These rating must be de-rated above 25°C.
NOMENCLATURE:

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<th>III</th>
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I - DA - Basic Model Designation

II - Phase
- 1 - Single phase

III - Cooling Options
- 0 = Standard Heatsink - natural convection.

IV - Output Voltage
- 02 = 24 to 48 V ac
  - *24 = 120 to 240 V ac
  - 60 = 277 to 600 V ac

V - Control Mode
- C0 = 4.5 to 32 V dc contactor mode
- F0 = 4 to 20 mA variable burst mode
- F1 = 12 to 20 mA variable burst mode
- K1 = 24 V ac contactor mode
- K2 = 120 V ac contactor mode
- K3 = 240 V ac contactor mode

VI - Alarm Options
- 0 = No alarm available

*VII - User Manual Language Options
- 0 = English
  - 1 = German
  - 2 = Spanish
  - 3 = French

VIII - Custom Options
- 00 = Standard Product
- Any two letters or numbers = custom logo’s and other class
  2 options.

ENGINEERING CONSIDERATIONS (NOT FOR FIELD REPRESENTATIVE’S USE):

General - These devices are open solid state power controllers intended for controlling electric resistance heating.

Spacings - Spacings were evaluated to UL 508 Table 34.1. PC board spacings were evaluated to UL 840.
DIN-A-MITE® “A” Power Controller

WATLOW Electric Manufacturing Company
1241 Bundy Blvd.
Winona, MN 55987 USA

Declares that the following products:

Designation: DIN-A-MITE® “A” Power Control
Model Numbers: DA10 – (02, 24 or 60)(C0, C1, C2, K1, K2, K3, F0 or F1) – 0 (followed by any 3 numbers or letters.)
Classification: Power Control, Installation Category III, Pollution degree 2, IP20
Rated Voltage: 24 to 600 V~ (ac), 50 or 60 Hz

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


EN 61326-1: 2013 Electrical equipment for measurement, control and laboratory use – EMC requirements (Industrial Immunity, Class A1, A2, A4 Emissions)
EN 61000-4-2:2009 Electrostatic Discharge Immunity
EN 61000-4-3:2010 Radiated Field Immunity 10V/m 80 MHz- 1GHz, 3V/m 1.4GHz-2.7GHz
EN 61000-4-4:2012 Electrical Fast-Transient / Burst Immunity
EN 61000-4-5:2006 Surge Immunity (Reviewed to IEC 61000-4-5 2014)
EN 61000-4-6:2014 Conducted Immunity
EN 61000-4-11:2004 Voltage Dips, Short Interruptions and Voltage Variations
EN 61000-3-2:2009 Harmonic Current Emissions (Reviewed to IEC 61000-3-2 2014)
EN 61000-3-3:2013 Voltage Fluctuations and Flicker

NOTES
1. Use of an external filter is required to comply with conducted emissions limits. See note 4 below.
2. A Line Impedance Stabilization Network (LISN) was used for conducted emissions measurements.
3. To comply with flicker requirements, command signal models F0 and F1 will require a reduced source impedance. Cycle time on ON/OFF models C0, C1, C2 and K1, K2, K3 may need to be up to 175 seconds at 16A.

2006/95/EC Low-Voltage Directive


Compliant with 2011/65/EU RoHS2 Directive

4. Required External EMI Filters for DIN-A-MITE with More Than 6 Amp Loads
   An external ElectroMagnetic Interference (EMI) filter must be used in conjunction with the DIN-A-MITE for loads in excess of six amperes (6A) at 150 to 250 KHz.
   Watlow has verified that a tank filter will suppress EMI created by SCR power controllers to comply with the conducted emissions limits.
Series DIN-A-MITE™ A CE

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<th>Description</th>
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<th>Watlow Filter</th>
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**WARNING:**
Tank filters may suppress desirable communications carried on power lines in the 150 to 250 KHz region. The filters may suppress carrier current such as that used for infant monitors and medical alert systems. Verify that suppressed carrier current or other desirable communications on power lines creates no hazard to people or property. Failure to observe this warning could result in damage to property, and or injury to death for personnel.

**WARNING:**
All filter installation and wiring must be performed by qualified personnel and conform to local and national electrical codes.

In-line power filters have been shown to properly suppress EMI; however, these filters must be rated for the entire load current and are generally more expensive than the tank filter specified. An In-line filter may be required if carrier current communications are used on site.

Joe Millanes
Name of Authorized Representative

Winona, Minnesota, USA
Place of Issue

Director of Operations
Title of Authorized Representative

September 2014
Date of Issue

Signature of Authorized Representative
File E73741  
Project 95NK10700  
June 8, 1995  

REPORT  
on  

SWITCHES INDUSTRIAL CONTROL  

Watlow Winona, Inc.  
Winona, MN  

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Underwriters Laboratories Inc. authorizes the above named company to reproduce this Report provided it is reproduced in its entirety.
DESCRIPTION

PRODUCT COVERED:

USL, CNL  Solid-State Power Controller without cooling fan, Part No. DB followed by 1, 2, 3, 4, 8 or 9; followed by 0, followed by 02, 24 or 60, followed by CX, FX, K1, K2, K3, followed by 0, or S, followed by any three letters or numbers.

RATINGS:

These devices are either single phase, three phase two leg, or three phase three leg, and rated as shown below:

Input or Input Command Signal Ratings - 24, 120, or 240 V ac, at 13 mA, 50/60 Hz, 4.5 to 32 V dc, 7 mA per pole, or 4 to 20 mA dc.

Output Ratings - 24 - 48 V ac, 120-240 V ac or 277-600 V ac, 50/60 Hz.

Models Without Cooling Fan - at 50°C

35 A - 1-pole
25 A - 2-pole
17 A - 3-pole

Control Mode Rating - 4.5 to 32 V dc

24 V ac
120 V ac
240 V ac
4 to 20 mA dc

These devices may be used in ambient found as part of the de-rating curve in ILL. 1. These ratings must be de-rated above 50°C.
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

I - DB-Basic Designator

II - Phase
1 - Single phase (1-pole)
2 - Three phase two leg (2-pole)
3 - Three phase three leg (3-pole)
4 - Three phase three leg 4 wire WYE connected load.
8 - Two single pole zones (input C or K only)
9 - Three single pole zones (input C or K only)

III - Cooling Options
0 - Standard Heatsink - natural convection.

IV - Output Voltage
02 - 24 to 48 V ac
24 - 100 to 240 V ac
60 - 277 to 600 V ac

V - Control Mode
C0 - 4.5 to 32 V dc contactor mode
F0 - 4 to 20 mA variable burst mode
F1 - 12 to 20 mA variable burst mode
K1 - 24 V ac contactor mode
K2 - 120 V ac contactor mode
K3 - 240 V ac contactor mode

VI - Alarm Options
0 - No alarm available
S - Shorted SCR Alarm

VII - User Manual Language Options
* 0 - English
* 1 - German
* 2 - Spanish
* 3 - French

VIII - Custom Options
00 - Standard Product
Any two letters or number - custom logo's and other Class 2 options.

ENGINEERING CONSIDERATIONS (NOT FOR FIELD REPRESENTATIVES USE):

General - These devices are open solid state power controllers intended for controlling electric resistance heating.

Spacings - Spacings were evaluated to UL 508 Table 34.1. PC board spacings were evaluated to UL 840.
DIN-A-MITE® “B” Power Controller

WATLOW Electric Manufacturing Company
1241 Bundy Blvd.
Winona, MN 55987 USA

Declares that the following product:

Designation: DIN-A-MITE® “B” Power Control
Model Numbers: DB (1, 2, 3, 4, 8 or 9) 0 – (02, 24 or 60)(CX, FX, K1, K2, K3) – (0 or S)(followed by any 3 letters or numbers) (where X = any number 0-9)
Classification: Power Control, Installation Category III, Pollution degree 2, IP20
Rated Voltage: 24 to 600 V~ (ac), 50/60 Hz

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


<table>
<thead>
<tr>
<th>EN 61326-1: 2013</th>
<th>Electrical equipment for measurement, control and laboratory use – EMC requirements (Industrial Immunity, Class A\textsuperscript{1,2,4} Emissions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 61000-4-2:2009</td>
<td>Electrostatic Discharge Immunity</td>
</tr>
<tr>
<td>EN 61000-4-3:2010</td>
<td>Radiated Field Immunity 10V/m 80 MHz- 1GHz, 3V/m 1.4GHz-2.7GHz</td>
</tr>
<tr>
<td>EN 61000-4-4:2012</td>
<td>Electrical Fast-Transient / Burst Immunity</td>
</tr>
<tr>
<td>EN 61000-4-5:2006</td>
<td>Surge Immunity (Reviewed to IEC 61000-4-5 2014)</td>
</tr>
<tr>
<td>EN 61000-4-6:2014</td>
<td>Conducted Immunity</td>
</tr>
<tr>
<td>EN 61000-4-11:2004</td>
<td>Voltage Dips, Short Interruptions and Voltage Variations</td>
</tr>
<tr>
<td>EN 61000-3-2:2009</td>
<td>Harmonic Current Emissions (Reviewed to IEC 61000-3-2 2014)</td>
</tr>
<tr>
<td>EN 61000-3-3:2013</td>
<td>Voltage Fluctuations and Flicker\textsuperscript{3} ≤ 16A</td>
</tr>
<tr>
<td>EN 61000-3-11:2000</td>
<td>Voltage Fluctuations and Flicker ≤ 75A with conditional connection</td>
</tr>
</tbody>
</table>

**NOTES**

1. **Use of an external filter is required to comply with conducted emissions limits.** See note 4 below.

2. A Line Impedance Stabilization Network (LISN) was used for conducted emissions measurements.

3. To comply with flicker requirements, command signal models F0 and F1 will require a reduced source impedance. Cycle time on ON/OFF models CX and K1, K2, K3 may need to be up to 175 seconds at 16A or have a reduced source impedance.

**2006/95/EC Low-Voltage Directive**

EN 50178:1997  
Electronic equipment for use in power installations.


Compliant with 2011/65/EU RoHS2 Directive

4. **Required External EMI Filters for DIN-A-MITE with More Than 6 Amp Loads**

An external ElectroMagnetic Interference (EMI) filter must be used in conjunction with the DIN-A-MITE for loads in excess of six amperes (6A) at 150 to 250 KHz.

Watlow has verified that a tank filter will suppress EMI created by SCR power controllers to comply with the conducted emissions limits.
WARNING: Tank filters may suppress desirable communications carried on power lines in the 150 to 250 KHz region. The filters may suppress carrier current such as that used for infant monitors and medical alert systems. Verify that suppressed carrier current or other desirable communications on power lines creates no hazard to people or property. Failure to observe this warning could result in damage to property, and or injury to death for personnel.

WARNING: All filter installation and wiring must be performed by qualified personnel and conform to local and national electrical codes.

In-line power filters have been shown to properly suppress EMI; however, these filters must be rated for the entire load current and are generally more expensive than the tank filter specified. An In-line filter may be required if carrier current communications are used on site.

Joe Millanes  
Name of Authorized Representative  
Winona, Minnesota, USA  
Place of Issue

Director of Operations  
Title of Authorized Representative  
September 2014  
Date of Issue

Signature of Authorized Representative
File E73741
Project 94NK10151

June 10, 1994

REPORT

on

SWITCHES, INDUSTRIAL CONTROL

Watlow Winona, Inc.
Winona, MN

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DESCRIPTION

PRODUCT COVERED:

- Solid State Power controller without cooling fan, Part No. DC followed by 1, 2, 3, 4, 8 or 9; followed by 0 or T; followed by 02, 12, 20, 24, 27, 40, 48 or 60, followed by CX, FX, LX, PX, SX, K1, K2 or K3, followed by 0, C, D, H or S, followed by any three numbers or letters.

- Solid State Power controller with cooling fan, Part No. DC followed by 1, 2, 3, 4, 8 or 9; followed by 1, 2 or 3; followed by 02, 12, 20, 24, 27, 40, 48 or 60; followed by CX, FX, LX, PX, SX, K1, K2 or K3; followed by 0, C, D, H or S; followed by any three numbers or letters.

Where X equals any number 0 through 9.

GENERAL:

These devices open solid state power controllers intended for controlling electric resistance heating.

RATINGS:

These devices are either single phase or three phase, 1, 2 or 3 pole and rated as shown below:

Command or Control Signal Ratings - 24, 120, or 240 V ac, 50/60 Hz. All other devices are low voltage DC.

Output Ratings - 24 to 48 V ac, 120 to 240 V ac or 277-600 V ac, 50/60 Hz.

<table>
<thead>
<tr>
<th>Models Without Cooling Fan at 50°C</th>
<th>Models With Cooling Fan at 50°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>55 A - 1 pole</td>
<td>75 A - 1 pole</td>
</tr>
<tr>
<td>40 A - 2 pole</td>
<td>65 A - 2 pole</td>
</tr>
<tr>
<td>30 A - 3 pole</td>
<td>55 A - 3 pole</td>
</tr>
<tr>
<td>62 A - 1 pole (through wall model only)</td>
<td></td>
</tr>
<tr>
<td>46 A - 2 pole (through wall model only)</td>
<td></td>
</tr>
<tr>
<td>35 A - 3 pole (through wall model only)</td>
<td></td>
</tr>
</tbody>
</table>

Control Mode Rating - 24 V ac, 120 V ac, 240 V ac

These devices may be used in ambient found as part of the derating curves in ILLS, 1, 2 and 3. The through wall version is suitable for Type 1 and 4X enclosures.
Series DIN-A-MITE™ C UL®

File E73741 Vol. 2 Sec. 4 *Page 2 Issued: 6-10-94
and Report Revised: 7-5-02

NOMENCLATURE:

<table>
<thead>
<tr>
<th>DC</th>
<th>X</th>
<th>X</th>
<th>XX</th>
<th>XX</th>
<th>X</th>
<th>X</th>
<th>X</th>
<th>XX</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I</td>
<td>II</td>
<td>III</td>
<td>IV</td>
<td>V</td>
<td>VI</td>
<td>VII</td>
<td>VIII</td>
</tr>
</tbody>
</table>

I - DC - Basic Designator

II - Phase
1 - Single Phase - 1 pole
2 - Three Phase - 2 pole controlled
3 - Three Phase - 3 pole controlled
4 - Three Phase - 3 pole controlled (4 wire WYE)
8 - Two independently controlled poles
9 - Three independently controlled poles

III - Cooling and Heatsink options
0 - Natural convection standard heatsink
1 - 120 V ac fan cooled standard heatsink
2 - 240 V ac fan cooled standard heatsink
3 - 24 V ac fan cooled standard heatsink
T - Natural convection Through Wall heatsink

IV - Output Voltage
02 - 24 to 48 V ac (Control options C, F or K)
12 - 100 to 120 V ac (Control options L, P or S)
20 - 200 to 208 V ac (Control options L, P or S)
24 - 100 to 240 V ac (Control options C, F or K)
  230 to 240 V ac (Control options L, P or S)
27 - 277 V ac (Control options L, P or S)
40 - 400 V ac (Control options L, P or S)
48 - 480 V ac (Control options L, P or S)
60 - 277 to 600 V ac (Control options C, F or K)
  600 V ac (Control options L, P or S)

V - Control Options
C0 - 4.5 to 32 V dc (Contactor)
F0 - 4 to 20 mA dc (Variable time base)
F1 - 12 to 20 mA dc (Variable time base)
K1 - 24 V ac (Contactor)
K2 - 120 V ac (Contactor)
K3 - 240 V ac (Contactor)
L - Phase angle control w/current limit (Select input 0-5 below)
P - Phase angle control (Select input 0-5 below)
S - Single cycle variable time base (Select input 0-5 below)
  0 - 4 to 20 mA dc
  1 - 12 to 20 mA dc
  2 - 0 to 20 mA dc
  3 - 0 to 5 V dc
  4 - 1 to 5 V dc
  5 - 0 to 10 V dc
VI - Alarm Options
  0 - No alarm
  C - Shorted SCR Alarm with transistor output
  D - Open Heater, Shorted SCR Alarm with transistor output
      (S control option only)
  H - Open Heater, Shorted SCR Alarm with triac output
      (S control option only)
  S - Shorted SCR Alarm with triac output

VII - User Manual Language Options
  0 - English Users manual
  1 - German Users manual
  2 - Spanish Users manual
  3 - French Users manual

VIII - Custom Label options and other non-critical options.
  0 - Standard product
  01 to 99 or letter AA to ZZ - custom options
    - Custom Overlays
    - Custom soft start phase angle times.
Series DIN-A-MITE™ C CE

DIN-A-MITE® “C” Power Controller

WATLOW Electric Manufacturing Company
1241 Bundy Blvd.
Winona, MN 55987 USA

ISO 9001 since 1996.

Declares that the following product:

Designation: DIN-A-MITE® “C” Power Control
Model Numbers: DC(1, 2, 3, 8 or 9)(0, 1, 2, 3 or T) – (02, 12, 20, 24, 27, 40, 48 or 60) (CX, K1, K2, K3, FX, SX) – (0, H or S)(followed by any 3 numbers or letters.)
Classification: Power Control, Installation Category III, Pollution degree 2, IP20
Rated Voltage: 24 to 600 V~ (ac), 50/60 Hz

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

EN 61326-1: 2013 Electrical equipment for measurement, control and laboratory use – EMC requirements (Industrial Immunity, Class A1, A2, B, Emissions)
Not for use in a Class B environment without additional filtering.
EN 61000-4-2:2009 Electrostatic Discharge Immunity
EN 61000-4-3:2010 Radiated Field Immunity 10V/m 80 MHz- 1GHz, 3V/m 1.4GHz-2.7GHz
EN 61000-4-4:2012 Electrical Fast-Transient / Burst Immunity
EN 61000-4-5:2014 Surge Immunity (Reviewed to IEC 61000-4-5 2014)
EN 61000-4-6:2014 Conducted Immunity
EN 61000-4-11:2004 Voltage Dips, Short Interruptions and Voltage Variations
EN 61000-3-2:2009 Harmonic Current Emissions (Reviewed to IEC 61000-3-2 2014)
EN 61000-3-3:2013 Voltage Fluctuations and Flicker ≤ 16A
EN 61000-3-11:2000 Voltage Fluctuations and Flicker ≤ 75A with conditional connection

NOTES
1 Use of an external filter is required to comply with conducted emissions limits. See note 4 below.
2 A Line Impedance Stabilization Network (LISN) was used for conducted emissions measurements.
3 To comply with flicker requirements, command signal models FX or SX will require a reduced source impedance. Cycle time on ON/OFF models CX and K1, K2, K3 may need to be up to 175 seconds at 16A or have a reduced source impedance.

2006/95/EC Low-Voltage Directive
EN 50178:1997 Electrical equipment for use in power installations.


Compliant with 2011/65/EU RoHS2 Directive

4 Required External EMI Filters for DIN-A-MITE with More Than 6 Amp Loads
An external ElectroMagnetic Interference (EMI) filter must be used in conjunction with the DIN-A-MITE for loads in excess of six amperes (6A) at 150 to 250 KHz.
Watlow has verified that a tank filter will suppress EMI created by SCR power controllers to comply with the conducted emissions limits.
**Series DIN-A-MITE™ C CE**

<table>
<thead>
<tr>
<th>Description</th>
<th>Crydom Filter</th>
<th>Watlow Filter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-Phase 230 V~ (ac)</td>
<td>1F25 14-0019</td>
<td></td>
</tr>
<tr>
<td>Three-Phase 440 V~ (ac)</td>
<td>3F20 14-0020</td>
<td></td>
</tr>
</tbody>
</table>

**WARNING:** Tank filters may suppress desirable communications carried on power lines in the 150 to 250 KHz region. The filters may suppress carrier current such as that used for infant monitors and medical alert systems. Verify that suppressed carrier current or other desirable communications on power lines creates no hazard to people or property. Failure to observe this warning could result in damage to property, and or injury to death for personnel.

**WARNING:** All filter installation and wiring must be performed by qualified personnel and conform to local and national electrical codes.

In-line power filters have been shown to properly suppress EMI; however, these filters must be rated for the entire load current and are generally more expensive than the tank filter specified. An In-line filter may be required if carrier current communications are used on site.

Joe Millanes  
Winona, Minnesota, USA  
Name of Authorized Representative  
Place of Issue

Director of Operations  
Sept. 2014  
Title of Authorized Representative  
Date of Issue

Signature of Authorized Representative
File E184390
Project 96NK28711

November 18, 1996

REPORT

on

MISCELLANEOUS
FOR USE IN HAZARDOUS LOCATIONS

Watlow Winona, Inc.
Winona, MN

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DESCRIPTION

PRODUCT COVERED:

USL, CNL  *Class I, Div. 2, Groups A, B, C and D Hazardous Locations. Solid State Power Controller Through Wall Heat Sink Mounting, Part No. DC, followed by 1, 2, 3, 4, 8, or 9, followed by T, followed by 02, 12, 20, 24, 27, 40, 48, or 60, followed by CX, K1, K2, K3, FX, LX, PX or SX; followed by 0, C, D, H or S, followed by any three numbers or letters, where "X" equals any number 0 through 9.

GENERAL:

These devices are open solid state power controllers intended for controlling electric resistance heating.

RATINGS:

These devices are either single or three phase, two leg or three phase, 1, 2 or 3 pole and rated as shown below.

Command or Control Signal Ratings - 24, 120-240 V ac, 50/60 Hz. All other control signals are low voltage DC.

Output Ratings - 24-48 V ac, 120-240 V ac or 277-600 V ac, 50/60 Hz.

Models Without Cooling Fan at 60°C - (Through Wall Heat Sink Mounting) -

55 A - 1 pole
37 A - 2 pole
30 A - 3 pole

Control Mode Rating -

24 V ac
120 V ac
240 V ac

These devices may be used in ambients found as part of the derating curves in ILL. 1. These ratings are not to exceed 60°C. The through wall version is suitable for Type 1 and 4X ratings.
ENGINEERING CONSIDERATIONS (NOT FOR FIELD REPRESENTATIVE'S USE):

CNL indicates investigation to Canadian Standards C22.2 No. 213-M1987 and C22.2 No. 14-95.

NOMENCLATURE:

<table>
<thead>
<tr>
<th>DC</th>
<th>T</th>
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<th>C0</th>
<th>0</th>
<th>0</th>
<th>00</th>
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<tr>
<td>I</td>
<td>II</td>
<td>III</td>
<td>IV</td>
<td>V</td>
<td>VI</td>
<td>VII</td>
</tr>
</tbody>
</table>

I - DC - Basic Designator.

II - Phase.

1 - Single phase, one pole
2 - 3 phase, two pole controlled
3 - 3 phase, three pole controlled
4 - 3 phase, three pole controlled (four wire WYE)
8 - Two independently controlled poles
9 - Three independently controlled poles

III - Cooling and Heat Sink Options.

T - Natural convection through wall heat sink

IV - Output Voltage.

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>02</td>
<td>24-48 V ac (control option C, f or K)</td>
</tr>
<tr>
<td>12</td>
<td>100 to 120 V AC (control options L, P or S)</td>
</tr>
<tr>
<td>20</td>
<td>200 to 208 V ac (control options L, P or S)</td>
</tr>
<tr>
<td>24</td>
<td>100-240 V ac (control option C, f or K)</td>
</tr>
<tr>
<td></td>
<td>230 to 240 V ac (control options L, P or S)</td>
</tr>
<tr>
<td>27</td>
<td>277 V ac (control options L, P or S)</td>
</tr>
<tr>
<td>40</td>
<td>400 V ac (control options L, P or S)</td>
</tr>
<tr>
<td>48</td>
<td>480 V ac (control options L, P or S)</td>
</tr>
<tr>
<td>60</td>
<td>277-600 V ac (control option C, f or K)</td>
</tr>
<tr>
<td></td>
<td>600 V ac (control options L, P or S)</td>
</tr>
</tbody>
</table>

V - Control Options.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C0</td>
<td>4.5-32 V dc (contactor)</td>
</tr>
<tr>
<td>F0</td>
<td>4-20 mA dc (variable time base)</td>
</tr>
<tr>
<td>F1</td>
<td>12-20 mA dc (variable time base)</td>
</tr>
<tr>
<td>K1</td>
<td>24 V ac (contactor)</td>
</tr>
<tr>
<td>K2</td>
<td>120 V ac (contactor)</td>
</tr>
<tr>
<td>K3</td>
<td>240 V ac (contactor)</td>
</tr>
<tr>
<td>L</td>
<td>Phase angle with current limit (Select input 0-5 below)</td>
</tr>
<tr>
<td>P</td>
<td>Phase angle control (Select input 0-5 below)</td>
</tr>
<tr>
<td>S</td>
<td>Single cycle variable time base (Select input 0-5 below)</td>
</tr>
<tr>
<td>_0</td>
<td>4 to 20 mA dc</td>
</tr>
<tr>
<td>_1</td>
<td>12 to 20 mA dc</td>
</tr>
<tr>
<td>_2</td>
<td>0 to 20 mA dc</td>
</tr>
<tr>
<td>_3</td>
<td>0 to 5 V dc</td>
</tr>
<tr>
<td>_4</td>
<td>1 to 5 V dc</td>
</tr>
<tr>
<td>_5</td>
<td>0 to 10 V dc</td>
</tr>
</tbody>
</table>

(Continued)
VI - Alarm Options.

0 - No alarm
C - Shorted SCR alarm with transistor output
D - Open Heater, Shorted SCR Alarm with transistor output
   (S control option only)
H - Open Heater, Shorted SCR Alarm with triac output
   (S control option only)
S - Shorted SCR alarm with triac output

VII - User Manual Language Options.

0 - English users manual
1 - German users manual
2 - Spanish users manual
3 - French users manual

VIII - Custom Label Options and Other Noncritical Options.

00 - Standard product
01-99 or AA-ZZ - Custom options
    Custom overlays
    Custom soft start phase angle times
File E73741
Project 95NK22218

October 6, 1995

REPORT

on

SWITCHES INDUSTRIAL CONTROL

Watlow Winona, Inc.
Winona, MN

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DESCRIPTION

PRODUCT COVERED:

* USL, CNL Solid-State Power Controller without cooling fan,
  Part No. DD10- followed by 02, 24, 48 or 60; followed by CX, K1, K2, K3 or FX; (where X = any number 0 to 9); followed by 0, 1 or S; followed by any three numbers or letters.

  Solid-State Power Controller without cooling fan, Part
  No. E-RRL4CSSAAA48X or E-RRL4CSSAA248E. where X = any number or letter.

RATINGS:

These devices are all single phase, and rated as shown below:

Input or Input Command Signal Ratings - 24, 120 or 240 V ac at 13 mA
50/60 Hz, or Class 2 dc voltage input or linear current input; maximum 20 mA.

Output Ratings - 24 to 48 V ac, 120 to 240 V ac or 277 to 600 V ac,
50/60 Hz.

Models Without Cooling Fan -

100 A at 30°C

Control Mode Rating - 24 V ac
  120 V ac
  240 V ac
  linear current input up to 20 mA
  low voltage dc input up to 32 V dc.

These devices may be used in ambient found as part of the de-rating
curve in ILL. 1. These ratings must be de-rated above 30°C.
## NOMENCLATURE:

### DD

<table>
<thead>
<tr>
<th>DD</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
<th>V</th>
<th>VI</th>
<th>VII</th>
<th>VIII</th>
</tr>
</thead>
</table>

I - Basic Model Designator  
DD = DIN-A-Mite “D”

II - Number of Phases of control  
1 = Single Phase control.

III - Heat sink options  
0 = Natural convection standard heatsink

IV - Output Voltage  
02 = 24 to 48 V ac  
24 = 120 to 240 V ac  
48 = 277 to 480 V ac  
60 = 277 to 600 V ac

V - Control Signal  
C0 = 4.5 to 32 V dc - contactor  
P0 = 4 to 20 mA - variable time base  
P1 = 12 to 20 mA - variable time base  
K1 = 24 to 28 V ac - contactor  
K2 = 100 to 120 V ac - contactor  
K3 = 200 to 240 V ac - contactor

VI - Alarm Options  
0 = No alarm  
1 = Load current transformer  
*  
S = Shorted SCR alarm with triac output

VII - User Manual Language Options  
0 = English  
1 = German  
2 = Spanish  
3 = French

VIII - Custom Options  
00 = Standard product  
XX = Any number 01 to 99 or letter AA to ZZ for custom logo screenings and minor class 2 options.
ALTERNATE NOMENCLATURE:

<table>
<thead>
<tr>
<th>E-RRL4CSSAA</th>
<th>248E</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>II</td>
</tr>
</tbody>
</table>

I - E-RRL4CSSAA = Basic Model Designator, Single Phase control
Natural convection heatsink, Output Voltage
277 to 480 V ac, Load current transformer
with pass through connectors, Glasstech logo.

II - Control Signal
A48C = 120 V ac without accessory bulbs
A48D = 120 V ac with accessory bulbs
248E = 24 V dc

ENGINEERING CONSIDERATIONS (NOT FOR FIELD REPRESENTATIVE'S USE):

General - These devices are open solid-state power controllers intended
for controlling electric resistance heating.

Spacings - Spacings were evaluated to UL 508, Table 34.1. PCB spacings
were evaluated to UL 840.
DIN-A-MITE® “D” Power Controller

WATLOW Electric Manufacturing Company
1241 Bundy Blvd.
Winona, MN 55987 USA

Declares that the following product:

Model Numbers: DD10 – (02, 24, 48 or 60)(CX, K1, K2, K3, FX) – (0, 1, S)(followed by any 3 numbers or letters.) X = any number 0-9, or E-RRL4CSSAA48X (X = any number or letter) or E-RRL4CSSAA248E
Classification: Power Control, Installation Category III, Pollution degree II, IP00
Rated Voltage: 24 to 600 V~ (ac), 50/60 Hz

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


EN 61326-1: 2013  Electrical equipment for measurement, control and laboratory use – EMC requirements (Industrial Immunity, Class A1-2,4 Emissions) Not for use in a Class B environment without additional filtering.
EN 61000-4-2:2009  Electrostatic Discharge Immunity
EN 61000-4-3:2010  Radiated Field Immunity 10V/m 80 MHz- 1GHz, 3V/m 1.4GHz-2.7GHz
EN 61000-4-4:2012  Electrical Fast-Transient / Burst Immunity
EN 61000-4-5:2006  Surge Immunity (Reviewed to IEC 61000-4-5 2014)
EN 61000-4-6:2014  Conducted Immunity
EN 61000-4-11:2004  Voltage Dips, Short Interruptions and Voltage Variations
EN 61000-3-2:2009  Harmonic Current Emissions (Reviewed to IEC 61000-3-2 2014)
EN 61000-3-3:2013  Voltage Fluctuations and Flicker $\leq 16$A
EN 61000-3-11:2000  Voltage Fluctuations and Flicker $\leq 75$A with conditional connection

**NOTES**

1. *Use of an external filter is required to comply with conducted emissions limits. See note 4 below.*

2. A Line Impedance Stabilization Network (LISN) was used for conducted emissions measurements.

3. To comply with flicker requirements, command signal models FX will require a reduced source impedance. Cycle time on ON/OFF models CX and K1, K2, K3 may need to be up to 175 seconds at 16A or have a reduced source impedance.

**2006/95/EC Low-Voltage Directive**


Industrial Applications Exemption for 2011/65/EU RoHS2 Directive


   An external ElectroMagnetic Interference (EMI) filter must be used in conjunction with the DIN-A-MITE for loads in excess of six amperes (6A) at 150 to 250 KHz.

   Watlow has verified that a tank filter will suppress EMI created by SCR power controllers to comply with the conducted emissions limits.
WARNING: Tank filters may suppress desirable communications carried on power lines in the 150 to 250 KHz region. The filters may suppress carrier current such as that used for infant monitors and medical alert systems. Verify that suppressed carrier current or other desirable communications on power lines creates no hazard to people or property. Failure to observe this warning could result in damage to property, and or injury to death for personnel.

WARNING: All filter installation and wiring must be performed by qualified personnel and conform to local and national electrical codes. Failure to observe this warning could result in damage to property, and or injury to death for personnel.

In-line power filters have been shown to properly suppress EMI; however, these filters must be rated for the entire load current and are generally more expensive than the tank filter specified. An In-line filter may be required if carrier current communications are used on site.

Joe Millanes
Name of Authorized Representative

Winona, Minnesota, USA
Place of Issue

Sept. 2014
Date of Issue

Signature of Authorized Representative
File E73741
Project 93NK19930

October 5, 1993

REPORT

on
SWITCHES, INDUSTRIAL CONTROL

Watlow Winona, Inc.
Winona, MN

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DESCRIPTION

PRODUCT COVERED:

Single Phase - Q followed by 01; followed by 12, 20, 24, 27, 38, 40, 41, 48 or 57; followed by 0, 1 or 2; followed by 030, 050, 075, 100, 150, 200, 300, 400, 500, 600, 800 or 01K; followed by CA, CD, BF, BV, AF or AL, may be followed by additional numbers or letters.

* Three Phase - Q followed by 32 or 33*; followed by 12, 20, 24, 27, 38, 40, 41, 48 or 57*; followed by 0, 1 or 2; followed by 030, 050, 075, 100, 150, 200, 300, 400*, 500*, 600*, 800* or 01K*; followed by CA, CB, BF, BV, AF or AL, may be followed by additional numbers or letters.

GENERAL:

These devices are solid-state, single or 3 phase controllers which provide continuous, variable, single phase or 3 phase power outputs to various types of loads. They are intended for temperature-regulating applications only. These units contain power SCRs connected as gated bidirectional switches, control circuits and pulse and phase angle (except for 3 phase, two leg controlled units) firing circuits to trigger and control the SCR output status. These units are zero voltage or phase angle fired and utilize time proportioning output for control. The variable control input signal to the control circuit will cause the output power to vary from zero to 100 percent. The rms output is proportional to the input control signal. The larger units are provided with cooling fan(s). Each controller may be provided with a maximum of three pairs of SCRs of appropriate ampere rating. They are for indoor use and wall mounting, intended to control either electric convection, radiant ceiling panel, or duct heaters in large industrial and commercial applications. *Q33 and 575V not available in 400-1000A models.
### Electrical Ratings (See Designation System)

**NOMENCLATURE DESIGNATION SYSTEM:**

<table>
<thead>
<tr>
<th>Q</th>
<th>XX</th>
<th>I</th>
<th>II</th>
<th>X</th>
<th>XXX</th>
<th>XX</th>
<th>X</th>
</tr>
</thead>
</table>

I. Basic Series

II. Phase & Legs Controlled

- 01 - Single Phase
- 32 - Three Phase Two Leg
- 33 - Three Phase Three Leg *(Not available in 400-01K models)*

III. Voltage

- 12 = 120 V ac
- 20 = 208 V ac
- 24 = 240 V ac
- 27 = 277 V ac
- 38 = 380 V ac
- 40 = 400 V ac
- 41 = 415 V ac
- 48 = 480 V ac
- 57 = 575 A ac *(Not available in 400-01K Amp models)*

IV. Cooling Fan Voltage

- 0 = No fan
- 1 = 120 V ac fan
- 2 = 240 V ac fan

V. Amp Rating (load amps)

- 150 = 150 A
- 200 = 200 A
- 300 = 300 A
- **400 = 400 A**
- 500 = 500 A
- 600 = 600 A
- 800 = 800 A
- 01K = 1000 A

*
VI. Control Card
CA = AC Contactor (08-5285)
CD = DC Contactor (08-5286)
BF = Burst Fired Fixed Time Base (08-5289)
BV = Burst Fired Variable Time Base (08-5342)
AF = Phase Fired (08-5288)
AL = Phase Fired with Current Limit (08-5411)

VII. Options Low Voltage Option Code

ENGINEERING CONSIDERATIONS (NOT FOR FIELD REPRESENTATIVE USE):

Use - For use only in complete equipment where the acceptability of the combination is determined by Underwriters Laboratories Inc.

This component has been judged on the basis of the required spacings in the Standard for Industrial Control Equipment, UL 508.
File E73741
Project 98NK31919
September 2, 1999
REPORT
on
INDUSTRIAL CONTROL SWITCHES
Watlow Winona Inc.
Winona, MN

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DESCRIPTION:

PRODUCT COVERED:

USL, CNL  Microprocessor-Based Solid State Power Controller, Model P; followed by the letter C; followed by any number 1 through 9; followed by any number 0 through 9; followed by the letter N or F; followed by the number 20, 25, 30 or 35; followed by the letter A, B, C or D; followed by any number 0 through 9; followed by any number 0 through 9; followed by any number 0 through 9 or any two letters AA through ZZ.

GENERAL:

These devices are solid-state, single or three phase controllers which provide continuous, variable, single or three phase power outputs to various types of loads. These units contain power SCR's connected as gated bidirectional switches, control circuits and pulse and phase angle firing circuits to trigger and control the SCR output status. These units are zero cross or phase angle fired and utilize time proportioning output for control. The variable control input signal to the control circuit will cause the output power to vary from zero to 100 percent. The rms output is proportional to the input control signal. Each controller may be provided with a maximum of three pairs of SCR's of appropriate ampere rating. They are for indoor use and wall mounting, intended to control resistive elements, or duct heaters in large industrial applications.

RATINGS:

OUTPUT PERFORMANCE AMPERAGE CHART at 50°C
Package Style C

<table>
<thead>
<tr>
<th>Single Phase</th>
<th>3 Phase, 2 Leg</th>
<th>3 Phase, 3 Leg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non Fan Cooled</td>
<td>Non Fan Cooled</td>
<td>Non Fan Cooled</td>
</tr>
<tr>
<td>N20 = 100 A</td>
<td>N20 = 80 A</td>
<td>N20 = 65 A</td>
</tr>
<tr>
<td>N25 = 140 A</td>
<td>N25 = 105 A</td>
<td>N25 = 85 A</td>
</tr>
<tr>
<td>N30 = 165 A</td>
<td>N30 = 120 A</td>
<td>N30 = 105 A</td>
</tr>
<tr>
<td>Fan Cooled</td>
<td>Fan Cooled</td>
<td>Fan Cooled</td>
</tr>
<tr>
<td>F20 = 125 A</td>
<td>F20 = 120 A</td>
<td>F20 = 90 A</td>
</tr>
<tr>
<td>F25 = 205 A</td>
<td>F25 = 160 A</td>
<td>F25 = 140 A</td>
</tr>
<tr>
<td>F30 = 250 A</td>
<td>F30 = 185 A</td>
<td>F30 = 155 A</td>
</tr>
<tr>
<td>F35 = 250 A</td>
<td>F35 = 250 A</td>
<td>F35 = 225 A</td>
</tr>
</tbody>
</table>

These devices may be used in ambient found as part of the derating curves I ILLS. 1 through 5. The non-fan cooled models are not to exceed 65°C and the fan cooled models not to exceed 60°C.
NOMENCLATURE:

<table>
<thead>
<tr>
<th>P</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
<th>V</th>
<th>VI</th>
<th>VII</th>
<th>VIII</th>
<th>XI</th>
</tr>
</thead>
</table>

I. Power Series = Microprocessor-Based Solid State Power Controller

II. Package Style
C = 65 to 250 A

III. Phase
1 = 1 phase
2 = 3 phase-2 leg control (4 SCRs)
3 = 3 phase-3 leg control (6 SCRs)
4 = 3 phase-4 wire, wye connected load
8 = 2 single phase zones
9 = 3 single phase zones

IV. Heater Diagnostics
0 = None
1 through 9 = Heater Diagnostics

V. Output Performance Package
(See Ratings)

VI. Output Voltage
A = 24 to 120 V ac
B = 200 to 480 V ac
C = 200 to 600 V ac
D = Zone 1 and 3 – 24 to 120 V ac, Zone 2 – 200 to 480 V ac

VII. Communications
0 = None
1 through 9 = EIA/TIA 232/485 communications, opto-isolated (field selectable)

VIII. Feedback/Retransmit
0 = None
1 through 9 = Load current feedback (0-10 or 4-20 mA retransmit output) (must have heater diagnostics selected).

IX. Custom
00 = None
AA = No Watlow Logo
* 01-99 or AB-ZZ = Custom, consult factory for options
Power Series CE

Power Series Power Controller

WATLOW Electric Manufacturing Company
1241 Bundy Blvd.
Winona, MN 55987 USA

Declares that the following products:
Designation: Power Series Power Control
Model Numbers: PC (1, 2, 3, 4, 8 or 9)(0 or 1) – (N or F)(20, 25, 30 or 35)(A, B or C) – (0 or 1)(0 or 1) any two letters or numbers.
Classification: Power Control, Installation Category III, Pollution degree 3, IP00
Unit Supply: 100-240 V~ (85 – 264)(ac), 50 or 60 Hz, 60 VA
Load Supply: 24 to 600 V~ (ac), 50 or 60 Hz, 65 to 250 A depending on model.

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


EN 61326-1: 2013 Electrical equipment for measurement, control and laboratory use – EMC requirements (Industrial Immunity, Class A1,2,5 Emissions) Not for use in a Class B environment without additional filtering.
EN 61000-4-2:2009 Electrostatic Discharge Immunity
EN 61000-4-3:2010 Radiated Field Immunity 10V/m 80 MHz-1 GHz, 3V/m 1.4GHz-2.7GHz
EN 61000-4-4:2012 Electrical Fast-Transient / Burst Immunity
EN 61000-4-5:2006 Surge Immunity
EN 61000-4-6:2014 Conducted Immunity
EN 61000-4-11:2004 Voltage Dips, Short Interruptions and Voltage Variations
EN 61000-3-2:2009 Harmonic Current Emissions
EN 61000-3-3:2013 Voltage Fluctuations and Flicker (Unit Supply)
EN 61000-3-11:2000 Voltage Fluctuations and Flicker (Load Supply)

**NOTES**

1. Use of an external filter is required to comply with conducted emissions limits. See note 5 below.
2. A Line Impedance Stabilization Network (LISN) was used for conducted emissions measurements.
3. To comply with flicker requirements will require a reduced source impedance.
4. Phase angle control mode will not pass harmonics, burst fire control mode meets requirements.

**2006/95/EC Low-Voltage Directive**


**Per 2012/19/EU W.E.E.E Directive Please Recycle Properly.**

*These devices contain lead solder and are not RoHS compliant. They are Industrial Control Devices and fall outside the scope of 2011/65/EU Directive.*

5. **Required External EMI Filters for Power Series with More Than 6 Amp Loads**

   An external ElectroMagnetic Interference (EMI) filter must be used in conjunction with the Power Series for loads in excess of six amperes (6A) at 150 to 250 KHz. Watlow has verified that the following tank filters will suppress EMI created by SCR power controllers to comply with the conducted emissions limits.

<table>
<thead>
<tr>
<th>Description</th>
<th>Crydom Filter</th>
<th>Watlow Filter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-Phase 230 V~ (ac)</td>
<td>1F25</td>
<td>14-0019</td>
</tr>
<tr>
<td>Three-Phase 440 V~ (ac)</td>
<td>3F20</td>
<td>14-0020</td>
</tr>
</tbody>
</table>
WARNING:
Tank filters may suppress desirable communications carried on power lines in the 150 to 250 KHz region. The filters may suppress carrier current such as that used for infant monitors and medical alert systems. Verify that suppressed carrier current or other desirable communications on power lines creates no hazard to people or property.

WARNING:
All filter installation and wiring must be performed by qualified personnel and conform to local and national electrical codes. Failure to observe this warning could result in damage to property, and or injury to death for personnel.

In-line power filters have been shown to properly suppress EMI; however, these filters must be rated for the entire load current and are generally more expensive than the tank filter specified. An In-line filter may be required if carrier current communications are used on site.

Joe Millanes
Name of Authorized Representative
Winona, Minnesota, USA
Place of Issue
September 2014
Date of Issue

Directory of Operations
Title of Authorized Representative

Signature of Authorized Representative
REPORT

on

COMPONENT – Switches, Industrial Control

Watlow Winona Inc.
Winona, MN
PRODUCT COVERED:

USR, CNR  Model ES2, followed by 1, 2 or 3, followed by 1, 2, or 3, followed by LV or HV, followed by 0 - 0, followed by any three letters or numbers.

GENERAL:

These devices are open type, hybrid type solid state/mechanical, single, dual, or three pole industrial control switches. They are intended to be used in industrial applications where the suitability of the combination has been determined by Underwriters Laboratories, Inc.

RATINGS:

Electrical - Units are rated as follows:

Load Power  100 – 120 or 200 – 240 or 400, or 480 V ac 50/60 Hz 35 Amps Neutral Wye/Star connected load, max switched voltage 277 V ac.

Control Power - 3 to 32 V dc or 24 V ac, 50/60 Hz; or 100-240 V ac, 50/60 Hz.

* Temperature - Surrounding Air Temperature rating, maximum 70 °C depending on cycle time and wire size and type. See conditions of acceptability and product rating graph for further details. See instruction manual for derating curves.
### NOMENCLATURE:

<table>
<thead>
<tr>
<th>Model Number Designator</th>
<th>Number of Poles</th>
<th>Load Voltage</th>
<th>Command Signal Voltage</th>
<th>Placeholder for future options</th>
<th>Custom Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>ES2 (E-Safe 2)</td>
<td>1 Pole</td>
<td>100 - 120 V ac</td>
<td>LV = Low voltage 3-24 V dc or 24 V ac</td>
<td>000 = Standard Product</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 Poles controlled</td>
<td>200 - 240 V ac</td>
<td>HV = High voltage 100 - 240 V ac</td>
<td>Any three letters or numbers = cosmetic options</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 Poles controlled</td>
<td>400 - 480 V ac (with wye/star configured load above) 230/277 Vac</td>
<td>L1 to N</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*III Load Voltage:
- 1 = 100 - 120 V ac
- 2 = 200 - 240 V ac
- 3 = 400 - 480 V ac (with wye/star configured load above) 230/277 Vac
ENGINEERING CONSIDERATIONS (NOT FOR FIELD REPRESENTATIVE’S USE):

Use - For use only in products where the acceptability of the combination is determined by Underwriters Laboratories Inc.

This component has been judged on the basis of the required spacings in the Standard for Industrial Control Equipment, UL 508.

Conditions of Acceptability - When installed in the final use equipment, etc., the following are among the considerations to be made:

1. These devices are to be used within their Recognized ratings as specified above.
2. These terminals are not suitable for field wiring.
3. Mounted in suitable end use enclosure.
4. Devices were tested at a 97% duty cycle with a 30 second cycle time, if used at any other cycle times, temperature tests should be considered.
5. During temperature tests, device was mounted horizontally, if mounted vertically additional temperature tests may be necessary.
6. Suitability of wire insulation shall be determined in end application. Wire gauge size, use profile of product shall be used to determine wire temperature insulation system required.

NOTES:

30 Amps is Maximum rating when operating above 240 V-(ac) across relay. If other wire insulation temperature, other size of wire is used, other orientations, or other cycle times are used, the following tests may be necessary.

a. Monitor temperatures of terminals with sensors between ring terminal and connectors L1, L2, L3. Temperature not to exceed 95°C.
   WARNING: Sensors attached to terminals will be at load voltage potential use isolated equipment or isolate sensor from terminal with suitable insulation.

b. Monitor temperatures of wire insulation with sensor located 2-3 inches from connector. Temperature not to exceed insulation rating of wire.
Series E-SAFE® II Relay

WATLOW Electric Manufacturing Company
1241 Bundy Blvd.
Winona, MN 55987 USA

Declares that the following product:

**Designation:** Series E-SAFE® II Relay

**Model Numbers:**
- ES2 (1, 2 or 3) – (1, 2 or 3)(LV or HV)0 – 0 (any three letters or numbers)

**Classification:**
- AC51 Semiconductor Direct-on-line contactor,
- Installation Category III, Pollution degree 2, IP00

**Rated Supply:**
- 100-120 Vac, 200-240 Vac, 230-277 Vac* 50/60 Hz
*Star or Wye Load with Center Connected Neutral Required.

**Rated Power:**
- 35A Resistive Load Maximum

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


<table>
<thead>
<tr>
<th>Standard</th>
<th>Year</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 60947-4-1</td>
<td>2011</td>
<td>Low-Voltage switchgear and controlgear Part 4-3: Contactors and motor-starters AC semiconductor controllers and contactors for non-motor loads. Class B Emissions</td>
</tr>
<tr>
<td>EN 60947-4-3</td>
<td>2011</td>
<td></td>
</tr>
<tr>
<td>EN 61000-4-2</td>
<td>2009</td>
<td>Electrostatic Discharge Immunity</td>
</tr>
<tr>
<td>EN 61000-4-3</td>
<td>2010</td>
<td>Radiated Field Immunity</td>
</tr>
<tr>
<td>EN 61000-4-4</td>
<td>2012</td>
<td>Electrical Fast-Transient / Burst Immunity</td>
</tr>
<tr>
<td>EN 61000-4-5</td>
<td>2006</td>
<td>Surge Immunity (Reviewed to IEC 61000-4-5 2014)</td>
</tr>
<tr>
<td>EN 61000-4-6</td>
<td>2014</td>
<td>Conducted Immunity</td>
</tr>
<tr>
<td>EN 61000-4-8</td>
<td>2010</td>
<td>Magnetic Field Immunity</td>
</tr>
<tr>
<td>EN 61000-4-11</td>
<td>2004</td>
<td>Voltage Dips, Short Interruptions and Voltage Variations Immunity</td>
</tr>
<tr>
<td>IEC 61000-3-12</td>
<td>2009</td>
<td>Harmonic Current Emissions &lt; 75A (Reviewed to IEC 61000-3-2 2014)</td>
</tr>
<tr>
<td>IEC 61000-3-11²</td>
<td>2000</td>
<td>Voltage Fluctuations and Flicker &lt; 75A</td>
</tr>
</tbody>
</table>

²NOTE 1: To comply with flicker requirements cycle time may need to be greater than 175 seconds if Load Power is ≤ 16A to comply with standard, or the maximum source impedance needs to be determined. Source impedance shall meet EN 61000-3-11 requirements.

**2006/95/EC Low-Voltage Directive**

<table>
<thead>
<tr>
<th>Standard</th>
<th>Year</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 60947-1</td>
<td>2011</td>
<td>Low-Voltage switchgear and controlgear Part 4-3: Contactors and motor-starters AC semiconductor controllers and contactors for non-motor loads.</td>
</tr>
<tr>
<td>EN 60947-4-3</td>
<td>2011</td>
<td></td>
</tr>
</tbody>
</table>

**Compliant with 2011/65/EU RoHS2 Directive**

**Per 2012/19/EU WEEE Directive** Please Recycle Properly

Joe Millanes Winona, Minnesota, USA
Name of Authorized Representative Place of Issue

Director of Operations September 2014
Title of Authorized Representative Date of Issue

Signature of Authorized Representative
File E102269
Project 05NK26022
January 30, 2006
REPORT
on
AUXILIARY DEVICES
*****************************************************************************
Process Control Equipment (QUYX) & (QUYX7)

Watlow Winona Inc.
Winona, MN

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DESCRIPTION

PRODUCT COVERED:

USL, CNL - Temperature/Time Control Microprocessor, Series ST, followed by K, B, P, E, D, H, J or C, followed by A, L or B, followed by A, B or F, followed by L, H, 1, 2 or 3, followed by any letter or number combination, followed by B, C, D, E, F, G, H, J, K, L, M, N, P, R, S or T, followed by B, C, D, E or F followed by any letter or number, followed by two digit alphanumeric combination

GENERAL:

These devices are open type, single phase, temperature or time controllers with integrated solid state relays to control external resistive loads. The sensor terminals are intended for connection to thermocouple, RTD or process inputs which sense the process to be controlled and turn the outputs on or off based on set point or timer interval or both. An option exists for a redundant control monitor shutdown device.

RATINGS:

Electrical - Units are related as follows:

Input: Control Module
24-28 V ac/dc, 50/60 Hz; 100-240 V ac/dc, 50/60 Hz max 12 VA if no contactor; 24-28 V ac/dc, 50/60 Hz; 120 V ac, 50/60 Hz, or 208-240 V ac, 50/60 Hz max 50 VA if integrated contactor is supplied or max 140 VA if external contactor is used.

Base Module/Solid State Relay
24-240 V ac, 25, 40 or 75 A depending on heatsink and SSR or 48-600 V ac, 25, 40 or 75 A depending on heatsink and SSR or 100-240 V ac, 25, 40 or 75 A phase angle model depending on heat sink and SSR or 260-600 V ac 25, 40 or 75 A phase angle depending on heatsink and SSR provided.

Output: Control Module
Model ST: Switched DC to control Solid State Relay Class 2 DC

Model ST (K, B, P or E): Solid state relay rated 0.5 A resistive 24-240 V ac, 20 VA pilot duty 120/240 V ac.

Model ST (H, D, J or C): Mechanical relay rated 5 A resistive 24-240 V ac, 125 VA pilot duty 120/240 V ac, 25 VA 24 V ac

Model STXL: Mechanical relay rated 5 A resistive 24-240 V ac, 125 VA pilot duty 120/240 V ac, 25 VA 24 V ac and mechanical relay rated 2 A resistive 24-240 V ac, 125 VA pilot duty 120/240 V ac, 25 VA 24 V ac
Base Module/Solid State Relay
24-240 V ac, or 48-600 V ac Zero Cross control or
100-240 V ac or 260-600 V ac Phase angle control.
* Rated 25, 40 or 75 A depending on heatsink and Solid State
Relay provided.

Temperature: 0 to 70 °C ambient temperature.
Note: Currents are derated above 50 °C ambient based on figure 1.
Series EZ-ZONE® ST UL®

NOMENCLATURE:

<table>
<thead>
<tr>
<th>ST</th>
<th>K</th>
<th>A</th>
<th>A</th>
<th>L</th>
<th>Xx</th>
<th>A</th>
<th>A</th>
<th>Xx</th>
<th>xx</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>II</td>
<td>III</td>
<td>IV</td>
<td>V</td>
<td>VI</td>
<td>VII</td>
<td>VIII</td>
<td>IX</td>
<td>IX</td>
</tr>
</tbody>
</table>

I - Basic Series Designation

II - Controller Options
- K = Output 2, 0.5 A SSR (solid state relay)
- B = Output 2, 0.5 A SSR, 2 Digital I/O
- P = Output 2, 0.5 A SSR, Current Measurement
- E = Output 2, 0.5 A SSR, 2 Digital I/O, Current Measurement
- H = Output 2, 5 A Mechanical Relay
- D = Output 2, 5 A Mechanical Relay, 2 Digital I/O
- J = Output 2, 5 A Mechanical Relay, Current Measurement
- C = Output 2, 5 A Mechanical Relay, 2 Digital I/O, Current Measurement

III - Limit Control Options
- A = No limit module
- L = Limit Module, Output 3, 5 A Mechanical Relay Form C
  Output 4, 2 A Mechanical Relay Form A
- B = No Limit Module, Terminal block access to contactor coil

IV - Mechanical Limit Contactor Options
- A = No Contactor
- B = 40 A Single Pole
- F = 40 A Dual Pole

V - Power Supply Options
- L = Low voltage 24-28 Vac/dc universal supply (no limit module)
- H = High voltage 100-240 Vac/dc universal supply (no limit module)
  1 = 24-28 Vac - contactor voltage
  2 = 120 Vac - Contactor voltage
  3 = 208/240 Vac - Contactor voltage

VI - Communications Options
- Any letter or number

*VII - SSR Options*
- A = None - user provided (R/C option only)
- B = Zero cross 10 A (24 to 240 V ac output)
- C = Zero cross 25 A (24 to 240 V ac output)
- D = Zero cross 40 A (24 to 240 V ac output)
- E = Zero cross 50 A (24 to 240 V ac output)
- K = Zero cross 75 A (24 to 240 V ac output)
- F = Zero cross 90 A (24 to 240 V ac output)
  G = Zero cross 25 A (48 to 600 V ac output)
- H = Zero cross 40 A (48 to 600 V ac output)
- L = Zero cross 75 A (48 to 600 V ac output)
- J = Zero cross 90 A (48 to 600 V ac output)
- M = Phase angle 25 A (100 to 240 V ac output)
VII - SSR Options* (cont).
N = Phase angle 40 A (100 to 240 V ac output)
P = Phase angle 75 A (100 to 240 V ac output)
R = Phase angle 25 A (260 to 600 V ac output)
S = Phase angle 40 A (260 to 600 V ac output)
T = Phase angle 75 A (260 to 600 V ac output)

*Unit load current rating dependant on heatsink selected.

VIII - Heat Sink Option
A = None (R/C only)
B = 25 A
C = 40 A
D = 75 A, 24 V dc fan cooled heatsink*
E = 75 A, 120 V ac fan cooled heatsink*
F = 75 A, 240 V ac fan cooled heatsink*

*not available with contactor model. Option IV must be “A”

IX - Firmware Options
Any letter or number

X - Custom Options
Any two letters or numbers - Custom firmware, logo’s (Watlow Logo to be on Label
File E102269
05NK26022

January 31, 2006

REPORT

on

COMPONENT - AUXILIARY DEVICES

Watlow Winona Inc.
Winona, MN

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Underwriters Laboratories Inc. authorizes the above named company to reproduce that portion of this Report consisting of this Cover Page through Page 2.
PRODUCT COVERED:

*USR, CNR  Heat Sink Assembly, STRT-HS, followed by AA or CB-, followed by any three numbers or letters, followed by B, C, D, E or F.

Base Module Assembly, STRT-BASE-, followed by 0000 or DP, followed by A, B or F, followed by 1, 2 or 3.

Control Module Assembly, STRC-, followed by any number or letter, followed by K, B, P, E, H, D, J or C, followed by A, B or L, followed by L, H, 1, 2 or 3, followed by any four numbers or letters

GENERAL:

These devices are open type, single phase, temperature control devices with integrated solid state relay output for resistive load control. Options exist for redundant monitor device with mechanical contactor shutdown of load power. A system consists of a control module and base module along with some type of heatsink. If the heatsink module p/n above is part of system, see Listed File E102236, Vol. 2, Sec. 4 for system part number details.

RATINGS:

Electrical - Units are rated as follows:

* Load Power (Base and Heat sink module) – 240 Vac to 600 V ac, 25 A, 40 A or 75 A model dependant.

Control Power – 24 to 28 Vac/dc or 100-240 V ac/dc, 50/60 Hz, 12 VA control module only, 50 VA with on board contactor or 140 VA with external contactor

Temperature - Maximum 70 °C. Current ratings are based on a 50 °C ambient and derated above based on figure 1.
NOMENCLATURE:

Heat Sink Module

<table>
<thead>
<tr>
<th>STRT-HS</th>
<th>AA-</th>
<th>000</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>II</td>
<td>III</td>
<td>IV</td>
</tr>
</tbody>
</table>

I. Heat sink assembly model family

II. Base Module Options

   AA = Control Only Base
   CB = Contactor Base

III. Custom Options

   000 = Standard Product
   Any three numbers or letters = Cosmetic options

IV. Heat Sink Amperage

   B = 25 A
   C = 40 A
   D = 75 A, 24 V dc fan cooled heatsink*
   E = 75 A, 120 V ac fan cooled heatsink*
   F = 75 A, 240 V ac fan cooled heatsink*

*Item II must be AA with these models.

Base Module

<table>
<thead>
<tr>
<th>STRT-BASE-</th>
<th>DP-</th>
<th>F</th>
<th>I</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>II</td>
<td>III</td>
<td>IV</td>
</tr>
</tbody>
</table>

I. Base Module Assembly Family

II. Base Module Type

   00 = Control Only Base
   DP = Contactor Base

III. Mechanical Contactor Type

   0 or A = No contactor
   B = 40 A single pole
   F = 40 A dual pole

IV. Contactor Voltage

   0 = No Contactor
   1 = 24 Vac
   2 = 120 Vac
   3 = 208/240 Vac
Control Module

<table>
<thead>
<tr>
<th>STRC-</th>
<th>0</th>
<th>K</th>
<th>L</th>
<th>1</th>
<th>-AAAA</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>II</td>
<td>III</td>
<td>IV</td>
<td>V</td>
<td>VI</td>
</tr>
</tbody>
</table>

I. Control Module Assembly Family

STRC-

II. Future Expansion Placeholder

0 = Current Model
Any number or letter = Future Non-Critical Options

III. Control Output #2 and I/O Options

*K = 0.5A SSR
*B = 0.5A SSR, Two Digital I/O
*P = 0.5A SSR, Current Measurement
*E = 0.5A SSR, Two Digital I/O, Current Measurement
*H = 5A Relay
*D = 5A Relay, Two Digital I/O
*J = 5A Relay, Current Measurement
*C = 5A Relay, Two Digital I/O, Current Measurement

IV. Limit Card Options

A = No Limit card
L = Limit Card
B = No Limit function, field access to contactor coil

V. Power supply voltage

H = High voltage universal 100 to 240 Vac/dc, 50/60 Hz
L = Low voltage universal 24 to 28 Vac/dc, 50/60 Hz
1 = 24 Vac (contactor voltage), 50/60 Hz
2 = 120 Vac (contactor voltage), 50/60 Hz
3 = 208/240 Vac (contactor voltage), 50/60 Hz

VI. Customization

Any four letters or numbers for communications, firmware and other non-critical cosmetic options.
ENGINEERING CONSIDERATIONS (NOT FOR FIELD REPRESENTATIVE'S USE):

Use - For use only in products where the acceptability of the combination is determined by Underwriters Laboratories Inc.

Conditions of Acceptability - When installed in the final use equipment, etc., the following are among the considerations to be made:

1. These devices are to be used within their Recognized ratings as specified above.
2. For units provided without integrated heatsink, evaluation of end product temperature in the final assembly will be required.
3. The devices must be mounted in an end use enclosure.
4. Temperature of plastic enclosure not to exceed 130 °C
5. Temperature of Solid state relay junction not to exceed 125 °C.
6. Use of thermal compound/pad between SSR and heat sink required.
Edition 1: December 15, 2006; Project 1827433 – Cleveland
Issued by David Schaefer; Reviewed by John Kory

Edition 2: December 10, 2007; Project 1974582 – Toronto
Issued by Edward Lourenço; Reviewed by Ana Adari, P. Eng.
Illustrations added: 28 to 34
Appendix replaced: A

Edition 3: January 10, 2011; Project 2386483 – Toronto
Issued by Ricardo Sanchez; Reviewed by Ana Adari, P.Eng.
All attachments compiled as per CSA conventions

Edition 4: December 16, 2011; Project 2479353 – Toronto
Issued by Ricardo Sanchez
Figure updated: 1
Illustrations added: 35 to 40
Appendix replaced: B
Appendix replaced: C
Appendix replaced: D
Appendix replaced: E

Edition 5: May 23, 2013; Project 2616949 – Toronto
Issued by Ricardo Sanchez

Appendix replaced: A
Appendix replaced: C

Report pages reissued

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Certificate of Compliance - Page 1 to 2
Supplement to Certificate of Compliance – Page 1
Description and Tests - Pages 1 to 218
Att1 Figures 1 to 2
Att2 Illustrations 1 to 40
Att3 Appendix A UL File E102269 – Vol. 2 Sec. 5
Att4 Appendix B UL File E102269 – Vol. 2 Sec. 4
Att5 Appendix C UL File E102269 – Vol. 1 Sec. 5
Att6 Appendix D UL File E102269 – Vol. 3 Sec. 1
Att7 Appendix E UL File E102269 – Test Results
PRODUCTS

CLASS 3211-07 INDUSTRIAL CONTROL EQUIPMENT-Miscellaneous Apparatus

PART A - Remote User Interface Series EZK followed by A or B, followed by A, L or H, followed by A, followed by any two alphanumeric characters, followed by A, followed by A, followed by any two alphanumeric characters. Control Power - 24 to 28 Vac/dc or 100-240 Vac/dc, 50/60 Hz, 10 VA. The front panel of these devices are Type 1, Type 4 (Indoor Use Only) approved for indoor use when properly mounted with integrated gasket.

Note:
1. This equipment was tested for 70° C maximum ambient temperature.

PART B - Temperature/Time Control Microprocessor, Series ST followed by K, B, P, E, D, H, J or C, followed by A, L or B, followed by A, B or F, followed by L, H, 1, 2 or 3, followed by any letter or number combination, followed by B, C, D, E, F, G, H, J, K, L, M, N, P, R, S or T followed by B, C, D, E or F followed by any letter or number, followed by two digit alphanumeric combination.

Input:
Control Module: 24-28 Vac/dc, 50/60 Hz; 100-240 Vac/dc, 50/60 Hz max 12 VA if no contactor; 24-28 Vac/dc, 50/60 Hz; 120 Vac, 50/60 Hz, or 208-240 Vac, 50/60 Hz max 50 VA if integrated contactor is supplied or max 140 VA if external contactor is used.
Base Module/Solid State Relay: 24-240 Vac zero cross or 100-240 Vac Phase angle, 25, 40 or 75 A depending on heatsink and SSR or 48-600 Vac zero cross or 260-600 Vac Phase angle, 25, 40 or 75 A depending on heatsink and SSR provided.

Output:
Control Module:
Model ST: Switched DC to control Solid State Relay Class 2 DC
Model ST (K, B, P or E): Solid state relay rated 0.5 A resistive 24-240 V ac, 20 VA pilot duty 120/240 V ac.
Model ST (H, D, J or C): Mechanical relay rated 5 A resistive 24-240 V ac, 125 VA pilot duty 120/240 V ac, 25 VA 24Vac
Model STXL: Mechanical relay rated 5 A resistive 24-240 V ac, 125 VA pilot duty 120/240 V ac, 25 VA 24 V ac and mechanical relay rated 2 A resistive 24-240 V ac, 125 VA pilot duty 120/240 V ac, 25 VA 24 Vac

Base Module/Solid State Relay: 24-240 Vac zero cross or 100-240 Vac Phase angle, 25, 40 or 75 A TUNGSTEN, HEATING depending on heatsink and Solid state relay or 48-600 Vac zero cross or 260-600 Vac Phase angle, 25, 40 or 75 A TUNGSTEN, HEATING depending on heatsink and solid state relay provided.

Note:
1. This equipment was tested for 70° C maximum ambient temperature.

PART C - Heat Sink Assembly, STRT-HS, followed by AA or CB-, followed by any three numbers or letters, followed by B, C, D, E or F. Base Module Assembly, STRT-BASE-, followed by 0000 or DP, followed by A, B or F, followed by 1, 2 or 3. Control Module Assembly, STRC-, followed by any
number or letter, followed by K, B, P, E, H, D, J or C, followed by A, B or L, followed by L, H, 1, 2 or 3, followed by any four numbers or letters.

Power (Base and Heat sink module) 24 – 240 V ac zero cross or 100-240 Vac Phase angle; 48–600 Vac zero cross or 260-600 Vac phase angle, 25 A, 40 A or 75 A TUNGSTEN, HEATING.

Control Power – 24 to 28 Vac/dc or 100-240 V ac/dc, 50/60 Hz, 12 VA control module only, 50 VA with on board contactor or 140 VA with external contactor.

Notes:
1. This equipment is certified only for use in complete assemblies where the suitability of the combination is to be determined.
2. See report for a complete breakdown of model number configurations.

**APPLICABLE REQUIREMENTS**

<table>
<thead>
<tr>
<th>Standard Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAN/CSA - C22.2 No.0-M91</td>
<td>General Requirements - Canadian Electrical Code, Part II</td>
</tr>
<tr>
<td>CAN/CSA-C22.2 No. 0.4-04</td>
<td>Bonding of electrical equipment</td>
</tr>
<tr>
<td>CAN/CSA-C22.2 No. 14-10</td>
<td>Industrial Control Equipment</td>
</tr>
<tr>
<td>CAN/CSA-C22.2 No. 65-03</td>
<td>Standard for Wire Connectors</td>
</tr>
<tr>
<td>CAN/CSA-C22.2 No. 94-M91 (R2001)</td>
<td>Special Purpose Enclosures</td>
</tr>
</tbody>
</table>
Series EZ-ZONE® ST Tower

WATLOW Electric Manufacturing Company
1241 Bundy Blvd.
Winona, MN 55987 USA

ISO 9001 since 1996.

Declares that the following product:

**Designation:** Series EZ-ZONE® ST Tower

**Model Numbers:** ST, followed by K, B, P, E, H, D, J or C, followed by A, L or B, followed by A, B or F, followed by L, H, 1, 2 or 3, followed by any letter or number, followed by A – H, J – N, P, R, S or T, followed by A, B, C, D, E or F followed by any three numbers or letters.

**Classification:** Temperature control, Installation Category II, Pollution degree 2, IP20

**Rated Voltage and Frequency:** Control 100 to 240 V~ ac or 24 to 28 V ± ac or dc (ac = 50/60 Hz)
Load 24 to 240 V~ ac or 48 to 600 V~ ac zero cross, or
Load 100 to 240 V~ ac or 260 to 600 V~ ac phase angle

**Rated Power Consumption:** Control 12 VA, Control with Contactor 50 VA, Control with external contactor 140 VA. Load Current 25, 40 or 75A depending upon SSR and heatsink used. (see derating curve)

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


<table>
<thead>
<tr>
<th>EN 61326-1</th>
<th>2013</th>
<th>Electrical equipment for measurement, control and laboratory use – EMC requirements (Industrial Immunity, Class A Emissions). Not for use in a Class B environment without additional filtering.</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 61000-4-2</td>
<td>2009</td>
<td>Electrostatic Discharge Immunity</td>
</tr>
<tr>
<td>EN 61000-4-3</td>
<td>2010</td>
<td>Radiated Field Immunity</td>
</tr>
<tr>
<td>EN 61000-4-4</td>
<td>2012</td>
<td>Electrical Fast-Transient / Burst Immunity</td>
</tr>
<tr>
<td>EN 61000-4-5</td>
<td>2006</td>
<td>Surge Immunity (Reviewed to IEC 61000-4-5 2014)</td>
</tr>
<tr>
<td>EN 61000-4-6</td>
<td>2014</td>
<td>Conducted Immunity</td>
</tr>
<tr>
<td>EN 61000-4-8</td>
<td>2010</td>
<td>Magnetic Field Immunity</td>
</tr>
<tr>
<td>EN 61000-4-11</td>
<td>2004</td>
<td>Voltage Dips, Short Interruptions and Voltage Variations Immunity</td>
</tr>
<tr>
<td>EN 61000-3-2a</td>
<td>2009</td>
<td>Harmonic Current Emissions (Reviewed to IEC 61000-3-2 2014)</td>
</tr>
<tr>
<td>EN 61000-3-3²</td>
<td>2013</td>
<td>Voltage Fluctuations and Flicker</td>
</tr>
<tr>
<td>SEMI F47</td>
<td>2000</td>
<td>Specification for Semiconductor Sag Immunity Figure R1-1</td>
</tr>
</tbody>
</table>

¹NOTE 1: Use of an external filter is required to comply with conducted emissions limits for load terminals. For 230 Vac or less, use Watlow P/N 14-0019 or Crydom P/N 1F25 filters. For voltages up to 440 Vac use Watlow P/N 14-0020 or Crydom P/N 3F20 filters. A Line Impedance Stabilization Network (LISN) was used for conducted emissions measurements.

²NOTE 2: To comply with flicker requirements cycle time may need to be greater than 175 seconds if Load Power is ≤ 16A to comply with standard, or the maximum source impedance needs to be determined. Source impedance shall meet EN 61000-3-11 requirements for load currents > 16A. Control module power complies with 61000-3-3 requirements.

³NOTE 3: For Phase Angle control models, filtering in addition to that recommended in NOTE 1 will be needed to comply with conducted emissions requirements, consult factory for details.

⁴NOTE 4: Phase angle models will need power factor correction to pass harmonic current standard.
2006/95/EC Low-Voltage Directive

EN 61010-1 2011\textsuperscript{5} Safety Requirements of electrical equipment for measurement, control and laboratory use. Part 1: General requirements

\textsuperscript{5} Compliance with 3\textsuperscript{rd} Edition requirements with use of external surge suppressor installed on 100-240 Vac~ power line units. Recommend minimum 1000 V peak to maximum 2000 V peak, 70 joules or better part be used.

Compliant with 2011/65/EU RoHS2 Directive

Per 2012/19/EU WEEE Directive \hspace{1cm} Please Recycle Properly

Amperage/Temperature Derating Curve
EZ-ZONE ST

Joe Millanes  
Name of Authorized Representative  
Winona, Minnesota, USA  
Place of Issue

Director of Operations  
Title of Authorized Representative  
September 2014  
Date of Issue

Signature of Authorized Representative
# Series EZ-ZONE® ST Tower Components

WATLOW Electric Manufacturing Company
ISO 9001 since 1996.

1241 Bundy Blvd.
Winona, MN 55987 USA

Declares that the following COMPONENTS:

<table>
<thead>
<tr>
<th>Designation:</th>
<th>Series EZ-ZONE® ST Tower Components</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model Numbers:</td>
<td>HEATSINK STRT–HS(AA or CB) – (Any three numbers or letters)(B, C, D, E or F)</td>
</tr>
<tr>
<td></td>
<td>BASE MODULE STRT – BASE – (0000 or DP(A, B or F)(1, 2 or 3))</td>
</tr>
<tr>
<td></td>
<td>CONTROL MODULE STRC – (Any number or letter)(K, B, P, E, H, D, J or C)(A, B or L)(L, H, 1, 2 or 3) – (Any four numbers or letters)</td>
</tr>
<tr>
<td>Classification:</td>
<td>Temperature control, Installation Category II, Pollution degree 2</td>
</tr>
<tr>
<td>Rated Voltage and Frequency:</td>
<td>Control 100 to 240 V~ (ac 50/60 Hz) or 24 to 28 V⊥ (ac 50/60 Hz or dc) Load 24 to 240 V~ (ac) or 48 to 600 V~ (ac) 50/60 Hz</td>
</tr>
<tr>
<td>Rated Power Consumption:</td>
<td>Control 12 VA, Control with Contactor 50 VA, Control with external contactor 140 VA. Load Current 25, 50 or 75A depending upon heatsink and SSR used.</td>
</tr>
</tbody>
</table>

Have no function in an of themselves and can only be used when combined together as a system. Consult the Series EZ-ZONE® ST Declaration of Conformity for directives and standards used for compliance.

**Compliant with 2011/65/EU RoHS2 Directive**

*Per 2012/19/EU WEEE Directive ➡ Please Recycle Properly*

Joe Millanes
Name ofAuthorized Representative
Winona, Minnesota, USA
Place of Issue

Director of Operations
September 2014
Date of Issue

Signature of Authorized Representative
File E102269
Project 06NK04890
March 31, 2006

REPORT
on

AUXILIARY DEVICES

Process Control Equipment (QUYX) & (QUYX7)

Watlow Winona Inc.
Winona, MN

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DESCRIPTION

PRODUCT COVERED:

* USL, CNL - Remote user Interface Series EZK followed by A or B, followed by A, L or H, followed by A, followed by any two alphanumeric characters, followed by A, followed by any two alphanumeric characters.

GENERAL:

These devices are Listed panel mount interface devices. Units offer display access to other control assemblies through a communications link.

RATINGS:

Electrical - Units are related as follows:

Control Power - EZKXX(A) models
24 to 28 V ac/dc or 100-240 V ac/dc, 50/60 Hz, 10 VA

Temperature - Maximum 70° C ambient (EZKXX(A) models)

Enclosure - The front panel of these devices are Type 1, Type 4 (Indoor Use Only) (IP66) approved for indoor use when properly mounted with integrated gasket.
**NOMENCLATURE:**

<table>
<thead>
<tr>
<th>EZK</th>
<th>B</th>
<th>-H</th>
<th>A</th>
<th>AA</th>
<th>-A</th>
<th>A</th>
<th>AA</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>II</td>
<td>III</td>
<td>IV</td>
<td>V</td>
<td>VI</td>
<td>VII</td>
<td>VIII</td>
</tr>
</tbody>
</table>

I - EZ-Zone Accessory Kit Family  
EZK = Family Identifier

II - Remote User Interface Size  
A = None  
B = 1/16 DIN

III - Power Supply Options  
A = None  
H = High voltage universal 100 to 24 Vac/dc, 50/60 Hz  
L = Low voltage universal 24 to 28 Vac/dc, 50/60 Hz

IV - Communication Options  
A = **Default Watbus 485 comms.**

V - Custom Options  
AA = None  
Any two letters or numbers for communications, firmware, overlay and other non-critical cosmetic options.

VI - Placeholder for future options  
A = None

VII - Placeholder for future options  
A = None

VIII - Placeholder for future options  
AA = None  
Any two letters or numbers for custom software interface.
Series EZ-ZONE® RUI

WATLOW Electric Manufacturing Company
1241 Bundy Blvd.
Winona, MN 55987 USA

ISO 9001 since 1996.

Declares that the following product:

Designation: Series EZ-ZONE® RUI
Model Numbers: EZK (A, B, C, D or E) (A, L or H) (any three numbers or letters) A, A, (any two letters or numbers)
Classification: Temperature control, Installation Category II, Pollution degree 2 IP65 Environmental seal on front panel.
Rated Voltage and Frequency: Control 100 to 240 V~ (ac 50/60 Hz) or 24 to 28 V (ac 50/60 Hz or dc)
Rated Power Consumption: 10 VA

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

### 2004/108/EC Electromagnetic Compatibility Directive

<table>
<thead>
<tr>
<th>EN</th>
<th>Year</th>
<th>Standard</th>
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<tbody>
<tr>
<td>61326-1</td>
<td>2013</td>
<td>Electrical equipment for measurement, control and laboratory use – EMC requirements (Industrial immunity, EZK - A models are Class A emissions. Not for use in a Class B environment without additional filtering. All other models are Class B emissions.</td>
</tr>
<tr>
<td>61000-4-2</td>
<td>2009</td>
<td>Electrostatic Discharge Immunity</td>
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<tr>
<td>61000-4-3</td>
<td>2010</td>
<td>Radiated Field Immunity</td>
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<td>61000-4-4</td>
<td>2012</td>
<td>Electrical Fast-Transient / Burst Immunity</td>
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<tr>
<td>61000-4-5</td>
<td>2006</td>
<td>Surge Immunity (Reviewed to IEC 61000-4-5 2014)</td>
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<td>61000-4-6</td>
<td>2014</td>
<td>Conducted Immunity</td>
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<td>61000-3-2</td>
<td>2009</td>
<td>Harmonic Current Emissions (Reviewed to IEC 61000-3-2 2014)</td>
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<td>61000-3-3</td>
<td>2013</td>
<td>Voltage Fluctuations and Flicker</td>
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<tr>
<td>SEMI F47</td>
<td>2000</td>
<td>Specification for Semiconductor Sag Immunity Figure R1-1</td>
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### 2006/95/EC Low-Voltage Directive

<table>
<thead>
<tr>
<th>EN</th>
<th>Year</th>
<th>Standard</th>
</tr>
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<tr>
<td>61010-1</td>
<td>2011</td>
<td>Safety Requirements of electrical equipment for measurement, control and laboratory use. Part 1: General requirements</td>
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</table>

^1 Compliance with 3rd Edition requirements with use of external surge suppressor installed on 230 Vac~ power line units. Recommend minimum 1000 V peak to maximum 2000 V peak, 70 joules or better part be used.

### Compliant with 2011/65/EU RoHS2 Directive

Per 2012/19/EU WEEE Directive Please Recycle Properly

Joe Millanes  Winona, Minnesota, USA
Name of Authorized Representative  Place of Issue
Director of Operations  September 2014
Title of Authorized Representative  Date of Issue
Signature of Authorized Representative
ODVA EtherNet/IP Conformance

Declaration of Conformity to the EtherNet/IP™ Specification

ODVA hereby issues this Declaration of Conformity to the EtherNet/IP™ Specification for the product(s) described below. The Vendor listed below (the “Vendor”) has holds a valid the Terms of Usage Agreement for the EtherNet/IP Technology from ODVA, which is incorporated herein by reference, thereby agreeing that it is the Vendor’s ultimate responsibility to assure that its EtherNet/IP Compliant Products conform to the EtherNet/IP Specifications and that the EtherNet/IP Specifications are provided by ODVA to the vendor on an AS IS basis without warranty. NO WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, ARE BEING PROVIDED BY ODVA.

In recognition of the below EtherNet/IP Compliant Product(s) having been EtherNet/IP Conformance Tested at ODVA-authorized Test Service Provider and having received a passing result from ODVA at the Composite Test Revision Level specified below, this Declaration of Conformity authorizes the Vendor to use the EtherNet/IP Certification Marks in conjunction with the specific EtherNet/IP Compliant Product(s) described below, for so long as the Vendor’s Terms of Usage Agreement for the EtherNet/IP Technology remains valid.

EtherNet/IP™ CONFORMANCE TESTED.™

This Declaration of Conformity is issued on 26 March 2007 on behalf of ODVA by:

Katherine Voss
Executive Director

Vendor Information

<table>
<thead>
<tr>
<th>Vendor Name</th>
<th>Watlow Winona Inc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vendor Address</td>
<td>1241 Bundy Blvd.</td>
</tr>
<tr>
<td></td>
<td>Winona, MN 55987</td>
</tr>
<tr>
<td></td>
<td>USA</td>
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Test Information

<table>
<thead>
<tr>
<th>Test Date</th>
<th>26 March 2007</th>
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<tr>
<td>Composite Test Revision</td>
<td>4</td>
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ODVA Devicenet Conformance

Declaration of Conformity to the DeviceNet™ Specification

ODVA hereby issues this Declaration of Conformity to the DeviceNet™ Specification for the product(s) described below. The Vendor listed below (the "Vendor") has held a valid the Terms of Usage Agreement for the DeviceNet Technology from ODVA, which is incorporated herein by reference, thereby agreeing that it is the Vendor's ultimate responsibility to assure that its DeviceNet Compliant Products conform to the DeviceNet Specifications and that the DeviceNet Specifications are provided by ODVA to the vendor on an AS IS basis without warranty. NO WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, ARE BEING PROVIDED BY ODVA.

In recognition of the below DeviceNet Compliant Product(s) having been DeviceNet Conformance Tested at ODVA-authorized Test Service Provider and having received a passing result from ODVA at the Composite Test Revision Level specified below, this Declaration of Conformity authorizes the Vendor to use the DeviceNet Certification Marks in conjunction with the specific DeviceNet Compliant Product(s) described below, for so long as the Vendor's Terms of Usage Agreement for the DeviceNet Technology remains valid.

 DeviceNet® Certification Logo Mark

DeviceNet CONFORMANCE TESTED ™ Certification Word Mark

This Declaration of Conformity is issued on 3 April 2009 on behalf of ODVA by:

Katherine Voss
Executive Director

Vendor Information
Vendor Name: Watlow Winona Inc.
Vendor Address: 1241 Bundy Blvd.
Winona, MN 55987
USA

Test Information
Test Date: 09 March 2009
Composite Test Revision: 21
ODVA File Number: 10584

Product Information
Identity Object Instance 1

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Vendor ID (Identity Object Attribute 1): 153
Network Category: Node
Device Type (Identity Object Attribute 2): 12
Device Profile Name: Communication Adapter
Product Revision (Identity Object Attribute 4): 1.003

Products Covered Under This Declaration of Conformity

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DeviceNet and the DeviceNet CONFORMANCE TESTED logo mark and word marks are trademarks of ODVA.

Copyright © ODVA Inc. 2004
SERIES TLM, CLS and D8 UL®

File E185611
Project 06SC05260

December 11, 2006

REPORT
ON
PROCESS CONTROL EQUIPMENT

Watlow Winona Inc
Winona, MN

Copyright © 2006 Underwriters Laboratories Inc.

Underwriters Laboratories Inc. authorizes the above-named company to reproduce this Report provided it is reproduced in its entirety.
DESCRIPTION

PRODUCT COVERED:

USL, CNL Temperature Controllers, Model TLM followed by C, E or P, followed by any number 0 to 9, followed by 0 or 1, followed by 0 or 1, may be followed by alphanumeric characters.

Model CLS2 followed by 00 to 16, followed by any letter or number followed by 0, 1 or 3, may be followed by alphanumeric characters.

Model D8 followed by 4 or 8, followed by 0, followed by additional suffixes.

GENERAL:

The TLM Series controllers are used to continuously monitor eight channels of Type J, K, T, E, R, or S thermocouple inputs, RTDs, or thermal limit switches. These devices are supplied by a Class 2 source. These devices are similar and differ in minor mechanical, and extra low-voltage circuit options.

The other series are used for controlling and/or monitoring process control systems. They differ in the number of channels they control/monitor: Models CLS204 (four channel), CLS208 (eight channel), CLS216 (16 channel), and D8 (four or eight channel). Each model can be configured with either an 18 pin terminal block (TBl8) or a rear 50 pin SCSI connector. However, the CLS2 and D8 Series are used for both controlling and monitoring process control systems.

RATINGS:

TLM-8 Series

* Input: 400 mA, 10-26 V dc (SELV, Limited Energy)

Output: 1 A, 30 V dc

CLS2, and D8 Series

Input: 610 mA, 12-27 V dc (SELV, Limited Energy)

Maximum

Output: 60 mA, 24 V dc

Operating Temperature 0-40°C
<p>| | | | | | | | |</p>
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<td>V</td>
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### I

**TLM** = Series Designation (Temperature Limit Monitor)

### *II*

Setpoint Selection

- C = Fixed at factory with high precision resistors
- E = Fixed at factory based on VI selections

### III

**Sensor Type**

- 0 = 100 Ohm Platinum RTD 0.00385 curve.
- 1 = Type E Thermocouple
- 2 = Type J Thermocouple
- 3 = Type K Thermocouple
- 4 = Type R Thermocouple
- 5 = Type S Thermocouple
- 6 = Type T Thermocouple

### IV

**Alarm Relay**

- 0 = Global Relays Only
- 1 = Global and Channel Alarm Relays

### V

**Mounting**

- 0 = Panel Mount
- 1 = DIN Rail Mount

**Additional Numbers** = Above mounting styles with ground straps

### VI

**Trip Point**

Any combination of up to eight letters or numbers indicating a code for the temperature setting of each zone.

### D8

<p>| | | | | | | |</p>
<table>
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### I

**D8** = Model Series Designator

### II

Number of Loops

- 4 = 4 loop controller
- 8 = 8 loop controller

### III

Sensor and Power Connection

- 0 = Screw terminal blocks

### IV

0000 = Place holder for future options

### V

Digital I/O Terminations

- 0 = TB18 (Screw terminals on the controller)
- 1 = SCSI connector, no terminal board or cable
- 2 = SCSI connector, TB50 terminal board and 3-foot cable
- 3 = SCSI connector, TB50 and 6-foot cable
- 4 = SCSI connector, TB50 and 3-foot right angle cable
- 5 = SCSI connector, TB50 and 6-foot right angle cable

### VI

Power Supply

- 0 = No power supply provided with unit.
- 2 = Class 2 power supply rated 90 to 256Vac input, 15 V dc, 1.2 A output supplied with unit. (Din-rail mount)

### VII

0 = Place holder for future options

### VIII

Special Inputs

- 0 = Thermocouples and -10 to 60 mV inputs only
- X = Current, voltage and/or RTD inputs
Series TLM, CLS and D8 UL®

Model Designation
CLS2

Sensor Inputs
04 = 4 sensor inputs
08 = 8 sensor inputs
16 = 16 sensor inputs

Controller Type
Any number or letter designating standard or custom firmware

Terminal Board
0 = No terminal board
1 = TB18 terminal board
2 = TB50 terminal board

Power Supply
0 = None provided
3 = Class 2 power supply rated 90 to 256 V ac input, 15 V dc, 1.2 A output supplied with unit. (Din-rail mount)

SCSI Cable – used with TB50 terminal board.
Any number or letter to define type of cable and length

Communications cable
Any number or letter to define length of cable.

Communications type
0 = RS 232
1 = RS 485
2 = RS485 terminated

Special inputs
Any two numbers or letters defining custom sensor options.
DESCRIPTION

PRODUCT COVERED:

USR, CNR - Temperature Controllers, Series TLM-8, followed by C or E, followed by any number 0 to 9, followed by 0 or 1, followed by any number, may be followed by alphanumeric characters.

Model series CLS2, followed by 04, 08 or 16, followed by 0 through 9, followed by 0, 1 or 3, followed by 0, followed by additional alphanumeric characters. *

GENERAL:

The TLM-8 Series controllers used to continuously monitor eight channels of Type J, K, T, E, R or S thermocouple inputs, RTDs or thermal limit switches. These devices are supplied by a Class 2 source. These devices are similar and differ in minor mechanical and extra low-voltage circuit options.

*CLS Series, Models CLS 204 (four channel), CLS 208 (eight channel), CLS 216 (16 channel). Each model can be configured with either an 18 pin terminal block (TBl8) or a rear 50 pin SCSI connector. However, the CLS Series is used for both controlling and monitoring process control systems.

RATINGS:

TLM-8 Series

Input : 400 mA, 12-24 V dc, Class 2
Output: 1 A, 30 V dc, Class 2, upto 8 relay SPST contacts.

*CLS Series

Input : 610 mA, 12-24 V dc, Class 2
Output: 60 mA, 24 V dc, Class 2

Operating Temperature 0-40°C
*Power Supply provided with the CLS2 as noted in the 5th suffix field;

Input: 100/240 V ac, 0.5A
Output: 15 V dc, 18 W, (Class 2) or 5 V dc, 15 W (Class 2)

Operating Temperature 0-40°C

ENGINEERING CONSIDERATIONS (NOT FOR FIELD REPRESENTATIV’S USE):

Use - For use only in products where the acceptability of the combination is determined by Underwriters Laboratories Inc.

CONDITIONS OF ACCEPTABILITY -

1. The terminals are not acceptable for filed connection. The acceptability of the connections to these terminals, including temperature and secureness, shall be determined in the ultimate application.

2. This component has been judged on the basis of the required spacings in the standard for Temperature Indicating and Regulating Equipment, UL 873 Par 32.4.1.4 dated December 22, 1994, and CSA 22.2 No. 24-93.

3. The housing has not been investigated to serve as any part of the ultimate enclosure in the end use application.

4. These devices shall be installed in compliance with the enclosure, mounting, spacing and segregation requirements of the ultimate enclosure.

5. These devices have not been investigated for safety or limiting applications.
Series TLM-8

WATLOW Electric Manufacturing Company
1241 Bundy Blvd.
Winona, MN 55987 USA

Declares that the following product:
Designation: Series TLM-8
Model Numbers: TLM (C, E or P)(0 – 6)(0 or 1)(0 – 9)(additional letters or numbers indicating setpoint temperatures.
Classification: Temperature control, Installation Category II, Pollution degree 2, IP10
Rated Supply: Control 12 to 24 Vdc ÷ 400 mA maximum
Note: Use of external CE approved ELV (UL Class 2) power supply required.*

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

EN 61326-1: 2013 Electrical equipment for measurement, control and laboratory use – EMC requirements (Industrial Immunity, Class A Emissions)
**Not for use in a Class B environment without additional filtering.**
EN 61000-4-2:2009 Electrostatic Discharge Immunity
EN 61000-4-3:2010 Radiated Field Immunity 10V/m 80 MHz- 1GHz, 3V/m 1.4GHz-2.7GHz
EN 61000-4-4:2012 Electrical Fast-Transient / Burst Immunity
EN 61000-4-5:2006* Surge Immunity (Reviewed to IEC 61000-4-5 2014)
EN 61000-4-6:2014 Conducted Immunity
EN 61000-4-11:2004* Voltage Dips, Short Interruptions and Voltage Variations
EN 61000-3-2:2009* Harmonic Current Emissions (Reviewed to IEC 61000-3-2 2014)
EN 61000-3-3:2013” Voltage Fluctuations and Flicker
SEMI F47:2000 Specification for Semiconductor Sag Immunity Figure R1-1

*For relay loads, cycle time may need to be extended up to 160 seconds to meet flicker requirements depending on load switched and source impedance.

**2006/95/EC Low-Voltage Directive**
EN 61010-1:2011 Safety Requirements of electrical equipment for measurement, control and laboratory use. Part 1: General requirements

**Per 2012/19/EU WEEE Directive Please Recycle Properly**

*These devices contain lead solder and are not RoHS compliant. They are used in large scale fixed installations and fall outside the scope of 2011/65/EU Directive.*

Joe Millanes
Name of Authorized Representative
Winona, Minnesota, USA
Place of Issue

Director of Operations
September 2014

Title of Authorized Representative
Date of Issue

Signature of Authorized Representative
Series CLS

WATLOW Electric Manufacturing Company
1241 Bundy Blvd.
Winona, MN 55987 USA

Declarers that the following products:
Designation: CLS
Model Numbers: 2 (04, 08 or 16) - (1,2,3 or 4) (0,1 or 2) (0 or 2) (0,1,2 or 3) (0,1,2 or 3) (0,1, or 2) (1 or 2 letters or numbers)
Classification: Temperature Control, Installation Category II, Pollution degree 2, IP20
Rated Supply: 15 to 24 V (dc) 610 mA maximum

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

EN 61326-1: 2013 Electrical equipment for measurement, control and laboratory use – EMC requirements (Industrial Immunity, Class A Emissions)
Not for use in a Class B environment without additional filtering.
EN 61000-4-2:2009 Electrostatic Discharge Immunity
EN 61000-4-3:2010 Radiated Field Immunity 10V/m 80 MHz- 1GHz, 3V/m 1.4GHz-2.7GHz
EN 61000-4-4:2012 Electrical Fast-Transient / Burst Immunity
EN 61000-4-5:2006 Surge Immunity (Reviewed to IEC 61000-4-5 2014)
EN 61000-4-6:2014 Conducted Immunity
EN 61000-4-11:2004 Voltage Dips, Short Interruptions and Voltage Variations
EN 61000-3-2:2009 Harmonic Current Emissions (Reviewed to IEC 61000-3-2 2014)
EN 61000-3-3:2013 Voltage Fluctuations and Flicker
SEMI F47:2000 Specification for Semiconductor Sag Immunity Figure R1-1

1For relay loads, cycle time may need to be extended up to 160 seconds to meet flicker requirements depending on load switched and source impedance.

2006/95/EC Low-Voltage Directive
EN 61010-1:2011 Safety Requirements of electrical equipment for measurement, control and laboratory use. Part 1: General requirements

Per 2012/19/EU WEEE Directive Please Recycle Properly
These devices contain lead solder and are not RoHS compliant.
They are used in large scale fixed installations and fall outside the scope of 2011/65/EU Directive.

Joe Millanes
Name of Authorized Representative
Winona, Minnesota, USA
Place of Issue

Director of Operations
Title of Authorized Representative
September 2014
Date of Issue

Signature of Authorized Representative
Series D8

WATLOW Electric Manufacturing Company
1241 Bundy Blvd.
Winona, MN 55987 USA

Declares that the following products:

Designation: D8
Model Numbers: D8 (4, 8) - (any digit or letter) - (any 4 digits or letters) - (any 4 digits or letters)
Classification: Temperature Control, Installation Category II, Pollution degree 2, IP20
Rated Supply: 15 to 24 V\(\text{dc}\) 610 mA maximum

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


EN 61326-1: 2013 Electrical equipment for measurement, control and laboratory use – EMC requirements (Industrial Immunity, Class A Emissions) 
Not for use in a Class B environment without additional filtering.

EN 61000-4-2:2009 Electrostatic Discharge Immunity
EN 61000-4-3:2010 Radiated Field Immunity 10V/m 80 MHz- 1GHz, 3V/m 1.4GHz-2.7GHz
EN 61000-4-4:2012 Electrical Fast-Transient / Burst Immunity
EN 61000-4-5:2016 Surge Immunity (Reviewed to IEC 61000-4-5 2014)
EN 61000-4-6:2014 Conducted Immunity
EN 61000-4-11:2004 Voltage Dips, Short Interruptions and Voltage Variations
EN 61000-3-2:2009 Harmonic Current Emissions (Reviewed to IEC 61000-3-2 2014)
EN 61000-3-3:2013\(^1\) Voltage Fluctuations and Flicker
SEMI F47:2000 Specification for Semiconductor Sag Immunity Figure R1-1

\(^1\)For relay loads, cycle time may need to be extended up to 160 seconds to meet flicker requirements depending on load switched and source impedance.

**2006/95/EC Low-Voltage Directive**

EN 61010-1:2011 Safety Requirements of electrical equipment for measurement, control and laboratory use. Part 1: General requirements

Per 2012/19/EU WEEE Directive Please Recycle Properly

These devices contain lead solder and are not RoHS compliant. They are used in large scale fixed installations and fall outside the scope of 2011/65/EU Directive.

Joe Millanes 
Name of Authorized Representative 
Winona, Minnesota, USA 
Place of Issue 

Director of Operations 
September 2014 
Date of Issue 

Signature of Authorized Representative
Series D8 ODVA Devicenet

Open DeviceNet Vendor Association, Inc.

Declaration of DeviceNet Conformance

The following product, or family of products, has passed the ODVA DeviceNet Conformance test at the University of Michigan test laboratory and is declared to be conformant to the composite test revision indicated. Family approval may be granted in accordance with the ODVA Conformance Policy. If family approval is requested, tested family members are listed on the first page with qualifying untested products listed on the attachment.

Test Date: August 12, 2002
Composite Test Revision: 17

Vendor ID: 153
Vendor Name: Watlow Electric Inc.
Vendor Address: 314 Westridge Dr
Watsonville, CA 95076

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Approved by:

John Korsakas

James Moyne

The University of Michigan
College of Engineering
Electrical Engineering & Computer Science, Room 3316
1301 Beal Ave
Ann Arbor, MI 48109-2122
734-764-4336, FAX 734-936-0347
File E185611
Service Request 07SR3191998

September 1, 1998

REPORT
ON
PROCESS CONTROL EQUIPMENT

Watlow Winona
Winona, MN

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DESCRIPTION

PRODUCT COVERED:

USL, CNL, Process Control Equipment - MLS300PM (Processor Module), MLS300-AIM (Analog Input Module, Temperature monitoring unit) and MLS300-CIM (Compact Input Module, Temperature monitoring unit). The AIM series has been evaluated for both the AIM-16 and AIM-32. The CIM series has been evaluated for both the CIM332 and CIM316.

Open Type Process Control Accessory: TB50 (interface terminal block).

GENERAL:

The MLS300-PM is a Processor Module that contains the CPU, RAM, screen and touch keypad allowing for programming the MLS300 system. The MLS300-PM interfaces with either the MLS300-AIM or MLS300-CIM and other external sensors through input cables.

The MLS300-AIM are Analog Input Modules that consist of the AIM-TB (AIM Terminal Board) and AIM’s plug-in cards. The MLS300-AIM or receives input signals from sensors and transmits this information to the MLS300-PM through cables. There are two versions of the MLS300-AIM, the AIM-16 and AIM-32. The AIM-16 has one multiplexer card, and the AIM-32 has two, both versions have one voltage to frequency converting card.

The MLS300-AIM continuously monitors (AIM-16 monitors 16 and AIM-32 monitors 32) channels of Type J, K, T, E, R, or S thermocouple inputs. These devices are supplied by a Class 2 source. These devices are similar and differ in minor mechanical, and extra low-voltage circuit options.

The only difference between the AIM-16 and AIM-32 is the AIM 32 has two multiplexer cards and two banks of three layer terminal blocks.

The MLS300-CIM is very similar to the MLS300-AIM and performs a similar function. The main difference between these two models is that the MLS300-CIM is provided with 50-pin connectors instead of terminal blocks for connecting the thermocouple sensor wires.

The only difference between the CIM332 and CIM316 is that the CIM332 has 32 sensor input channels while the CIM316 has 16 sensor input channels.

The TB50 is a screw terminal interface for control wiring which allows you to connect relays, encoders and discrete I/O devices to the system. The screw terminal blocks accept wires as large as No. 18 AWG. A 50-pin SCSI cable connects the TB50 to the system.
RATINGS:

MLS300-PM

Input: 12 to 24 V dc, 1 A maximum
Output: 350 mA maximum, +5 V dc
For use in a Class 2 circuit only

MLS300-AIM Series

Input: 5 V dc, 0.5A maximum
Output: 60 mA max., +5V dc per channel
For use in a Class 2 circuit only

MLS300-CIM Series

Input: 5 V dc, 0.5A maximum
Output: 60 mA max., +5V dc per channel
For use in a Class 2 circuit only
Series MLS

WATLOW Electric Manufacturing Company
1241 Bundy Blvd.
Winona, MN 55987 USA

Declares that the following products:

Designation: MLS
Model Numbers: 3 (16,32,C1 or C2) - (0,1,2,3 or 4) (0 or 1) (0 or 2) (0,1,2, or 3) (0,1,2,3,7 or 8)
(0,1 or 2) (0,1 or 2) (any two letters or numbers)

Classification: Temperature Control, Installation Category II, Pollution degree 2, IP20
Rated Supply: 12 to 24 V \(\text{dc}\) 1 A maximum ELV (UL Class 2) supply required.

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

### 2004/108/EC Electromagnetic Compatibility Directive

**EN 61326-1: 2013** Electrical equipment for measurement, control and laboratory use – EMC requirements (Industrial Immunity, Class A Emissions)

Not for use in a Class B environment without additional filtering.

- EN 61000-4-2:2009 Electrostatic Discharge Immunity
- EN 61000-4-3:2010 Radiated Field Immunity 10V/m 80 MHz- 1GHz, 3V/m 1.4GHz-2.7GHz
- EN 61000-4-4:2012 Electrical Fast-Transient / Burst Immunity
- EN 61000-4-5:2006 Surge Immunity (Reviewed to IEC 61000-4-5 2014)
- EN 61000-4-6:2014 Conducted Immunity
- EN 61000-4-11:2004 Voltage Dips, Short Interruptions and Voltage Variations
- EN 61000-3-2:2009 Harmonic Current Emissions (Reviewed to IEC 61000-3-2 2014)
- EN 61000-3-3:2013 Voltage Fluctuations and Flicker
- SEMI F47:2000 Specification for Semiconductor Sag Immunity Figure R1-1

\(^1\)For relay loads, cycle time may need to be extended up to 160 seconds to meet flicker requirements depending on load switched and source impedance.

### 2006/95/EC Low-Voltage Directive

**EN 61010-1:2011** Safety Requirements of electrical equipment for measurement, control and laboratory use. Part 1: General requirements

**Per 2012/19/EU WEEE Directive** Please Recycle Properly

These devices contain lead solder and are not RoHS compliant. They are used in large scale fixed installations and fall outside the scope of 2011/65/EU Directive.

Joe Millanes
Name of Authorized Representative
Winona, Minnesota, USA
Place of Issue

Director of Operations
Title of Authorized Representative
September 2014
Date of Issue

Signature of Authorized Representative
Series TB50

WATLOW Electric Manufacturing Company
1241 Bundy Blvd.
Winona, MN 55987 USA

ISO 9001 since 1996.

Declares that the following COMPONENT:

Designation: Series TB50
Classification: Connector Interface, Installation Category II, Pollution degree 2
Rated Supply: ELV 5-24 Vdc

Has no function in an of itself and can only be used when combined with Series MLS, CLS, CAS, CPC, or D8 models as a system. Consult the Declaration of Conformities for these models for compliance.

Per 2012/19/EU WEEE Directive Please Recycle Properly

These devices contain lead solder and are not RoHS compliant. They are used in large scale fixed installations and fall outside the scope of 2011/65/EU Directive.

Joe Millanes 
Name of Authorized Representative 
Winona, Minnesota, USA 
Place of Issue 

Director of Operations
Title of Authorized Representative
September 2014
Date of Issue

Signature of Authorized Representative
File E185611
Service Request 07SR3191998

September 2, 1998

REPORT
ON
PROCESS CONTROL EQUIPMENT

Watlow Winona
Winona, MN

Copyright © 1998 Underwriters Laboratories Inc.

Underwriters Laboratories Inc. authorizes the above-named company to reproduce this Report provided it is reproduced in its entirety.
DESCRIPTION

PRODUCT COVERED:
* USL, CNL Digital to Analog converters, SDAC and Serial DAC.

GENERAL:
* The Serial Digital to Analog Converter (SDAC) consists of one PWB fully enclosed in a mountable Aluminum rectangle. The SDAC/SerialDAC receives input voltage from a Class 2 supply and outputs either voltage or current.

RATINGS:
* SDAC, Serial DAC

  Input: 5 V dc, 300 mA maximum
  Output: 10 mA maximum, +10 V dc (Voltage output)
          20 mA maximum, +10 V dc (Current output)

For use in a Class 2 circuit only
Series DAC or SDAC

WATLOW Electric Manufacturing Company
1241 Bundy Blvd.
Winona, MN 55987 USA

Declares that the following products:
Designation: SDAC
Model Numbers: Serial DAC-4 (A, B or C)
Classification: Serial Digital to Analog Control, Installation Category II, Pollution degree 2, IP20
Rated Supply: 5 V (dc) 300 mA maximum

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

EN 61326-1: 2013 Electrical equipment for measurement, control and laboratory use – EMC requirements (Industrial Immunity, Class A Emissions)
Not for use in a Class B environment without additional filtering.
EN 61000-4-2:2009 Electrostatic Discharge Immunity
EN 61000-4-3:2010 Radiated Field Immunity 10V/m 80 MHz– 1GHz, 3V/m 1.4GHz-2.7GHz
EN 61000-4-4:2012 Electrical Fast-Transient / Burst Immunity
EN 61000-4-5:2006 Surge Immunity (Reviewed to IEC 61000-4-5 2014)
EN 61000-4-6:2014 Conducted Immunity
EN 61000-4-11:2004 Voltage Dips, Short Interruptions and Voltage Variations
EN 61000-3-2:2009 Harmonic Current Emissions (Reviewed to IEC 61000-3-2 2014)
EN 61000-3-3:2013 Voltage Fluctuations and Flicker
SEMI F47:2000 Specification for Semiconductor Sag Immunity Figure R1-1

1For relay loads, cycle time may need to be extended up to 160 seconds to meet flicker requirements depending on load switched and source impedance.

2006/95/EC Low-Voltage Directive
EN 61010-1:2011 Safety Requirements of electrical equipment for measurement, control and laboratory use. Part 1: General requirements

Per 2012/19/EU WEEE Directive Please Recycle Properly

These devices contain lead solder and are not RoHS compliant.
They are used in large scale fixed installations and fall outside the scope of 2011/65/EU Directive.

Joe Millanes
Name of Authorized Representative
Winona, Minnesota, USA
Place of Issue

Director of Operations
September 2014
Date of Issue

Signature of Authorized Representative
SERIES D8 Recognized UL®

File E185611

Project 07NK08802

April 27, 2007

REPORT

ON

COMPONENT - PROCESS CONTROL EQUIPMENT

Watlow Winona Inc
Winona, Minnesota

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DESCRIPTION

PRODUCT COVERED:

USR, CNR - Temperature Controllers, Series D8 Series, consists of Model D8 followed by 4 or 8, followed by 1, followed by 0000, followed by 0, 1, 2, 3, 4 or 5, followed by 0 or 1, followed by 0, followed by 0 or X.

GENERAL:

* Each model can be configured with either a D-Sub 25 terminal block and/or a rear 50 pin SCSI connector. The devices are used for both controlling and monitoring process control systems.

RATINGS:

* Supply Input: 610 mA, 12-27 V dc (SELV, Limited Energy)

Maximum
Output: 60 mA, 24 V dc

Operating Temperature: 0-40°C
## NOMENCLATURE

<table>
<thead>
<tr>
<th>D8</th>
<th>X</th>
<th>I</th>
<th>0000</th>
<th>X</th>
<th>X</th>
<th>0</th>
<th>X</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>II</td>
<td>III</td>
<td>IV</td>
<td>V</td>
<td>VI</td>
<td>VII</td>
<td>VIII</td>
</tr>
</tbody>
</table>

I  
D8 = Model Series Designator

II  
Number of Loops
4 = 4 loop controller
8 = 8 loop controller

III  
Sensor and Power Connection
1 = D-Sub 25 and pluggable power connection

IV  
0000 = Place holder for future options

V  
Digital I/O Terminations
0 = TB18 (Screw terminals on the controller)
1 = SCSI connector, no terminal board or cable
2 = SCSI connector, TB50 terminal board and 3-foot cable
3 = SCSI connector, TB50 and 6-foot cable
4 = SCSI connector, TB50 and 3-foot right angle cable
5 = SCSI connector, TB50 and 6-foot right angle cable

VI  
Power Supply
0 = No power supply provided with unit
3 = Class 2 power supply rated 90 to 256 V ac input, 15 V dc, 1.2 A output supplied with unit. (Din-rail mount)

VII  
0 = Place holder for future options

VIII  
Special Inputs
0 = Thermocouples and -10 to 60 mV inputs only
X = Current, voltage and/or RTD inputs
ENGINEERING CONSIDERATIONS (NOT FOR FIELD REPRESENTATIVE'S USE):

Use - For use only in complete equipment where the acceptability of the combination is determined by Underwriters Laboratories Inc.

These components have been judged on the basis of the required spacings in the Standard for Industrial Control Equipment, UL 508, Seventeenth Edition, and the Canadian Standard for Process Control Equipment, C22.2 No. 142, which would cover the component itself if submitted for unrestricted Listing.

Conditions of Acceptability -

1. These devices should be used within their Recognized ratings, as specified above.

2. These devices are suitable for use in Pollution Degree 2 or cleaner environments in accordance with Paragraph 34.5 and Table 34.3 of UL 508.

3. These devices have been evaluated for use in ambient temperatures of maximum 40°C.

4. Open-type devices should be mounted in an enclosure having adequate strength and thickness and in the intended manner and with acceptable spacings being provided.

5. The devices are suitable for connection to Class 2, limited Voltage/Current or Limiting Impedance Circuits only, as defined in UL 508, 17th Edition, Section 32.

*  

*6. Terminals suitable for factory wiring only.
File E185611
Project 98NK7104

May 15, 1998

REPORT

on

PROCESS CONTROL EQUIPMENT

Watlow Winona Inc.
Winona, MN

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t entirety.
DESCRIPTION

PRODUCT COVERED:

USL, CNL Process Controller, Model F4; followed by the letter S, D or *P; followed by the letters H or L; followed by the letter C, E, F or K; followed by the letter A, C, E, F or K; followed by a letter or number or A, C, F or K; followed by the letter or number A, C, K, F, any letter or number or 0 or 6; followed by the number 0, 1 or 2; followed by any three letters or numbers. Auxiliary input or output modules, Models Z100-0745, followed by -0001 through -0007.

GENERAL CHARACTER:

These devices are process controllers intended to control the manufacturing process.

The control of the desired process is obtained through one or two remotely installed output units. Non-optional "input units" are remotely installed in the event of input module failure. The output units are available with various functions and/or electrical ratings which are inserted into sockets provided on the output printed wiring board. These devices are intended to be panel mounted and only the front face (bezel) is considered an enclosure. The front face and gasket were evaluated to the requirements in UL 50, the Standard for Enclosures, and rated Type 4X indoor use only.

RATINGS:

Electrical -

* Input - (Models with second suffix H) 100 to 240 V ac/V dc, 50-60 Hz, 39 VA maximum.

* (Models with second suffix L) 24 to 28 V ac/dc, 50/60 Hz, 20 VA max.

Control Input/Output - See Designation System

<table>
<thead>
<tr>
<th>Module Name</th>
<th>Module No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solid State Relay Output</td>
<td>Z100-0745-0001</td>
</tr>
<tr>
<td>Open Collector Output</td>
<td>Z100-0745-0002</td>
</tr>
<tr>
<td>Process Output</td>
<td>Z100-0745-0003</td>
</tr>
<tr>
<td>Dual Universal Auxiliary Input</td>
<td>Z100-0745-0004</td>
</tr>
<tr>
<td>Single Universal Auxiliary Input</td>
<td>Z100-0745-0005</td>
</tr>
<tr>
<td>Auxiliary Retransmit Output</td>
<td>Z100-0745-0006</td>
</tr>
<tr>
<td>Mechanical Relay Output</td>
<td>Z100-0745-0007</td>
</tr>
</tbody>
</table>

Temperature - Maximum operating ambient 55°C for Models F4S and F4D Series. Maximum operating ambient, 65°C for Model F4P Series only.

Environmental Protection - NEMA 4X, IP65.
SERIES F4 UL®

File E185611 Vol. 2 Sec. 1 Page 2 Issued: 5-15-98
and Report Revised: 8-17-00

DESIGNATION SYSTEM: Series F4 Model Breakdown Structure

<table>
<thead>
<tr>
<th>Series F4</th>
<th>Controller Type</th>
<th>Power Supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>Single Channel Ramping Control, 4 Event Inputs, EIA232/485 Comms, 8 Event Outputs, 2 Alarms, 40 Files, 256 Steps</td>
<td>H - 100-240 V ac/V dc</td>
</tr>
<tr>
<td>D</td>
<td>Dual Channel Ramping Control, 4 Event Inputs, EIA232/485 Comms, 8 Event Outputs, 2 Alarms, 40 Files, 256 Steps</td>
<td>*L - 24-28 V ac/V dc</td>
</tr>
<tr>
<td>P</td>
<td>Single Channel Temperature Process Control, 2 Alarms, EIA232/485 Comms, 4 Event Inputs</td>
<td></td>
</tr>
</tbody>
</table>

Output 1A
- C - Open Collector/Switched DC, Class 2
- E - Mechanical Relay, 2A, 240 V ac, Form C (F4P only), Resistive
- K - Solid State Relay, 0.5A, 240 V ac, Form A, Resistive
- F - Process, 0-5, 0-10 V dc, 0-20, 4-20 mA, Class 2

Output 1B
- A - None
- C - Open Collector/Switched DC, Class 2
- E - Mechanical Relay, 2A, 240 V ac, Form C (F4P only), Resistive
- K - Solid State Relay, 0.5A, 240 V ac, Form A, Resistive
- F - Process, 0-5, 0-10 V dc, 0-20, 4-20 mA, Class 2

Software (F4S and F4P only)
- X - Any Letter or number

Output 2A (F4D only)
- A - None
- C - Open Collector/Switched DC, Class 2
- E - Mechanical Relay, 0.5A, 240 V ac, Form A, Resistive
- F - Process, 0-5, 0-10 V dc, 0-20, 4-20 mA, Class 2

Auxiliary Input Module (F4P or F4S only)
- 0 - None
- 6 - Dual Universal Inputs, Class 2

Output 2B (F4D or F4P)
- A - None (F4D only)
- C - Open Collector/Switched DC, Class 2 (F4D only)
- K - Solid State Relay, 0.5A, 240 V ac, Form A, Resistive (F4D only)
- F - Process, 0-5, 0-10 V dc, 0-20, 4-20 mA, Class 2 (F4D only)
- X - Any letter or number. Enhanced control/Operation (F4P only).

Auxiliary Retransmit Module
- 0 - None
- 1 - Single Retransmit Output, 0-5, 0-10 V dc, 0-20, 4-20 mA, Class 2
- 2 - Dual Retransmit Outputs, 0-5, 0-10 V dc, 0-20, 4-20 mA, Class 2

Language Option
- 1 - English
- 2 - German
- 3 - Spanish
- 4 - French

Display/Custom Options
- XX - Any 2 letters or numbers
SERIES F4 CE

Series F4

WATLOW Electric Manufacturing Company
1241 Bundy Blvd.
Winona, MN 55987 USA

ISO 9001 since 1996.

Declares that the following product:
Designation: Series F4
Model Numbers: F4 (S, D or P) (H or L) – (C, E, F or K) (A, C, E, F or K) (A, C, F, K, 0 or 6) – (0, 1 or 2) (Any three numbers of letters)
Classification: Temperature control, Installation Category II, Pollution degree 2 continuous unmonitored operation, IP65 Front panel
Rated Voltage: 100 to 240 V~ (ac) 50/60 Hz
Rated Power: 39 VA maximum

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

EN 61326-1 2013 Electrical equipment for measurement, control and laboratory use – EMC requirements (Industrial Immunity, Class A* Emissions).
EN 61000-4-2 2009 Electrostatic Discharge Immunity
EN 61000-4-3 2010 Radiated Field Immunity
EN 61000-4-4 2012 Electrical Fast-Transient / Burst Immunity
EN 61000-4-5 2006 Surge Immunity (Reviewed to IEC 61000-4-5 2014)
EN 61000-4-6 2014 Conducted Immunity
EN 61000-4-11 2004 Voltage Dips, Short Interruptions and Voltage Variations Immunity
EN 61000-3-2 2009 Harmonic Current Emissions (Reviewed to IEC 61000-3-2 2014)
EN 61000-3-3 2013 Voltage Fluctuations and Flicker
SEMI F47 2000 Specification for Semiconductor Sag Immunity Figure R1-1
*NOTE: Not appropriate for use in commercial or residential applications without additional filtering.

2006/95/EC Low-Voltage Directive
EN 61010-1 2011 Safety Requirements of electrical equipment for measurement, control and laboratory use. Part 1: General requirements
2 Compliance with 3rd Edition requirements with use of external surge suppressor installed on 230 Vac~ power line units. Recommend minimum 1000 V peak to maximum 2000 V peak, 70 joules or better part be used.

Per 2012/19/EU WEEE Directive Please Recycle Properly

These devices contain lead solder and are not RoHS compliant. They are Industrial Controls and fall outside the scope of 2011/65/EU Directive.

Joe Millanes Winona, Minnesota, USA
Name of Authorized Representative Place of Issue
Director of Operations September 2014
Title of Authorized Representative Date of Issue

Signature of Authorized Representative
File E185611
Project 07NK03422
March 20, 2007

REPORT

on

PROCESS CONTROL EQUIPMENT, ELECTRICAL

Watlow Winona Inc.
Winona, MN

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DESCRIPTION

PRODUCT COVERED:

*USL/CNL  Temperature controllers, PM Series, Models PM followed by 3, 4, 6, 8 or 9, followed by any letter or number, followed by 1, 2, 3, 4, followed by A, C, E, F or K, followed by A, C, H, J or K, followed by any letter or number, followed by A, C, J, L, M, P, R or T, followed by A, C, E, F or K, followed by A, C, H, J, or K, followed by any letter or number, followed by AA or XX where XX is any alphanumeric character

USL/CNL Communications interfaces, EZK Series, Models EZK followed by B, C, D or E followed by L or H, followed by any number 0 – 9, followed by any two letters or number, followed by AA, followed by any two letters or numbers

GENERAL CHARACTER:

*The EZ-ZONE PM Series devices are microprocessor based process controllers intended to control a temperature or other process variable. The EZK Series are communications interfaces to other EZ-ZONE models. They are enclosed in 1/32, 1/16, 1/8 or 1/4 DIN panel mount size.

*The PM Series controls accept thermocouple, thermistor, RTD, or other type process sensing inputs. The output options include heat, cool, event, alarm and communications. The supply and outputs of the control series may be high voltage mains or low voltage/current (SELV, Limited Energy). Mains voltage outputs are controlled by mechanical or solid state relays. Mains voltage supply circuits are isolated from other circuits by a switch mode type transformer. The EZK Series controls accept communications modules only.

These devices are intended to be panel mounted and only the front face (Bezel) of the device is accessible once installed into a panel or enclosure. The front face and gasket were evaluated per the requirements of UL 50, the standard for Enclosures for Electrical Equipment, Eleventh Edition, and are rated Type 4X indoor use. In addition, the front face was subjected to IP 66 tests as outlined in IEC 60529, Degrees of protection provided by enclosures (IP Code), Second Edition.

These devices have not been evaluated for safety or limiting applications.
RATINGS:

Electrical -

INPUTS: PM Series Only

<table>
<thead>
<tr>
<th>Type</th>
<th>Input Rating</th>
<th>Terminals</th>
</tr>
</thead>
<tbody>
<tr>
<td>*Power supply</td>
<td>100-240 V ac, 50/60 Hz; 24V ac, 50/60 Hz; 15-36 V dc, 10 VA max</td>
<td>98-99</td>
</tr>
<tr>
<td>Digital Input 5 (DC Voltage or Contact Closure)</td>
<td>36 V dc, 3 mA max, SELV, Limited Energy</td>
<td>B5-D5</td>
</tr>
<tr>
<td>Digital Input 6 (DC Voltage or Contact Closure)</td>
<td>36 V dc, 3 mA max, SELV, Limited Energy</td>
<td>B5-D6</td>
</tr>
<tr>
<td>Input 1, Thermocouple</td>
<td>SELV, Limited Energy</td>
<td>R1-S1</td>
</tr>
<tr>
<td>Input 1, RTD, Thermistor</td>
<td>SELV, Limited Energy</td>
<td>R1-S1; R1-S1-T1</td>
</tr>
<tr>
<td>Input 1, Process</td>
<td>SELV, Limited Energy</td>
<td>R1-S1; S1-T1</td>
</tr>
<tr>
<td>Input 1, Potentiometer</td>
<td>SELV, Limited Energy</td>
<td>R1-S1</td>
</tr>
<tr>
<td>Input 2, Thermocouple</td>
<td>SELV, Limited Energy</td>
<td>R2-S2</td>
</tr>
<tr>
<td>Input 2, RTD, Thermistor</td>
<td>SELV, Limited Energy</td>
<td>R2-S2; R2-S2-T2</td>
</tr>
<tr>
<td>Input 2, Process</td>
<td>SELV, Limited Energy</td>
<td>R2-S2</td>
</tr>
<tr>
<td>Input 2, Potentiometer</td>
<td>SELV, Limited Energy</td>
<td>R2-S2</td>
</tr>
<tr>
<td>Input 2, Current Transformer</td>
<td>SELV, Limited Energy</td>
<td>S2-T2</td>
</tr>
<tr>
<td>Digital Input board up to 6 digital inputs (DC voltage or Contact Closure)</td>
<td>36 V dc, 3 mA max, SELV, Limited Energy</td>
<td>B7, D7-D12, 27</td>
</tr>
</tbody>
</table>

COMMUNICATION: PM and EZK Series

<table>
<thead>
<tr>
<th>Type</th>
<th>Rating</th>
<th>Terminal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard EIA-485</td>
<td>SELV, Limited Energy</td>
<td>CD, CE, CF</td>
</tr>
<tr>
<td>Modbus RTU or Standard EIA-485</td>
<td>SELV, Limited Energy</td>
<td>CA, CB, CC</td>
</tr>
<tr>
<td>EIA-232/485 Modbus RTU</td>
<td>SELV, Limited Energy</td>
<td>Communications CA, CB, CC, C2, C3, C5</td>
</tr>
<tr>
<td>Ethernet/IP</td>
<td>SELV, Limited Energy</td>
<td>E1-E8</td>
</tr>
<tr>
<td>Devicenet</td>
<td>SELV, Limited Energy</td>
<td>V+, CH, SH, CL, V-</td>
</tr>
<tr>
<td>Profibus</td>
<td>SELV, Limited Energy</td>
<td>E1-E8</td>
</tr>
</tbody>
</table>
### OUTPUTS: PM Series Only

<table>
<thead>
<tr>
<th>Type</th>
<th>Rating</th>
<th>Terminal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital Output 5 (DC Voltage or Contact Closure)</td>
<td>24 V, 24 mA max, SELV, Limited Energy</td>
<td>B5-D5</td>
</tr>
<tr>
<td>Digital Output 6 (DC Voltage or Contact Closure)</td>
<td>24 V, 24 mA max, SELV, Limited Energy</td>
<td>B5-D6</td>
</tr>
<tr>
<td>Output 1, 3 DC/Open Collector</td>
<td>32 V dc, 30 mA max, switched DC, 32 V dc, 100 mA external sourced, SELV, Limited Energy</td>
<td>W1-X1-Y1, W3-X3-Y3</td>
</tr>
<tr>
<td>*Output 1, 3, Mechanical Relay (Form C)</td>
<td>240 V ac, 5 A resistive 30 V dc, 5A resistive 120/240 @ 125 VA 24 V ac @ 25 VA, resistive, 100 K cycles</td>
<td>J1-K1-L1, J3-K3-L3</td>
</tr>
<tr>
<td>Output 1, 3 Universal Process</td>
<td>0-20 mA, 0-10 V dc, SELV, Limited Energy</td>
<td>F1-G1-H1, F3-G3-H3</td>
</tr>
<tr>
<td>Output 1-4 SSR, Form A</td>
<td>20-264 V ac, 0.5 A resistive 120/240 V @ 20 VA pilot duty See derating curve below</td>
<td>L1-K1, L2-K2, L3-K3, L4-K4</td>
</tr>
<tr>
<td>Output 2, 4 Switched DC</td>
<td>32 V dc, 10 mA max SELV</td>
<td>W2-Y2, W4-Y4</td>
</tr>
<tr>
<td>*Output 2, 4 Mechanical Relay (Form A)</td>
<td>240 V ac, 5 A resistive 30 V dc, 5A resistive 120/240 @ 125 VA 24 V ac @ 25 VA, resistive, 100 K cycles</td>
<td>K2-L2, K4-L4</td>
</tr>
<tr>
<td>Digital Output (Switched DC or Open Collector) up to 6 outputs per card.</td>
<td>Switched DC 24-32 V, 80 mA max, SELV, Limited Energy, or Open collector 1.5A maximum for each output or combined total 8A per card.</td>
<td>B7, D7-12, Z7</td>
</tr>
</tbody>
</table>
Temperature - -18 to 65°C

![Graph showing 1 Amp SSR Derating Curve]
NOMENCLATURE

<table>
<thead>
<tr>
<th>PM</th>
<th>C</th>
<th></th>
<th>C</th>
<th>C</th>
<th>A</th>
<th>R</th>
<th>C</th>
<th>A</th>
<th>-</th>
<th>XX</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>II</td>
<td>III</td>
<td>IV</td>
<td>V</td>
<td>VI</td>
<td>VII</td>
<td>VIII</td>
<td>IX</td>
<td>X</td>
<td>XI</td>
</tr>
</tbody>
</table>

I  PM - Series Model Designation

II  DIN Panel Size
3 = 1/32 DIN
6 = 1/16 DIN
8 = 1/8 DIN Vertical
9 = 1/8 DIN Horizontal
4 = 1/4 DIN

III  Unit Primary Function
X = Any letter - designates custom firmware for unit control

IV  Voltage and Digital I/O Options
1 = HV 100-240 V ac no Digital I/O
2 = HV 100-240 V ac two Digital I/O
3 = LV 15-36 V dc / 24 V ac/dc no Digital I/O
4 = LV 15-36 V dc / 24 V ac/dc two Digital I/O

V  Output 1 Options
A = None
C = Switched DC
E = Mechanical Relay Form C - 5 Amps
F = Universal Process Output
K = Solid State Relay - 0.5 Amp

VI  Output 2 Options
A = None
C = Switched DC
H = No-Arc Relay output 15 Amps
J = Mechanical Relay Form A - 5 Amps
K = Solid State Relay - 0.5 Amp

VII  Communications or Digital I/O Options
A = None
1 = 485 Modbus RTU Communications
2 = Modbus RTU 232/484
3 = Ethernet IP/Modbus/TCP
4 = Ethernet with Datalogging
5 = Devicenet
6 = Profibus
C = 6 Digital I/O
D = 6 Digital I/O and EIA 485 Modbus RTU
X = Any letter or number - future communications options

*
| PM | 6 | C | - | 3 | C | C | A | - | R | C | C | A | - | XX |
|----|---|---|---|---|---|---|---|---|---|---|---|---|---|---|----|
| I  | II | III | IV | V | VI | VII | VIII | IX | X | XI | XII |

VIII Auxiliary Control Functions
- A = None
- C = PID control with universal input
- J = PID control with thermistor input
- R = Auxiliary universal input
- P = Auxiliary thermistor input
- T = Current Transformer Input
- L = Integrated Limit Controller with universal input
- M = Integrated Limit controller with thermistor input

IX Output 3 Options
- A = None
- C = Switched DC
- E = Mechanical Relay Form C – 5 Amps
- F = Universal Process Output
- K = Solid State Relay – 0.5 Amp

X Output 4 Options
- A = None
- C = Switched DC
- H = No-Arc Relay output 15 Amps
- J = Mechanical Relay Form A – 5 Amps
- K = Solid State Relay – 0.5 Amp

XI Special software
- A = Standard Firmware
- B = PM Express Firmware
- C = Enhanced Firmware
- X = Any letter or number indicating custom non-critical options

XII Customer firmware/Overlay Options
- AA = Standard Product
- XX = Any two letters or numbers indicating custom non-critical options
NOMENCLATURE

EZK  B  -  J  2  XX  -  A  A  XX
   I  II  III  IV  V  VI  VII  VIII

   I  EZK - Series Communications Interface

   II  DIN Panel Size
       B = 1/16 DIN
       C = 1/8 DIN Vertical
       D = 1/8 DIN Horizontal
       E = 1/4 DIN

   III  Power Supply Options
       L = Low Voltage 15 – 36 V dc, 24 Vac 50/60 Hz
       H = High Voltage 100 – 240 Vac 50/60 Hz

   IV  Communications Options
       2 = EIA 232/485 Modbus RTU
       3 = Eithernet/IP / Modbus TCP
       5 = Devicenet
       6 = Profibus

   V  Custom options
       AA = Standard Product
       XX = Any two letter or numbers indicating custom firmware or logo.

   VI  Future Option
       A = None

   VII  Future Option
       A = None

   VIII  Firmware Options
       AA = None
       XX = Any two letters or numbers indicating custom defaults or firmware options.
REPORT on PROCESS CONTROL EQUIPMENT FOR USE IN HAZARDOUS LOCATIONS

Watlow Winona, Inc.
Winona, MN
DESCRIPTION

PRODUCT COVERED:

*USL/CNL  Class I, Division 2, Groups A, B, C, and D Hazardous Locations

Temperature controllers, PM Series, Models PM followed by 3, 4, 6, 8 or 9 followed by any letter or number, followed by 1, 2, 3, 4, followed by A, C, F or K, followed by A, C or K, followed by any letter or number, followed by A, C, J, R, P or T, followed by A, C, F or K, followed by any letter or number, followed by 12 or XX where XX is any alphanumeric character

Communications Interfaces, EZK Series, Models EZK followed by B, C, D or E, followed by L or H, followed by 2, 3, 5 or 6, followed by any two letters or numbers, followed by A, followed by A, followed by 12 or any two numbers or letters.

GENERAL CHARACTER:

* The EZ-ZONE PM Series devices are microprocessor based process controllers intended to control a temperature or other process variable. The EZK model series are communication interfaces used with other EZ-ZONE model. They are enclosed in 1/32, 1/16, 1/8 or 1/4 DIN panel mount size.

The PM Series controls accept thermocouple, thermistor, RTD, or other type process sensing inputs. The output options include heat, cool, event, alarm and communications. The supply and outputs of the control series may be high voltage mains or low voltage/current (SELV, Limited Energy). Mains voltage outputs are controlled by mechanical or solid state relays. Mains voltage supply circuits are isolated from other circuits by a switch mode type transformer. The EZK Series are identical to the PM Series except for PID Control Card and Process Control Card. These cards are not provided with EZK Series. See Ill. 14 for the model difference details between PM and EZK Series.

These devices are intended to be panel mounted and only the front face (Bezel) of the device is accessible once installed into a panel or enclosure. The front face and gasket were evaluated per the requirements of UL 50, the standard for Enclosures for Electrical Equipment, Eleventh Edition, and are rated Type 4X. In addition, the front face was subjected to IP 66 tests as outlined in IEC 60529, Degrees of protection provided by enclosures (IP Code), Second Edition.

These devices have not been evaluated for safety or limiting applications.
**RATINGS:**

**Electrical**

**INPUTS: PM Series Only**

<table>
<thead>
<tr>
<th>Type</th>
<th>Input Rating</th>
<th>Terminals</th>
</tr>
</thead>
<tbody>
<tr>
<td>*Power supply</td>
<td>100-240 V ac, 50/60 Hz; 24 V ac, 50/60 Hz; 15-36 V dc, 10 VA max</td>
<td>98-99</td>
</tr>
<tr>
<td>Digital Input 5 (DC Voltage or Contact Closure)</td>
<td>36 V dc, 3 mA max, SELV, Limited Energy</td>
<td>B5-D5</td>
</tr>
<tr>
<td>Digital Input 6 (DC Voltage or Contact Closure)</td>
<td>36 V dc, 3 mA max, SELV, Limited Energy</td>
<td>B5-D6</td>
</tr>
<tr>
<td>Input 1, Thermocouple</td>
<td>SELV, Limited Energy</td>
<td>R1-S1</td>
</tr>
<tr>
<td>Input 1, RTD, Thermistor</td>
<td>SELV, Limited Energy</td>
<td>R1-S1; R1-S1-T1</td>
</tr>
<tr>
<td>Input 1, Process</td>
<td>SELV, Limited Energy</td>
<td>R1-S1</td>
</tr>
<tr>
<td>Input 1, Potentiometer</td>
<td>SELV, Limited Energy</td>
<td>R2-S2</td>
</tr>
<tr>
<td>Input 2, RTD, Thermistor</td>
<td>SELV, Limited Energy</td>
<td>R2-S2; R2-S2-T2</td>
</tr>
<tr>
<td>Input 2, Process</td>
<td>SELV, Limited Energy</td>
<td>R2-S2</td>
</tr>
<tr>
<td>Input 2, Potentiometer</td>
<td>SELV, Limited Energy</td>
<td>S2-T2</td>
</tr>
<tr>
<td>Digital Input Board up to 6 digital inputs (DC voltage or Contact Closure)</td>
<td>36 V dc, 3 mA max, SELV, Limited Energy</td>
<td>B7, D7-D12, 27</td>
</tr>
</tbody>
</table>

**COMMUNICAITON: PM and EZK Series**

<table>
<thead>
<tr>
<th>Type</th>
<th>Rating</th>
<th>Terminal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard EIA-485</td>
<td>SELV, Limited Energy</td>
<td>CD, CE, CF</td>
</tr>
<tr>
<td>Modbus RTU or Standard EIA-485</td>
<td>SELV, Limited Energy</td>
<td>CA, CB, CC</td>
</tr>
<tr>
<td>EIA-232/485 Modbus RTU</td>
<td>SELV, Limited Energy</td>
<td>Communications CA, CB, CC, C2, C3, C5</td>
</tr>
<tr>
<td>Ethernet/IP</td>
<td>SELV, Limited Energy</td>
<td>E1-E8</td>
</tr>
<tr>
<td>Devicenet</td>
<td>SELV, Limited Energy</td>
<td>V+, CH, SH, CL, V-</td>
</tr>
<tr>
<td>Profibus</td>
<td>SELV, Limited Energy</td>
<td>E1-E8</td>
</tr>
</tbody>
</table>
OUTTTTTEEESSSS:  **PM Series Models only.**

<table>
<thead>
<tr>
<th>Type</th>
<th>Rating</th>
<th>Terminal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital Output 5 (DC Voltage or Contact Closure)</td>
<td>24 V, 24 mA max, SELV, Limited Energy</td>
<td>B5-D5</td>
</tr>
<tr>
<td>Digital Output 6 (DC Voltage or Contact Closure)</td>
<td>24 V24 mA max, SELV, Limited Energy</td>
<td>B5-D6</td>
</tr>
<tr>
<td>*Output 1, 3 DC/Open Collector</td>
<td>32 V dc, 30 mA max, <strong>switched dc</strong>, 32 V dc, 100 mA external sourced, SELV, Limited Energy</td>
<td>W1-X1-Y1, W3-X3-Y3</td>
</tr>
<tr>
<td>Output 1, 3 Universal Process</td>
<td>0-20 mA, 0-10 V dc, SELV, Limited Energy</td>
<td>F1-G1-H1, F3-G3-H3</td>
</tr>
<tr>
<td>*Output 1-4 SSR, Form A</td>
<td>20-264 V ac, 0.5 A resistive 120/240 V @ 20 VA pilot duty <em>See derating curve below.</em></td>
<td>L1-K1, L2-K2, L3-K3, L4-K4</td>
</tr>
<tr>
<td>Output 2, 4 Switched DC</td>
<td>32 V dc, 10 mA max SELV</td>
<td>W2-Y2, W4-Y4</td>
</tr>
<tr>
<td><em>Digital Output (Switched DC or Open Collector) up to 6 outputs per card.</em></td>
<td>Switched DC 24-32 V, 80 mA max, SELV, Limited Energy, or Open collector 1.5A maximum for each output or combined total 8A per card.</td>
<td>B7, D7-12, Z7</td>
</tr>
</tbody>
</table>
Temperature - -18 to 65°C
### NOMENCLATURE

| PM | 6 | C | – | 3 | C | C | A | – | R | C | C | A | – | XX |
|----|---|---|---|---|---|---|---|---|---|---|---|---|---|---|----|
| I  | II | III | IV | V | VI | VII | VIII | IX | X | XI | XII |

**I** PM - Series Model Designation

**II** DIN Panel Size
- 3 = 1/32 DIN
- 6 = 1/16 DIN
- 8 = 1/8 DIN Vertical
- 9 = 1/8 DIN Horizontal
- 4 = 1/4 DIN

**III** Unit Primary Function
- C = Control
- R = Ramping Control
- X = Any letter - designates custom firmware

**IV** Voltage and Digital I/O Options
- 1 = HV 100-240 V ac no Digital I/O
- 2 = HV 100-240 V ac two Digital I/O
- 3 = LV 15-36 V dc / 24 V ac/dc no Digital I/O
- 4 = LV 15-36 V dc / 24 V ac/dc two Digital I/O

**V** Output 1 Options
- A = None
- C = Switched DC
- F = Universal Process Output
- K = Solid State Relay - 0.5 Amp

**VI** Output 2 Options
- A = None
- C = Switched DC
- K = Solid State Relay - 0.5 Amp

* **VII** Communications or Digital I/O Options
- A = None
- 1 = 485 Modbus RTU Communications
- 2 = RS232 or 485 Modbus RTU Communications
- 3 = Ethernet
- 5 = DeviceNet
- 6 = Profinet
- C = 6 Digital I/O
- D = 6 Digital I/O and EIA 485 Modbus RTU
- X = Any letter or number - future communications options.

*
VIII Auxiliary Control Functions
   A = None
   C = PID control with universal input
   J = PID control with thermistor input
   R = Auxiliary universal input
   P = Auxiliary thermistor input
   T = Current Transformer Input

IX Output 3 Options
   A = None
   C = Switched DC
   F = Universal Process Output
   K = Solid State Relay – 0.5 Amp

X Output 4 Options
   A = None
   C = Switched DC
   K = Solid State Relay – 0.5 Amp

* XI Special software
   A = Standard Firmware
   B = PM Express
   C = Enhanced Firmware
   X = Any letter or number indicating custom non-critical software options

XII Customer firmware/Overlay Options
   12 = Standard Product
   XX = Any two letters or numbers indicating custom non-critical options

NOMENCLATURE

<table>
<thead>
<tr>
<th>EZK</th>
<th>B</th>
<th>J</th>
<th>2</th>
<th>XX</th>
<th>A</th>
<th>A</th>
<th>XX</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>II</td>
<td>III</td>
<td>IV</td>
<td>V</td>
<td>VI</td>
<td>VII</td>
<td>VIII</td>
</tr>
</tbody>
</table>

   I EZK – Series Communications Interface

   II DIN Panel Size
   B = 1/16 DIN
   C = 1/8 DIN Vertical
   D = 1/8 DIN Horizontal
   E = 1/4 DIN

   III Power Supply Options
   L = Low Voltage 15 – 36 V dc, 24 Vac 50/60 Hz
   H = High Voltage 100 – 240 Vac 50/60 Hz
IV Communications Options
2 = EIA 232/485 Modbus RTU
3 = Ethernet/IP / Modbus TCP
5 = Devicenet
6 = Profinet

V Custom options
AA = Standard Product
XX = Any two letter or numbers indicating custom firmware or logo.

VI Future Option
A = None

VII Future Option
A = None

VIII Firmware Options
12 = Standard indication of hazardous locations approval
XX = Any two letters or numbers indicating custom defaults or firmware options.

TECHNICAL CONSIDERATIONS (NOT FOR FIELD REPRESENTATIVE’S USE):

Special Considerations - The following items are considerations that were used when evaluating this product.

* USL indicates investigation to US standard 61010-1, the Standard for Electrical Equipment for Measurement, Control, and Laboratory Use; Part 1: General Requirements; ANSI/ISA-12.12.01-2012, Nonincendive Electrical equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations, Approved 9 July 2012.

CNL indicates investigation to Canadian Standard CAN/CSA-C22.2 No. 61010-1-04, Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use - Part 1: General Requirements; CAN/CSA-C22.2 No. 213-1987, Non-incendive Electrical Equipment for Use in Class I, Division 2 Hazardous Locations

These devices have also been evaluated to UL 61010-1 and CAN/CSA-C22.2 No. 61010-1-04. This evaluation is covered in the Applicant’s File E185611, Issue dated 2007-03-20.

The device was submitted and tested for a maximum manufacturer’s recommended ambient (T_{mra}) of 65°C.

Clauses 9a (Single Fault) and 9c (Fire Containment within Enclosure) were utilized to demonstrate compliance for protection against the spread of fire.

The equipment is considered:
- Fixed (stationary)
- Permanently Connected
- Installation Category II
- Pollution Degree 2
Certificate of Compliance

Certificate: 2016623 (LR 30586)  
Master Contract: 158031  
Project: 2505572  
Date Issued: April 5, 2012  
Issued to: Wattlow Winona, Inc.  
1241 Bundy Blvd  
WINONA, MN 55987  
USA  
Attention: Larry Glentz

The products listed below are eligible to bear the CSA Mark shown

Rajinder Jakhu  
Issued by: Rajinder Jakhu

PRODUCTS
CLASS 4813 02 - TEMPERATURE-INDICATING AND REGULATING EQUIPMENT -
Other Than Appliance Type

Temperature Controllers, Model Series PM followed by followed by 3, 4, 6, 8 or 9 followed by any letter or number, followed by 1, 2, 3, 4, followed by A, C, E, F or K, followed by A, C, H, J or K, followed by any letter or number, followed by A, C, J, L, M, P, R or T, followed by A, C, E, F or K, followed by A, C, H, J, or K, followed by any letter or number, followed by AA or XX where XX is any alphanumeric character. Control Power 15 to 36 V dc/24 Vac or 100-240 Vac/dc, 50/60 Hz, 10 VA PM 3, 6 models, 14 VA PM4, 8, 9 models. The front panel of these devices are Type 1, Type 4 (Indoor Use Only) approved for indoor use when properly mounted with integrated gasket.

Temperature Controllers, Model Series EZK followed by A, B, C, D or E followed by A, L or H, followed by any number 0 – 9, followed by any two numbers or letters, followed by A, followed by A, followed by any two numbers or letters. Control Power 15 to 36 V dc/24 Vac or 100-240 Vac/dc, 50/60 Hz, 10 VA. The front panel of these devices are Type 1, Type 4 (Indoor Use Only) approved for indoor use when properly mounted with integrated gasket.

Input:
Model PM3, PM6: 15 to 36 V dc/24 V ac, 50/60 Hz; 100-240 V ac/dc, 50/60 Hz max 10 VA.
Model PM4, PM8, PM9: 15 to 36 V dc/24 V ac, 50/60 Hz; 100-240 V ac/dc, 50/60 Hz max 14 VA.
Model EZK: 15 to 36 V dc/24 V ac, 50/60 Hz; 100-240 V ac/dc, 50/60 Hz max 10 VA.
Output:

Model PM Output 1 to 4 Option C: Switched DC to control Solid State Relay Class 2 DC
Model PM Output 1 to 4 Option K: Solid state relay rated 0.5 A resistive 24-240 V ac, 20 VA pilot duty 120/240 V ac, 100,000 cycles
Model PM Output 1 to 4 Option E or J: Mechanical relay rated 5 A resistive 20-240 V ac, 125 VA pilot duty 120/240 V ac, 25 VA 24 V ac, 100,000 cycles
Model PM Output 2 or 4 Option H: Mechanical relay rated 15 A resistive 100-240 V ac 500,000 cycles.
Model EZK output options: Class 2 communications interface only.

Notes:

1. These controls are intended for temperature indicating and regulating functions only. They have not been evaluated for safety and limiting functions.
2. This equipment was tested for 65°C maximum ambient temperature.
3. This equipment is certified only for use in complete assemblies where the suitability of the combination is to be determined by the CSA international.
4. See report for complete breakdown of model number configurations.

APPLICABLE REQUIREMENTS

CSA C22.2 No. 24-93 - Temperature-Indicating and -Regulating Equipment - Eighth edition (UPD 2)
Supplement to Certificate of Compliance

Certificate: 2016623  Master Contract: 158031

The products listed, including the latest revision described below, are eligible to be marked in accordance with the referenced Certificate.

Product Certification History

<table>
<thead>
<tr>
<th>Project</th>
<th>Date</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2505572</td>
<td>April 5, 2012</td>
<td>Use alternate components for obsolete parts in Low Voltage Power Supply board and changes to PCB layout. Add alternate terminal block.</td>
</tr>
<tr>
<td>2386129</td>
<td>January 5, 2011</td>
<td>Alternate relays PE0 and RT3 for PM series controller.</td>
</tr>
<tr>
<td>2335223</td>
<td>September 2, 2010</td>
<td>Addition of larger package sizes PM8, PM9 and PM4.</td>
</tr>
<tr>
<td>2122807</td>
<td>December 23, 2008</td>
<td>Add a limited feature set software to Series PM; add the long case EZK Model Series: add some alternate terminal blocks to be used with the product and update ratings on terminal blocks as manufacturer of terminal has updated ratings.</td>
</tr>
<tr>
<td>2016623</td>
<td>May 27, 2008</td>
<td>Original Certification.</td>
</tr>
</tbody>
</table>
SERIES EZ-ZONE® PM CE

Series EZ-ZONE® PM

WATLOW Electric Manufacturing Company
1241 Bundy Blvd.
Winona, MN 55987 USA

ISO 9001 since 1996.

Declares that the following product:

Designation: Series EZ-ZONE® PM (Panel Mount)
Model Numbers: PM (3, 6, 8, 9 or 4)(Any letter or number) – (1, 2, 3 or 4)(A, C, E, F or K) (A, C, H, J or K) (Any letter or number) – (Any letter or number)(A, C, E, F or K) (A, C, H, J or K) (Any three letters or numbers)
Classification: Temperature control, Installation Category II, Pollution degree 2, IP65
Rated Voltage and Frequency: 100 to 240 V~ (ac 50/60 Hz) or 15 to 36 V\textsuperscript{d}c/ 24 V~ac 50/60 Hz
Rated Power Consumption: 10 VA maximum PM3, PM6 Models. 14 VA maximum PM8, PM9, PM4 Models

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


<table>
<thead>
<tr>
<th>EN 61326-1</th>
<th>2013</th>
<th>Electrical equipment for measurement, control and laboratory use – EMC requirements (Industrial Immunity, Class B Emissions).</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 61000-4-2</td>
<td>2009</td>
<td>Electrostatic Discharge Immunity</td>
</tr>
<tr>
<td>EN 61000-4-3</td>
<td>2010</td>
<td>Radiated Field Immunity 10V/M 80–1000 MHz, 3 V/M 1.4–2.7 GHz</td>
</tr>
<tr>
<td>EN 61000-4-4</td>
<td>2012</td>
<td>Electrical Fast-Transient / Burst Immunity</td>
</tr>
<tr>
<td>EN 61000-4-5</td>
<td>2006</td>
<td>Surge Immunity (Also compliant with IEC 61000-4-5 2014)</td>
</tr>
<tr>
<td>EN 61000-4-6</td>
<td>2014</td>
<td>Conducted Immunity</td>
</tr>
<tr>
<td>EN 61000-4-11</td>
<td>2004</td>
<td>Voltage Dips, Short Interruptions and Voltage Variations Immunity</td>
</tr>
<tr>
<td>EN 61000-3-2</td>
<td>2009</td>
<td>Harmonic Current Emissions (Also compliant with IEC 61000-3-2 2014)</td>
</tr>
<tr>
<td>EN 61000-3-3\textsuperscript{1}</td>
<td>2013</td>
<td>Voltage Fluctuations and Flicker</td>
</tr>
<tr>
<td>SEMI F47</td>
<td>2000</td>
<td>Specification for Semiconductor Sag Immunity Figure R1-1</td>
</tr>
</tbody>
</table>

\textsuperscript{1}For mechanical relay loads, cycle time may need to be extended up to 160 seconds to meet flicker requirements depending on load switched and source impedance.

**2006/95/EC Low-Voltage Directive**

| EN 61010-1 | 2011\textsuperscript{2} | Safety Requirements of electrical equipment for measurement, control and laboratory use. Part 1: General requirements |

\textsuperscript{2}Compliance with 3rd Edition requirements with use of external surge suppressor installed on 230 Vac~ power line units. Recommend minimum 1000 V peak to maximum 2000 V peak, 70 joules or better part be used.

**Compliant with 2011/65/EU RoHS2 Directive**

Per 2012/19/EU W.E.E.E Directive / Please Recycle Properly.

Joe Millanes  
Name of Authorized Representative  
Winona, Minnesota, USA  
Place of Issue

Director of Operations  
September 2014  
Date of Issue

Signature of Authorized Representative
SERIES F4T UL®
CERTIFICATE OF COMPLIANCE

Certificate Number 20140802-E185611
Report Reference E185611-A6-UL
Issue Date 2014-August-02

Issued to: WATLOW WINONA INC
1241 BUNDY BLVD PO BOX 5580 WINONA MN 55987

This is to certify that representative samples of PROCESS CONTROL EQUIPMENT, ELECTRICAL
Temperature Controller F4T Control Series, Models F4, followed by T, followed by any two letters or numbers, followed by A or any letter or number, followed by 1, 2, 3, 4, 5, 6, 7 or 8, followed by any letter or number, followed by AA, followed by any two letters or numbers, followed by any three letters of numbers

Have been investigated by UL in accordance with the Standard(s) indicated on this Certificate.

Standard(s) for Safety: UL 61010-1, CAN/CSA-C22.2 No. 61010-1 ELECTRICAL EQUIPMENT FOR MEASUREMENT, CONTROL, AND LABORATORY USE

Additional Information: See the UL Online Certifications Directory at www.ul.com/database for additional information

Only those products bearing the UL Listing Mark for the US and Canada should be considered as being covered by UL's Listing and Follow-Up Service meeting the appropriate requirements for US and Canada.

The UL Listing Mark for the US and Canada generally includes: the UL in a circle symbol with "C" and "US" identifiers; the word "LISTED"; a control number (may be alphanumeric) assigned by UL; and the product category name (product identifier) as indicated in the appropriate UL Directory.

Look for the UL Listing Mark on the product.

William R. Carney, Director, North American Certification Programs
UL LLC
Any information and documentation involving UL Mark services are provided on behalf of UL LLC (UL) or any authorized Licensee of UL. For questions, please contact a local UL Customer Service Representative at www.ul.com/customer-service.
Series F4T

WATLOW Electric Manufacturing Company
1241 Bundy Blvd.
Winona, MN 55987 USA

Declares that the following products:

**Designation:** Series F4T ¼ DIN Control

**Model Numbers:**
- F4T X X (1 to 8) – X AA XX X – XXX
  - X = any number or letter.

**Classification:**
- Process Controller Base Installation Category II,
  - rated IP65 or IP40 if flush mount option is used.

**Rated Voltage and Frequency:**
- High Voltage 100 – 240 Vac 50/60 Hz, F4TXX(1, 2, 3, 4)
- Low Voltage 24 – 28 Vac/dc 50/60 Hz, F4TXX(5, 6, 7, 8)

**Rated Power Consumption:**
- Up to 23 Watts with six modules loaded.

Only the front display is considered part of the ultimate enclosure, the unit is considered an open type process control, it requires an ultimate enclosure and at least one WATLOW EZ-ZONE® FM “Flex Module” to have a useful function. All Flex Modules were tested as part of F4T system for compliance with the following directives.

### 2004/108/EC Electromagnetic Compatibility Directive

<table>
<thead>
<tr>
<th>Directive</th>
<th>Year</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 61326-1</td>
<td>2013</td>
<td>Electrical equipment for measurement, control and laboratory use – EMC requirements (Industrial Immunity, Group 1 Class A¹ Emissions).</td>
</tr>
<tr>
<td>EN 55011</td>
<td>2010</td>
<td>Electrostatic Discharge Immunity</td>
</tr>
<tr>
<td>EN 61000-4-2</td>
<td>2009</td>
<td>Radiated Field Immunity</td>
</tr>
<tr>
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<td>Harmonic Current Emissions (Reviewed to IEC 61000-3-2 2014)</td>
</tr>
<tr>
<td>EN 61000-3-3²</td>
<td>2013</td>
<td>Voltage Fluctuations and Flicker</td>
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<tr>
<td>SEMI F47</td>
<td>2000</td>
<td>Specification for Semiconductor Sag Immunity Figure R1-1</td>
</tr>
</tbody>
</table>

¹NOTE: Not for use in Commercial or Residential locations without additional emissions protection.
²NOTE: To comply with flicker requirements cycle time may need to be up to 160 seconds if load current is at 15A, or the maximum source impedance needs to be < 0.13Ω. Unit power of F4T model complies with 61000-3-3 requirements.

### 2006/95/EC Low-Voltage Directive

<table>
<thead>
<tr>
<th>Directive</th>
<th>Year</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 61010-1</td>
<td>2011</td>
<td>Safety Requirements of electrical equipment for measurement, control and laboratory use. Part 1: General requirements</td>
</tr>
</tbody>
</table>

Compliant with 2011/65/EU RoHS2 Directive


---

Joe Millanes
Name of Authorized Representative
Winona, Minnesota, USA
Place of Issue

Directory of Operations
September 2014

Title of Authorized Representative
Date of Issue

Signature of Authorized Representative
CERTIFICATE OF COMPLIANCE

Certificate Number 20130625-E185611
Report Reference E185611-A3-UL
Issue Date 2013-JUNE-25

Issued to: WATLOW WINONA INC
1241 BUNDY BLVD
PO BOX 5580
WINONA MN 55987

This is to certify that COMPONENT - PROCESS CONTROL EQUIPMENT, ELECTRICAL
See Addendum Page

Have been investigated by UL in accordance with the Standard(s) indicated on this Certificate.

Standard(s) for Safety: See Addendum Page For Standards
Additional Information: See the UL Online Certifications Directory at www.ul.com/database for additional information

Only those products bearing the UL Recognized Component Marks for the U.S. and Canada should be considered as being covered by UL's Recognition and Follow-Up Service and meeting the appropriate U.S. and Canadian requirements.

The UL Recognized Component Mark for the U.S. generally consists of the manufacturer's identification and catalog number, model number or other product designation as specified under "Marking" for the particular Recognition as published in the appropriate UL Directory. As a supplementary means of identifying products that have been produced under UL's Component Recognition Program, UL's Recognized Component Mark: UL may be used in conjunction with the required Recognized Marks. The Recognized Component Mark is required when specified in the UL Directory preceding the recognition or under "Markings" for the individual recognitions. The UL Recognized Component Mark for Canada consists of the UL Recognized Mark for Canada: AU and the manufacturer's identification and catalog number, model number or other product designation as specified under "Marking" for the particular Recognition as published in the appropriate UL Directory.

Recognized components are incomplete in certain constructional features or restricted in performance capabilities and are intended for use as components of complete equipment submitted for investigation rather than for direct separate installation in the field. The final acceptance of the component is dependent upon its installation and use in complete equipment submitted to UL LLC.

Look for the UL Recognized Component Mark on the product.

[Signature]
William R. Corney, Director, North American Certification Programs
UL LLC

Any information and documentation showing UL Mark services are provided on behalf of UL LLC (UL) or any authorized licensee of UL. For questions, please contact a local UL Customer Service Representative at www.ul.com/callcenter.

Page 1 of 2
CERTIFICATE OF COMPLIANCE

Certificate Number 20130625-E185611
Report Reference E185611-A3-UL
Issue Date 2013-JUNE-25

This is to certify that representative samples of the product as specified on this certificate were tested according to the current UL requirements.

Process control,
Temperature control module cards, CC, PM, RM EZ-Zone Controllers

A007-2775-0000, A007-2776-0000, A007-2777-0000, A007-2778-0000, A007-2779-0000, A007-2814-0001, A007-2815-0000, A007-2828-0000, A007-2829-0000, A007-2830-0000, A007-2831-0000, A007-2832-0000, A007-2833-0000, A007-2835-0000, A007-2836-0000, A007-2841-0000, A007-2842-0000, A007-2948-0000, A007-2978-0000, A007-2884-0000, A007-2907-0000, A007-2908-0000, A007-2909-0000, A007-2910-0000, A007-2911-0000, A007-2912-0000, A007-2937-0000, A007-2939-0000A007-3002-0000, A007-3003-0000, A007-3004-0000, A007-3005-0000, A007-3006-0000, A007-2940-0000.

Standard(s) for Safety:

UL 61010-1-Safety Requirements For Electrical Equipment For Measurement, Control, And Laboratory Use - Part 1: General Requirements
CSA C22.2 NO. 61010-1-Safety Requirements For Electrical Equipment For Measurement, Control, And Laboratory Use — Part 1: General Requirements

[Signature]
William R. Canney, Director, North American Certification Programs
UL LLC

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Page 2 of 2
SERIES FM (Flex Modules) CE

Series EZ-ZONE® Flex Modules

WATLOW Electric Manufacturing Company

1996.
1241 Bundy Blvd.
Winona, MN 55987 USA

Declarations:

Series EZ-ZONE® Flex Modules

Designation:

Model Numbers:

Classification:

Rated Voltage and Frequency:

Rated Power Consumption:

Flex Modules are considered components and have no function in and of themselves, it is only when installed in a Watlow EZ-ZONE® CC or F4T Base enclosure that they have useful function. Modules were tested as part of these systems for compliance with the following directives.


EN 61326-1 2013 Electrical equipment for measurement, control and laboratory use – EMC requirements (Industrial Immunity, Class B Emissions).

2006/95/EC Low-Voltage Directive

EN 61010-1:2011 ED3 All FM’s in all bases are compliant with this standard.
EN 60730-1:2011
EN 60730-2-9:2010

Compliant output options.
When in EZ-ZONE® CC Base.

2011/65/EC RoHS2 Directive


See the Declarations of Conformity for Watlow EZ-ZONE® CC and F4T models for further details on standards used for compliance.

Joe Millanes
Name of Authorized Representative

Winona, Minnesota, USA
Place of Issue

Directory of Operations
September 2014
Date of Issue

Signature of Authorized Representative
SERIES EZ-ZONE® RM UL®

CERTIFICATE OF COMPLIANCE

Certificate Number 20141105-E185611
Report Reference E185611-A1-UL
Issue Date 2014-NOVEMBER-05

Issued to: WATLOW WINONA INC
1241 BUNDY BLVD
PO BOX 5580
WINONA MN 55987

This is to certify that representative samples of PROCESS CONTROL EQUIPMENT, ELECTRICAL See Addendum Page

Have been investigated by UL in accordance with the Standard(s) indicated on this Certificate.

Standard(s) for Safety: UL 61010-1 Safety Requirements For Electrical Equipment For Measurement, Control, And Laboratory Use - Part 1: General Requirements CAN/CSA C22.2 NO. 61010-1 Safety Requirements For Electrical Equipment For Measurement, Control, And Laboratory Use — Part 1: General Requirements

Additional Information: See the UL Online Certifications Directory at www.ul.com/database for additional information

Only those products bearing the UL Certification Mark should be considered as being covered by UL's Certification and Follow-Up Service.

Look for the UL Certification Mark on the product.

Bruce Miedenbach, Assistant Chief Engineer, Global Inspection and Field Services
UL LLC

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Page 1 of 2
SERIES E7-ZONE® RM UI®

CERTIFICATE OF COMPLIANCE

Certificate Number 20141105-E185611
Report Reference E185611-A1-UL
Issue Date 2014-NOVEMBER-05

This is to certify that representative samples of the product as specified on this certificate were tested according to the current UL requirements.

Process control

Temperature controllers, RM Series.


Access module, RM Series, Models RMA; followed by A, B, C, D, E, F, G, H, J, K, L, M, N, P, R, S, T, U, Y or Z; followed by any letter or number; followed by A or B; followed by A, B, C, D, E, F, G, H, J, K, L, M, N, P, R, S, T, U, Y or Z; followed by any letter or number; followed by AA; followed by any three numbers or letters.

High Density Controller module, RM Series, Models RMH; followed by A, B, C, D, E, F, G, H, J, K, L, M, N, P, R, S, T, U, Y or Z; followed by any letter or number; followed by AA; followed by any three numbers or letters.


Refer to Supplement 7-07 for nomenclature

Bruce Marenholz, Assistant Chief Engineer, Global Inspection and Field Services

UL LLC

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SERIES EZ-ZONE® RM Class 1 DIV. 2 UL®

CERTIFICATE OF COMPLIANCE

Certificate Number 20141103-E184390
Report Reference E184390-20081022
Issue Date 2014-NOVEMBER-03

Issued to: WATLOW WINONA INC
1241 BUNDY BLVD
PO BOX 5580
WINONA MN 55987

This is to certify that PROCESS CONTROL EQUIPMENT FOR USE IN
representative samples of HAZARDOUS LOCATIONS
Refer to Addendum Page for Models

Have been investigated by UL in accordance with the
Standard(s) indicated on this Certificate.

Standard(s) for Safety: ANSI/ISA-12.12.01-2013 - Nonincendive Equipment
CSA C22.2 No. 213-M1987 - Non-incendive Electrical Equipment

Additional Information: See the UL Online Certifications Directory at
www.ul.com/database for additional information

Only those products bearing the UL Certification Mark should be considered as being covered by UL's
Certification and Follow-Up Service.

Look for the UL Certification Mark on the product.

[Signature]
Briana Mathenole, Assistant Chief Engineer, Global Inspection and Field Services
UL LLC

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SERIES EZ-ZONE® RM Class 1 DIV. 2 UL®

CERTIFICATE OF COMPLIANCE

Certificate Number 20141103-E184390
Report Reference E184390-20081022
Issue Date 2014-NOVEMBER-03

This is to certify that representative samples of the product as specified on this certificate were tested according to the current UL requirements.

Class I, Division 2, Groups A, B, C, and D Hazardous Locations

Temperature controllers, RM Series, Models RMC; followed by 1, 2, 3, 4, 7 or 9; followed by A, E, G, N, P, S, T, U or Z; followed by A, 1, 2, 7, 9, R or P; followed by A, E, G, N, P, S, T, U or Z; followed by A, 1, 2, 7, 9, R or P; followed by A, E, G, N, P, S, T, U or Z; followed by A, C, E, G, N, P, S, T, U or Z; followed by A or F; followed by any three numbers or letters

Expansion module, RM Series, Models RME; followed by A, F, R or S; followed by A, C, F, K, L or T; followed by A, C, F, L or T; followed by A, C, F, K, L or T; followed by A, C, F, L or T; followed by AA; followed by any two numbers or letters

Access module, RM Series, Models RMA; followed by A, F or S; followed by A; followed by any number or letter; followed by A or B; followed by A, B, U, Y or D; followed by AA; followed by any two numbers or letters

High Density Controller module, RM Series, Models RMH; followed by A, F or S; followed by 1, 2 or T; followed by A, 1, 2 or T; followed by 1, 2, A, C, F, L or T; followed by 1, 2, A, C, F, L or T; followed by A; followed by any three numbers or letters

High Density Sensor module, RM Series, Models RMS; followed by A, F or S; followed by R, P or T; followed by A, R, P or T; followed by A, C, D, R, P or T; followed by A, C, R, P or T; followed by A; followed by any three numbers or letters

Fiber Optic Sensor module, RM Series, Models RMF; followed by A; followed by A or 1 through 8; followed by A or T; followed by AA; followed by A; followed by A; followed by any two numbers

EtherCat/Optical Input module; RM Series, Models RMZ; followed by 4; followed by any two letters or numbers; followed by AA or 04; followed by A or B; followed by A; followed by any two numbers

Bruce Mahrenholz, Assistant Chief Engineer, Global Inspection and Field Services
UL LLC

Any information and documentation involving UL Mark services are provided on behalf of UL LLC (UL) or any authorized licensee of UL. For questions, please contact a local UL Customer Service Representative at www.ul.com/contactus
Declaration of Conformity

EZ Zone Series RM

WATLOW Electric Manufacturing Company
1241 Bundy Blvd.
Winona, MN 55987 USA

Declares that the following Series RM (Rail Mount) products:

Model Numbers: RM followed by additional letters or numbers describing use of up to four module options of various inputs and outputs or communications.

Classification: Temperature control, Installation Category II, Pollution degree 2

Voltage and Frequency: SELV 24 to 28 V ac 50/60 Hz or dc

Power Consumption: RMA models 4 Watts, any other RM model 7 Watts

Environmental Rating: IP20

Meet the essential requirements of the following European Union Directives by using the relevant standards show below to indicate compliance.


<table>
<thead>
<tr>
<th>Standard</th>
<th>Year</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 61326-1</td>
<td>2013</td>
<td>Electrical equipment for measurement, control and laboratory use – EMC requirements, Industrial Immunity, Class A Emissions (Not for use in a Class B environment without additional filtering).</td>
</tr>
<tr>
<td>EN 61000-4-2</td>
<td>2009</td>
<td>Electrostatic Discharge Immunity</td>
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<tr>
<td>EN 61000-4-3</td>
<td>2010</td>
<td>Radiated Field Immunity</td>
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<tr>
<td>EN 61000-4-4</td>
<td>2012</td>
<td>Electrical Fast-Transient / Burst Immunity</td>
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<tr>
<td>EN 61000-4-5</td>
<td>2006</td>
<td>Surge Immunity (Reviewed to IEC 61000-4-5 2014)</td>
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<tr>
<td>EN 61000-4-6</td>
<td>2014</td>
<td>Conducted Immunity</td>
</tr>
<tr>
<td>EN 61000-4-11</td>
<td>2004</td>
<td>Voltage Dips, Short Interruptions and Voltage Variations Immunity</td>
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<tr>
<td>EN 61000-3-2</td>
<td>2009</td>
<td>Harmonic Current Emissions (Reviewed to IEC 61000-3-2 2014)</td>
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<tr>
<td>EN 61000-3-31</td>
<td>2013</td>
<td>Voltage Fluctuations and Flicker</td>
</tr>
<tr>
<td>SEMI F47</td>
<td>2000</td>
<td>Specification for Semiconductor Sag Immunity Figure R1-1</td>
</tr>
</tbody>
</table>

1NOTE: To comply with flicker requirements cycle time may need to be up to 160 seconds if load current is at 15A, or the maximum source impedance needs to be < 0.13Ω. Control power input of RM models comply with 61000-3-3 requirements.

**2006/95/EC Low-Voltage Directive**

<table>
<thead>
<tr>
<th>Standard</th>
<th>Year</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>EN 61010-1</td>
<td>2011</td>
<td>Safety Requirements of electrical equipment for measurement, control and laboratory use. Part 1: General requirements</td>
</tr>
</tbody>
</table>

**Compliant with 2011/65/EU RoHS Directive**

Per 2012/19/EU W.E.E.E Directive Please Recycle Properly

Joe Millanes
Name of Authorized Representative

Winona, Minnesota, USA
Place of Issue

Director of Operations

September 2014
Date of Issue

Signature of Authorized Representative
Declaration of Conformity
to the DeviceNet™ Specification

ODVA hereby issues this Declaration of Conformity to The DeviceNet™ Specification for the product(s) described below. The Vendor listed below (the "Vendor") holds a valid Terms of Usage Agreement, which is incorporated herein by reference, for the DeviceNet Technology from ODVA, thereby agreeing that it is the Vendor's ultimate responsibility to assure that its DeviceNet Compliant Products conform to The DeviceNet Specification and that The DeviceNet Specification is provided by ODVA to the Vendor on an AS IS basis without warranty. NO WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, ARE BEING PROVIDED BY ODVA.

In recognition of the below DeviceNet Compliant Product(s) having been DeviceNet Conformance Tested at ODVA-authorized Test Service Provider and having received a passing result from ODVA at the Composite Test Revision Level specified below, this Declaration of Conformity authorizes the Vendor to use the DeviceNet Certification Marks in conjunction with the specific DeviceNet Compliant Product(s) described below, for so long as the Vendor's Terms of Usage Agreement for the DeviceNet Technology remains valid.

This Declaration of Conformity is issued on February 11, 2015 on behalf of ODVA by:

Katherine Voss
Executive Director

Test Information
Vendor Name: WATLOW

Test Information
Test Date: January 12, 2015
Composite Test Revision: CT26
ODVA File Number: 11368.01

Product Information
Identity Object Instance
Vendor ID (Attribute 1): 153
Device Type (Attribute 2): 0x2B
Device Profile Name: Generic Device (keyable)

Products Covered under this Declaration of Conformity (Identity Object Instance)

<table>
<thead>
<tr>
<th>No.</th>
<th>Product Code (Attribute 3)</th>
<th>Product Name (Attribute 7)</th>
<th>Product Revision (Attribute 4)</th>
<th>SOC File Name</th>
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<tr>
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<td>124</td>
<td>Watlow EZ-ZONE RMZ</td>
<td>2.011</td>
<td>11368.01_EZ-ZONE RMZ.stc</td>
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