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

AGENCY STANDARDS used at Watlow's Winona MN Location:

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 Controls 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

UL CCN	**Description**
(XXXX)	Listed Product
(XXXX**2**)	Recognized Component.
(XXXX**7**)	Listed Product approved for use in Canada.
(XXXX**8**)	Recognized Component approved for use in Canada.
CCN	**Title of Category**
(NKCR)	Auxiliary Devices
(NLDX)	Magnetic
(NMFT)	Motor Controllers, Miscellaneous
(NRAQ)	Programmable Controllers
(NRNT)	Switches, Industrial Control
(QUZW)	Process Control Equipment for use in Hazardous Locations
(QUXY)	Process Control Equipment
(QUYX)	Process Control Equipment, Electrical
(WGZR)	Switches, Clock-operated
(XAPX)	Temperature-Indicating and Regulating Equipment
(XATJ)	Temperature-Indicating and Regulating Equipment

Symbol #	Symbol	Requirements for Symbol Use	Agency Files Using This Symbol
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-8 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 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 # 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 depart-ment 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

Symbol #	Symbol	Requirements for Symbol Use	Agency Files Using This Symbol
8 UL label depart-ment 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 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	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 RUI
			158031 Series EZ-Zone PM

11		• 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	 REG-Nr. 10143	• Only used on Models manufactured conforming with Agency Files shown on right.	VDE File Solid State Relays

Symbol #	Symbol	Requirements for Symbol Use	Agency Files Using This Symbol
13		• 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-8, D8, SDAC, MLS, TB50, EHG2, EZ-ZONE ST, EZ-Zone RUI, EZ-Zone PM, E-Safe II, EZ-Zone RM, , Series LS
14		• 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		• 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		• 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

Symbol #	Symbol	Requirements for Symbol Use	Agency Files Using This Symbol
28		• Used on all CE approved Products	WEEE (Waste Electrical and Electronic Equipment) 2012/19/EU Directive Indicates Requirement to Recycle equipment.
29a 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 #56Y8 E43684 Vol 8 Sec 1 EHG2 SL10 E185611 Vol 2 Sec 4 EHG2 SL10
30	SCCR; not an agency mark, but information on ratings.	• 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		• EtherCAT card used on RMZ models • A007-3009-0000 Card	EZ-ZONE RMZ4

MODELS	Approval Marks	Standards Used	Files	Models Approved
Series N7	**Symbol 8 (cURus)**	UL 873, UL 60730	E43684 Vol 1 Sec 43 XAPX2, XAPX8	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)
	Symbol 10 (CSA)	CSA E60730-1	LR 30586 Class 4823-51	Same as cURus File listing.
	Symbol 11 (NSF)	NSF Standard 2	49660-0003-000	N7(any two letters or numbers) – (1-6)(0-6)(0-7)(any number) – (0-5)(any number)(any two letters or numbers)
	Symbol 13 (CE)	See declaration	CE Declaration	Same as UL
Series **C** Series **TM** **Basics & Limits**	**Symbol 8 (cURus)**	UL 873, UL 197 UL 60730-1, UL 60730-2-9 UL tested to ANSI Z21.23 UL50 IP65 tactile key models.	E43684 Vol 1 Sec 44 XAPX2, XAPX8	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) – (1, 2, 5, 6, A or C)(any alphanumeric character)(additional alphanumeric characters)
	Symbol 10 (CSA)	CSA C22.2 No. 24	LR 30586 Class 4813-02	Series C Series TM
	Symbol 13 (CE)	See declaration RoHS, WEEE	CE Declaration	Same as cURus
Series LS	**Symbol 8 (cURus)**	UL 60730-1, UL 60730-2-9	E43684 Vol 1 Sec 49 XAPX2, XAPX8 Thermal Cut-out	Series LSF4 (X) W (####) (###) (XX) Where X = any number or letter, # = Any number.
	Symbol 13 (CE)	See declaration RoHS, WEEE	CE Declaration	Same as cURus
Series L	**Symbol 8 (cURus)**	UL 873, UL 197, UL 991 UL tested to ANSI Z21.23 UL50, IP65 for tactile key models.	E43684 Vol 1 Sec 44 XAPX2, XAPX8	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)
	Symbol 14 (FM)	Factory Mutual Class 3545	J.I. 3017239	LF(C, E or G) – (1, 2, 3, 4, 5, 6 or 7)(any alphanumeric character)(U, W, Y or Z) – (any four numbers) – (additional alphanumeric characters) Same as cURus LV approval.
	Symbol 10 (CSA)	CSA C22.2 No. 24	LR 30586 Class 4813-02	Series L
	Symbol 13 (CE)	See declaration RoHS, WEEE	CE Declaration	Same as cURus approval.

MODELS	Approval Marks	Standards Used	Files	Models Approved
Smartheat	**Symbol 8 (cURus)**	UL 873	E43684 Vol 1 Sec 45 XAPX2, XAPX8	WCSH – (0120 or 0240) – (additional letters or numbers)
	Symbol 13 (CE)	See declaration	CE Declaration	Same as cURus

MODELS	Approval Marks	Standards Used	Files	Models Approved
Series **F2 Minichef**	**Symbol 8 (cURus)**	UL 873, UL 197, UL 60730, UL/ANSI Z21.23	E43684 Vol 2 Sec 29 XAPX2, XAPX8	F2(H or U)(A or C) – (0-4)(0-3)(0-3)(0 or 1) – (0 or 1)(0 or 1)(AA-ZZ)
	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

MODELS	Approval Marks	Standards Used	Files	Models Approved
EHG2 (SL10)	**Symbol 29(cULus) Control # 56Y8**	UL 60730, UL 61010, UL 1998	E43684 Vol 8 Sec 1 E185611 Vol 2 Sec 4 XATJ, XATJ7 QUYX, QUYX7	EHG2-(CNTL or EXTR or AAAA)-(any four letters or numbers)
	Symbol 13 (CE)	EN 60730, EN 61010	CE Declaration SL10 CE Declaration CL	Same as UL above.

MODELS	Approval Marks	Standards Used	Files	Models Approved
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~~ File closed Oct. 1, 2006	~~1995500~~ ~~1995500~~	~~Same as UR~~CZ50, and AC20 options obs ECO 14374 Aug. 2010
	Symbol 13 (CE)	See declaration	CE Declaration	CZ(18, 24, 34 or 42) – A (24, 48, 60) V – (AC10 or DC10)
Solid State Relays SSR	**Symbol 7 (UR)**	UL 508	E151484 NMFT2 Cross-Reference	18-60(01-06, 11, 13, 14, 16-21, 23, 25 or 38-41) 0003-0195 – (0000, 6005, 6006, 6013) 0003-0221-(0001, 0002, 0003, 0004)
			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, 16-19, 21, 23, 25 or 38-41) 0003-0195-(0000, 6005, 6006, 6011, 6013, 6016, 6017, 6019, 6023 or 6038) 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

MODELS	Approval Marks	Standards Used	Files	Models Approved
DIN-A-Mite A	**Symbol 1 (cULus)** **Control # 948Y** **SCCR Note**	UL 508	E73741 Vol 2 Sec 5 NRNT, NRNT7	DA10 – (02, 24 or 60)(CX, FX, K1, k2 or K3) – 0(any 3 numbers or letters) (where X = any number 0-9)
	Symbol 13 (CE)	See declaration	CE Declaration	Same as cULus
DIN-A-Mite B	**Symbol 1 (cULus)** **Control # 948Y** **SCCR Note**	UL 508	E73741 Vol 2 Sec 6 NRNT, NRNT7	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) (where X = any number 0-9)
	Symbol 13 (CE)	See declaration	CE Declaration	Same as cULus
DIN-A-Mite C	**Symbol 1 (cULus)** **Control # 948Y** **SCCR Note**	UL 508	E73741 Vol 2 Sec 4 NRNT, NRNT7	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) (where X = any number 0-9)
	Symbol 13 (CE)	See declaration	CE Declaration	Same as cULus
DIN-A-Mite C Throughwall	**Symbol 3 (cULus)** **Control # 2S81** **SCCR Note**	UL 508 UL 1604, UL 50 (Nema 4X) ISA12.12.01	E184390 Vol 1 Sec 1 QUZW, QUZW7	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) (where X = any number 0-9)
	Symbol 13 (CE)	See declaration	CE Declaration	Same as cULus
DIN-A-Mite D	**Symbol 1 (cULus)** **Control # 948Y** **SCCR Note**	UL 508	E73741 Vol 1 Sec 7 NRNT, NRNT7	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) E-RRL4CSSAA248E , E-RRL4CSSAAA48X, (X = any letter or number)
	Symbol 13 (CE)	See declaration	CE Declaration	Same as cULus

MODELS	Approval Marks	Standards Used	Files	Models Approved
QPAC	**Symbol 1 (cULus)** **Control # 948Y** **SCCR Note**	UL 508	E73741 Vol 3 Sec 1 NRNT, NRNT7	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)
				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)
Series PC Power Series	**Symbol 1 (cULus)** **Control # 948Y** **SCCR Note**	UL 508	E73741 Vol 3 Sec 2 NRNT, NRNT7	PC(1-9)(0-9) – (N or F)(20, 25, 30 or 35)(A, B, C or D) – (0-9)(0-9)(00 or any two letters)
	Symbol 13 (CE)	See declaration	CE Declaration	Same as cULus

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

MODELS	Approval Marks	Standards Used	Files	Models Approved
Series EZ-ZONE ST Tower	**Symbol 5 (cULus)** **Control # 88CM** **SCCR Note**	UL 508, UL 61010	E102269 Vol 2 Sec 4 NKCR, NKCR7 QUYX, QUYX7	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)
	Symbol 8 (cURus)	UL 508, UL 61010	E102269 Vol 1 Sec 5 NKCR2, NKCR8	**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)
	Symbol 14 (FM)	Factory Mutual Class 3545	3026112	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)
	Symbol 10 (CSA)	C22.2 No 14-05	158031 Class 3211 07	**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)(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)
	Symbol 13 (CE)	See declaration	CE Declaration Declaration of Incorporation	ST(K, B, P, E, H, D, J or C)(A, L or B) – (A, B or F)(L, H, 1, 2 or 3)(Any letter or number)(A to H or J to N, P, R, S or T)(A, B, C, D, E or F)(Any three numbers or letters)
Series EZ-Zone RUI	**Symbol 5 (cULus)** **Control # 88CM**	UL 508, UL 61010 IP66, Nema 4X	E102269 Vol 2 Sec 5 NKCR, NKCR7 QUYX, QUYX7	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.
	Symbol 10 (CSA)	C22.2 No 24 long case C22.2 No 14 short case	158031 Class 4813 02 158031 Class 3211 07	EZK (A, B or C) – (A, L or H) A, or 0 to 9 (any two alphanumeric characters) – A A (any two alphanumeric characters)
	Symbol 13 (CE)	See declaration	CE Declaration	As UL file above.
	Symbol 27 ODVA	ODVA Ethernet/IP	**ODVA Declaration**	EZ-Zone EZKX-X3XX-XXXX models that use A007-2779-0000 Rev C
	Symbol 26 Devicenet	ODVA Devicenet	**Devicenet Declaration**	EZ-Zone EZKX-X5XX-XXXX models that use A007-2814-0000 Revision A or B PCB

MODELS	Approval Marks	Standards Used	Files	Models Approved
TLM-8	**Symbol 4 (cULus)** **Control # 93RL**	UL 61010-1	E185611 Vol 2 Sec 5 QUYX, QUYX7	TLM (C, E or P) – (0-9)(0 or 1)(any number)(additional alphanumeric characters)
		Companion Recognition to UL 873	E43684 Vol 4 Sec 27 XAPX2, XAPX8	
	Symbol 14 (FM)	Factory Mutual Class 3545	FM 3031690	**Temperature Limit Switch non-indicating** TLM (C or E)(0 – 6) 1 (any number)(additional alphanumeric characters) **Temperature Supervisory Switch** TLM (C or E)(0 – 6) 0 (any number)(additional alphanumeric characters)
	Symbol 13 (CE)	See declaration	CE Declaration	Same as cULus
CLS200 1/8 DIN	**Symbol 4 (cULus)** **Control # 93RL**	UL 61010-1	E185611 Vol 2 Sec 5 QUYX, QUYX7	CLS2 – (00 to 16) X (0, 1 or 3) (additional alphanumeric characters)
		Companion Recognition to UL 916	E43684 Vol 4 Sec 27 XAPX2, XAPX8	
	Symbol 13 (CE)	See declaration	CE CLS	Same as cULus
Series D8	**Symbol 4 (cULus)** **Control # 93RL**	UL 916	E185611 Vol 2 Sec 5 QUYX, QUYX7	D8(4 or 8) 0 followed by any numbers or letters
	Symbol 8 (cURus)	UL 916	E185611 Vol 3 Sec 1 QUYX2, QUYX8	D8(4 or 8)1-0000-(0, 1, 2, 3, 4 or 5)(0 or 1) 0 (any number or letter)
	Symbol 26 (Devicenet)	ODVA Composite Test Revision 17	ODVA DOC	Watlow D88
	Symbol 13 (CE)	See declaration	CE D8	Same as cULus and cURus
MLS300	**Symbol 4 (cULus)** **Control # 19GK**	UL 916	E185611 Vol 2 Sec 7 QUYX, QUYX7	MLS300PM (Processor Module) MLS300-AIM (Analog Input Module) MLS300-CIM (Compact Input Module)
	Symbol 13 (CE)	See declaration	CE Declaration	Same as cULus
TB50	**Symbol 4 (cULus)** **Control # 19GK**	UL 916	E185611 Vol 2 Sec 7 QUYX, QUYX7	TB50 (Interface module)
	Symbol 13 (CE)	See declaration	CE Declaration	Same as cULus
SDAC	**Symbol 4 (cULus)** **Control # 19GK**	UL 916	E185611 Vol 2 Sec 8 QUYX, QUYX7	SDAC and Series DAC(Serial Digital to Analog Converter)
	Symbol 13 (CE)	See declaration	CE Declaration	Same as cULus

MODELS	Approval Marks	Standards Used	Files	Models Approved
Series F4 1/4 DIN	**Symbol 4 (cULus)** **Control # 93RL**	UL 916, UL 50 (Nema 4X)	E185611 Vol 2 Sec 1 QUYX, QUYX7	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)
	Symbol 13 (CE)	See declaration	CE Declaration	Same as cULus

MODELS	Approval Marks	Standards Used	Files	Models Approved
EZ-Zone PM	**Symbol 4 (cULus)** **Control # 93RL**	UL 61010-1 2nd edition UL 50 4X, IP66	E185611 Vol 2 Sec 6 QUYX, QUYX7	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)
	Symbol 3 (cULus) **Control # 2S81**	ANSI/ISA 12.12.01-2001 Class 1 Div 2, Groups A, B, C, D Temp Code T4A	E184390 Vol 1 Sec 2 QUZW, QUZW7	PM (3, 4, 6, 8 or 9)(Any letter or number)(1, 2, 3 or 4)(A, C, F or K)(A, C or K) – (Any letter or number)(A, C, J, R, P or T)(A, C, F or K)(A, C or K) Any letter or number (12 or any two numbers or letters) EZK (B, C, D or E) – (L or H)(2, 3, 5 or 6)(XX) – A A (12 or XX)
	Symbol 27 ODVA	ODVA Ethernet/IP	ODVA Declaration	EZ-Zone PM or EZK models that use A007-2779-0000 Rev C
	Symbol 26 Devicenet	ODVA Devicenet	Devicenet Declaration	EZ-Zone PM or EZK models that use A007-2814-0000 Revision A or B PCB
	Symbol 10 (CSA)	CSA C22.2 #24,	158031 Class 4813-02	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) – A A (XX)
	Symbol 14 (FM)	FM Class 3545	J.I. 3029084	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)
	Symbol 13 (CE)	See declaration	CE Declaration	All Models, See CE Declaration.

Series F4T 1/4 DIN	**Symbol 4 (cULus)** **Control # 93RL**	UL 61010 (Nema 4X) IP65	E185611 Vol X1 Sec A6 QUYX, QUYX7	F4T X – X (1 – 8) X A – A XX X - XXX
	Symbol 13 (CE)	See declaration	CE Declaration	Same as cULus

EZ-Zone FM	**Symbol 8 (cURus)**	UL 61010-1 2nd edition	E185611 Vol X2 Sec A3 QUYX2, QUYX8	**Mixed I/O Module FMMA** – X (A, C, E, F or K)(A, C, H, J or K) A – A (A, B, F or G) XX **High Density Module FMHA** – (B, C, F, J, K, L, P or R) AAA – A (A, B, F or G) XX **Limit Module FMLA** – (LAJ, LCJ, LEJ, MAJ, MCJ, MEJ or YEB) A – A (A, B, F or G) XX **Communications Module FMCA** – X AAA – A (A, B, F or G) XX
	Symbol 14 (FM)	FM Class 3545	J.I. 3048381	**Limit Module FMLA** – (LAJ, LCJ, LEJ, MAJ, MCJ, MEJ or YEB) A – A (A, B, F or G) XX
	Symbol 13 (CE)	See declaration	CE Declaration	All Models, See CE Declaration.

EZ-Zone RM	**Symbol 4 (cULus)** Control # 93RL	UL 61010-1 2nd edition	E185611-A1-UL-1 QUYX, QUYX7	**Control Module – RMC** X (A, B, D, E, F, G, H, J, K, L, M, N, P, R, S, T, U, Y, Z) X (A, B, D, E, F, G, H, J, K, L, M, N, P, R, S, T, U, Y, Z) X (A, B, D, E, F, G, H, J, K, L, M, N, P, R, S, T, U, Y, Z) X (A, B, C, D, E, F, G, H, J, K, L, M, N, P, R, S, T, U, Y, Z) (A, F) XXX **Expansion Module - RME** (A, F, R, S)(A, C, F, J, K, L, T)(A, C, F, J, L, T)(A, C, F, J, K, L, T)(A, C, F, L, T) AA XX **Access Module – RMA** (A, F, S) A X (A, B)(A, B, U, Y, D) AA XX **High Density Module – RMH** (A, F, S)(1, 2, T)(A, 1, 2, T)(1, 2, A, C, F, J, L, T)(1, 2, A, C, F, J, L, T) A XXX **Scanner Module – RMS** (A, F, S)(R, P, T)(A, R, P, T)(A, C, D, J, R, P, T)(A, B, C, J, R, P, T) A XXX **Limit Module – RML** (A, F, S)(5, 6)(A, B, C, J, 5, 6)(A, B, C, J, 5, 6) (B, C, J) A XXX **Optic Input Module – RMF** A (A, 1 to 8)(A, T) AA A A XX **EtherCat Module – RMZ** 4 XX (AA or 04) X A XX Where X = any letter or number.
	Symbol 3 (cULus) **Control # 2S81**	ANSI/ISA 12.12.01-2013 Class 1 Div 2, Groups A, B, C, D Temp Code T4	E184390 Vol 1 Sec 3 QUZW, QUZW7	**Control Module – RMC** (1, 2, 3, 4, 7 or 9)(A, E, G, N, P, S, T, U or Z) (A, 1, 2, 7, 9, R or P)(A, E, G, N, P, S, T, U or Z)(A, 1, 2, 7, 9, R or P) (A, E, G, N, P, S, T, U or Z) (A, 1, 2, 7, 9, R or P)(A, C, E, G, N, P, S, T, U or Z) (A or F) XXX. **Expansion Module – RME** (A, F, R or S)(A, C, F, K, L or T)(A, C, F,L or T)(A, C, F, K, L or T)(A, C, F, L or T) AA XX **Access Module – RMA** (A, F or S) A X (A or B) (A, B, U, Y or D) AA 12 **High Density Module – RMH** (A, F or S)-(1, 2 or T)(A, 1, 2 or T)(1, 2, A, C, F, L or T) (1, 2, A, C, F, L or T) - A XXX **Scanner Module – RMS** (A, F or S) – (R, P or T)(A, R, P or T) (A, C, D, R, P or T) (A, C, R, P or T) A XXX **EtherCAT Module - RMZ**4 – XX (AA or 04) – (A, B) A (XX). **Optical Sensor Module – RMFA** – (A, 1 to 8)(A, T) AA – A A (XX) Where X = any letter or number.
	Symbol 14 (FM)	FM Class 3545	J.I. 3033513 J.I. 3039786	**RMC** (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 F) (A or 1) Any two letters or numbers. (Need a 5 or 6 in at least one of positions 4, 6, 8 or 10 of model number to be a Limit.) **RML** (A, F or S) - (5, 6)(A, 5, 6, J, C, B)(A, 5, 6, J, C, B)(A, J, C, B) – A (A, 1) any two letters or numbers
	Symbol 27 ODVA	ODVA Ethernet/IP	ODVA Declaration	**EZ-Zone RMA** models using A007-2779-000 Rev C – Ethernet board.
	Symbol 26 Devicenet	ODVA Devicenet	Devicenet Declaration RMZ Devicenet DOC	**EZ-Zone RMA** models that use A007-2814-0000 Revision B PCB RMZ4-XXXX-X5XX Devicenet order option RMZ models.
	Symbol 13 (CE)	See declaration	CE Declaration	RM followed by additional letters or numbers describing up to four modules used for input, control, output or communications.
	Symbol 32 EtherCAT	AGENCY	No CERTIFICATE	**RMZ4 –** XX (AA or 04) – (A, B) A (XX)

OBSOLETE FILES

E43684 Vol 1

03-03-CG	OBS File 211	OBS July 2010	E43684 Vol 1 Sec 10	0303-CG00-0301
04-03-A(L,P)		Obsolete 11-16-93	E43684 Vol 1 Sec 8	All models
03-03-CX		Obsolete 03-31-02	E43684 Vol 1 Sec 13	All models
Model 02-03		Obsolete 03-31-04	E43684 Vol 1 Sec 17	All models
Model 100A		Obsolete 04-03-02	E43684 Vol 1 Sec 26	100A – (1 or 2)(600-699) – (00 or 02) XX or Models 1(A, B)10-11JX-XXXX
61-06-AR		Obsolete 03-31-04	E43684 Vol 1 Sec 28	All models
Series 92		Obsolete 9/8/99	E43684 Vol 1 Sec 34	All models
Central Boiler	OBS File 159	Obsolete 12-6-04	E43684 Vol 1 Sec 37	All models
Series 101	OBS File 163	Obsolete 5-12-05	E43684 Vol 1 Sec 38	All models
Series 550		Obsolete 5-15-03	E43684 Vol 1 Sec 39	All models
Series 104	OBS File 163	Obsolete 5-12-05	E43684 Vol 1 Sec 40	All models
Series 147	OBS File 163	Obsolete 5-12-05	E43684 Vol 1 Sec 40	All models
Series 103	OBS File 163	Obsolete 5-12-05	E43684 Vol 1 Sec 41	All models
Series 146	OBS file 163	Obsolete 5-12-05	E43684 Vol 1 Sec 41	All models
Series 102	OBS file 163	Obsolete 5-12-05	E43684 Vol 1 Sec 42	All models
Series 145	OBS file 163	Obsolete 5-12-05	E43684 Vol 1 Sec 42	All models
Series 945 Series 942	OBS file 186	Obsolete 9/26/08	E43684 Vol 1 Sec 32 LR 30586, J.I. 0Y6A4.AF	All models BC, CS, DS or TD infrared models obs. 11-3-99

E43684 Vol 2

Series 808		Obsolete 5/10/96	E43684 Vol 2 Sec 1	All models
Series 100B		Obsolete 04-03-02	E43684 Vol 2 Sec 2	All models
Series 804		Obsolete 12/2/96	E43684 Vol 2 Sec 9	All models
Series 800		Obsolete 10-27-97	E43684 Vol 2 Sec 10	All models
Series 80	OBS Files 101, 103, 164	Obsolete 03-01-05	E43684 Vol 2 Sec 12	All models
Series 100A		Obsolete 04-03-02	E43684 Vol 2 Sec 18	All models
Relay Master		Obsolete 12/2/96	E43684 Vol 2 Sec 19	All models
Series 985		Obsolete 10-27-97	E43684 Vol 2 Sec 20	All models
Series 910		Obsolete 1996	E43684 Vol 2 Sec 21	All models
Series 150		Obsolete 10-27-97	E43684 Vol 2 Sec 22	All models
Series 400		Obsolete 05-15-03	E43684 Vol 2 Sec 23	All models
Series 92X		Obsolete 07-07-00	E43684 Vol 2 Sec 25	All models
Series 965		Obsolete 5/4/00	E43684 Vol 2 Sec 27	All models
Series 142	OBS file 163	Obsolete 05-12-05	E43684 Vol 2 Sec 30	All models

Series 360		Obsolete 12/2/96	?	
Series 1500		Obsolete 5/16/96	?	
Series 92X		Obsolete 11/9/99	E43684 Vol 2 Sec 25	920, 922 models.
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	Obsolete 10/25/2013	E43684 Vol 1 Sec 36	GRON – RELY – (XXXX) GRON-DISP models obs. File 165
Series 988 Series 998	LOG 227	Obsolete 5/23/2014	E43684 Vol 1 Sec 35	(98 or 99)(1-4 or 6-9)(A-Z) – (0-9)(0-9)(A-F or K)(A-F, K or T) – (A, B, C, J, K, M, N or T)(A-E, K, R, S, T or U)(any two letters or numbers)
		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 DPAC-S		Obsolete Aug, 2010	E43684 Vol 4 Sec 2 E43684 Vol 5 Sec 1	D01, 32, 43 all models, D01S, D32S, D43S all models

Various files.

Series V4	LOG 170	Obsolete	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

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

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

Series 935 1/32 DIN	OBS log 220	Obsolete 4/30/10	E102269 Vol 2 Sec 1 NKCR, NKCR7	935(A-Z) – (0-9) C (C, D or K)(0 or 1) – (any four letters or numbers)
			CE Declaration	Same as cULus

Series 94	Symbol 14 (FM) OBS 223 3/2/12	Factory Mutual Class 3545 Nema 4X, Nema 12	J.I. 0D5A1.AF	94(A or B)(A or B) – 1D (A, C, D or K)(0 or 1) – (any four letters or numbers)
	Symbol 13 (CE)	See declaration	CE Declaration	94(A or B) B – 1D (A, C, D or K) (0 or 1) – (any four letters or numbers)

Revision	Date	Description	Agency Review of Symbols Required?	Change Due to:
A	7-15-08	Adjusted format and corrected agency symbols to comply with UL Label Marking department requirements. Symbols 1, 3, 5, 10, 13, 14, 21, 29 updated.	Yes Approved by UL 7-11-08	UL VN 0805221840 CATSWEB 14979
B	9/26/08	Obsolete Series 942/945, Corrected DIN C standard model UL logo callout by removing Throughwall model. FM now has an online searchable database.	No symbols changed. N/A	OBS Log 186
C	10/23/08	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.	No symbols changed N/A	Milestone 5
D	1/30/09	EZ-ZONE PM Limited Feature update, EZK long case CSA approval and other typographical corrections	No symbols changed N/A	Updated approvals received.
E	3/17/09	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.	No symbols changed N/A	ODVA test 10584.02
F	7/24/09	Series PM8, 9, 4 UL and FM approval received. Added thermistor input to PM6 and Profibus comms.	No symbols change N/A	FM 3035726, UL 09NK05591 UL 09NK08399
G	11/02/09	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.	No symbols change N/A	UL 09CA49692 UL 09NK05591
H	3/19/2010	Updated EZ-Zone ST due to release of Phase angle models.	No symbols change N/A	UL 09NK15933 FM 3037883 IM 484 UL SR5713714-T001
J	7/30/10	Updated RM FM file to add High density Limits, removed T321 UL approval due to standards change.	No symbols change N/A	FM 3039786 IM 472

Revision	Date	Description	Agency Review of Symbols Required?	Change Due to:
K	9/24/10	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	Updated NSF logos to wider Component box and created inverse logo.	OBS log 198, 211 ECO 14374, ECO 14429, ECO 14402
L	2/18/11	Series 935 Obsolete. Updated symbol 29 to enhance UL logo information on label.	Symbol 29 approved 2-10-11	ECO 14448, OBS Log 220, ECO 14549
M	07/08/2011	Power series F35 model addition. Typographical corrections on DIN B and D. Series 988 OBS, EZ-Zone RM updates	N/A	IM 581, IM 572, ECO 14575, IM 623, OBS 227, IM 625, IM 626, IM 630
N	3-20-13	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.	N/A	IM 640, ECO 14749, ECO 14819, OBS log 223, IM 675, 676, 679, IM 637, ECO 14892, IM 773, 774
P	04/02/2015	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.	Symbols 1a, 3a, 4a, 5a, 29a Approved 03-30-15	IM 781, OBS 188, ECO 15350, OBS 227, OBS 216, OBS 232, IM 1016

Short-Circuit Current Rating - SCCR

Watlow Power Controllers

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.

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Telephone (507) 494-5656

Short-Circuit Current Rating - SCCR

Watlow Power Controllers

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.**

Model	Fuse Rating 125% of load	Watlow Semiconductor Fuse Part No.	Watlow Semiconductor Fuse Holder Part No.	*Bussmann Semiconductor Fuse Part No.	Bussmann/ *Watlow Combination Fuse Part No.	Bussmann/ *Watlow Fuse Holder for Combination Fuse	SCCR in Amperes
DIN-A-MITE® A, B, C	20 A	17-8020	17-5110	FWC-20A10F	DFJ-20 0808-0325-0020	CH30J1i 0808-0326-1530	200,000
DIN-A-MITE® A, B, C	25A	17-8025	17-5110	FWC-25A10F	DFJ-25 No Watlow P/N	CH30J1i 0808-0326-1530	200,000
DIN-A-MITE® A[1], B, C	30 A	17-8030	17-5114	FWP-30A14F	DFJ-30 0808-0325-0030	CH30J1i 0808-0326-1530	200,000
DIN-A-MITE® A[1], B, C	40 A	17-8040	17-5114	FWP-40A14F	DFJ-40 0808-0325-0040	CH60J1i 0808-0326-3560	200,000
DIN-A-MITE® B[1], C	50 A	17-8050	17-5114	FWP-50A14F	DFJ-50 0808-0325-0050	CH60J1i 0808-0326-3560	200,000
DIN-A-MITE® B[1], C	63 A	17-8063	17-5122	FWP-63A22F	DFJ-60 0808-0326-0060	CH60J1i 0808-0326-3560	200,000
DIN-A-MITE® C	80 A	17-8080	17-5122	FWP-80A22F	DFJ-80 0808-0325-0080	J601001CR 0808-0326-7010	200,000
DIN-A-MITE® C	100 A	17-8100	17-5122	FWP-100A22F	DFJ-100 0808-0325-0100	J601001CR 0808-0326-7010	200,000
DIN-A-MITE® D[2, 3]	65 A x 2	0808-0096-0000	Not Applicable	170N3437	Not Applicable	Not Applicable	200,000

[1]FPW 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] DIN-A_MITE® D uses two 65A fuses in parallel.

[3] DIN-A_MITE® D, Power Series and QPAC have on board semiconductor fuses.

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Short-Circuit Current Rating - SCCR

Watlow Power Controllers

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

Model	Fuse Rating 125% of load	Watlow Semiconductor Fuse Part No.	Watlow Semiconductor Fuse Holder Part No.	*Bussmann Semiconductor Fuse Part No.	Bussmann/ *Watlow Combination Fuse Part No.	Bussmann/ *Watlow Fuse Holder for Combination Fuse	SCCR in Amperes
Power Series[3]	100 A	0808-0102-0100	Not Applicable	170M1317	Not Applicable	Not Applicable	200,000
Power Series	125 A	0808-0102-0125	Not Applicable	170M1318	Not Applicable	Not Applicable	200,000
Power Series	160 A	0808-0102-0160	Not Applicable	170M1319	Not Applicable	Not Applicable	200,000
Power Series	200 A	0808-0102-0200	Not Applicable	170M1320	Not Applicable	Not Applicable	200,000
Power Series	250 A	0808-0102-0250	Not Applicable	170M1321	Not Applicable	Not Applicable	200,000
Power Series	315 A	0808-0102-0315	Not Applicable	170M1322	Not Applicable	Not Applicable	200,000
QPAC[3]							
Qxx-xxx-150-xxx	200 A	17-7053	Not Applicable	FWH-200A	Not Applicable	Not Applicable	200,000
Qxx-xxx-200-xxx	250 A	17-7054	Not Applicable	FWH-250A	Not Applicable	Not Applicable	200,000
Qxx-xxx-300-xxx	400 A	17-7056	Not Applicable	FWH-400A	Not Applicable	Not Applicable	200,000
Qxx-xxx-400-xxx	500 A	17-7057	Not Applicable	FWH-500A	Not Applicable	Not Applicable	200,000
Qxx-xxx-500-xxx	600 A	17-7058	Not Applicable	FWH-600A	Not Applicable	Not Applicable	200,000
Qxx-xxx-600-xxx	800 A	17-7059	Not Applicable	FWH-800A	Not Applicable	Not Applicable	200,000
Qxx-xxx-800-xxx	1000 A	17-7082	Not Applicable	170M6714[4]	Not Applicable	Not Applicable	200,000
Qxx-xxx-01K-xxx	1250 A	17-7081	Not Applicable	170M6766[4]	Not Applicable	Not Applicable	200,000

[1]FPW 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

Model	Fuse Rating 125% of load	Watlow Semiconductor Fuse Part No.	Watlow Semiconductor Fuse Holder Part No.	*Bussmann Semiconductor Fuse Part No.	Bussmann/ *Watlow Combination Fuse Part No.	Bussmann/ *Watlow Fuse Holder for Combination Fuse	SCCR in Amperes
EZ-ZONE® ST ≤ 25A	30 A	17-8030	17-5114	FWP-30A14F	DFJ-30 0808-0325-0030	CH30J1i 0808-0326-1530	200,000
EZ-ZONE® ST ≤ 25A	40 A[1]	17-8040	17-5114	FWP-40A14F	DFJ-30 is max size 125% rating		
EZ-ZONE® ST ≤ 50A	50 A at 480 Vac	17-8050	17-5122	FWP-50A22F	DFJ-50 0808-0326-0050	CH60J1i 0808-0326-3560	200,000
EZ-ZONE® ST ≤ 50A	63 A at 480 Vac	17-8063	17-5122	FWP-63A22F	DFJ-50 is max size for I^2T at 480V		
EZ-ZONE® ST ≤ 50A	63 A at **240 Vac**	17-8063	17-5122	FWP-63A22F	DFJ-60 0808-0326-0060	CH60J1i 0808-0326-3560	200,000
EZ-ZONE® ST ≤ 75A	80 A at 480 Vac	17-8080	17-5122	FWP-80A22F	DFJ-80 0808-0325-0080	J60100-1CR 0808-0326-7010	200,000
EZ-ZONE® ST ≤ 75A	90 A at 480 Vac			No FWP-90 available	DFJ-90 No Watlow P/N	J60100-1CR 0808-0326-7010	200,000
EZ-ZONE® ST ≤ 75A	100 A at **240 Vac**	17-8100	17-5122	FWP-100A22F	DFJ-100 0808-0325-0100	J60100-1CR 0808-0326-7010	200,000

[1]FPW 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
Type 1 Protection - 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.
Type 2 Protection - 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.

When fused per the combinations listed above, products comply with Type 2 Protection.

Short-Circuit Current Rating - SCCR

Watlow Power Controllers

The following outputs on Watlow Models have been tested for SCCR at 10kA for **240 Vac** systems

Model	Fuse Rating 125% of max load	Watlow Semiconductor Fuse Part No.	Watlow Semiconductor Fuse Holder Part No.	*Bussmann Semiconductor Fuse Part No.	*Bussmann Branch Fuse Part No.	Watlow Branch Fuse Holder Part No.	SCCR in Amperes
EZ-Zone RM **Dual 10A SSR** RMEx-KAKA-xxxx FMHA-KAAA-xxxx	12.5A	17-8012	17-5110	FWC12A10F	[5]Any Class CC fuse LP-CC, KTK-R, FNQ-R to 125% of rated current or 20A	0808-0235-0000	10,000

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

Model	Fuse Rating 125% of max load	Semiconductor fuse.	*Bussmann Branch Fuse Part No.	Watlow Branch Fuse Holder Part No.	SCCR in Amperes
EZ-Zone RM, PM **No-arc 15A relay** RMC outputs D,J or Y RMC-X_X_X_X_-XXXX PMXXXXH-XXXHXXX FMMA-XXHX-XXXX	20A	Not tested with this output	[5]Class CC fuse LP-CC, KTK-R, FNQ-R to 125% of rated current or 20A	0808-0235-0000	10,000
EZ-Zone RM, PM **5A Mechanical Relay** PMXXXEJ-XXEJXXX RMC outputs B,F,G,H,J,K,L,M, or R RMC-X_X_X_X_-XXXX RMEX-JJJX-XXXX RMHX-XXJJ-XXXX RMSX-XXJ(J,B)-XXXX RMLX-XXJ(J,B)-XXXX FM(M,L)A-XEJX-XXXX FMHA-JAAA-XXXX	7A	Not tested with this output			
EZ-Zone RM **Quad 2A SSR output** RMEX-LLLL-XXXX RMHX-XXLL-XXXX FMHA-LAAA-XXXX	2.5A	Not tested with this output			

[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

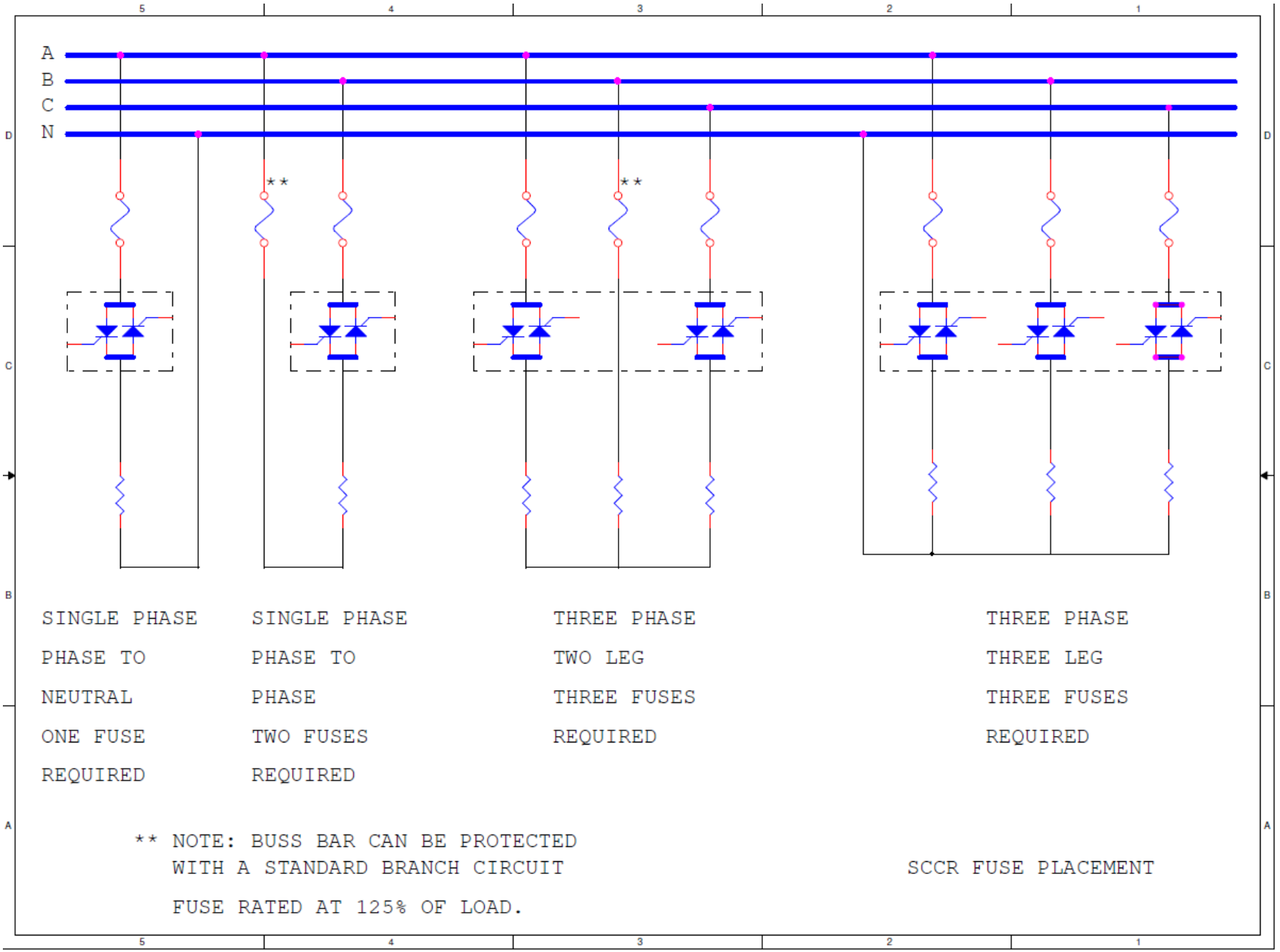
Notes:

- 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



1241 Bundy Blvd
Winona, MN 55987
Telephone (507) 494-5656

Underwriters Laboratories Inc.®

Northbrook Division
333 Pfingsten Road
Northbrook, IL 60062-2096 USA
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fax: 1 847 272 8129
Customer service: 1 877 854 3577

1/10/2007

Mr. Larry Glentz
Watlow 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 Facilites 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
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Reviewed by:

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PROFIBUS Nutzerorganisation e.V.
Haid-und-Neu-Str. 7
D-76131 Karlsruhe
Tel.: +49-721-96 58-590
Fax: +49-721-96 58 589
E-mail: info@profibus.com
http://www.profibus.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: ☐ Master ☑ Slave

Protocol type: ☐ FMS ☑ 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

M. Schell

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

File E43684 Vol. 1 Sec. 43 and Report Page 1 Issued: 2003-03-05 Revised: 2006-08-18

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, 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):

*

File E43684 Vol. 1 Sec. 43 and Report Page 1A Issued: 2003-03-05 New: 2006-08-18

INPUTS:

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

COMMUNICATION:

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

OUTPUTS:

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

TEMPERATURE:

Maximum 80°C ambient.

DESIGNATION SYSTEM:

N7 XX - X X X X - X X XX
I II III IV V VI VII VIII IX

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.

USR indicates that this product has been judged on the basis of the requirements in the United States Standard UL 60730-1A, Standard for Automatic Electrical Controls for Household and Similar Use, Part 1: General Requirements, Third Edition, dated January 28, 2002 and UL 60730-2-9, Particular Requirements for Temperature Sensing Controls, First Edition, dated January 17, 2003.

CNR indicates that this product has been judged on the basis of the requirements in the Canadian Standard CAN/CSA-E60730-1:02, Standard for Automatic Electrical Controls for Household and Similar Use, Part 1: General Requirements, Third Edition, 1999-04 and CAN/CSA-E60730-2-9:01, Particular Requirements for Temperature Sensing Controls, Second Edition, December 2001.

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

CE

WATLOW Electric Manufacturing Company ISO 9001 since 1996.
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.

2004/108/EC Electromagnetic Compatibility Directive

EN 60730-1:2011	**Automatic electrical controls for household and similar use – Part 1 General requirements. Clause H.26 EMC requirements Immunity, Clause H.23 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 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

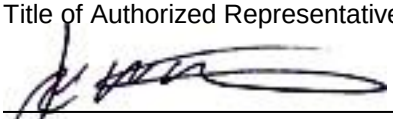
EN 60730-1:2011	**Automatic electrical controls for household and similar use – Part 1 General requirements and Part 2-9:2010 – Temperature sensing controls.**

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

Compliant with 2011/65/EU RoHS2 Directive

Joe Millanes
Name of Authorized Representative

Director of Operations
Title of Authorized Representative



Signature of Authorized Representative

Winona, Minnesota, USA
Place of Issue

September 2014
Date of Issue

NSF International

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)

F2HC-(1)(2)1-(4)(5)(6)

F2UA-(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-numerical 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	-50° to 600°F
Type K thermocouple	-50° to 600°F
Type E thermocouple	-50° to 600°F

789 N. Dixboro Road, Ann Arbor, Michigan 48105-9723 USA
1-800-NSF-MARK / 734-769-8010
www.nsf.org

WWW.UL.COM
1.877.ULHELPS / (1.877.854.3577)

File E43684
Project 03NK12886

June 15, 2003
Revised: November 17, 2010

REPORT

on

COMPONENT - TEMPERATURE-INDICATING AND REGULATING EQUIPMENT
*

Watlow Winona Inc.
Winona, MN

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 4 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:

Input – 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:

LF	**X**	**X**	**X**	**X**	XXXX	**AAAA**	**X**
I	**II**	**III**	**IV**	**V**	**VI**	**VII**	**VIII**

I – LF – Limit Fixed 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**

1 = Panel mount 1/8 DIN Square	(Regulating control),	Terminal 1
2 = DIN Rail sub-panel mount	(Regulating control),	Terminal 1
3 = Open board sub-panel mount	(Regulating control),	Terminal 1
4 = Potted sub-panel mount	(Limit control),	Terminal 1
5 = Panel mount 1/8 DIN Square	(Regulating control),	Terminal 2
6 = DIN Rail sub-panel mount	(Regulating control),	Terminal 2
7 = Open board sub-panel mount	(Regulating control),	Terminal 2
8 = Potted sub-panel mount	(Limit control),	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 Terminals
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 – 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:

CF	**X**	**X**	**X**	**X**	XXXX	**AAAA**	**X**
I	**II**	**III**	**IV**	**V**	**VI**	**VII**	**VIII**

I – CF – ON/OFF Temperature Control Fixed 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.**
1 = Panel mount 1/8 DIN Square, Terminal 1
2 = DIN Rail sub-panel mount, Terminal 1
3 = Open board sub-panel mount, Terminal 1
4 = Potted sub-panel mount, Terminal 1
5 = Panel Mount 1/8 DIN Square, Terminal 2
6 = DIN Rail sub-panel mount, Terminal 2
7 = Open board sub-panel mount, Terminal 2
8 = Potted 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: -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 – 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:

LV X X X X XXXX XXXX X
I II III IV V VI VII VIII

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**
1 = 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	**X**	**X**	**X**	**X**	XXXX	**XXXX**	**X**
I	**II**	**III**	**IV**	**V**	**VI**	**VII**	**VIII**

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**
1 = 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:

TM	**X**	**X**	**X**	**A**	AAAA	**AAAA**	**X**
I	**II**	**III**	**IV**	**V**	**VI**	**VII**	**VIII**

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) **Master Contract:** 158031

Project: 2677774 **Date Issued:** March 5, 2014

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 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

CE

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

ISO 9001since 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.

2004/108/EC Electromagnetic Compatibility Directive

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 **EN 60730-2-9:2010** CXX4 units	**Automatic electric controls for household and similar use: Particular requirements for temperature sensing controls.**
EN 61010-1:2011[1] All other units	**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)) **Master Contract:** 158031

Project: 2707164 **Date Issued:** March 5, 2014

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 70C.

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)

Series L

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

ISO 9001 since 1996.

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 –###) (AAAA) 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.

2004/108/EC Electromagnetic Compatibility Directive

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**
EN 60730-2-9:2010	**temperature sensing controls, 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 LS	Magnetic Field Immunity
EN 61000-4-11:2004	Voltage Dips, Short Interrupts and Variations – Immunity
EN 61000-4-28:2009 LS	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 Sag Immunity Figure R1-1

2006/95/EC Low-Voltage Directive

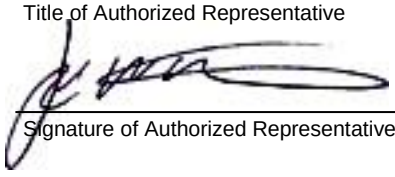
EN 60730-1:2011 LS	**Automatic electric controls for household and similar use: Particular requirements for**
EN 60730-2-9:2010	**temperature sensing controls.**
EN 61010-1:2011 LF, LV	**Safety Requirements of electrical equipment for measurement, control and laboratory use. Part 1: General requirements**

Compliant with 2011/65/EU RoHS Directive

Per 2012/19/EU WEEE Directive Please Recycle Properly

Joe Millanes
Name of Authorized Representative

Director of Operations
Title of Authorized Representative



Signature of Authorized Representative

Winona, Minnesota, USA
Place of Issue

January 2015
Date of Issue

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

TLM	C	2	0	0	XXXXXXXX
I	II	III	IV	V	VI

I TLM – Model Series Designator
II Setpoint Precision
E – Standard Setpoint Selection
C – High Precision Setpoint
III Sensor Type
0 – RTD
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 Relays
0 – Global relays Only
V Mounting Style
0 – Panel mount
1 – DIN Rail Mount
Additional numbers – one of the above mounting styles with grounding straps
VI Trip Point Code
Any combination of letters or numbers indicating individual setpoint codes for each channel. May be 3-8 digits.

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.

All Products FM Class 3545 Temperature Limit Approval

EZ-ZONE, PM Series, Microprocessor Based Limit Controller Variable Set Point

Limit and Enhanced Limit Options

PM	Z	Z	-	Z	Z	J	Z	-	A	Z	Z	A	-	ZZ
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 *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.

All Products FM Class 3545 Temperature Limit Approval

Hybrid Control Limit Model Option

PM	6	Z	-	Z	Z	Z	Z	-	L	Z	J	A	-	ZZ
I	II	III		IV	V	VI	VII		VIII	IX	X	XI		XII

I PM – Series Model Designation

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.

TLM	C	2	1	0	XXXXXXXX
I	II	III	IV	V	VI

I TLM – Model Series Designator
II Setpoint Precision
E – Standard Setpoint Selection
C – High Precision Setpoint
III Sensor Type
0 – RTD
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 Relays
1 – Global relays and 8 channel alarm relays
V Mounting Style
0 – Panel mount
1 – DIN Rail Mount
Additional numbers – one of the above mounting styles with grounding straps
VI Trip Point Code
Any combination of letters or numbers indicating individual setpoint codes for each channel. May be 3-8 digits.

For operation at 10 to 26 V dc. Limit contacts rated for 1 A at 30 V dc.

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

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

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

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 = 25 A (100 to 240 V ac output) Phase angle
N = 40 A (100 to 240 V ac output) Phase angle
P = 75 A (100 to 240 V ac output) Phase angle
R = 25 A (260 to 600 V ac output) Phase angle
S = 40 A (260 to 600 V ac output) Phase angle
T = 75 A (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

STRC	-	0	X	X	X	X
I		II	III	IV	V	VI

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

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.

RMC	X	X	X	X	X	X	X	X	X	X	XX
I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII

I RMC = Multi-Loop Control Module

II Zone 1 Primary Function
1 = Control with Universal Input
2 = Control with Thermistor Input
3 = Ramp/Soak with Universal Input
4 = Ramp/Soak with Thermistor Input
5 = Limit with Universal Input (Output 1, 2 must be B, F or L)
6 = Limit with Thermistor Input (Output 1, 2 must be B, F or L)
7 = Current transformer input (Not valid with outputs N, P, R or S)
9 = Custom

III

Zone 1 Output 1 Options	Output 2 Options
A = None	None
B = None	Mechanical relay 5A form A
U = Switched DC/Open Collector	None
D = Switched DC/Open Collector	NO-ARC 15A Relay
E = Switched DC/Open Collector	Switched DC
F = Switched DC/Open Collector	Mechanical relay 5A form A
G = Switched DC/Open Collector	Solid State Relay 0.5A
H = Mechanical Relay 5A form C	None
J = Mechanical Relay 5A form C	NO-ARC 15A Relay
K = Mechanical Relay 5A form C	Switched DC
L = Mechanical Relay 5A form C	Mechanical relay 5A form A
M = Mechanical Relay 5A form C	Solid State Relay 0.5A
N = Universal Process	None
P = Universal Process	Switched DC
R = Universal Process	Mechanical relay 5A form A
S = Universal Process	Solid State Relay 0.5A
T = None	Solid State Relay 0.5A
Y = Solid State Relay 0.5A	NO-ARC 15A Relay
Z = Solid State Relay 0.5A	Solid State Relay 0.5A

IV Zone 2 Primary Function
A = None
1 = Control with Universal Input
2 = Control with Thermistor Input
5 = Limit with Universal Input (Output 3, 4 must be B, F or L)
6 = Limit with Thermistor Input (Output 3, 4 must be B, F or L)
7 = Current transformer input (Not valid with outputs N, P, R or S)
9 = Custom

V	Zone 2 Output 3 Options	Output 4 Options
	A = None	None
	B = None	Mechanical relay 5A form A
	U = Switched DC/Open Collector	None
	D = Switched DC/Open Collector	NO-ARC 15A Relay
	E = Switched DC/Open Collector	Switched DC
	F = Switched DC/Open Collector	Mechanical relay 5A form A
	G = Switched DC/Open Collector	Solid State Relay 0.5A
	H = Mechanical Relay 5A form C	None
	J = Mechanical Relay 5A form C	NO-ARC 15A Relay
	K = Mechanical Relay 5A form C	Switched DC
	L = Mechanical Relay 5A form C	Mechanical relay 5A form A
	M = Mechanical Relay 5A form C	Solid State Relay 0.5A
	N = Universal Process	None
	P = Universal Process	Switched DC
	R = Universal Process	Mechanical relay 5A form A
	S = Universal Process	Solid State Relay 0.5A
	T = None	Solid State Relay 0.5A
	Y = Solid State Relay 0.5A	NO-ARC 15A Relay
	Z = Solid State Relay 0.5A	Solid State Relay 0.5A

VI Zone 3 Primary Function

A = None
1 = Control with Universal Input
2 = Control with Thermistor Input
5 = Limit with Universal Input (Output 3, 4 must be B, F or L)
6 = Limit with Thermistor Input (Output 3, 4 must be B, F or L)
7 = Current transformer input (Not valid with outputs N, P, R or S)
9 = Custom

VII	Zone 3 Output 5 Options	Output 6 Options
	A = None	None
	B = None	Mechanical relay 5A form A
	U = Switched DC/Open Collector	None
	D = Switched DC/Open Collector	NO-ARC 15A Relay
	E = Switched DC/Open Collector	Switched DC
	F = Switched DC/Open Collector	Mechanical relay 5A form A
	G = Switched DC/Open Collector	Solid State Relay 0.5A
	H = Mechanical Relay 5A form C	None
	J = Mechanical Relay 5A form C	NO-ARC 15A Relay
	K = Mechanical Relay 5A form C	Switched DC
	L = Mechanical Relay 5A form C	Mechanical relay 5A form A
	M = Mechanical Relay 5A form C	Solid State Relay 0.5A
	N = Universal Process	None
	P = Universal Process	Switched DC
	R = Universal Process	Mechanical relay 5A form A
	S = Universal Process	Solid State Relay 0.5A
	T = None	Solid State Relay 0.5A
	Y = Solid State Relay 0.5A	NO-ARC 15A Relay
	Z = Solid State Relay 0.5A	Solid State Relay 0.5A

VIII Zone 4 Primary Function

A = None
1 = Control with Universal Input
2 = Control with Thermistor Input
5 = Limit with Universal Input (Output 3, 4 must be B, F or L)
6 = Limit with Thermistor Input (Output 3, 4 must be B, F or L)
7 = Current transformer input (Not valid with outputs N, P, R or S)
9 = Custom

	Zone 4 Output 7 Options	Output 8 Options
	A = None	None
	B = None	Mechanical relay 5A form A
	U = Switched DC/Open Collector	None
	D = Switched DC/Open Collector	NO-ARC 15A Relay
	E = Switched DC/Open Collector	Switched DC
	F = Switched DC/Open Collector	Mechanical relay 5A form A
	G = Switched DC/Open Collector	Solid State Relay 0.5A
	H = Mechanical Relay 5A form C	None
	J = Mechanical Relay 5A form C	NO-ARC 15A Relay
	K = Mechanical Relay 5A form C	Switched DC
	L = Mechanical Relay 5A form C	Mechanical relay 5A form A
	M = Mechanical Relay 5A form C	Solid State Relay 0.5A
	N = Universal Process	None
	P = Universal Process	Switched DC
	R = Universal Process	Mechanical relay 5A form A
	S = Universal Process	Solid State Relay 0.5A
	T = None	Solid State Relay 0.5A
	Y = Solid State Relay 0.5A	NO-ARC 15A Relay
	Z = Solid State Relay 0.5A	Solid State Relay 0.5A
	C = 6 digital inputs/outputs (valid only if item VIII = A)	

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

C = 6 Digital Inputs/outputs
B = 1 Digital input, 2 mechanical relay outputs 5A

VI Slot E – Board Function
A = None
J = 4 mechanical relays 5A Form A
C = 6 Digital Inputs/outputs
B = 1 Digital input, 2 mechanical relay outputs 5A

VII Future Options
A = Standard product

VIII Enhanced Options
A = Standard bus communications
1 = standard bus communication and Modbus RTU 485 (selectable via switch).

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

EZ-Zone Temperature Controller Modules

FM	L	A	-	LCJ	A	-	A	A	AA
I	II	III		IV	V		VI	VII	VIII

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

VII	Connector and conformal coating options
	A = Right angle screw connector
	B = Right angle screw connector and conformal coated boards
	F = Front side screw connector
	G = Front side screw connector and conformal coated boards
VIII	Custom Options – overlay, preset parameters, locked code etc.
	AA = Standard product
	XX any other two letters or numbers for custom options.

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 Mahrenholz, Assistant Chief Engineer, Global Inspection and Field Services

UL LLC

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

Report No. 4786654193-20150202 Issued: 2015-02-02
Enclosure 6

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

Table of Contents

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:

Microelectronic Hardware			
Component	**Function**	**Manufacturer**	**Model/Version**
U8	Master Microcontroller	Atmel	ATmega168
U2	Slave Microcontroller	Atmel	ATmega168

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:

Software		
Module	**Firmware Part No.**	**Software Version**
Master (U8)	0500-3018-0005	1.00.04
Slave (U2)	0500-3018-0005	1.00.04

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

The checklist in the Detailed Design Review Report dated January 25, 2006 demonstrated compliance details of the EHG2 Electronic Thermal Cutouts (considered representative of the LSF4 Electronic Thermal Cutouts) to the requirements in ANSI/UL 60730-1A, Third Edition and ANSI/UL 1998, Second Edition, which are considered substantially equivalent to the applicable software requirements in ANSI/UL 60730-1, Fourth Edition, CSA E60730-1:13, Fourth Edition, and IEC 60730-1, Fourth Edition. The changes to the original checklist as a result of this investigation are outlined below:

UL 60730-1; CSA E60730-1:13; IEC 60730-1			
Clause	Requirement + Test	Result – Remark	Verdict

UL 60730-1; CSA E60730-1:13; IEC 60730-1			
Clause	Requirement + Test	Result – Remark	Verdict
H.11.12.3.4.2	Management of software versions: All versions are uniquely identified for traceability	New version identifier assigned to the software	Pass
H.11.12.3.4.3	Software modification		Pass
H.11.12.3.4.3.1	Software modifications are based on a modification request which details the following:	See “Code Changes from EHG II and General Operation” and “Firmware Updates”	Pass
	• the hazards which may be affected	(See above)	Pass
	• the proposed change	(See above)	Pass
	• the reasons for change	(See above)	Pass
H.11.12.3.4.3.2	An analysis is carried out to determine the impact of the proposed modification on functional safety.	See H.11.12.3.4.3.1	Pass
H.11.12.3.4.3.3	A detailed specification for the modification is generated including the necessary activities for verification and validation, such as a definition of suitable test cases	Modifications made are documented in “Code Changes from EHG II and General Operation” and “Firmware Updates” Selected cases from the validation plan were repeated; see “LSF4 Firmware Validation” and “LSF4 Watchdog Tests”	Pass
H.11.12.3.4.3.4	The modification are carried out as planned	See H.11.12.3.4.3.3	Pass
H.11.12.3.4.3.5	The assessment of the modification is carried out based on the specified verification and validation activities. This may include:	Selected cases from the validation plan were repeated; see “LSF4 Firmware Validation” and “LSF4 Watchdog Tests”	Pass
	• a reverification of changed software modules	(See above)	Pass
	• a reverification of affected software modules	(See above)	Pass
	• a revalidation of the complete system	(See above)	Pass

UL 60730-1; CSA E60730-1:13; IEC 60730-1			
Clause	Requirement + Test	Result – Remark	Verdict
H.11.12.3.4 .3.6	All details of modification activities are documented	Modifications made are documented in “Code Changes from EHG II and General Operation” and “Firmware Updates” Selected cases from the validation plan were repeated; see “LSF4 Firmware Validation” and “LSF4 Watchdog Tests” As part of the modification, the “EHG II Extended Version Firmware Requirements” and “Software Requirements Specification for Series LS” were updated	Pass

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
6. Software Requirements Specification for Series LS, 0500-3018-0005, Base Only, dated December 31, 2014

4.2 Reference Standards

1. ANSI/UL 60730-1, Automatic Electrical Controls for Household and Similar Use – Part 1: General Requirements, Fourth Edition, revision date 2014-05-21
2. CSA E60730-1:13, Automatic Electrical Controls for Household and Similar Use – Part 1: General Requirements, Fourth Edition, revision date 2013-03-01
3. IEC 60730-1, Automatic Electrical Controls for Household and Similar Use – Part 1: General Requirements, Fourth Edition, revision date 2010-03-01

4.3 Report Revision History

Report Type	Issue Date	PSC Number
Detailed Design Review	January 25, 2006	06PSC00007
Maintenance Review	December 11, 2006	06PSC00104
Maintenance Review	February 19, 2007	07PSC00018
Maintenance Review	January 23, 2012	11PSC00102

5. Statement of Compliance

The review found that the development and verification activities for Watlow Electric Manufacturing Co.'s LSF4 Electronic Thermal Cutouts with software version 1.00.04 (firmware part number 0500-3018-0005) complied with the applicable requirements in ANSI/UL 60730-1, Automatic Electrical Controls for Household and Similar Use – Part 1: General Requirements, Fourth Edition, revision date 2014-05-21; CSA E60730-1:13, Automatic Electrical Controls for Household and Similar Use – Part 1: General Requirements, Fourth Edition, revision date 2013-03-01; and IEC 60730-1, Automatic Electrical Controls for Household and Similar Use – Part 1: General Requirements, Fourth Edition, revision date 2010-03-01.

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Please note that the subject investigation will not imply that UL has Listed, Classified or Recognized the end-product nor will the Report authorize the use of Listing or Classification Marks or other references to UL, on or in connection with the end-product, unless specifically authorized.

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

Series EHG (Smartheat) UL®

File E43684
Project 02NK52086

2003-09-08

REPORT

on

COMPONENT - TEMPERATURE-INDICATING AND REGULATING EQUIPMENT

Watlow Winona Inc.
Winona, MN

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:

Model	Terminals	Supply Voltage, Vac
WCSH-0120	J4 – J5	100-120
WCSH-0240	J4 – J5	200-240

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:

WCSH	XXXX	XXXX
I	II	III

*

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)

CE

WATLOW Electric Manufacturing Company ISO 9001since 1996.
1241 Bundy Blvd.
Winona, MN 55987 USA

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_{min} 0 T_{max} 70°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

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 60730-1	**2011**	**Automatic Electrical Controls for Household and Similar Use, Part 1: General Requirements**
EN 60730-2-9	**2010**	**Particular Requirements for Temperature Sensing Controls**

Compliant with 2011/65/EU RoHS2 Directive

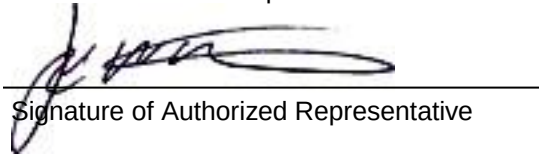
Per 2012/19/EU WEEE Directive  ***Please Recycle Properly***

Joe M. Millanes
Name of Authorized Representative

Winona, Minnesota, USA
Place of Issue

Director of Operations
Title of Authorized Representative

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

File E43684 Vol. 2 Sec. 29 and Report Page 1 Issued: 1997-06-06 Revised: 2005-05-24

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:

F2	H or U	A or C	X	X	X	1	X	X	AA
I	II	III	IV	V	VI	VII	VIII	IX	X

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)

CE

WATLOW Electric Manufacturing Company ISO 9001 since 1996.
1241 Bundy Blvd.
Winona, MN 55987 USA

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, 1, 2 or 3)(0 or 1) – (0 or 1) (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.

2004/108/EC Electromagnetic Compatibility Directive

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

Director of Operations
Title of Authorized Representative

Winona, Minnesota, USA
Place of Issue

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

File E43684 Vol. 8 Sec. 1 and Report Page 1 Issued: 2006-03-14 Revised: 2012-06-29

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:

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

COMMUNICAITON:

Type	Rating	Terminal
Connection to the user interface and RS 485	SELV, Limited Energy (Class 2)	J2

OUTPUTS:

Type	Rating	Terminal
Alarm Relay*	2 A, 30 V ac/dc	J1 – 4 to 8
Heater Relay	10 A, 100-240 V ac, 50/60 Hz	J3 – 1 to 5

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:

EHG2 - CNTL - xxxx
I II III

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

File E185611 Vol. 2 Sec. 4 Page 1 and Report Issued: 2006-03-14 Revised: 2012-06-09

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 EHG@-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:

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

COMMUNICATION:

Type	Rating	Terminal
Connection to the user interface and RS 485	SELV, Limited Energy (Class 2)	J2

OUTPUTS:

Type	Rating	Terminal
Alarm Relay (K4)*	SELV, Limited Energy (Class 2)	J1 – 7 to 8
Alarm Relay (K3)	10 A, 100-240 V ac, 50/60 Hz	J3 – 1 to 2
Heater Relay (K1)	10 A, 100-240 V ac, 50/60 Hz	J3 – 1 to 2

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 Semicondicuctor 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

CE

WATLOW Electric Manufacturing Company ISO 9001since 1996.
1241 Bundy Blvd.
Winona, MN 55987 USA

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

EN 60730-1	**2011**	**Edition 4**	**Automatic electrical controls for household and similar use –**
EN 60730-2-9	**2010**		**Temperature Sensing Controls, 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
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
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	**2010**	**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 –**
EN 60730-2-9	**2010**	**Edition 3.1**	**Temperature Sensing Controls**
UL 1998	**2008**	**ED.2**	**Software in programmable components.**

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
Title of Authorized Representative

Sept. 2014
Date of Issue

Signature of Authorized Representative

Series EHG® CL

CE

WATLOW Electric Manufacturing Company

ISO 9001since 1996.

1241 Bundy Blvd.
Winona, MN 55987 USA

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.

2004/108/EC Electromagnetic Compatibility Directive

EN 60730-1	**2011**	**Edition 4**	**Automatic electrical controls for household and similar use –**
EN 60730-2-9	**2010**		**Temperature Sensing Controls, 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 61000-4-28	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 –**
EN 60730-2-9	**2010**	**Edition 3.1**	**Temperature Sensing Controls**
UL 1998	**2008**	**ED.2**	**Software in programmable components.**

Compliant with 2011/65/EU RoHS Directive

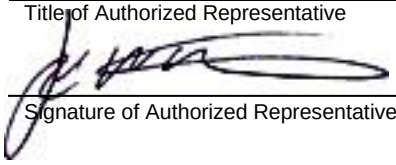
Per 2012/19/EU WEEE Directive *Please Recycle Properly*

Joe M. Millanes
Name of Authorized Representative

Winona, Minnesota, USA
Place of Issue

Directory of Operations
Title of Authorized Representative

Sept. 2014
Date of Issue



Signature of Authorized Representative

NRNT2.E73741
Switches, Industrial Control – Component

WATLOW ELECTRIC MANUFACTURING CO E73741

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

NMFT2.E151484
Motor Controllers, Mechanically Operated and Solid-state - Component

WATLOW ELECTRIC MANUFACTURING CO E151484

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).

Solid State relays , Models 0003-0221-0001, 0003-0221-0002, 0003-0221-0003, 0003-0221-0004.

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.

Model	Location	Temp °C
18-6041	On Attached Heat Sink	57
18-6003, 18-6006	On Attached Heat Sink	53
18-6023	On Attached Heat Sink	82
18-6018, 18-6013 18-6020, 18-6019 18-6016, 18-6021	On Attached Heat Sink	40

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

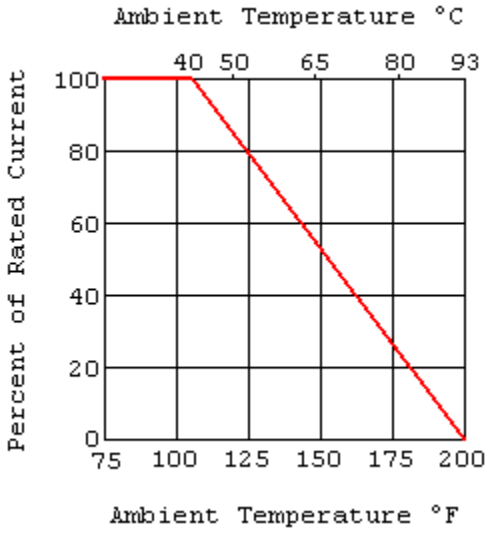
The spacings from the exposed live-metal parts to the enclosure walls shall be in accordance with the requirements of the overall equipment.

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 **Master Contract: 700195**

Project: 1749930 **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:

Models	Input Voltage	Output Voltage	Current
CR24^{xx}, CZ24^{xx}, CZ34^{xx}, CR34^{xx}, CR42^{xx}, CZ42^{xx}, CR50^{xx}, CZ50^{xx}	3-32V dc	24-280V ac	35-65A
CR24^{xx}, CZ24^{xx}, CZ34^{xx}, CR34^{xx}, CR42^{xx}, CZ42^{xx}, CR50^{xx}, CZ50^{xx}	90-140V ac	24-280V ac	35-65A
CR24^{xx}, CZ24^{xx}, CZ34^{xx}, CR34^{xx}, CR42^{xx}, CZ42^{xx}, CR50^{xx}, CZ50^{xx}	90-140V ac	48-530V ac	35-65A
CR24^{xx}, CZ24^{xx}, CZ34^{xx}, CR34^{xx}, CR42^{xx}, CZ42^{xx}, CR50^{xx}, CZ50^{xx}	4-32V dc	48-530V ac	35-65A
CR24^{xx}, CZ24^{xx}, CZ34^{xx}, CR34^{xx}, CR42^{xx}, CZ42^{xx}, CR50^{xx}, CZ50^{xx}	4-32V dc	48-660V ac	35-65A
CR24^{xx}, CZ24^{xx}, CZ34^{xx}, CR34^{xx}, CR42^{xx}, CZ42^{xx}, CR50^{xx}, CZ50^{xx}	90-140V ac	48-660V ac	35-65A

Note: XX should be output voltage rating.

Models	Input (Control) Voltage	Output Voltage	Current
CR18-A24V-AC20	90-280V ac	24-280V ac	10-30A
CZ18-A24V-AC20	90-280V ac	24-280V ac	10-30A
CR18-A24V-AC10	90-280V ac	24-280V ac	10-30A
CZ18-A24V-AC10	90-280V ac	24-280V ac	10-30A
CR18-A24V-DC10	4.5-32V dc	24-280V ac	10-30A
CZ18-A24V-DC10	4.5-32V dc	24-280V ac	10-30A
CR18-A48V-AC20	90-280V ac	48-480V ac	10-30A
CZ18-A48V-AC20	90-280V ac	48-480V ac	10-30A
CR18-A48V-AC10	90-280V ac	48-480V ac	10-30A
CZ18-A48V-AC10	90-280V ac	48-480V ac	10-30A
CR18-A48V-DC10	4.5-32V dc	48-480V ac	10-30A
CZ18-A48V-DC10	4.5-32V dc	48-480V ac	10-30A
CR18-A60V-DC10	4.5-32V dc	600V ac	10-30A
CZ18-A60V-DC10	4.5-32V dc	600V ac	10-30A
CR18-6030-AC10	90-280V ac	600V ac	10-30A
CZ18-A60V-AC10	90-280V ac	600V ac	10-30A
CR18-A60V-AC20	90-280V ac	600V ac	10-30A
CZ18-A60V-AC20	90-280V ac	600V ac	10-30A

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:

Models	Input Voltage	Output Voltage	Current
0003-0195-0000	90-280V ac 3-32V dc	48-660V ac 48-660V ac	10A, 70 deg C
0003-0195-6005 0003-0195-6011 0003-0195-6038	90-280V ac 3-32V dc	48-660V ac 48-660V ac	25A, 70 deg C
0003-0195-6006 0003-0195-6013 0003-0195-6016 0003-0195-6019	90-280V ac 3-32V dc	48-660V ac 48-660V ac	50A, 60 deg C
0003-0195-6023 0003-0195-6017	90-280V ac 3-32V dc	48-660V ac 48-660V ac	90A, 65 deg C

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 Industrial Control Equipment

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.

Series SSR VDE®

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

Type	Technical Data
0003-0195-0000	
0003-0195-6005	
0003-0195-6006	
0003-0195-6011	
0003-0195-6013	
0003-0195-6016	
0003-0195-6017	
0003-0195-6019	
0003-0195-6023	
0003-0195-6038	
18-6001	
18-6002	
18-6003	
18-6004	
18-6005	
18-6006	
18-6011	
18-6013	
18-6014	
18-6016	
18-6017	
18-6018	
18-6019	
18-6021	
18-6023	
18-6025	
18-6038	
18-6039	

Solid State Relay

CE

WATLOW Electric Manufacturing Company ISO 9001since 1996.
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, 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.

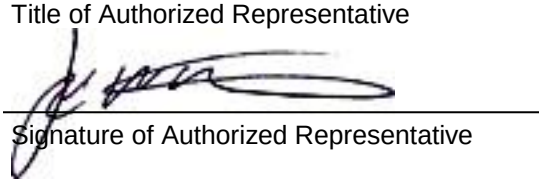
2006/95/EC Low-Voltage Directive

EN 60950-1:2013 **Safety of information technology equipment.**

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	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

Series SSR'S Agency P/N Cross-Reference

Watlow Top Level P/N	Agency File P/N	UL FILE and Category	VDE FILE and Category	CSA FILE AND Class
SSR-240-10A-DC1	18-6004	E151484 NMFT2	1995500 4941-07	700195 3211-07
SSR-240-25A-DC1	18-6005	E151484 NMFT2	1995500 4941-07	700195 3211-07
SSR-240-40A-DC1	18-6006	E151484 NMFT2	1995500 4941-07	700195 3211-07
SSR-240-50A-DC1	18-6013	E151484 NMFT2	1995500 4941-07	700195 3211-07
SSR-240-75A-DC1	18-6014	E151484 NMFT2	1995500 4941-07	700195 3211-07
SSR-240-10A-AC1	18-6001	E151484 NMFT2	1995500 4941-07	700195 3211-07
SSR-240-25A-AC1	18-6002	E151484 NMFT2	1995500 4941-07	700195 3211-07
SSR-240-40A-AC1	18-6003	E151484 NMFT2	1995500 4941-07	700195 3211-07
SSR-240-50A-AC1	18-6018	E151484 NMFT2	1995500 4941-07	700195 3211-07
SSR-240-75A-AC1	18-6023	E151484 NMFT2	1995500 4941-07	700195 3211-07
SSR-480-25A-DC1	18-6011	E151484 NMFT2	1995500 4941-07	700195 3211-07
SSR-480-50A-DC1	18-6016	E151484 NMFT2	1995500 4941-07	700195 3211-07
SSR-480-75A-DC1	18-6017	E151484 NMFT2	1995500 4941-07	700195 3211-07
SSR-480-25A-AC1	18-6038	E151484 NMFT2	1995500 4941-07	700195 3211-07
SSR-480-50A-AC1	18-6019	E151484 NMFT2	1995500 4941-07	700195 3211-07
SSR-480-75A-AC1	18-6025	E151484 NMFT2	1995500 4941-07	700195 3211-07
SSR-480-50A-RND	18-6021	E151484 NMFT2	1995500 4941-07	700195 3211-07
SSR-480-75A-RND	18-6039	E151484 NMFT2	1995500 4941-07	700195 3211-07
SSR-240-10A-RND	0003-0195-0000	E151484 NMFT2	1995500 4941-07	700195 3211-07
SSR-240-25A-DCA	0003-0195-6005	E151484 NMFT2	1995500 4941-07	700195 3211-07
SSR-240-40A-DCA	0003-0195-6006	E151484 NMFT2	1995500 4941-07	700195 3211-07
SSR-240-50A-DCA	0003-0195-6013	E151484 NMFT2	1995500 4941-07	700195 3211-07
SSR-600-25A-DC1	0003-0195-6011	E73741 NRNT2	1995500 4941-07	700195 3211-07
SSR-600-50A-DC1	0003-0195-6016	E73741 NRNT2	1995500 4941-07	700195 3211-07
SSR-600-75A-DC1	0003-0195-6017	E73741 NRNT2	1995500 4941-07	700195 3211-07
SSR-600-50A-AC1	0003-0195-6019	E73741 NRNT2	1995500 4941-07	700195 3211-07
SSR-600-75A-AC1	0003-0195-6023	E73741 NRNT2	1995500 4941-07	700195 3211-07
SSR-600-25A-AC1	0003-0195-6038	E73741 NRNT2	1995500 4941-07	700195 3211-07
SSR-100-20A-DC1	0003-0195-6100	E73741 NRNT2	Not Approved	Not Approved
SSR-100-20A-DC2	0003-0195-6101	E73741 NRNT2	Not Approved	Not Approved
Use agency p/n	0003-0221-0001	E151484 NMFT2	Not Approved	700195 3211-07
Use agency p/n	0003-0221-0002	E151484 NMFT2	Not Approved	700195 3211-07
Use agency p/n	0003-0221-0003	E151484 NMFT2	Not Approved	700195 3211-07
Use agency p/n	0003-0221-0004	E151484 NMFT2	Not Approved	700195 3211-07
Zero Cross SSR EZ-Zone ST	0003-0214-0000 0003-0215-0000 0003-0216-0000 0003-0217-0000 0802-0952-0000 0802-0951-0000	Approved as part of EZ-Zone ST File E102269	Not Approved	700195 EZ-Zone ZT component
Phase angle models EZ-Zone ST	0003-0256-0001 0003-0256-0002 0003-0256-0003 0003-0256-0004 0003-0256-0005 0003-0256-0006	Approved as part of EZ-Zone ST File E102269	Not Approved	700195 EZ-Zone ST component

File E73741
Project 94NK32682

February 14, 1995

REPORT

on

SWITCHES, INDUSTRIAL CONTROL

Watlow Winona, Inc.
Winona, MN

File E73741 Vol. 2 Sec. 5 Page 1 Issued: 1995-02-14
and Report Revised: 2003-05-19

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:

DA	1	0	02	C0	0	0	00
I	II	III	IV	V	VI	VII	VIII

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

CE

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

ISO 9001since 1996.

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.

2004/108/EC Electromagnetic Compatibility Directive

EN 61326-1: 2013	**Electrical equipment for measurement, control and laboratory use – EMC requirements (Industrial Immunity, Class A[1,2,4] 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[3]

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

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

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

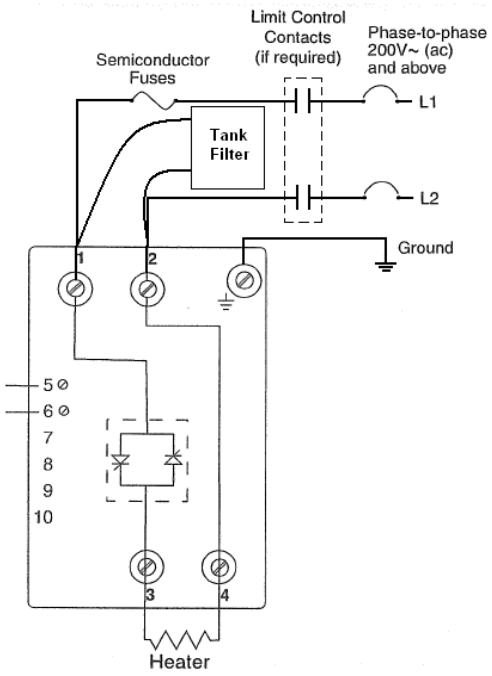
Compliant with 2011/65/EU RoHS2 Directive

[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



Description	Crydom Filter	Watlow Filter
Single-Phase 230 V~ (ac)	1F25	14-0019

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

Director of Operations
Title of Authorized Representative

Winona, Minnesota, USA
Place of Issue

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

File E73741 Vol. 2 Sec. 6 and Report Page 1 Issued: 1995-06-08 Revised: 2011-06-04

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.

NOMENCLATURE:

DB	X	0	XX	XX	X	X	XX
I	II	III	IV	V	VI	VII	VIII

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

CE

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

ISO 9001since 1996.

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.

2004/108/EC Electromagnetic Compatibility Directive

EN 61326-1: 2013	**Electrical equipment for measurement, control and laboratory use – EMC requirements (Industrial Immunity, Class A[1,2,4] 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[3] ≤ 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 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.**

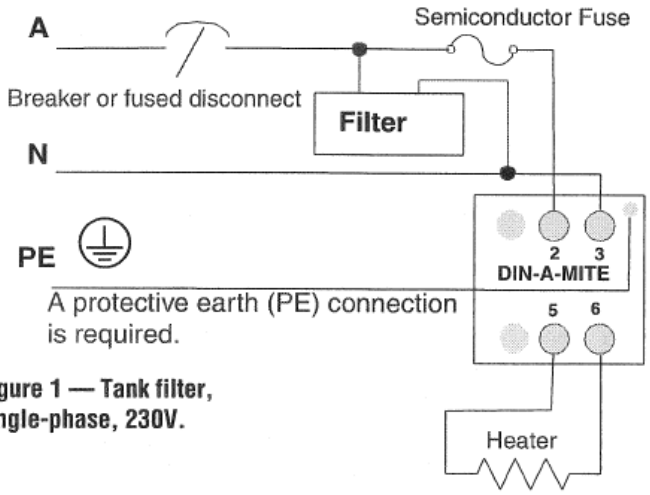
Per 2012/19/EU W.E.E.E Directive  ***Please Recycle Properly.***

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.



Description	Crydom Filter	Watlow Filter
Single-Phase 230 V~ (ac)	1F25	14-0019
Three-Phase 440 V~ (ac)	3F20	14-0020

Figure 1 — Tank filter, single-phase, 230V.

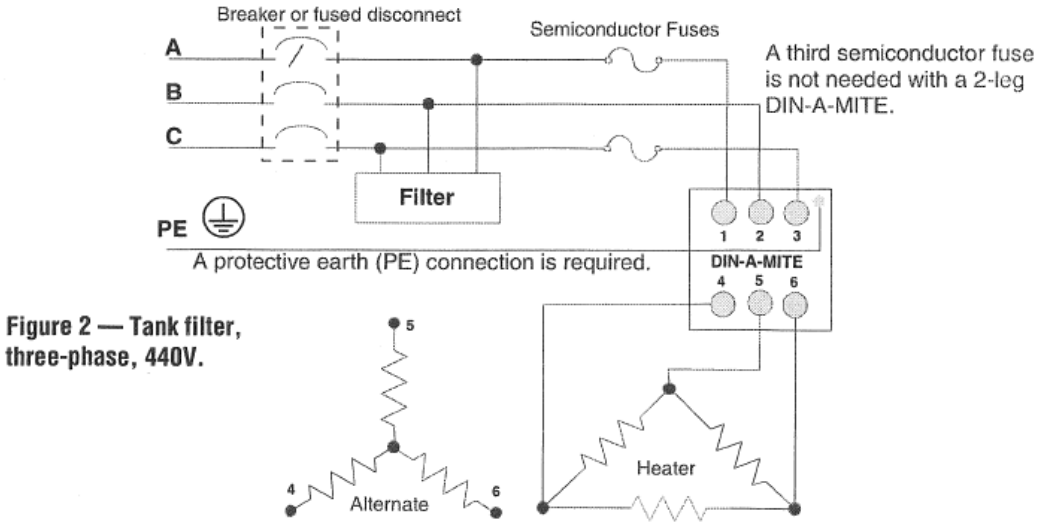


Figure 2 — Tank filter, three-phase, 440V.

⚠ 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

Director of Operations
Title of Authorized Representative

Winona, Minnesota, USA
Place of Issue

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

File E73741 Vol. 2 Sec. 4 Page 1 Issued: 1994-06-10
and Report Revised: 2003-05-19

DESCRIPTION

PRODUCT COVERED:

Solid State Power controller without cooling fan, Part No. DC followed by 1, 2, 3, 4, 8 or 9; followed by O 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.

Models Without Cooling Fan at 50°C	Models With Cooling Fan at 50°C
55 A - 1 pole	75 A - 1 pole
40 A - 2 pole	65 A - 2 pole
30 A - 3 pole	55 A - 3 pole
62 A - 1 pole (through wall model only)	
46 A - 2 pole (through wall model only)	
35 A - 3 pole (through wall model only)	

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.

NOMENCLATURE:

DC	X	X	XX	XX	X	X	XX
I	II	III	IV	V	VI	VII	VIII

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
O – 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.

DIN-A-MITE® "C" Power Controller

CE

WATLOW Electric Manufacturing Company ISO 9001since 1996.
1241 Bundy Blvd.
Winona, MN 55987 USA

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) (C**X**, K1, K2, K3, F**X**, S**X**) – (0, H or S)(followed by any 3 numbers or letters.) **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.

2004/108/EC Electromagnetic Compatibility Directive

EN 61326-1: 2013	**Electrical equipment for measurement, control and laboratory use – EMC requirements (Industrial Immunity, Class A[1,2,4] 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[3] ≤ 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 **Electronic equipment for use in power installations.**

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

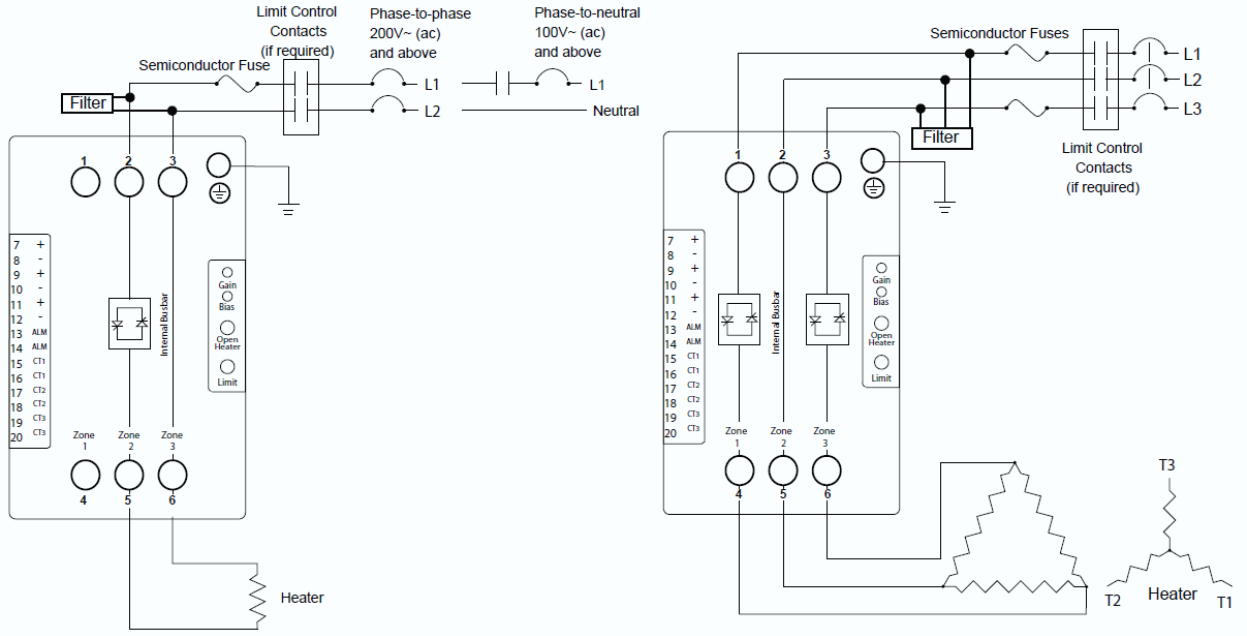
Compliant with 2011/65/EU RoHS2 Directive

[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



Description	Crydom Filter	Watlow Filter
Single-Phase 230 V~ (ac)	1F25	14-0019
Three-Phase 440 V~ (ac)	3F20	14-0020

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

Director of Operations
Title of Authorized Representative

Winona, Minnesota, USA
Place of Issue

Sept. 2014
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

Series DIN-A-MITE™ C ThroughWall UL®

File E184390 Vol. 1 and Report Sec. 1 *Page 1 Issued: 11-18-96 Revised: 7-18-02

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.

USL indicates investigation to United States UL Standards 508 and **ANSI/ISA 12.12.01-2011, Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Division 1 and 2 Hazardous (Classified) Locations, Approved 24 August 2011.**

NOMENCLATURE:

DC	1	T	24	C0	0	0	00
I	II	III	IV	V	VI	VII	VIII

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.

02 – 24-48 V ac (control option 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 – 100-240 V ac (control option 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 – 277-600 V ac (control option C, f or K)
600 V ac (control options L, P or S)

V - Control Options.

C0 – 4.5-32 V dc (contactor
F0 – 4-20 mA dc (variable time base)
F1 – 12-20 mA dc (variable time base)
K1 – 24 V ac (contactor
K2 – 120 V ac (contactor)
K3 – 240 V ac (contactor)
L_ - Phase angle with 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

(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

Series DIN-A-MITE™ D UL®

File E73741
Project 95NK22218

October 6, 1995

REPORT

on

SWITCHES INDUSTRIAL CONTROL

Watlow Winona, Inc.
Winona, MN

Series DIN-A-MITE™ D UL®

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	1	0	XX	XX	X	X	XX
I	II	III	IV	V	VI	VII	VIII

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
F0 = 4 to 20 mA – variable time base
F1 = 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:

E-RRL4CSSAA	**248E**
I	**II**

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

CE

WATLOW Electric Manufacturing Company ISO 9001since 1996.
1241 Bundy Blvd.
Winona, MN 55987 USA

Declares that the following product:

Designation:	DIN-A-MITE® "D" Power Control
Model Numbers:	DD10 – (02, 24, 48 or 60)(C**X**, K1, K2, K3, F**X**) – (0, 1, S)(followed by any 3 numbers or letters.) **X** = any number 0-9, or E-RRL4CSSAAA48X (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.

2004/108/EC Electromagnetic Compatibility Directive

EN 61326-1: 2013	**Electrical equipment for measurement, control and laboratory use – EMC requirements (Industrial Immunity, Class A[1,2,4] 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[3] ≤ 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 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.**

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

Industrial Applications Exemption for 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.

Description	Crydom	Watlow

	Filter	Filter
Single-Phase 230 V~ (ac)	1F25	14-0019
Three-Phase 440 V~ (ac)	3F20	14-0020

Table 1 — DIN-A-MITE EMI filters.

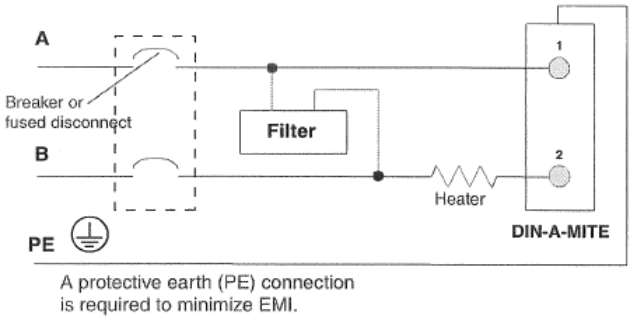


Figure 1 — Tank filter, single-phase, 230V~ (ac).

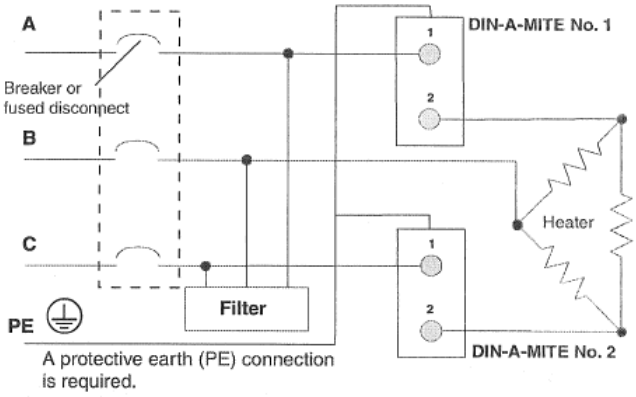


Figure 2 — Three-phase, 2-leg control using two (2) DIN-A-MITE D controllers. Contactor input models (C and K) only.

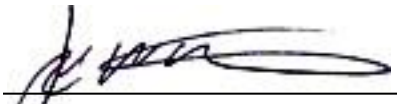
⚠ WARNING: Tank filters may suppress desirable communications carried on power lines in the 150 to 250 KHz region. The filters may suppress carrier current such as that used for infant monitors and medical alert systems. Verify that suppressed carrier current or other desirable communications on power 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

Director of Operations
Title of Authorized Representative



Signature of Authorized Representative

Winona, Minnesota, USA
Place of Issue

Sept. 2014
Date of Issue

File E73741
Project 93NK19930

October 5, 1993

REPORT

on
SWITCHES, INDUSTRIAL CONTROL

Watlow Winona, Inc.
Winona, MN

File E73741 Vol. 3 Sec. 1 Page 1 Issued: 1993-10-05
and Report Revised: 2007-09-27

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:

Q	XX	-	XX	-	X	XXX	XX	X
I	II		II		IV	V	VI	VII

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

File E73741 Vol. 3 Sec. 2 and Report Page 1 Issued: 1999-09-02 Revised: 2012-06-26

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** 00 **through 99** 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

Single Phase Non Fan Cooled	3 Phase, 2 Leg Non Fan Cooled	3 Phase, 3 Leg Non Fan Cooled
N20 = 100 A	N20 = 80 A	N20 = 65 A
N25 = 140 A	N25 = 105 A	N25 = 85 A
N30 = 165 A	N30 = 120 A	N30 = 105 A
Fan Cooled	Fan Cooled	Fan Cooled
F20 = 125 A	F20 = 120 A	F20 = 90 A
F25 = 205 A	F25 = 160 A	F25 = 140 A
F30 = 250 A	F30 = 185 A	F30 = 155 A
F35 = 250 A	F35 = 250 A	F35 = 225 A

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:

P	__	___	__	-	___	__	-	____	__
I	II	III	IV		V	VI		VIII	XI

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 Power Controller

CE

WATLOW Electric Manufacturing Company ISO 9001since 1996.
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.

2004/108/EC Electromagnetic Compatibility Directive

EN 61326-1: 2013	**Electrical equipment for measurement, control and laboratory use – EMC requirements (Industrial Immunity, Class A[1,2,5] 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- 1GHz, 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[4]
EN 61000-3-3:2013	Voltage Fluctuations and Flicker (Unit Supply)
EN 61000-3-11:2000	Voltage Fluctuations and Flicker[3] (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

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

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.

Description	Crydom Filter	Watlow Filter
Single-Phase 230 V~ (ac)	1F25	14-0019
Three-Phase 440 V~ (ac)	3F20	14-0020

Figure 1 - Tank Filter, 1Ø, 230 V~

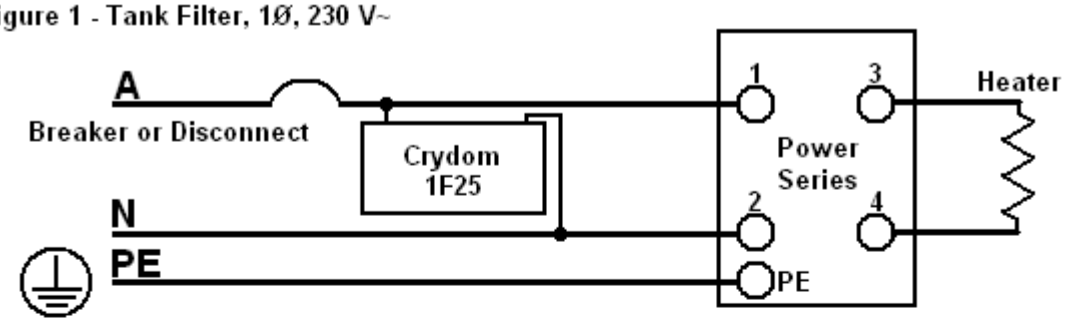
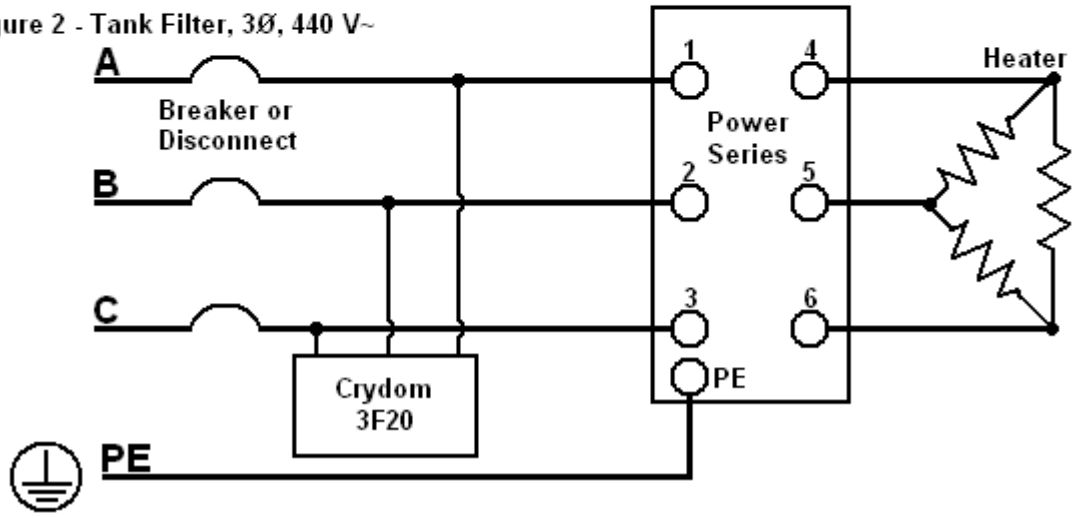


Figure 2 - Tank Filter, 3Ø, 440 V~



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

Directory of Operations
Title of Authorized Representative

Signature of Authorized Representative

File E73741
07CA08745

Issued: March 15, 2007
Revised: August 7, 2012

REPORT

on

COMPONENT – Switches, Industrial Control

Watlow Winona Inc.
Winona, MN

File E73741 Vol. 4 Sec. 1 and Report Page 1 Issued: 2007-03-15 Revised: 2010-02-19

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:

ES2	3	-	2	LV	0	-	0	000
I	II		III	IV	V		VI	VII

I Model Number Designator
ES2 (E-Safe 2)

II Number of Poles
1 = 1 Pole
2 = 2 Poles controlled
3 = 3 Poles controlled

*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 L1 to N

IV Command Signal Voltage
LV = Low voltage 3-24 V dc or 24 V ac
HV = High voltage 100 – 240 V ac

V Placeholder for future options

VI Placeholder for future options

VII Custom Options
000 = Standard Product
Any three letters or numbers = 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.

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

CE

WATLOW Electric Manufacturing Company ISO 9001since 1996.
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.

2004/108/EC Electromagnetic Compatibility Directive

EN 60947-4-1	**2011**	**Low-Voltage switchgear and controlgear Part 4-3: Contactors and motor-**
EN 60947-4-3	**2011**	**starters AC semiconductor controllers and contactors for non-motor loads. 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	Magnetic Field Immunity
EN 61000-4-11	2004	Voltage Dips, Short Interruptions and Voltage Variations Immunity
IEC 61000-3-12	2009	Harmonic Current Emissions < 75A (Reviewed to IEC 61000-3-2 2014)
IEC 61000-3-11[2]	2000	Voltage Fluctuations and Flicker < 75A

[2]NOTE 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

EN 60947-1	**2011**	**Low-Voltage switchgear and controlgear Part 4-3: Contactors and motor-**
EN 60947-4-3	**2011**	**starters AC semiconductor controllers and contactors for non-motor loads.**

Compliant with 2011/65/EU RoHS2 Directive

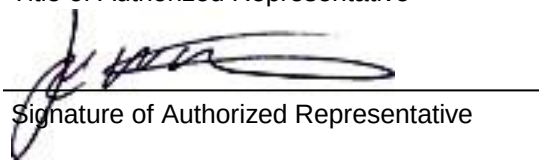
Per 2012/19/EU WEEE Directive  ***Please Recycle Properly***

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

File E102269
Project 05NK26022

January 30, 2006

REPORT

on

AUXILIARY DEVICES
**********Process Control Equipment (QUYX) & (QUYX7)

Watlow Winona Inc.
Winona, MN

File E102269 Vol. 2 Sec. 4 and Report Page 1 Issued: 2006-01-30 Revised: 2010-03-19

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

File E102269 Vol. 2 Sec. 4 and Report Page 1A Issued: 2006-01-30 Revised: 2010-03-19

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.

NOMENCLATURE:

ST	K	A	A	L	Xx	A	A	Xx	xx
I	II	III	IV	V	VI	VII	VIII	IX	IX

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

Series EZ-ZONE® ST Components UL®

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

STRT-HS	AA-	000	B
I	II	III	IV

I. Heat sink assembly model family
STRT-HS

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

STRT-BASE-	DP-	F	1
I	II	III	IV

I. Base Module Assembly Family
STRT-BASE-

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

STRC-	0	K	L	1	-AAAA
I	II	III	IV	V	VI

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.

MASTER CONTRACT: 158031
REPORT: 1827433
PROJECT: 2616949

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

Contents:

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 24Vac

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 V ac 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

CAN/CSA - C22.2 No.0-M91	General Requirements - Canadian Electrical Code, Part II
CAN/CSA-C22.2 No. 0.4-04	Bonding of electrical equipment
CAN/CSA-C22.2 No. 14-10	Industrial Control Equipment
CAN/CSA-C22.2 No. 65-03	Standard for Wire Connectors
CAN/CSA-C22.2 No. 94-M91 (R2001)	Special Purpose Enclosures

Series EZ-ZONE® ST Tower

CE

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

ISO 9001since 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[3].
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.

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[1]). *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
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	Magnetic Field Immunity
EN 61000-4-11	2004	Voltage Dips, Short Interruptions and Voltage Variations Immunity
EN 61000-3-2[4]	2009	Harmonic Current Emissions (Reviewed to IEC 61000-3-2 2014)
EN 61000-3-3[2]	2013	Voltage Fluctuations and Flicker
SEMI F47	2000	Specification for Semiconductor Sag Immunity Figure R1-1

[1]NOTE 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.

[2]NOTE 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.

[3]NOTE 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.

[4]NOTE 4: Phase angle models will need power factor correction to pass harmonic current standard.

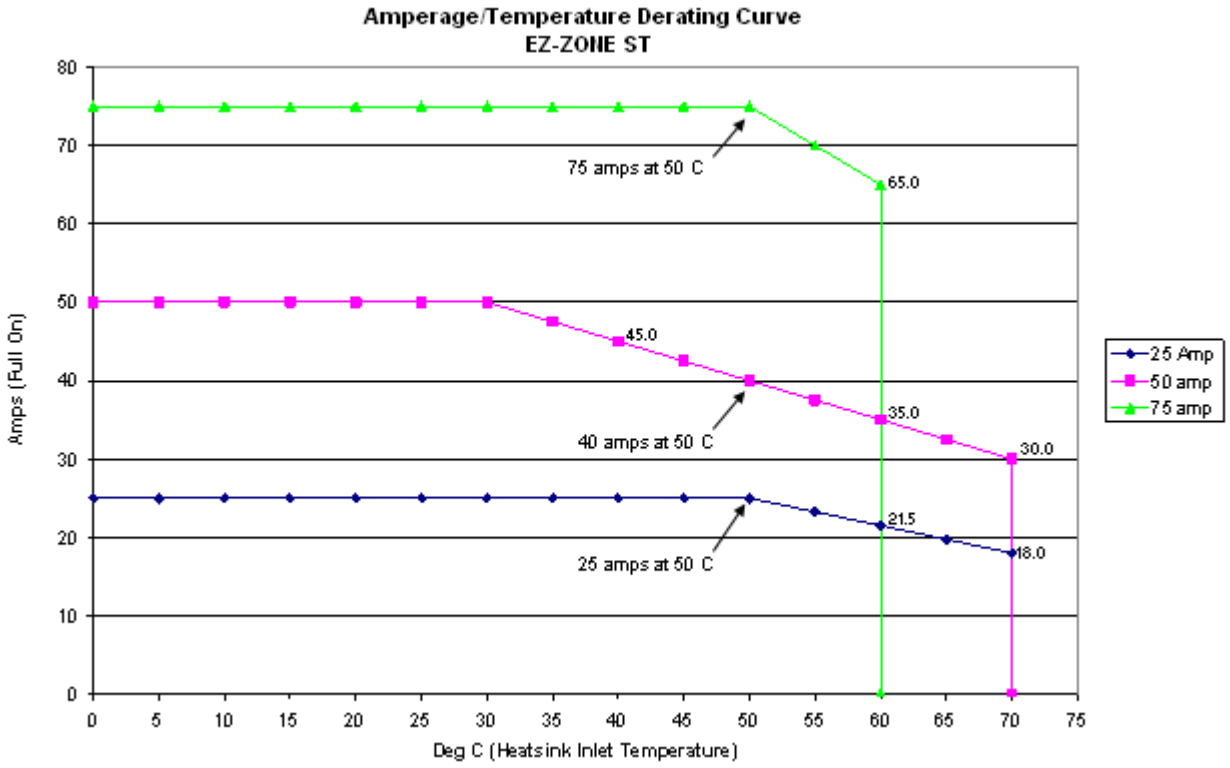
2006/95/EC Low-Voltage Directive

EN 61010-1 **2011[5]** **Safety Requirements of electrical equipment for measurement, control and laboratory use. Part 1: General requirements**

[5] Compliance with 3rd 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 *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

Series EZ-ZONE® ST Tower Components

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

ISO 9001since 1996.

Declares that the following COMPONENTS:

Designation:	**Series EZ-ZONE® ST Tower Components**
Model Numbers:	**HEATSINK** STRT–HS(AA or CB) – (Any three numbers or letters)(B, C, D, E or F) **BASE MODULE** STRT – BASE – (0000 or DP(A, B or F)(1, 2 or 3)) **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)
Classification:	Temperature control, Installation Category II, Pollution degree 2
Rated Voltage and Frequency:	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
Rated Power Consumption:	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.

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

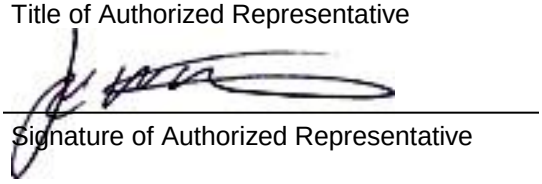
Per 2012/19/EU WEEE Directive  ***Please Recycle Properly***

Joe Millanes
Name 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 E102269
Project 06NK04890

March 31, 2006

REPORT

on

AUXILIARY DEVICES

**********Process Control Equipment (QUYX) & (QUYX7)

Watlow Winona Inc.
Winona, MN

Series EZ-ZONE® EZK UL®

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 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:

EZK	B	-H	A	AA	-A	A	AA
I	II	III	IV	V	VI	VII	VIII

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

CE

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

ISO 9001since 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

EN 61326-1	**2013**	**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.**
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	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
SEMI F47	2000	Specification for Semiconductor Sag Immunity Figure R1-1

2006/95/EC Low-Voltage Directive

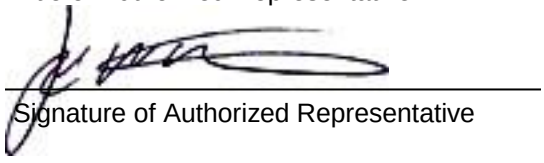
EN 61010-1	**2011[1]**	**Safety Requirements of electrical equipment for measurement, control and laboratory use. Part 1: General requirements**

[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
Networks Built on a Common Industrial Protocol

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 — *Certification Logo Mark*

EtherNet/IP CONFORMANCE TESTED ™ — *Certification Word Mark*

This Declaration of Conformity is issued on **26 March 2007** 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	**26 March 2007**
Composite Test Revision	**4**
ODVA File Number	**10514**

Product Information

Identity Object Instance 1

Device(s) Under Test	Value
Vendor ID (Identity Object Attribute 1)	**153**
Network Category	**Node**
Device Type (Identity Object Attribute 2)	**0x0C**
Device Profile Name	**Communications Adapter**
Product Revision (Identity Object Attribute 4)	**1.001**

Products Covered Under This Declaration of Conformity

No.	Product Code (Identity Object Attribute 3)	Product Name (Identity Object Attribute 7)	SOC File Name
1	**300**	**Watlow EZ-ZONE**	**Watlow EZ-Zone.dat**

ODVA
Networks Built on a Common Industrial Protocol

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 holds 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 CONFORMANCE TESTED

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

Device(s) Under Test	Value
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)	**1.002**

Products Covered Under This Declaration of Conformity

No.	Product Code (Identity Object Attribute 3)	Product Name (Identity Object Attribute 7)	SOC File Name
1	301	Watlow EZ-ZONE	10584.02 EZZONE.stc

SERIES TLM, CLS and D8 UL®

File E185611
Project 06SC05260

December 11, 2006

REPORT

ON

PROCESS CONTROL EQUIPMENT

Watlow Winona Inc
Winona, MN

SERIES TLM, CLS and D8 UL®

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

TLM	X	X	X	X	XXXXXXXX
I	II	III	IV	V	VI

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	X	0	0000	X	X	0	X
I	II	III	IV	V	VI	VII	VIII

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

File E185611 Vol. 2 Sec. 5 and Report Page 2A Issued: 2006-12-11 Revised: 2008-03-29

CLS2	04	X	1	0	0	0	0	00
I	II	III	IV	V	VI	VII	VIII	IX

I Model Designation
CLS2

II Sensor Inputs
04 = 4 sensor inputs
08 = 8 sensor inputs
16 = 16 sensor inputs

III Controller Type
Any number or letter designating standard or custom firmware

IV Terminal Board
0 = No terminal board
1 = TB18 terminal board
2 = TB50 terminal board

V 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)

VI SCSI Cable – used with TB50 terminal board.
Any number or letter to define type of cable and length

VII Communications cable
Any number or letter to define length of cable.

VIII Communications type
0 = RS 232
1 = RS 485
2 = RS485 terminated

IX Special inputs
Any two numbers or letters defining custom sensor options.

SERIES TLM and CLS Complementary UL®

File E43684
Project 06SC05260

March 7, 2007

REPORT

ON

COMPONENT- TEMPERATURE-INDICATING AND REGULATING EQUIPMENT

Watlow Winona Inc.
Winona, Minnesota

SERIES TLM and CLS Complementary UL®

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(Class2)

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

CE

WATLOW Electric Manufacturing Company ISO 9001since 1996.
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 Î 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.

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[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***

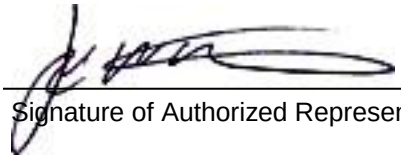
These devices contain lead solder and are not RoHS compliant.
They are used in large scale fixed installations and fall outside the scope of 2011/65/EU Directive.

Joe Millanes
Name of Authorized Representative

Winona, Minnesota, USA
Place of Issue

Director of Operations
Title of Authorized Representative

September 2014
Date of Issue



Signature of Authorized Representative

Series CLS

CE

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

ISO 9001since 1996.

Declares 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.

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[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***

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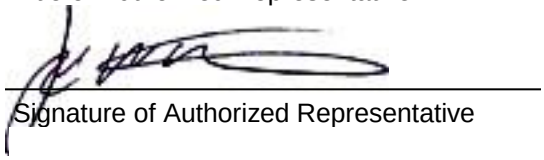
They are used in large scale fixed installations and fall outside the scope of 2011/65/EU Directive.

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

Series D8

CE

WATLOW Electric Manufacturing Company ISO 9001since 1996.
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⎓ (dc) 610 mA 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

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[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.
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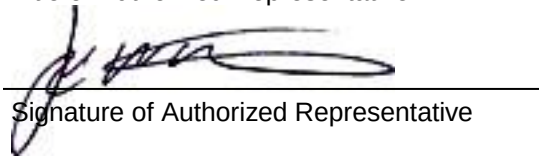
Joe Millanes
Name of Authorized Representative

Winona, Minnesota, USA
Place of Issue

Director of Operations
Title of Authorized Representative

September 2014
Date of Issue



Signature of Authorized Representative

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

Product Name(s) (Device actually tested)	WATLOW D88
Product Code(s)	1
Product Revision	1.1
Device Type Code	0
Device Profile Name	Generic
Electronic Data Sheet Revision	1.0

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

SERIES MLS UL®

File E185611
Service Request 07SR3191998

September 1, 1998

REPORT

ON

PROCESS CONTROL EQUIPMENT

Watlow Winona
Winona, MN

File E185611 Vol. 2 Sec. 7 and Report Page 1 Issued: 1998-09-01 Revised: 2002-12-23

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

CE

WATLOW Electric Manufacturing Company ISO 9001since 1996.
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$\hat{I}$ (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[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.

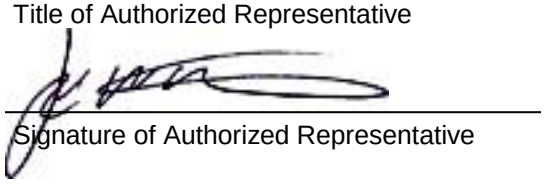
2006/95/EC Low-Voltage Directive

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	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

Series TB50

WATLOW Electric Manufacturing Company ISO 9001since 1996.
1241 Bundy Blvd.
Winona, MN 55987 USA

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***

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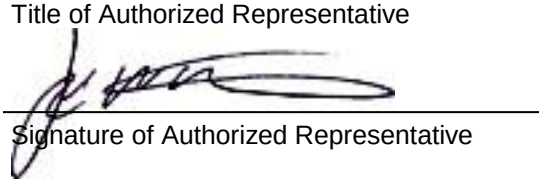
They are used in large scale fixed installations and fall outside the scope of 2011/65/EU Directive.

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
Service Request 07SR3191998

September 2, 1998

REPORT

ON

PROCESS CONTROL EQUIPMENT

Watlow Winona
Winona, MN

SERIES SDAC UL®

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

CE

WATLOW Electric Manufacturing Company ISO 9001since 1996.
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.

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[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.

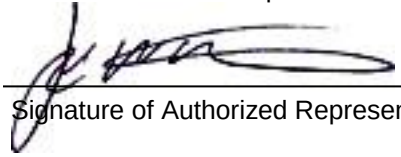
2006/95/EC Low-Voltage Directive

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	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

SERIES D8 Recognized UL®

File E185611

Project 07NK08802

April 27, 2007

REPORT

ON

COMPONENT - PROCESS CONTROL EQUIPMENT

Watlow Winona Inc
Winona, Minnesota

SERIES D8 Recognized UL®

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

D8	X	1	0000	X	X	0	X
I	II	III	IV	V	VI	VII	VIII

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

SERIES F4 UL®

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

Module Name	Module No.
Solid State Relay Output	Z100-0745-0001
Open Collector Output	Z100-0745-0002
Process Output	Z100-0745-0003
Dual Universal Auxiliary Input	Z100-0745-0004
Single Universal Auxiliary Input	Z100-0745-0005
Auxiliary Retransmit Output	Z100-0745-0006
Mechanical Relay Output	Z100-0745-0007

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.

DESIGNATION SYSTEM: Series F4 Model Breakdown Structure

F4 __ __ - __ __ __ __ __ - __ __ __

Series F4
Controller Type
S - Single Channel Ramping Control, 4
Event Inputs, EIA232/485 Comms, 8
Event Outputs, 2 Alarms, 40 Files, 256 Steps
D - Dual Channel Ramping Control, 4
Event Inputs, EIA232/485 Comms, 8
Event Outputs, 2 Alarms, 40 Files, 256 Steps
P - Single Channel Temperature Process
Control, 2 Alarms, EIA232/485 Comms,
4 Event Inputs

Power Supply
H - 100-240 V ac/V dc
*L - 24-28 V ac/V dc
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
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
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

WATLOW Electric Manufacturing Company ISO 9001since 1996.
1241 Bundy Blvd.
Winona, MN 55987 USA

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 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.

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).**
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

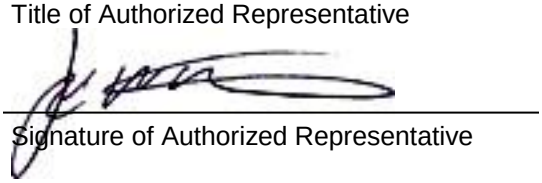
EN 61010-1	**2011[2]**	**Safety Requirements of electrical equipment for measurement, control and laboratory use. Part 1: General requirements**

[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

SERIES EZ-ZONE® PM UL®

File E185611
Project 07NK03422

March 20, 2007

REPORT

on

PROCESS CONTROL EQUIPMENT, ELECTRICAL

Watlow Winona Inc.
Winona, MN

SERIES EZ-ZONE® PM UL®

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

Type	Input Rating	Terminals
*Power supply	100-240 V ac, 50/60 Hz; 24V ac, 50/60 Hz; **15-36** V dc, 10 VA max	98-99
Digital Input 5 (DC Voltage or Contact Closure)	36 V dc, 3 mA max, SELV, Limited Energy	B5-D5
Digital Input 6 (DC Voltage or Contact Closure)	36 V dc, 3 mA max, SELV, Limited Energy	B5-D6
Input 1, Thermocouple	SELV, Limited Energy	R1-S1
Input 1, RTD, Thermistor	SELV, Limited Energy	R1-S1; R1-S1-T1
Input 1, Process	SELV, Limited Energy	R1-S1, S1-T1
Input 1, Potentiometer	SELV, Limited Energy	R1-S1
Input 2, Thermocouple	SELV, Limited Energy	R2-S2
Input 2, RTD, Thermistor	SELV, Limited Energy	R2-S2; R2-S2-T2
Input 2, Process	SELV, Limited Energy	R2-S2, S2-T2
Input 2, Potentiometer	SELV, Limited Energy	R2-S2
Input 2, Current Transformer	SELV, Limited Energy	S2-T2
Digital Input board up to 6 digital inputs (DC voltage or Contact Closure)	36 V dc, 3 mA max, SELV, Limited Engergy	B7, D7-D12, Z7

COMMUNICATION: PM and EZK Series

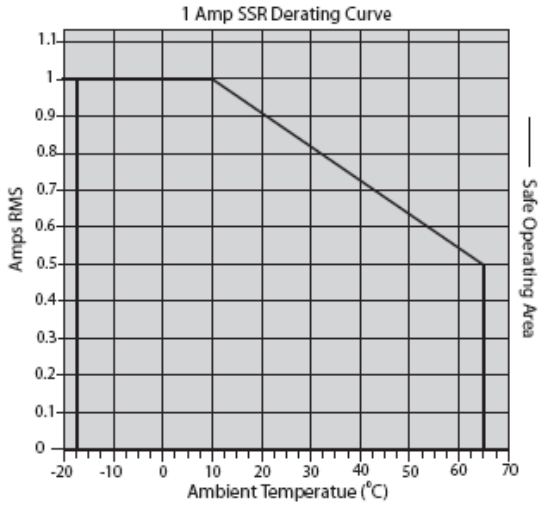
Type	Rating	Terminal
Standard EIA-485	SELV, Limited Energy	CD, CE, CF
Modbus RTU or Standard EIA-485	SELV, Limited Energy	CA, CB, CC
EIA-232/485 Modbus RTU	SELV, Limited Energy	Communications CA, CB, CC, C2, C3, C5
Ethernet/IP	SELV, Limited Energy	E1-E8
Devicenet	SELV, Limited Energy	V+, CH, SH, CL, V-
Profibus	SELV, Limited Energy	E1-E8

OUTPUTS: PM Series Only

Type	Rating	Terminal
Digital Output 5 (DC Voltage or Contact Closure)	24 V, 24 mA max, SELV, Limited Energy	B5-D5
Digital Output 6 (DC Voltage or Contact Closure)	24 V, 24 mA max, SELV, Limited Energy	B5-D6
Output 1, 3 DC/Open Collector	32 V dc, 30 mA max, switched DC, 32 V dc, 100 mA external sourced, SELV, Limited Energy	W1-X1-Y1 W3-X3-Y3
*Output 1, 3, Mechanical Relay (Form C)	240 V ac, 5 A resistive 30 V dc, 5A resistive **120**/240 @ 125 VA 24 V ac @ 25 VA, resistive, 100 K cycles	J1-K1-L1 J3-K3-L3
Output 1, 3 Universal Process	0-20 mA, 0-10 V dc, SELV, Limited Energy	F1-G1-H1 F3-G3-H3
Output 1-4 SSR, Form A	20-264 V ac, 0.5 A resistive 120/240 V @ 20 VA pilot duty See derating curve below	L1-K1, L2-K2, L3-K3, L4-K4
Output 2, 4 Switched DC	32 V dc, 10 mA max SELV	W2-Y2, W4-Y4
Output 2, 4 No-Arc Relay (Heater)	85-264 V ac, 15 A, 50/60 Hz, dc, resistive, 500 K cycles	K2-L2, K4-L4
*Output 2, 4 Mechanical Relay (Form A)	240 V ac, 5 A resistive 30 V dc, 5A resistive **120**/240 @ 125 VA 24 V ac @ 25 VA, resistive, 100 K cycles	K2-L2, K4-L4
Digital Output (Switched DC or Open Collector)up to 6 outputs per card.	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.	B7, D7-12, Z7

File E185611 Vol. 2 Sec. 6 and Report Page 3A Issued: 2007-03-20 New: 2009-07-03

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

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

File E185611 Vol. 2 Sec. 6 and Report Page 4B Issued: 2007-03-20 New: 2009-07-03

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.

SERIES EZ-ZONE® PM Class 1 DIV. 2 UL®

File E184390
Project 07NK05858

March 29, 2007

REPORT

on

PROCESS CONTROL EQUIPMENT FOR USE IN HAZARDOUS LOCATIONS

Watlow Winona, Inc.
Winona, MN

SERIES EZ-ZONE® PM Class 1 DIV. 2 UL®

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 A, C, 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.

SERIES EZ-ZONE® PM Class 1 DIV. 2 UL®

File E184390 Vol. 1 Sec. 2Page 2 Issued: 2007-03-29
and Report Revised: 2009-07-14

RATINGS:

Electrical -

INPUTS: **PM Series Only**

Type	Input Rating	Terminals
*Power supply	100-240 V ac, 50/60 Hz; **24** V ac, 50/60 Hz; **15-36** V dc, 10 VA max	98-99
Digital Input 5 (DC Voltage or Contact Closure)	36 V dc, 3 mA max, SELV, Limited Energy	B5-D5
Digital Input 6 (DC Voltage or Contact Closure)	36 V dc, 3 mA max, SELV, Limited Energy	B5-D6
Input 1, Thermocouple	SELV, Limited Energy	R1-S1
Input 1, **RTD, Thermistor**	SELV, Limited Energy	R1-S1; R1-S1-T1
Input 1, Process	SELV, Limited Energy	R1-S1, S1-T1
Input 1, Potentiometer	SELV, Limited Energy	R1-S1
Input 2, Thermocouple	SELV, Limited Energy	R2-S2
Input 2, **RTD, Thermistor**	SELV, Limited Energy	R2-S2; R2-S2-T2
Input 2, Process	SELV, Limited Energy	R2-S2, S2-T2
Input 2, Potentiometer	SELV, Limited Energy	R2-S2
Input 2, Current Transformer	SELV, Limited Energy	S2-T2
Digital Input Board up to 6 digital inputs (DC voltage or Contact Closure)	**36 V dc, 3 mA max, SELV, Limited Energy**	**B7, D7-D12, Z7**

COMMUNICAITON: **PM and EZK Series**

Type	Rating	Terminal
Standard EIA-485	SELV, Limited Energy	CD, CE, CF
Modbus RTU or Standard EIA-485	SELV, Limited Energy	CA, CB, CC
EIA-232/485 Modbus RTU	SELV, Limited Energy	Communications CA, CB, CC, C2, C3, C5
Ethernet/IP	**SELV, Limited Energy**	**E1-E8**
Devicenet	**SELV, Limited Energy**	**V+, CH, SH, CL, V-**
Profibus	**SELV, Limited Energy**	**E1-E8**

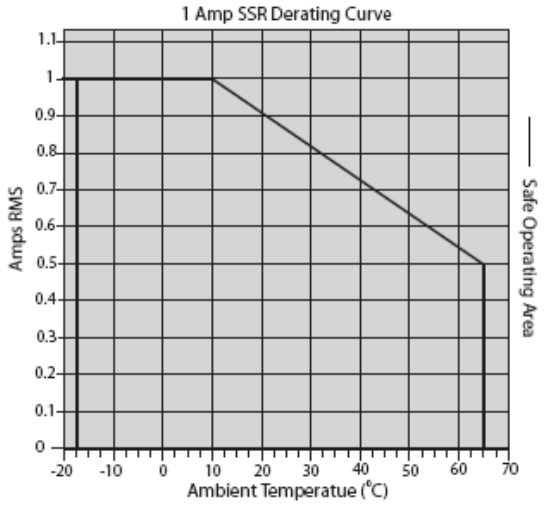
OUTPUTS: **PM Series Models only.**

Type	Rating	Terminal
Digital Output 5 (DC Voltage or Contact Closure)	24 V, 24 mA max, SELV, Limited Energy	B5-D5
Digital Output 6 (DC Voltage or Contact Closure)	24 V24 mA max, SELV, Limited Energy	B5-D6
*Output 1, **3** DC/Open Collector	32 V dc, 30 mA max, **switched dc, 32 V dc, 100 mA external sourced**, SELV, Limited Energy	W1-X1-Y1 **W3-X3-Y3**
Output 1, **3** Universal Process	0-20 mA, 0-10 V dc, SELV, Limited Energy	F1-G1-H1 **F3-G3-H3**
*Output **1-4** SSR, Form A	20-264 V ac, 0.5 A resistive 120/240 V @ 20 VA pilot duty **See derating curve below.**	**L1-K1, L2-K2, L3-K3, L4-K4**
Output 2, **4** Switched DC	32 V dc, 10 mA max **SELV**	**W2-Y2, W4-Y4**
*		
Digital Output (Switched DC or Open Collector) up to 6 outputs per card.	**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.**	**B7, D7-12, Z7**

*

File E184390 Vol. 1 Sec. 2 and Report Page 3A Issued: 2007-03-29 New: 2009-07-14

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 = Profibus
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

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 = Ethernet/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**
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

CSA INTERNATIONAL

Certificate of Compliance

Certificate: 2016623 (LR 30586) **Master Contract:** 158031

Project: 2505572 **Date Issued:** April 5, 2012

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

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.

CSA INTERNATIONAL

Certificate:	2016623 (LR 30586)	**Master Contract:**	158031
Project:	2505572	**Date Issued:**	April 5, 2012

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)

CSA INTERNATIONAL

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

Project	Date	Description
2505572	April 5, 2012	Use alternate components for obsolete parts in Low Voltage Power Supply board and changes to PCB layout. Add alternate terminal block.
2386129	January 5, 2011	Alternate relays PE0 and RT3 for PM series controller
2335223	September 2, 2010	Addition of larger package sizes PM8, PM9 and PM4
2122807	December 23, 2008	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.
2016623	May 27, 2008	Original Certification.

Series EZ-ZONE® PM

CE

WATLOW Electric Manufacturing Company

ISO 9001since 1996.

1241 Bundy Blvd.
Winona, MN 55987 USA

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⎓dc/ 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.

2004/108/EC Electromagnetic Compatibility Directive

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 10V/M 80–1000 MHz, 3 V/M 1.4–2.7 GHz
EN 61000-4-4	2012	Electrical Fast-Transient / Burst Immunity
EN 61000-4-5	2006	Surge Immunity (Also compliant with 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 (Also compliant with IEC 61000-3-2 2014)
EN 61000-3-3[1]	2013	Voltage Fluctuations and Flicker
SEMI F47	2000	Specification for Semiconductor Sag Immunity Figure R1-1

[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

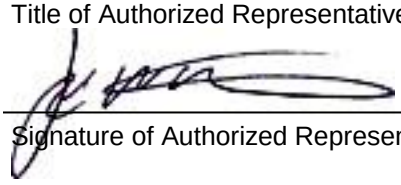
EN 61010-1	**2011[2]**	**Safety Requirements of electrical equipment for measurement, control and laboratory use. Part 1: General requirements**

[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.

Compliant with 2011/65/EU RoHS2 Directive

Per 2012/19/EU W.E.E.E 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

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: c UL us 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

William R. Carney, Director, North American Certification Programs

UL LLC

Series F4T

CE

WATLOW Electric Manufacturing Company

ISO 9001since 1996.

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

EN 61326-1	**2013**	**Electrical equipment for measurement, control and laboratory use – EMC requirements (Industrial Immunity, Group 1 Class A[1] Emissions).**
EN 55011	2010	
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[2]	2013	Voltage Fluctuations and Flicker
SEMI F47	2000	Specification for Semiconductor Sag Immunity Figure R1-1

[1]NOTE: Not for use in Commercial or Residential locations without additional emissions protection.

[2]NOTE: 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

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 W.E.E.E Directive and 2006-66-EC Battery Directive ***Please Recycle Properly.***

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

Signature of Authorized Representative

SERIES FM (Flex Modules) UL®

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 representative samples of	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: , may be used in conjunction with the required Recognized Marks. The Recognized Component Mark is required when specified in the UL Directory preceding the recognitions or under "Markings" for the individual recognitions. The UL Recognized Component Mark for Canada consists of the UL Recognized Mark for Canada: 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.

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/contactus

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, A007-2879-0000, 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

William R. Carney, Director, North American Certification Programs

UL LLC

Series EZ-ZONE® Flex Modules

CE

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

ISO 9001 since 1996.

Declares that the following products:

Designation:	**Series EZ-ZONE® Flex Modules**
Model Numbers:	FMLA-(LAJ, LCJ, LEJ, MAJ, MCJ, MEJ, YEB[1])A[1]-A[1](A[1],F[1],B[1],G[1])**X[1]X[1]** FMMA-**X**(A[1],C[1],E,F[1],K)(A[1],C[1],H,J,K)A[1]-A[1](A[1],F[1],B[1],G[1]) **X[1]X[1]** FMHA-(R[1],P[1],C[1],F[1],B[1],J,K,L[1])A[1]A[1]A[1]-A[1](A[1],F[1],B[1],G[1]) **X[1]X[1]** [1]FMCA-**X**AAA-A(A,F,B,G)**XX**; **Note: X[1] = Any letter or number**
Classification:	FMLA, FMMA and FMHA are Process Control modules, FMCA are Communication modules; Modules are Integrated Controls in either **EZ-ZONE® CC or F4T Bases**; Modules are IP10 when properly installed.
Rated Voltage and Frequency:	Relay, SSR or No-Arc Control outputs 24 - 240 Vac 50/60 Hz, Switched DC, Process and communications; low voltage SELV
Rated Power Consumption:	See user manual for de-ratings at high ambient temperatures. No-arc relays 15A 1.C, Dual SSR module 1.C 10A each output, Mechanical relay 5A 125 VA, 25 VA at 24 Vac 1.B, Discreet SSR 1/2A 1.C 20VA, Quad SSR 1.C 1.5A 50 VA, Hex I/O 1.5A, all others SELV limited energy.

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.

2004/108/EC Electromagnetic Compatibility Directive

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.	**Safety Requirements of electrical equipment for measurement, control and laboratory use. Part 1: General requirements**
EN 60730-1:2011 **EN 60730-2-9:2010**	**Automatic electrical controls for household and similar use – Particular requirements for temperature sensing controls.**
[1]Compliant output options. When in EZ-ZONE® CC Base.	Only certain output options comply with 60730 spacing and dielectric requirements, see order information for compatible models.

Compliant with 2011/65/EC RoHS2 Directive

Per 2012/19/EU W.E.E.E Directive and 2006-66-EC Battery Directive ***Please Recycle Properly.***

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
Title of Authorized Representative

September 2014
Date of Issue

Signature of Authorized Representative

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 Mahrenholz, Assistant Chief Engineer, Global Inspection and Field Services

UL LLC

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.
Control Module Models RMC; followed by any number; followed by A, B, 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, B, 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, B, 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, B, C, D, E, F, G, H, J, K, L, M, N, P, R, S, T, U, Y 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, J, K, L or T; followed by A, C, F, J, L or T; followed by A, C, F, J, 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, J, L or T; followed by 1, 2, A, C, F, J, L or T; followed by A; followed by any three letters or numbers.

Scanner 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, J, R, P or T; followed by A, B, C, J, R, P or T; followed by A; followed by any three letters or numbers.

High Density Limit module, RM Series, Models RML; followed by A, F or S; followed by 5 or 6; followed by A, B, C, J, 5 or 6; followed by A, B, C, J, 5 or 6; followed by B, C or J; followed by A; followed by any three letters or numbers.

Fiber Optic Input Module, RM Series, Model 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 letters or numbers.

EtherCAT/Optical Input Module, RM Series, Model RMZ; followed by 4; followed by any two letters or numbers; followed by AA or 04; followed by any letter or number; followed by A; followed by any two letters or numbers.

Refer to Supplement 7-07 for nomenclature

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

UL LLC

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 representative samples of	PROCESS CONTROL EQUIPMENT FOR USE IN 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.

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

UL LLC

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, 1, 2, 7, 9, R or P; 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 letters or numbers

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 letters or numbers

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

Declaration of Conformity

EZ Zone Series RM

CE

WATLOW Electric Manufacturing Company ISO 9001since 1996.
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.

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
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[1]	2013	Voltage Fluctuations and Flicker
SEMI F47	2000	Specification for Semiconductor Sag Immunity Figure R1-1

[1]NOTE: 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

EN 61010-1	**2011**	**Safety Requirements of electrical equipment for measurement, control and laboratory use. Part 1: General requirements**

Compliant with 2011/65/EU RoHS Directive

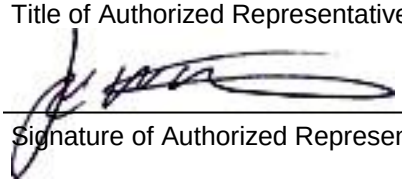
Per 2012/19/EU W.E.E.E Directive *Please Recycle Properly*

Joe Millanes
Name of Authorized Representative

Winona, Minnesota, USA
Place of Issue

Director of Operations
Title of Authorized Representative

September 2014
Date of Issue



Signature of Authorized Representative

ODVA
Networks Built on a Common Industrial Protocol

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.

DeviceNet CONFORMANCE TESTED

Certification Logo Mark

DeviceNet CONFORMANCE TESTED ™

Certification Word Mark

This Delcaration 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	**etwork Categor Node**
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)

No.	Product Code (Attribute 3)	Product Name (Attribute 7)	Product Revision (Attribute 4)	SOC File Name
1	124	Watlow EZ-ZONE RMZ	2.011	11368.01_EZ-ZONE RMZ.stc