DIN-A-MITE<sup>®</sup> C

# Anderson-Bolds 216-360-9800



The DIN-A-MITE<sup>®</sup> C silicon controlled rectifier (SCR) power controller provides a low cost, compact and versatile solid state option for controlling electric heat. This controller is designed and manufactured with the quality features expected from Watlow<sup>®</sup>. DIN-rail/panel mount and through-wall mount versions are available.

Features include single-phase, three-phase/two leg, and three-phase/three leg, 24-600VAC operation. Current switching capabilities range from 30 to 80A depending on the model ordered.

Variable time-base, linear voltage and current process control or VAC/VDC input contactor versions are available. Single-phase, phase angle firing and current limiting are also available. All options are model number dependent and factory configurable. This power controller includes 200KA short circuit current rating (SCCR) tested up to 480VAC to minimize damage in the event of a short circuit when used with required fusing.

# SCR Power Controller Delivers Up To 80 Amperes in a Compact Package

### **Features and Benefits**

### 200KA SCCR with proper fusing

Minimizes damage in the event of a short circuit

#### DIN-rail, panel and through-wall mounting

Provides versatility and quick, low-cost installation

#### Compact size

• Reduces panel space and cost

#### Touch-safe terminals

Increases safety for installer/user

#### One- and three-phase power

· Can be used in a variety of applications

#### Open heater/shorted output alarm

 Notifies the user in case of an open heater or shorted output

#### Mercury free

Assures environmental safety

#### Faster switching with solid state

- Saves energy and extends heater life
- UL® 508 listed, C-UL®, RoHS 2 and CE with filter
- Meets applications requiring agency approval
- Reduces end product documentation cost

#### System solution component

Provides single source thermal loop

#### Back-to-back SCR design

• Ensures a rugged design





WIN-DMC-0115

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### **Specifications**

### **Operator Interface**

- Control input and indication light
- Alarm output and indication light
- Current limit indication LED

### **Amperage Rating**

- See output rating curves on the next page
- Max. surge current for 16.6ms, 1,350A peak
- Max. I<sup>2</sup>t for fusing is 9100A<sup>2</sup>s
- Latching current: 200mA min.
- Holding current: 100mA min.
- Fan current: 0.14A for 24VDC; 0.12A for 120VAC; 0.06A for 240VAC
- Off-state leakage 1mA at 77°F (25°C) max.
- Power dissipation: 1 watt per ampere per leg switched
- 200KA SCCR, Type 1 and 2 approved with the recommended fusing; see user manual

### Line Voltage

- 24 to 48VAC units: 20.4VAC min. to 53VAC max.
- 100 to 240VAC units: 48VAC min. to 265VAC max.
- 277 to 600VAC units: 85VAC min. to 660VAC max.
- 100 to 120VAC, 200 to 208VAC, 230 to 240VAC, 277VAC, 400VAC, 480VAC, 600VAC, +10/-15%, 50 to 60Hz independent ±5% (control options L, P and S)

### Alarms (zero cross models only)

### Shorted SCR Alarm Option

 Alarm state when the input command signal is off and a 10A or more load current is detected by the current transformer (two turns required for 5A and three turns for 2.5A)

### Open Heater Alarm Option (Control Option S only)

 Alarm state when the input command signal is on and the load current detected by the current transformer is 20% less than customer adjusted set point

### Alarm Output

- Energizes on alarm, non-latching
- Triac 24 to 240VAC, external supply with a current rating of 300mA @ 77°F (25°C), 200mA @ 122°F (50°C), 100mA @ 176°F (80°C) and a holding current of 200µA with a latching current of 5mA typical

### Agency Approvals

• CE with proper filter:

204/108/EC electromagnetic compatibility directive EN 61326-1: industrial immunity Class A emissions not suitable for Class B environments

Phase angle and phase angle with current limit (control options P and L) are not CE approved for conducted or radiated emissions

2006/95/EC low voltage directive EN 50178 safety requirements installation category III, pollution degree 2

- UL<sup>®</sup> 50 Type 4X enclosure, Class 1, Div. 2 per ANSI/ISA 12.12.01. Through-wall heat sink models T4 File 184390
- <sup>(1)</sup>
   <sup>US</sup>
   <sup></sup>
- 2011/65/EU RoHS 2
- Shock and vibration tested to IEC 60068-2-32
- Vibration tested to IEC 60068-2-6

### **Control Input Terminals**

- Compression: will accept 24 to 16 AWG (0.2 to 1.5 mm<sup>2</sup>) wire
- Torque to 4.4 in. lb (0.5 Nm) max. with a <sup>1</sup>/<sub>8</sub> in. (3.5 mm) blade screwdriver

#### Line and Load Terminals

- Compression: will accept 14 to 3 AWG (2.5 to 25 mm<sup>2</sup>) wire
- Torque to 24 in. lb (2.7 Nm) max. with a <sup>1</sup>/<sub>4</sub> in. (6.4 mm) blade screwdriver, or a type 1A, #2 Pozi driver

#### **Operating Environment**

- See the output rating curve chart on next page
- 0 to 90% RH (relative humidity), non-condensing
- Storage temperature: -40 to 185°F (-40 to 85°C)
- Operating temperature: -29 to 176°F (-34 to 80°C)
- Insulation tested to 3,000 meters

### **DIN-Rail Mount**

• DIN EN 50022, 35 mm by 7.5 mm

### **Back-Panel Mount**

• Four mounting holes No. 6 to No. 8 (M3 to M4) fastener

### **Through-Wall Mount**

• See page 4 for through-wall panel cutout (**Note:** Mount cooling fins vertically.)

### Additional Specifications for Contactors and Time Proportional Controllers

#### **Control Mode, Zero-Cross**

- Control option C: VDC input, contactor output
- Control option K: VAC input, contactor output
- To increase service life on contactor models, the cycle time should be less than three seconds
- Control option F: 4 to 20mA DC input, variable time-base control output

### **Control Input**

- AC contactor: 24VAC ±10%, 120VAC +10/-25%, 240VAC +10/-25% @ 25mA max. per controlled leg
- DC contactor: 4.5 to 32VDC: max. current @ 4.5VDC is 6mA per leg, add 2mA per LED used to the total current
- Loop-powered linear current 4 to 20mA DC: loop-powered, control option F0 only, no more than three inputs connected in series

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## Anderson-Bolds 216-360-9800

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### Additional Specifications for Phase Angle, Phase Angle with Current Limit, and Single-Cycle, Variable Time-Base

#### Operation

- With control option S (single-cycle, variable time-base) the output is not on for more than one consecutive AC cycle below 50% power and not off for more than one consecutive AC cycle above 50% power
- Phase angle control, single-phase only

#### **Control Input**

- 0 to 20mA, 4 to 20mA, 0 to 5VDC, 1 to 5VDC and 0 to 10VDC
- Input impedance 250Ω for 4mA to 20mA, 5kΩ for linear voltage input

#### **Output Voltage**

 100 to 120VAC, 200 to 208VAC, 230 to 240VAC, 277VAC, 400VAC, 480VAC and 600VAC, ±10%

### Linearity (Control Option S)

• ±5% input to output power over 0 to 100% of span between calibration points

### Linearity (Control Options P and L)

 ±5% input to output power, as referenced to a sinusoidal power curve, between calibration points

#### Resolution

 Better than 0.1% of input span with respect to output change

### Soft Start (Control Options P and L)

Typically:

- 5 seconds soft start on power up
- Soft start on thermostat overtemperature
- Soft start on <sup>1</sup>/<sub>2</sub> cycle drop out detection
- 1 second soft start on set point change

### Options

- Manual control kit (1kΩ potentiometer) 08-5362
- Alarm option is **not** available on control options P or L

Specifications are subject to change without notice.

### **Output Rating Curves**

#### DIN-A-MITE Style C Ratings at 100% On







# Anderson-Bolds 216-360-9800

### **Dimensions-Natural Convection, DIN-rail/Panel Mount**



### Dimensions-Fan Cooled, DIN-rail/Panel Mount



### Dimensions-Natural Convection, Through-Wall Mount<sup>①</sup>



<sup>①</sup> With the potential for high through-wall heat sink temperatures, application may require a touch-safe shield.

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# Extended Heater and Power Controller Life Single-( with Variable Time-Base Models: D

With variable time-base control, the power controller automatically adjusts the time-base and output power with respect to the command signal. Accelerated life testing shows that variable time-base control significantly reduces expansion and contraction of the heater element. This extends heater and power controller life while improving process temperature control. This saves money on heaters, downtime and maintenance.

### **Loop-Powered or Transformer Powered**

### Loop-Powered

By using a temperature controller's 4-20mA process output signal as the power supply for the DIN-A-MITE input, the cost of the power controller can be reduced. With control option F0 the 4-20mA control signal simultaneously powers the DIN-A-MITE's internal electronics and provides the input command signal.

### **Transformer-Powered**

DIN-A-MITE controllers with single-cycle, variable time-base or phase angle outputs (control options L, P and S) detect the power line zero cross with a transformer that also powers their internal electronics. These units can be controlled manually with a potentiometer or automatically with a temperature controller using any of the control options: 4-20mA, linear voltage (0-5,1-5 and 0-10VDC).

### Loop-Powered, Variable Time-Base Output

Models: DC\_\_-\_F0 -\_\_\_

20% Power Output: 3 AC cycles on, 12 cycles off

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VVV	V		I	V	

50% Power Output: 3 AC cycles on, 3 cycles off

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1	I	V		V	l		V		V	V		V	J	V		V	l	]	V		J		V	

### 80% Power Output: 12 AC cycles on, 3 cycles off



With loop-powered, variable time-base control, the minimum on or off time is three cycles.

### Phase Angle Output

Models: DC1\_ - \_ \_ [L, P] \_ - 0\_ \_ \_



Phase angle control (control options L and P) is infinitely variable over the period of the AC sine wave. It provides a variable voltage and/or current output. The phase angle circuitry is transformer powered and accepts a linear voltage, current or potentionmeter input.

### Single-Cycle, Variable Time-Base Output

Models: DC\_\_-S\_-\_\_S

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25% Power Output: 1 AC cycle on, 3 cycles off



50% Power Output: 1 AC cycle on, 1 cycle off

With single-cycle, variable time-base control, at 50 percent power, the output is on for one cycle and off for one cycle. At 25 percent, it is on for one cycle and off for three cycles. Under 50 percent, the output is not on for more than one consecutive cycle; over 50 percent the output is not off for more than one consecutive cycle.

# Semiconductor Fuses for Applications through 600VAC

Fuse Part Number										
Fuse Rating	Watlow	Cooper Bussman <sup>®</sup>								
40A	17-8040	FWP-40A14F								
50A	17-8050	FWP-50A14F								
63A	17-8063	FWP-63A22F								
80A	17-8080	FWP-80A22F								
100A	17-8100	FWP-100A22F								

Fuse Holder Part Number									
Fuse Rating	Watlow	Ferraz Shawmut							
40A	17-5114	US141I							
50A	17-5114	US141I							
63A	17-5122	US2211							
80A	17-5122	US2211							
100A	17-5122	US2211							

### **Combined Branch Protection and Semiconductor Fuses for Applications through 480VAC**

Fuse Part Number									
Fuse Rating 125% of Load	Watlow	Cooper Bussman <sup>®</sup>							
20A	0808-0325-0020	DFJ-20							
30A	0808-0325-0030	DFJ-30							
40A	0808-0325-0040	DFJ-40							
50A	0808-0325-0050	DFJ-50							
63A	0808-0325-0060	DFJ-60							
80A	0808-0325-0080	DFJ-80							
100A	0808-0325-0100	DFJ-100							

Fuse Holder Part Number									
Fuse Rating	Watlow	Cooper Bussman <sup>®</sup>							
20 and 30A	0808-0326-1530	CH30J1i							
40 to 63A	0808-0326-3560	CH60J1i							
80 and 100A	0808-0326-7010	J601001CR							

### **Anderson-Bolds** 216-360-9800

2 = Spanish 3 = French

00 = Standard part

11 12

### **Ordering Information**

Part	Number												
1 D	© C	3 Phase	() Cooling & Current Rating/Leg	<ul> <li>(5)</li> <li>(6)</li> <li>(6)</li> <li>(7)</li> <li>(7)</li></ul>	⑦ ⑧ Control	) Alaı	rm	10 User Manual	1) 12 Custom Options				
3			Phase			78	)		C	ontrol			
1 =	1-phase, 1	controlled leg				C0=		4.5 to 32	VDC input,	contactor o	output		
2 =	3-phase, 2	controlled legs				F0 =		4 to 20m	A DC input,	variable tir	me-base ou	itput	
3 =	3-phase, 3	controlled legs	(use with four	wire wye)		K1 =		22 to 26\	/AC input, c	ontactor o	utput		
8 =	2 independe	ent zones (con	trol options C, I	K)		K2 =		100 to 12	20VAC input	, contacto	r output		
9 =	3 independe	ent zones (con	trol options C, I	K)		K3 =		200 to 24	10VAC input	, contacto	r output		
Cooling and Current Rating per Leg (see chart below)								<ul> <li>5)= Phase angle output with current limiting* (single-ph only)</li> </ul>					
0 =	Natural con	vection standa	rd DIN-rail or p	anel heat sink	(	P (0	to 5)= Phase angle output <sup>*</sup> (single-phase only)						
1 =	Fan cooled	120VAC stand	lard DIN-rail or	panel heat si	ink	S (0	to 5)=	Single-cycle variable time-base output					
2 =	Fan cooled	240VAC stand	lard DIN-rail or	panel heat si	ink			0 = 4 to 20mA input					
3 =	Fan cooled	24VDC standa	ard DIN-rail or J	oanel heat sin	ık			1 = 12 to 20mA input (option S only)					
T =	Natural con	vection throug	h-wall or cabin	et heat sink (I	NEMA 4X)			2 = 0 to 20mA input					
56	)	Line and	Load Voltage	a				3 = 0 to 5	5VDC input				
02 -	24 to 48VA	C (control onti	ons C. F. K)					4 = 1 to 5	5VDC input				
12 =	100 to 120	VAC (control o	otions L. P. S)				5 = 0 to 10VDC input						
20 =	200 to 208	VAC (control o	otions L. P. S)			* Not CE approved for conducted or radiated emissions.							
24 =	100 to 240	AC (control or	otions C. F. K):	230 to 240VA	С								
	(control opt	ions L, P, S)	, , ,			9			A	larm			
27 =	= 277VAC (control options L, P, S)							0 = No alarm					
40 =	400VAC (co	ontrol options I		S =	S = Shorted SCR alarm (not available with control options L or P)								
48 =	480VAC (co	ontrol options I	., P, S)	H = Open-heater and shorted-SCR alarm (control option S only)									
60 =	277 to 600	VAC (control o	ptions C, F, K)	: 600VAC (coi	ntrol								
	options L, I	P, S)					User Manual						
						0 =	Engli	ish					
						1 -	Gern	nan					

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**Custom Options** 

1X = 1-second soft start (control options P, L)

XX = Any letter or number, custom options, labeling, etc.

### **DIN-A-MITE C Current Rating Table**

Phase	Cooling	Current at 122°F (50°C)
1	0	55A
1	Т	60A
1	1, 2, 3	75A
2, 8	0	40A
2, 8	Т	46A
2, 8	1, 2, 3	65A
3, 9	0	30A
3, 9	Т	35A
3, 9	1, 2, 3	55A

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