

Modular SCR Power Controller for Custom Tailoring to the Application

The QPAC SERIES from Watlow® is a modular Silicon Controlled Rectifier (SCR) power controller with plug-in features for flexibility. Bases are rated from 150 to 1000 amperes in one-phase, three-phase, two leg and three-phase, three leg.

A variety of transformers from 120 to 575VAC along with 50/60Hz operation enable the QPAC to operate in applications anywhere. Plug-in control cards set the QPAC's SCR firing modes; solid state contactors, burst firing (zero cross) or phase-angle models are available with a wide variety of options. High speed fuses are included to protect the SCR from short circuit currents. 200KA short circuit current rating (SCCR) prevents arc flash.

Applications

- Furnace and ovens
- Petrochemical
- Heat treating
- Duct heating
- Environmental chambers
- Kilns



Features and Benefits

200KA Short Circuit Current Rating (SCCR)

- Prevents arc flash

Modular power controller

- Unit base can be fitted with a variety of plug-in transformers and control cards

Available in 150 to 1000 ampere ratings

- Handles large or small loads

Available in solid state contactor, burst firing (zero cross) or phase-angle fired mode

- Meets most application requirements

Rugged design for 122°F (50°C) ambient operation

- Full rating of the power controller can be used in industrial applications

Semiconductor fuses and snubber protection included

- Protects the SCR from voltage or current surges or spikes

Open heater or shorted SCR detector option

- Diagnostic capabilities

UL® 508 listed and C-UL® up to 1000 amperes

- For applications requiring agency approvals



ISO 9001



Registered Company
Winona, Minnesota USA

WIN-QPAC-1209

Specifications

Operation

Modular controller base with plug-in card and transformer

- Plug-in control cards
 - Solid state contactor, ac or dc input
 - Burst fire control, fixed or variable time base
 - Phase-angle fire control
 - Phase-angle control with soft start and current limiting

- Plug-in transformers (50/60Hz)
- 120, 208, 240, 380, 415, 480, 575VAC operation

Power bases

- 1-phase (Q01), 1 pair of SCRs
- 3-phase (Q32), 2 leg control, 2 pair SCRs
 - Resistive load only, burst firing only
- 3-phase (Q33), 3 pair hybrid SCRs/diodes
 - Recommended for phase-angle only with balanced load

Agency Approvals

- UL® 508 and C-UL® listed, 150 to 300A all configurations, File #E73741
- UL® 508 and C-UL® listed, 400 to 1,000A on Q01 and Q32, up to 480VAC

Control Card Inputs

(CA) Solid state contactor, ac input

- 120VAC @ 30mA min.
- AC signal input sources (i.e., triacs or mechanical relay outputs with noise suppression) require customer supplied resistors across the power controller ac command signal input terminals to prevent false firing
- 24VAC input, 200Ω/10 W typical;
- 120VAC input, 1kΩ/25 W typical;
- 240VAC input, two 1kΩ/25 W in series typical

(CD) Solid state contactor, dc input

- On, 4-10VDC; off, 0.5VDC
- Built-in noise reduction network

(BF) Burst firing control fixed time base

- Process input factory set @ 4-20mA DC
- Input impedance 250Ω (clip resistor for 5kΩ impedance voltage input), or manual control input
- Time base 4 seconds (clip resistor for 1 sec)

(BV) Burst firing control, variable time base

- Process input factory set @ 4-20mA DC
- Input impedance 250Ω (clip resistor for 5kΩ impedance voltage input), or manual control input. Requires an accessory bias and gain card to calibrate for 0-5VDC input.

(AF) Phase-angle control

- Process input factory set @ 4-20mA DC
- Input impedance 250Ω (clip resistor for 5kΩ impedance voltage input), or manual control input
- Soft start approximately 6 seconds upon power-up, 1 second upon set point change

(AL) Phase-angle control with current limit

- Process input factory set @ 4-20mA DC
- Input impedance 250Ω (clip resistor for 5kΩ impedance voltage input), or manual control input
- Soft start approximately 10 seconds upon power-up, 1 to 2 seconds upon set point change
- Current transformer included

Open Heater/Shorted SCR Detector

- Zero cross/burst fire models only
- Triac output
- 24 to 240VAC, 300mA @ 77°F (25°C), 125mA @ 176°F (80°C)
- Energizes on alarm
- Holding current 200µA min.
- Latching current 5mA typical

Outputs

- 120 through 575VAC
- 1, 2 or 3 pole
- 150 to 1000A per pole
- SCCR, 200KA with original equipment specified semiconductor fusing

Line Voltage / Power

- 50/60Hz ac line frequency, Q32 and Q33 models are 50/60Hz calibration dependent
- Voltage: ±10%, 120, 208, 240, 277, 380, 415, 480, 575VAC

Line Voltage Compensation

- 10% Δ in line, 2% Δ in load in the 30 to 70% power region (AF, AL and BV)

Power Dissipation (Watts)

- 1.5 W/A per controlled leg

Isolation

- Command signal to load 1250VAC min.

Linearity

- 2%, 30 to 70% power region (All units except CA and CD)

Off-State Leakage Current

- 20mA @ 480VAC

SCR Protection

- Semiconductor fuses provided dv/dt 200V/µsec min.
- MOV^① and RC snubber network standard
- (Q32) 3rd leg fuse kit may be used, but not required, with 3-phase, 2 leg models

Mounting

- Heat sink fins must be mounted in vertical orientation

Operating Environment

- 32 to 122°F (0 to 50°C)
- 0 to 90% RH, non-condensing
- 2,000 meters altitude

Storage Temperature

- -40 to 185°F (-40 to 85°C)

Options

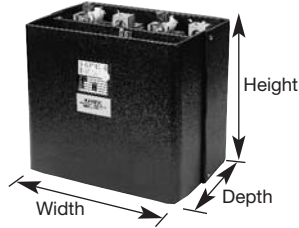
- Manual control kit for process input cards (1kΩ potentiometer) #08-5362
- 240VAC and 120VAC cooling fans

^① MOV comes only on Q33 (3-phase, 3 leg).

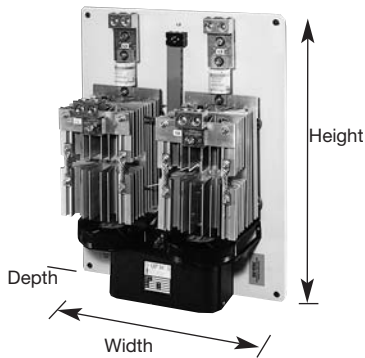
QPAC Weight Chart

Amps	Phase					
	1Ø/Q01		3Ø,2 leg/Q32		3Ø,3 wire/Q33	
	lb	(kg)	lb	(kg)	lb	(kg)
150	15	(6.8)	36	(16.3)	50	(22.7)
200	15	(6.8)	36	(16.3)	50	(22.7)
300	15	(6.8)	36	(16.3)	50	(22.7)
400-600	44	(20.0)	85	(38.5)	100	(45.4)
800-1000	49	(22.2)	120	(54.4)	135	(61.2)

Case Styles



Style C



Style E

QPAC Dimensions

Q01							
Style	Amps	Height (H)		Width (W)		Depth (D)	
		in.	(mm)	in.	(mm)	in.	(mm)
C*	150	13	(330)	6.9	(175)	10.25	(260)
C*	200	13	(330)	6.9	(175)	10.25	(260)
C*	300	13	(330)	6.9	(175)	10.25	(260)
E	400-600	27	(685)	17	(430)	11.7	(300)
E	800-1K	27	(685)	17	(430)	13.3	(340)

Q32							
Style	Amps	Height (H)		Width (W)		Depth (D)	
		in.	(mm)	in.	(mm)	in.	(mm)
C*	150	13	(330)	13.7	(350)	10.25	(260)
C*	200	13	(330)	13.7	(350)	10.25	(260)
C*	300	13	(330)	13.7	(350)	10.25	(260)
E*	400-600	27	(685)	21	(535)	11.7	(300)
E*	800-1K	33	(840)	21	(535)	13.3	(340)

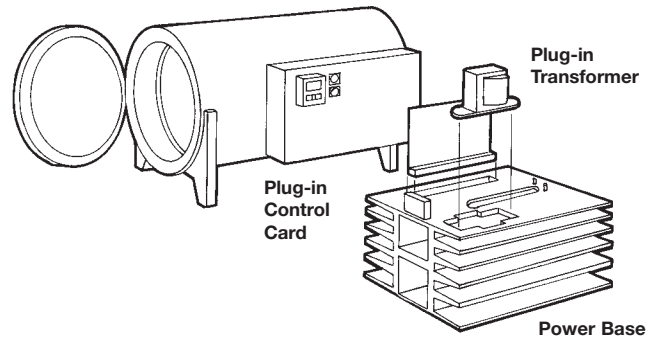
Q33							
Style	Amps	Height (H)		Width (W)		Depth (D)	
		in.	(mm)	in.	(mm)	in.	(mm)
C*	150	13	(330)	20.7	(525)	10.25	(260)
C*	200	13	(330)	20.7	(525)	10.25	(260)
C*	300	13	(330)	20.7	(525)	10.25	(260)
E*	400-600	33	(840)	27	(685)	11.7	(300)
E*	800-1K	33	(840)	27	(685)	13.3	(340)

*Includes fan

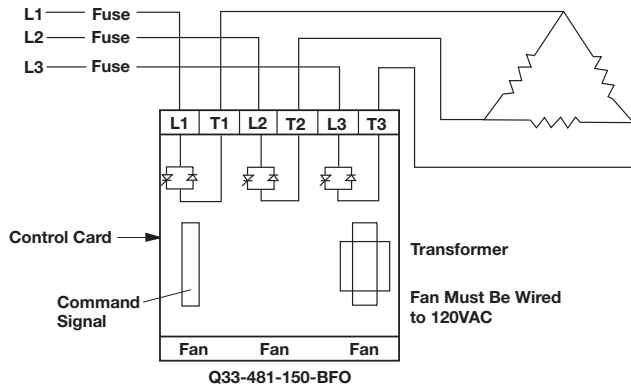
Applications Sketch

In heat treating applications, the QPAC offers modular flexibility. Different heater elements require different control firing modes: i.e., tungsten elements need phase-angle firing, while Nichrome® elements use burst (zero cross) firing.

Shipping the furnace to different countries could require different voltage sources (and thus transformers): i.e., U.S. 240 or 480 volt, Australia 415 volt; Europe 380 or 400 volt. By simply changing plug-in transformers, the OEM can ship anywhere in the world.



Wiring Example



Accessories

Manual Control Kit		08-5362
150A : 5A	Current Transformer	16-0008
200A : 5A	Current Transformer	16-0045
300A : 5A	Current Transformer	16-0073
400A : 5A	Current Transformer	0004-0286-0400
500A : 5A	Current Transformer	0004-0286-0500
600A : 5A	Current Transformer	0004-0286-0600
800A : 5A	Current Transformer	0004-0286-0800
1,000A : 5A	Current Transformer	0004-0288-1000
5A : 20mA	Interstage Transformer	16-0176

Ordering Information

To order, complete the code number to the right with the information below:

Q - - - - -

QPAC = Modular power control; phase, burst or solid state contactor, fuse(s) and holder(s) included

Phase

01 = 1-phase
 32 = 3-phase, 2-leg (Optional 3rd leg fuse kit extra)
 33 = 3-phase, 3-leg

Operating and Output Voltage

12 = 120VAC 38 = 380VAC
 20 = 208VAC 41 = 415VAC
 24 = 240VAC 48 = 480VAC
 27 = 277VAC 57 = 575VAC

Cooling Fan Voltage^①
 Customer to supply wiring and hook-up
 1 = 120VAC; required on all 3-phase models
 2 = 240VAC; required on all 3-phase models

Output Current (Amps)

150 = 150A 500 = 500A
 200 = 200A 600 = 600A
 300 = 300A 800 = 800A
 400 = 400A 01k = 1000A

Input Control Card

CA = Solid state ac input (08-5285) contactor
 CD = Solid state dc input (08-5286) contactor
 BF = Burst fired, fixed time base (08-5289) 4-20mA DC
 BV = Burst fired, variable time base (08-5342) 4-20mA DC
 AF = Phase-angle fired, not available on Q32 (08-5288) 4-20mA DC
 AL = Phase-angle fired w/current limit (08-5411) 4-20mA, not available on Q32. AL option includes one current transformer. Add second CT for 3-phase, 3-leg.

Open Heater/Shorted SCR Detector^{② ③}

0 = None
 1 = 1-phase operation
 2 = 3-phase operation

^① All cooling fans rated @ 20 W each, must be wired by customer.
^② The open heater/shorted SCR detector is for burst fire operation only.
^③ Includes one current transformer for 1-phase and two current transformers for 3-phase.

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