QPAC

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 contactor, burst firing (zero cross) or phase-angle models are available with a wide variety of options. This power controller includes 200KA short circuit current rating (SCCR) and high speed fuses to minimize damage in the event of a short circuit.

Typical Applications

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

Features and Benefits

200KA short circuit current rating (SCCR)
- Minimizes damage in the event of a short circuit

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

WATLOW®
Better Thermal Solutions...*Faster*

ISO 9001
Registered Company
Winona, Minnesota USA

WIN-QPAC-0613

Specifications

Operation

Modular controller base with plug-in card and transformer

- Plug-in control cards
  - Solid state contactor, 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

(CD) Solid state contactor, dc input

- On, 4-32VDC; 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 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

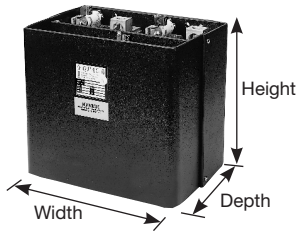
- Manual Control Kit for process input cards (1kΩ potentiometer) #08-5362
- 240VAC and 120VAC cooling fans

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

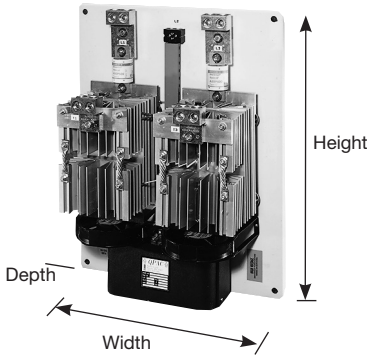
QPAC Weight Chart

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) in. (mm)	Width (W) in. (mm)	Depth (D) 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)

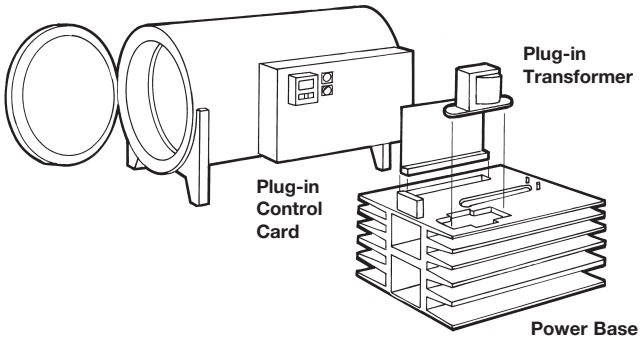
Q32				
Style	Amps	Height (H) in. (mm)	Width (W) in. (mm)	Depth (D) in. (mm)
C	150	13 (330)	13.7 (350)	10.25 (260)
C	200	13 (330)	13.7 (350)	10.25 (260)
C	300	13 (330)	13.7 (350)	10.25 (260)
E	400-600	27 (685)	21 (535)	11.7 (300)
E	800-1K	33 (840)	21 (535)	13.3 (340)

Q33				
Style	Amps	Height (H) in. (mm)	Width (W) in. (mm)	Depth (D) 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)

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.



Ordering Information

QPAC - Modular power controller; phase, burst or solid state contactor, fuse(s) and holder(s) included.

Part Number

①	②③	④⑤	⑥	⑦⑧⑨	⑩⑪	⑫
	Phase	Operating & Output Voltage	Cooling Fan Voltage	Output Control (Amps)	Input Control Card	Open Heater/ Shorted SCR Detector
Q		-		-	-	

②③ Phase	
01=	1-phase
32=	3-phase, 2-leg (Optional 3rd leg fuse kit extra)
33=	3-phase, 3-leg

④⑤ Operating and Output Voltage	
12=	120VAC
20=	208VAC
24=	240VAC
27=	277VAC
38=	380VAC
41=	415VAC
48=	480VAC
57=	575VAC

⑥ Cooling Fan Voltage	
1 =	120VAC; required on all 3-phase models
2 =	240VAC; required on all 3-phase models

Notes:
- Customer to supply wiring and hook-up.
- All cooling fans rated at 20 W each, must be wired by customer.

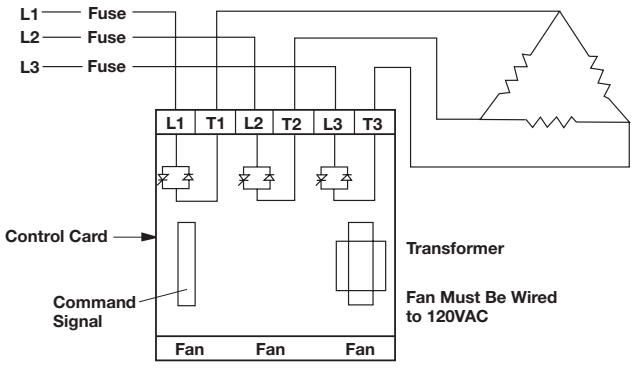
⑦⑧⑨ Output Control (Amps)	
150 =	150A
200 =	200A
300 =	300A
400 =	400A
500 =	500A
600 =	600A
800 =	800A
01k =	1000A

⑩⑪ Input Control Card	
CD =	Solid state dc input (08-5286) contactor 4-32VDC
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

⑫ Open Heater/Shorted SCR Detector	
0 =	None
1 =	1-phase operation
2 =	3-phase operation

Notes:
- The open heater/shorted SCR detector is for burst fire operation only.
- Includes one current transformer for 1-phase and two current transformers for 3-phase.

Wiring Example



Q33-481-150-BFO

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

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