

Electronic VAR Control Offer

AccuSine PFV+

Reactive current compensation solution for specific and high performance systems.

PB502825_R.eps



PB115718.eps



Model 6 MCC (UL and CSA approved)

PD405100.eps



Okken / Blokset (IEC61439 certified)

AccuSine PFV+ Technical Specifications

Electrical System Characteristics

Standard RMS output current ratings	208 - 240 Vac: 60 A, 120 A, 200 A, 300 A 380 - 480 Vac: 60 A, 120 A, 200 A, 300 A 480 - 600 Vac: 47 A, 94 A, 157 A, 235 A 600 - 690 Vac: 40 A, 80 A, 133 A, 200 A
Nominal voltage	208 - 240 Vac; +10%/-10% 380 - 480 Vac; +10%/-15% 480 - 600 Vac; +10%/-15% 600 - 690 Vac; +10%/-15%
Nominal frequency	50/60 Hz, $\pm 3\%$ auto sensing
Number of phases	3-phase, with or without neutral

Technical Product Characteristics

Power electronics	IGBT; 3 level inverter
Control Topology	Digital 1/4 cycle response
Losses	At 480 Vac < 3 %; at 690 Vac < 5 %
Efficiency	to 480 Vac >97%; to 690 Vac >95%
Current transformers (CT)	Any ratio with 1 or 5 ampere secondary; Type 1 accuracy; 50/60 or 400 Hz rated (Instrument rated or better); Grounded; can be shared with other devices.
Quantity of CT	2 or 3 for 3-phase loads 3 required for 4-wire with neutral connected loads
CT VA loading	40 mVA
Control basis	Closed and open loop (for new installations). Open loop (compatible for retrofit applications).
CT position	Closed loop control: Source sense (at mains) CT or load sense CT for single unit. Open loop control: Load sense CT or source sense CT for single unit.
Parallel operation	Upto 25 units per set of CT any size combination. Backward compatibility with AccuSine PFV operated in parallel.
Parallel operation options	Master/Master (masters receive mains CT); Master/Slave; Multi-master/Multi-slave.
Parallel sequence options	Cascade: Lead/lag with unit rotation: one unit operates to full capacity before next unit turns on; timed rotation Load Share: All operating units function at the same output percentage
Parallel redundancy	Any unit with CT connections will automatically become master if the controlling master is taken offline. Automatic increase in output of all units to make up capacity of any offline unit.
Parallel HMI control	Any unit permits viewing and changing parameter settings of the complete system or any other unit in the parallel system.
Power factor correction	Optimized PF correction, leading (capacitive) or lagging (inductive) power factor (Cos ϕ) to target.
Mains current load balancing	Negative sequence current injected to balance fundamental current on the mains due to load imbalance (inherently corrects displacement PF (Cos ϕ)).
Voltage support (Volt-VAR mode)	Mains voltage support via VAR injection: Maintain defined set point voltage by injecting leading VARs to raise voltage and lagging VARs to lower voltage; includes speed of adjustment.
Control response time	25 μ s
Reactive correction time	$\leq 1/4$ cycle
Display	145 mm QVGA TFT 7-color touchscreen
Operators	Magelis HMI STU touch panel screen
Display parameters	100's: includes oscilloscope for viewing many selected parameters, phasor diagrams, load power, measured currents for Is, If, I neg seq, PF (Cos ϕ), injected currents for I reactive, I neg seq, etc.
Communications capability	Modbus RTU, Modbus TCP/IP
Discrete input/outputs	4 input and 4 output dry contacts; assignable
Noise level	< 70 db(A) typical
Color	RAL7035 Enclosure; RAL7022 Plinth (floor standing units)
Earthing (Grounding) systems	Suitable for most earthing (grounding) systems; IT switch on EMC filter for IT earthing (ground), high resistance earthing (ground) or corner earthed (grounded) systems.

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Environmental Conditions

Operating temperature	60 A, 120 A, and 200 A: IP00 (UL Type Open) and IP20 (UL Type N1 wall mount): 0...45 °C; All others: 0...40 °C; Derate 2% per °C upto 50 °C.
Relative humidity	0-95 %, noncondensing
Seismic rating	Complies with IBC and ASCE7 (Requires top anchorage for all floor standing models - rec. use NSYSFWFIX).
Operating altitude	1000 m, (derate 1% per 100 m above)
Ambient temperature safety	Automatic temperature roll back based upon any device OT. Absolute shutdown if air inlet temperature reaches 51 °C.
Preset output limits (rms)	Programmable set limit due to altitude or ambient temperature - becomes fixed output limit.
Storage (in original shipping container)	Temperature: -20...60 °C; Relative humidity: to 95 %, noncondensing; Clean, dry, and protected; No conductive particles permitted.
"Contaminant levels - operating (IEC 60721-3-3)"	Chemical Class 3C2; Mechanical Class 3S2; No conductive particles permitted.
"Contaminant levels - transport and storage (IEC 60721-3-3)"	Chemical Class 3C3; Mechanical Class 3S3; When stored in original shipping container; No conductive particles permitted.

Reference Standards

Design	CE EMC Certification IEC/EN 61439-1, EN 61000-6-4 Class A, EN 61000-6-2
Protection (enclosure)	IP31, IP54, UL Type 1, UL Type 2, and UL Type 12
Standards compliance/certification	cULus (UL508 , CSA 22.2 No. 14) CE Certified, ABS, other local standards

Installation

Wall mount	IP00 (UL Type Open) and IP20 (UL Type 1) configurations
Free standing	IP31, IP54, UL Type 2, and UL Type 12
Circuit protection	IP00 and IP20 - external means required. Supplied by others. Free standing enclosures - Incoming circuit breaker with mechanical door interlock.
AIC rating (applies to input circuit breaker ratings for free standing model enclosures)	to 240 Vac - 200 kA cULus; 150kA IEC to 415 Vac - 200 kA cULus; 125 kA IEC to 480 Vac - 200 kA cULus; 75 kA IEC to 600 Vac - 100 kA cULus; 20 kA IEC to 690 Vac - No cULus; 100 kA IEC
Cable entry	Wall mount: UL Type open, IP00, UL Type 1, and IP20 - bottom only. Free standing: top and bottom entry through gland plates.
PCBA protection	Conformal coating on all PCBAs.
Cooling configuration	Natural and forced ventilation; Separate air plenums for heat sink section and PCBA section; Heat sink plenum input from bottom with exhaust out top; All components in heat sink plenum rated IP54 or better => no filtering required; PCBA air supply must be clean and dry (filtering may be required); No conductive particles permitted.

Service provisions

HMI (Magelis STU)	Plain language output (no cryptic codes). Languages: English, French, Spanish, Portuguese, and Chinese. USB port for upload of new software and download of operational records.
Service port	USB port: commission, program, or diagnostics via a laptop computer when power is on or off; laptop provides power to control board when no unit power is present.
Commissioning	On-board step-by-step commissioning protocol via HMI; CT automatic sizing, phase rotation, and polarity; external transformer ratio and phase shift; heat test, and more.

Typical Applications



Oil and gas



Water



Cement



HVAC



Building



Wind turbines

- b Oil and gas platforms
- b Port cranes
- b Steel
- b Water/wastewater
- b HVAC

- b Automotive
- b Process plants, pulp, and paper
- b Wind and solar farms
- b Lifts (ski or building)
- b Marine vessels

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Selection Table

AccuSine PFV+ 208 - 240 V, 50/60 Hz							
Rated current	KVAR rating @ voltage	Catalog number	Enclosure			Frame	Weight kg
			Rating	Style	Cable entry		
60	21.6 @ 208 24.9 @ 240	EVCP060D2IP00	IP00 (chassis)	Wall mount	Bottom	1	88
		EVCP060D2N2	UL Type 2	Floor standing	Top or Bottom	2	277
		EVCP060D2IP31	IP31				
		EVCP060D2N12	UL Type 12				
		EVCP060D2IP54	IP54				
120	43.2 @ 208 49.9 @ 240	EVCP120D2IP00	IP00 (chassis)	Wall mount	Bottom	3	113
		EVCP120D2N2	UL Type 2	Floor standing	Top or Bottom	4	279
		EVCP120D2IP31	IP31				
		EVCP120D2N12	UL Type 12				
		EVCP120D2IP54	IP54				
200	72.1 @ 208 83.1 @ 240	EVCP200D2IP00	IP00 (chassis)	Wall mount	Bottom	5	171
		EVCP200D2N1	UL Type N1	Floor standing	Top or Bottom	11	363
		EVCP200D2N2	UL Type 2				
		EVCP200D2IP31	IP31				
		EVCP200D2N12	UL Type 12				
EVCP200D2IP54	IP54	6	384				
300	108.1 @ 208 124.7 @ 240	EVCP300D2IP00	IP00 (chassis)	Wall mount	Bottom	7	210
		EVCP300D2N1	UL Type N1	Floor standing	Top or Bottom	11	402
		EVCP300D2N2	UL Type 2				
		EVCP300D2IP31	IP31				
		EVCP300D2N12	UL Type 12				
EVCP300D2IP54	IP54	8	422				
							436

Note:

60 A IP20/UL Type 1 configuration requires ordering two items: EVCP060D2IP00 and PCSPWMKIT60A; adds 232 mm to length and 8.7 kg.
 120 A IP20/UL Type 1 configuration requires ordering two items: EVCP120D2IP00 and PCSPWMKIT120A; adds 232 mm to length and 9.3 kg.
 200 A IP20/UL Type 1 configuration requires ordering two items: EVCP200D2IP00 and PCSPWMKIT300A; adds 273 mm to length and 8.6 kg.
 300 A IP20/UL Type 1 configuration requires ordering two items: EVCP300D2IP00 and PCSPWMKIT300A; adds 273 mm to length and 8.6 kg.

AccuSine PFV+ 380 - 480 V, 50/60 Hz							
Rated current	KVAR rating @ voltage	Catalog number	Enclosure			Frame	Weight kg
			Rating	Style	Cable entry		
60	39.5 @ 380 41.6 @ 400 43.1 @ 415 49.9 @ 480	EVCP060D5IP00	IP00 (chassis)	Wall mount	Bottom	1	88
		EVCP060D5N2	UL Type 2	Floor standing	Top or Bottom	2	277
		EVCP060D5IP31	IP31				
		EVCP060D5N12	UL Type 12				
		EVCP060D5IP54	IP54				
120	79.0 @ 380 83.1 @ 400 86.3 @ 415 99.8 @ 480	EVCP120D5IP00	IP00 (chassis)	Wall mount	Bottom	3	113
		EVCP120D5N2	UL Type 2	Floor standing	Top or Bottom	4	279
		EVCP120D5IP31	IP31				
		EVCP120D5N12	UL Type 12				
		EVCP120D5IP54	IP54				
200	131.6 @ 380 138.6 @ 400 143.8 @ 415 166.3 @ 480	EVCP200D5IP00	IP00 (chassis)	Wall mount	Bottom	5	171
		EVCP200D5N1	UL Type N1	Floor standing	Top or Bottom	11	363
		EVCP200D5N2	UL Type 2				
		EVCP200D5IP31	IP31				
		EVCP200D5N12	UL Type 12				
EVCP200D5IP54	IP54	6	384				
300	197.5 @ 380 207.8 @ 400 215.6 @ 415 249.4 @ 480	EVCP300D5IP00	IP00 (chassis)	Wall mount	Bottom	7	210
		EVCP300D5N1	UL Type N1	Floor standing	Top or Bottom	11	402
		EVCP300D5N2	UL Type 2				
		EVCP300D5IP31	IP31				
		EVCP300D5N12	UL Type 12				
EVCP300D5IP54	IP54	8	422				
							436

Note:

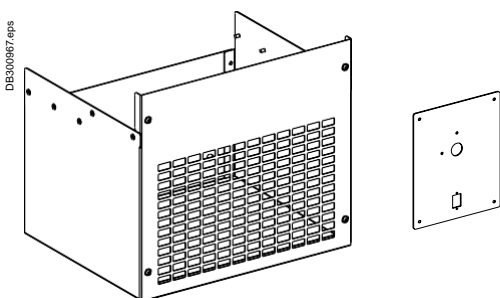
60 A IP20/UL Type 1 configuration requires ordering two items: EVCP060D5IP00 and PCSPWMKIT60A; adds 232 mm to length and 8.7 kg.
 120 A IP20/UL Type 1 configuration requires ordering two items: EVCP120D5IP00 and PCSPWMKIT120A; adds 232 mm to length and 9.3 kg.
 200 A IP20/UL Type 1 configuration requires ordering two items: EVCP200D5IP00 and PCSPWMKIT300A; adds 273 mm to length and 8.6 kg.
 300 A IP20/UL Type 1 configuration requires ordering two items: EVCP300D5IP00 and PCSPWMKIT300A; adds 273 mm to length and 8.6 kg.

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AccuSine PFV+ 480 - 600 V, 50/60 Hz							
Rated current	KVAR rating @ voltage	Catalog number	Enclosure		Cable entry	Frame	Weight kg
			Rating	Style			
47	48.8 @ 600	EVCP047D6N2	UL Type 2	Floor standing	Top or Bottom	9	461
		EVCP047D6IP31	IP31				
		EVCP047D6N12	UL Type 12				
		EVCP047D6IP54	IP54				
94	97.7 @ 600	EVCP094D6N2	UL Type 2	Floor standing	Top or Bottom	9	498
		EVCP094D6IP31	IP31				
		EVCP094D6N12	UL Type 12				
		EVCP094D6IP54	IP54				
157	163.2 @ 600	EVCP157D6N2	UL Type 2	Floor standing	Top or Bottom	10	653
		EVCP157D6IP31	IP31				
		EVCP157D6N12	UL Type 12				
		EVCP157D6IP54	IP54				
235	244.2 @ 600	EVCP235D6N2	UL Type 2	Floor standing	Top or Bottom	10	757
		EVCP235D6IP31	IP31				
		EVCP235D6N12	UL Type 12				
		EVCP235D6IP54	IP54				

AccuSine PFV+ 600 - 690 V, 50/60 Hz							
Rated current	KVAR rating @ voltage	Catalog number	Enclosure		Cable entry	Frame	Weight kg
			Rating	Style			
40	47.8 @ 690	EVCP040D7N2	UL Type 2	Floor standing	Top or Bottom	9	483
		EVCP040D7IP31	IP31				
		EVCP040D7N12	UL Type 12				
		EVCP040D7IP54	IP54				
80	95.6 @ 690	EVCP080D7N2	UL Type 2	Floor standing	Top or Bottom	9	533
		EVCP080D7IP31	IP31				
		EVCP080D7N12	UL Type 12				
		EVCP080D7IP54	IP54				
		EVCP133D7N2	UL Type 2				

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AccuSine+ Wall Mount IP20/UL Type 1 Conversion Kit

- Converts IP00 (UL Type Open) to IP20 (UL Type 1) wall-mounted enclosed assemblies.
- Includes HMI mounting plate and cable entry enclosure for mounting on the bottom of the IP00 assemblies.

Wall mount kit reference	Assembled dimensions - IP20				IP20 assembly	Cable entry enclosure
	Unit rating (A)	Height	Width	Depth	Weight (kg)	Weight (kg)
PCSPWMKIT60A	60	1530	421	349	97.3	8.7
PCSPWMKIT120A	120	1630	421	384	122.0	9.3
PCSPWMKIT300A	200	1642	575	435	180.0	8.6
PCSPWMKIT300A	300	1882	575	435	218.6	8.6