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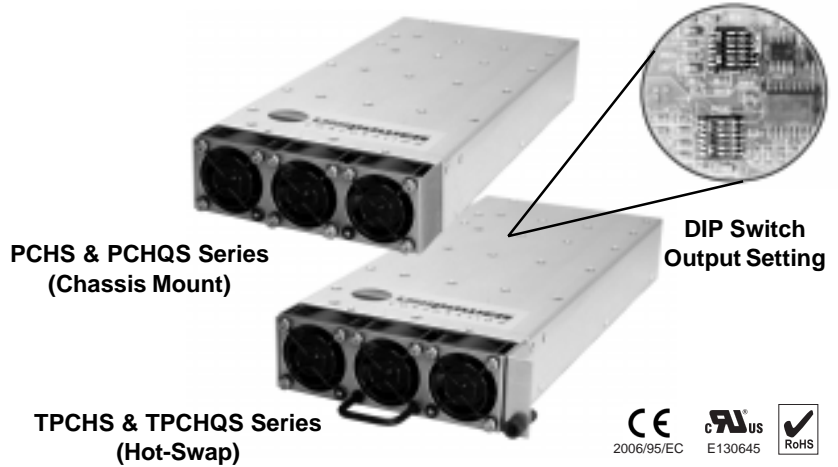
## QUICK-SET *PowerCassette*<sup>®</sup>: MULTI-OUTPUT SWITCHER

1U High, Up to 6 Outputs at 600 Watts, AC or DC Input  
 Outputs Instantly Set at Factory

### FEATURES

- Outputs Set by DIP Switches
- Advanced "CellularPower"<sup>™</sup> Architecture
- Up to 5 Outputs Plus 5V, ¼ A Standby
- 508 Different Models
- Hot-Swap or Chassis Mount Versions
- 1.8 to 12VDC Outputs
- AC or DC Input
- I2C Serial Data Bus Option
- Integral LED Status Indicators
- 6.8 Watts/Cubic Inch Power Density
- Power Factor Corrected (AC Input)
- Low Profile: 1.6 Inches High (1U)
- Hot-Swappable Connector
- Staged Pin Lengths
- ORing Diodes on All Outputs
- Two- or Three-Unit 19" Racks\*
- Active Current Sharing on V1, V2 & V3
- Universal 85 to 264VAC Input
- Class B EMI Input Filter
- Wide Range 36 to 72 VDC Input
- DC Input Reverse Polarity Protected
- Optimized Thermal Management
- No Minimum Load, Any Output
- Control & Monitoring Features

\*For TPCHS Models



### TWO-YEAR WARRANTY

### SAFETY CERTIFICATIONS

AGENCY	STANDARD
UL	UL1950
CUL	CSA22.2, No. 950
DEMKO	EN60950

Patents Issued & Pending

### ORDERING GUIDE

SERIES	AC or DC INPUT	V1 OUTPUT	I2C OUTPUT	V1 to V5 OUTPUTS
PCH = Chassis Mount TPCH = Hot Swap	Q = DC B* = AC	29332-S = 1.8-5V Out 32332-S = 12V Out	Z = I2C B* = No I2C	Use 5 Letters From Tables: -XXXXX (Pages 3 & 4)

NOTE: B\* means "leave blank" (no letter)

**Examples:** Model **TPCH29332-S-DBFGE** is a Hot-Swap version with AC input, no I2C, V1 = 5V/70A, V2 = 2.5V/50A, V3 = 12V/10A, V4 = -12V/3A and V5 = -5V/3A

Model **PCHQ32332-SZ-FCOGE** is a Chassis Mount version with DC input, I2C output, V1 = 12V/35A, V2 = 3.3V/50A, V3 = No Output, V4 = -12V/3A and V5 = -5V/3A

**Two- and Three-Unit Racks:** For ordering information on these racks, see data sheet on "Multi-Output PowerCassette<sup>®</sup> 19-Inch Racks".

[www.unipowerco.com](http://www.unipowerco.com)

## SPECIFICATIONS QUICK-SET PowerCassette® PCHS & TPCHS SERIES

Typical at Nominal 115/230VAC Line or 48VDC, Full Load and 25°C Unless Otherwise Noted.

### OUTPUT SPECIFICATIONS

Total Output Power, Continuous, Max	600 Watts
Voltage Adjustment Range, Min.	±5%
Total Regulation <sup>1</sup> , V1, V2, V3	2.0%
Total Regulation <sup>1</sup> , V4, V5	3.0%
Ripple & Noise, Pk-Pk <sup>2</sup>	1% or 50mV
Holdup Time	20mS
Dynamic Response <sup>3</sup>	300µS
Temperature Coefficient	±0.02%/°C
Minimum Load, Any Output	0A
Overload Protection	Auto Recovery
Overvoltage Protection, V1, V2, V3	Latched Shutdown
Remote Sense, V1, V2, V3	Up to 0.25V Per Wire
Current Share, V1, V2, V3	±10% Full Load Rating
Standby Output	+5V, 250mA
Output Power Good Signal	Logic High
Input Power Fail Signal	Logic High
Global Inhibit	Logic Low
Enable	Logic Low
Thermal Warning	Logic Low

### AC INPUT SPECIFICATIONS

Input Voltage Range	85-264VAC
Power Factor	0.99
Input Frequency	47-63Hz
Inrush Current Limiting	30A Peak
Input EMI Filter <sup>6</sup>	EN55022 Curve B FCC20780 pt. 15J Curve B
Harmonic Distortion	EN61000-3-2
Input Immunity, Conducted	
Fast Transients, Line-Line	±2kV (EN61000-4-4 Level 3)
Surges, Line-Line	±2kV (EN61000-4-5 Level 3)
Surges, Line-Ground	±4kV (EN61000-4-5 Level 4)
Input Protection	Internal Fuse, 15A

### DC INPUT SPECIFICATIONS

Input Voltage Range	36-72VDC
Inrush Current Limiting	10A Peak
Input EMI Filter	Standard
Input Immunity, Conducted	
Fast Transients, Line-Line	±2kV (EN61000-4-4 Level 3)
Surges, Line-Line	±500V (EN61000-4-5 Level 1)
Surges, Line-Ground	±500V (EN61000-4-5 Level 1)
Input Protection	Internal Fuse, 25A

### GENERAL SPECIFICATIONS

Efficiency <sup>4</sup>	75% at Full Load
Switching Frequency, PFC Converter (AC Input)	48-110kHz
Output Converters	275kHz Nominal
Isolation, Class I, min. <sup>5</sup>	
Input-Output (AC Input/DC Input)	3000VAC/1500VDC
Input-Ground (AC Input/DC Input)	1500VAC/1500VDC
Output-Ground (AC Input/DC Input)	50VDC/50VDC
MTBF (Bellcore)	200,000 Hours
Safety Standards	EN60950, UL1950, CSA22.2 No.950

### ENVIRONMENTAL SPECIFICATIONS

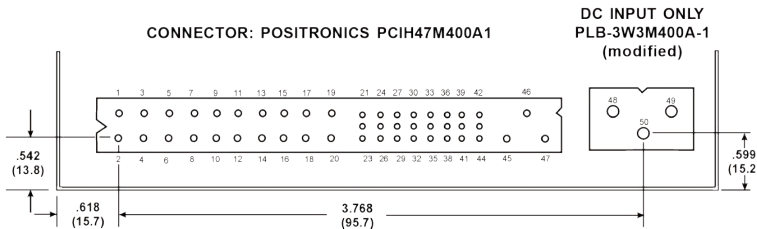
Operating Temperature	0°C to 70°C Ambient
Derating	2.5% / °C, 50°C to 70°C
Storage Temperature	-40°C to +85°C
Cooling	Integral Ball Bearing Fans

### PHYSICAL SPECIFICATIONS

Case Material	Aluminum
Dimensions, Inches(mm)	1.6 H x 5.0 W x 11.0 D (40.6 x 127 x 279)
Weight	3.3 lbs. (1.5 kg.)

### NOTES:

- No load to full load, including line regulation and load regulation.
  - Whichever is greater. 20MHz bandwidth. Measure with 0.1µF ceramic and 10µF tantalum capacitors in parallel across the output. For outputs of 2.5V or lower, the figure is 2% maximum.
  - <4% deviation recovering to within 1% for 25% load change.
  - Typical efficiency for 4 output unit with one high-current output of 5V or lower. Efficiency can vary 5% or more depending on combination of outputs.
  - Input-output isolation figure is for isolation components only.
  - 100% production Hipot tested.
- When installed in compatible rack. Consult factory.



PIN STAGING	
PINS	LENGTH
1-20	.300"
21-26	.250"
27	.150"
28-44	.250"
45-47	.450"
48-5-	.250"

MATING INTERFACE BOARD
For Single PCHS/TPCHS PowerCassette (AC or DC) Order No. 009-3708-0000

MATING CONNECTOR KIT
AC Input: Order Kit No. 775-1429-0000
DC Input: Order Kit No. 775-1445-0000

PIN CONNECTIONS			
PIN	FUNCTION	PIN	FUNCTION
1	+V1 Out	26	+5V, 250mA Standby
2	+V1 Out	27	Enable*
3	+V1 Out	28	Spare/ADD GA1*
4	+V1 Out	29	V1 External Trim
5	+V1 Out	30	+V1 Sense
6	+V1 Out	31	-V1 Sense
7	V1 & V2 Return	32	V2 External Trim
8	V1 & V2 Return	33	+V2 Sense
9	V1 & V2 Return	34	-V2 Sense
10	V1 & V2 Return	35	V1 Current Share
11	V1 & V2 Return	36	+V3 Sense
12	V1 & V2 Return	37	-V3 Sense
13	V1 & V2 Return	38	Output Power Good/SDA*
14	+V2 Out	39	Global Inhibit
15	+V2 Out	40	Overtemp. Warning/SCLK*
16	+V2 Out	41	V2 Current Share
17	+V2 Out	42	Input Power Fail
18	+V2 Out	43	Spare/Interrupt*
19	V3 Return	44	V3 Current Share
20	+V3 Out	45	Chassis Ground
21	V4 Out	46	AC Line
22	Signal Ground	47	AC Neutral
23	V5 Out	48	+DC Input
24	V4 & V5 Return	49	-DC Input
25	Spare/ADD GA0*	50	Chassis Ground

\*NOTES: For unit to operate, pin 27 must be at logic LO or shorted to pin 22. Pins 25, 28, 38, 40 and 43 function as I2C outputs when that option is present. All returns and signal ground are connected together.

ALL DIMENSIONS IN INCHES (mm). All specifications subject to change without notice.

**QUICK-SET PowerCassette® MODEL SUFFIX SELECTOR**

V1	V2	V3	V4	V5	MODEL SUFFIX	V1	V2	V3	V4	V5	MODEL SUFFIX
12V/35A	2.5V/50A		-12V/3A	-5V/3A	FBOGE	12V/35A	3.3V/50A			-5V/3A	FCOOE
12V/35A	2.5V/50A		-12V/3A	5V/3A	FBOGD	12V/35A	3.3V/50A		-12V/3A	-5.2V/3A	FCOGK
12V/35A	2.5V/50A			-5V/3A	FBOOE	12V/35A	3.3V/50A	5V/10A		1.8V/3A	FCJOA
12V/35A	2.5V/50A		-12V/3A	-5.2V/3A	FBOGK	12V/35A	3.3V/50A	5V/10A			FCJOO
12V/35A	2.5V/50A	5V/10A		1.8V/3A	FBJOA	12V/35A	5V/50A		-12V/3A	-5V/3A	FDOGE
12V/35A	2.5V/50A	5V/10A			FBJOO	12V/35A	5V/50A		-12V/3A	3.3V/3A	FDOGC
12V/35A	3.3V/50A		-12V/3A	-5V/3A	FCOGE	12V/35A	5V/50A		-12V/3A	2.5V/3A	FDOGB
12V/35A	3.3V/50A		-12V/3A	5V/3A	FCOGD	12V/35A	5V/50A		-12V/3A	-5.2V/3A	FDOGK
						12V/35A	5V/50A		-12V/3A		FDOGO
						12V/35A	5V/50A				FDOOO
5V/70A	3.3V/50A	12V/10A	-12V/3A	-5V/3A	DCFGE						
5V/70A	3.3V/50A	12V/10A	-12V/3A		DCFGO						
5V/70A	3.3V/50A	12V/10A		2.5V/3A	DCFOB	5V/70A	2.5V/50A	12V/10A	-12V/3A	-5V/3A	DBFGE
5V/70A	3.3V/50A		-12V/3A	1.8V/3A	DCOGA	5V/70A	2.5V/50A		-12V/3A	3.3V/3A	DBOGC
5V/70A	3.3V/50A		-12V/3A	-5V/3A	DCOGE	5V/70A	2.5V/50A	12V/10A		2.5V/3A	DBFOB
5V/70A	3.3V/50A	12V/10A	-12V/3A	2.5V/3A	DCFGB	5V/70A	2.5V/50A	12V/10A		-5V/3A	DBFOE
5V/70A	3.3V/50A				DCOOO	5V/70A	2.5V/50A		-12V/3A		DBOGO
5V/70A	3.3V/50A	12V/10A		-5V/3A	DCFOE	5V/70A	2.5V/50A			-5V/3A	DBOOE
5V/70A	3.3V/50A		12V/3A	-5V/3A	DCOFE	5V/70A	2.5V/50A		12V/3A	3.3V/3A	DBOFC
5V/70A	3.3V/50A		12V/3A	2.5V/3A	DCOFB	5V/70A	2.5V/50A	12V/10A	-12V/3A	2.5V/3A	DBFGB
5V/70A	3.3V/50A			2.5V/3A	DCOOB	5V/70A	2.5V/50A		-12V/3A	-5V/3A	DBOGE
5V/70A	3.3V/50A	12V/10A		-5.2V/3A	DCFOK	5V/70A	2.5V/50A		12V/3A	1.8V/3A	DBOFA
						5V/70A	2.5V/50A		-12V/3A	1.8V/3A	DBOGA
5V/70A		12V/10A	-12V/3A	-5V/3A	DOFGE						
5V/70A		12V/10A	-12V/3A	3.3V/3A	DOFGC	5V/70A			-12V/3A	-5V/3A	DOOGE
5V/70A		12V/10A		2.5V/3A	DOFOB	5V/70A				3.3V/3A	DOOOC
5V/70A		12V/10A		3.3V/3A	DOFOC	5V/70A				2.5V/3A	DOOOB
5V/70A		12V/10A			DOFOO	5V/70A				1.8V/3A	DOOAA
5V/70A			-12V/3A	2.5V/3A	DOOGB	5V/70A			12V/3A	1.8V/3A	DOOFA
5V/70A		12V/10A	-12V/3A		DOFGO	5V/70A			12V/3A	2.5V/3A	DOOFB
5V/70A		12V/10A		-5V/3A	DOFOE	5V/70A			12V/3A	3.3V/3A	DOOFC
5V/70A			-12V/3A	1.8V/3A	DOOGA	5V/70A			12V/3A		DOOFO
5V/70A			-12V/3A	3.3V/3A	DOOGC	5V/70A				-5.2V/3A	DOOOK
						5V/70A				-5V/3A	DOOOE
5V/100A		12V/10A	-12V/3A	-5V/3A	LDFGE						
5V/100A		12V/10A	-12V/3A	3.3V/3A	LDFGC	3.3V/70A	5V/50A	12V/10A	-12V/3A	-5V/3A	COFGE
5V/100A		12V/10A		2.5V/3A	LDFOB	3.3V/70A	5V/50A	12V/10A	-12V/3A	5V/3A	COFGD
5V/100A			12V/3A	-5V/3A	LDOFE	3.3V/70A	5V/50A		-12V/3A		COFGO
5V/100A			-12V/3A	2.5V/3A	LDOGB	3.3V/70A	5V/50A			-5V/3A	CDOOE
5V/100A		12V/10A	-12V/3A		LDFGO	3.3V/70A	5V/50A		-12V/3A	1.8V/3A	CDOGA
5V/100A		12V/10A		-5V/3A	LDFOE	3.3V/70A		12V/10A		2.5V/3A	COFOB
5V/100A			-12V/3A	3.3V/3A	LDOGC	3.3V/70A	5V/50A	12V/10A	-12V/3A	2.5V/3A	CDFGB
5V/100A			-12V/3A	-5V/3A	LDOGE	3.3V/70A	5V/50A			2.5V/3A	CDOOB
5V/100A		12V/10A		3.3V/3A	LDFOC	3.3V/70A	5V/50A		12V/3A	2.5V/3A	CDOFB
5V/100A		12V/10A		-5.2V/3A	LDFOK	3.3V/70A			-12V/3A	2.5V/3A	COOGB
3.3V/70A	2.5V/50A	12V/10A	-12V/3A	-5V/3A	CBFGE	3.3V/70A		12V/10A	-12V/3A	-5V/3A	COFGE
3.3V/70A	2.5V/50A	12V/10A	-12V/3A		CBFGO	3.3V/70A		12V/10A	-12V/3A		COFGO
3.3V/70A	2.5V/50A	12V/10A		-5V/3A	CBFOE	3.3V/70A		12V/10A		-5V/3A	COFOE
3.3V/70A	2.5V/50A			-5V/3A	CBOOE	3.3V/70A		12V/10A		5V/3A	COFOD
3.3V/70A	2.5V/50A		12V/3A	-5V/3A	CBOFE	3.3V/70A		12V/10A		1.8V/3A	COFOA
3.3V/70A	2.5V/50A		12V/3A	5V/3A	CBOFD	3.3V/70A				2.5V/3A	COOGB
3.3V/70A	2.5V/50A	12V/10A		5V/3A	CBFOD	3.3V/70A		12V/10A	-12V/3A	-5.2V/3A	COFGK
3.3V/70A	2.5V/50A	5V/10A		-5.2V/3A	CBJOO	3.3V/70A		12V/10A	-12V/3A	2.5V/3A	COFGB
3.3V/70A	2.5V/50A	12V/10A	-12V/3A		CBFGK	3.3V/70A		12V/10A			COFOO
3.3V/70A	2.5V/50A	5V/10A		1.8V/3A	CBJOA	3.3V/70A		5V/10A			COJOO
3.3V/70A	2.5V/50A		12V/3A	1.8V/3A	CBOFA	3.3V/70A		5V/10A		1.8V/3A	COJOA
3.3V/70A	2.5V/50A	12V/10A	-12V/3A	1.8V/3A	CBFGA	3.3V/70A		12V/10A		-5.2V/3A	COFOK
2.5V/70A	5V/50A	12V/10A	-12V/3A	-5V/3A	BDFGE	2.5V/70A	3.3V/50A	12V/10A	-12V/3A	5V/3A	BCFGD
2.5V/70A	5V/50A	12V/10A	-12V/3A	3.3V/3A	BDFGC	2.5V/70A	3.3V/50A	12V/10A	-12V/3A	3.3V/3A	BCFGC
2.5V/70A	5V/50A	12V/10A		2.5V/3A	BDFOB	2.5V/70A	3.3V/50A	12V/10A		2.5V/3A	BCFOB
2.5V/70A	5V/50A		12V/3A	-5V/3A	BDOFE	2.5V/70A	3.3V/50A		12V/3A	-5V/3A	BCOFE
2.5V/70A	5V/50A		-12V/3A	3.3V/3A	BDOGC	2.5V/70A	3.3V/50A		12V/3A	5V/3A	BCOFD
2.5V/70A	5V/50A		12V/3A	1.8V/3A	BDOFA	2.5V/70A	3.3V/50A	12V/10A	-12V/3A	-5.2V/3A	BCFGK
2.5V/70A	5V/50A		-12V/3A	1.8V/3A	BDOGA	2.5V/70A	3.3V/50A	5V/10A		1.8V/3A	BCJOA
2.5V/70A	5V/50A		-12V/3A		BDOGO	2.5V/70A	3.3V/50A			-5V/3A	BCOOE
2.5V/70A	5V/50A	12V/10A			BDFOO	2.5V/70A	3.3V/50A		-12V/3A	1.8V/3A	BCOGA
2.5V/70A	5V/50A	12V/10A		-5V/3A	BDFOE	2.5V/70A	3.3V/50A		-12V/3A	-5V/3A	BCOGE
2.5V/70A	5V/50A	12V/10A		3.3V/3A	BDFOC	2.5V/70A	3.3V/50A	12V/10A	-12V/3A	-5V/3A	BCFGE
2.5V/70A	5V/50A			3.3V/3A	BDOOC	2.5V/70A	3.3V/50A	12V/10A	-12V/3A		BCFGO

**QUICK-SET PowerCassette® MODEL SUFFIX SELECTOR (CONTINUED)**

V1	V2	V3	V4	V5	MODEL SUFFIX	V1	V2	V3	V4	V5	MODEL SUFFIX
2.5V/70A			-12V/3A	-5V/3A	BOOGE	1.8V/70A	5V/50A	12V/10A	-12V/3A	-5V/3A	ADFGE
2.5V/70A			12V/3A	3.3V/3A	BOOFC	1.8V/70A	5V/50A	12V/10A	-12V/3A		ADFGO
2.5V/70A			-12V/3A	5V/3A	BOOGD	1.8V/70A	5V/50A	12V/10A		-5V/3A	ADFOE
2.5V/70A			12V/3A		BOOFO	1.8V/70A	5V/50A	12V/10A			ADFOO
2.5V/70A			-12V/3A	3.3V/3A	BOOGC	1.8V/70A	5V/50A	12V/10A		2.5V/3A	ADFOB
2.5V/70A			12V/3A	5V/3A	BOOFD	1.8V/70A	5V/50A	12V/10A	-12V/3A	3.3V/3A	ADFGC
2.5V/70A			12V/3A	1.8V/3A	BOOFA	1.8V/70A	5V/50A		-12V/3A	2.5V/3A	ADOGB
2.5V/70A			-12V/3A	1.8V/3A	BOOGA	1.8V/70A	5V/50A	12V/10A	-12V/3A	2.5V/3A	ADFGB
2.5V/70A				1.8V/3A	BOOOA	1.8V/70A	5V/50A		12V/3A	3.3V/3A	ADOFB
2.5V/70A			-12V/3A		BOOGO	1.8V/70A	5V/50A				ADOOO
2.5V/70A			12V/3A	-5V/3A	BOOFE	1.8V/70A	5V/50A			3.3V/3A	ADOOB
2.5V/70A				-5V/3A	BOOOE	1.8V/70A	5V/50A			2.5V/3A	ADOOO
2.5V/70A				5V/3A	BOOOD	1.8V/70A	5V/50A			-5V/3A	ADOOE
1.8V/70A	3.3V/50A	12V/10A	-12V/3A	-5V/3A	ACFGE	1.8V/70A	2.5V/50A	12V/10A	-12V/3A	-5V/3A	ABFGE
1.8V/70A	3.3V/50A	12V/10A	-12V/3A	3.3V/3A	ACFCG	1.8V/70A	2.5V/50A	12V/10A	-12V/3A		ABFGO
1.8V/70A	3.3V/50A	12V/10A		2.5V/3A	ACFOB	1.8V/70A	2.5V/50A	12V/10A			ABFOO
1.8V/70A	3.3V/50A		12V/3A	-5V/3A	ACOFE	1.8V/70A	2.5V/50A	12V/10A		5V/3A	ABFOD
1.8V/70A	3.3V/50A		12V/3A	3.3V/3A	ACOFB	1.8V/70A	2.5V/50A	12V/10A		-5V/3A	ABFOE
1.8V/70A	3.3V/50A			5V/3A	ACOOD	1.8V/70A	2.5V/50A		-12V/3A	-5V/3A	ABOGE
1.8V/70A	3.3V/50A		-12V/3A		ACOGO	1.8V/70A	2.5V/50A	12V/10A		3.3V/3A	ABFOC
1.8V/70A	3.3V/50A		12V/3A	2.5V/3A	ACOFB	1.8V/70A	2.5V/50A	12V/10A	-12V/3A	3.3V/3A	ABFGC
1.8V/70A	3.3V/50A		12V/3A	5V/3A	ACOFD	1.8V/70A	2.5V/50A		12V/3A	3.3V/3A	ABOFC
1.8V/70A	3.3V/50A	12V/10A	-12V/3A	-5.2V/3A	ACFGK	1.8V/70A	2.5V/50A	5V/10A			ABJOO
1.8V/70A	3.3V/50A		12V/3A		ACFOF	1.8V/70A	2.5V/50A		12V/3A	5V/3A	ABOFD
1.8V/70A	3.3V/50A	5V/10A			ACJOO	1.8V/70A	2.5V/50A			3.3V/3A	ABOOC
1.8V/70A	3.3V/50A			2.5V/3A	ACOOB	1.8V/70A	2.5V/50A	12V/10A	-12V/3A	-5.2V/3A	ABFGK
1.8V/70A	3.3V/50A		-12V/3A	2.5V/3A	ACOGB	1.8V/70A	2.5V/50A			5V/3A	ABOOD
3.3V/70A			12V/3A	5V/3A	COOFD	3.3V/100A		12V/10A	-12V/3A	-5V/3A	MCFGE
3.3V/70A			-12V/3A	-5V/3A	COOGE	3.3V/100A		12V/10A	-12V/3A		MCFGO
3.3V/70A			-12V/3A	5V/3A	COOGD	3.3V/100A		12V/10A		-5V/3A	MCFOE
3.3V/70A			12V/3A	-5V/3A	COOFE	3.3V/100A		12V/10A			MCFOO
3.3V/70A				5V/3A	COOOD	3.3V/100A		12V/10A	-12V/3A	-5.2V/3A	MCFGK
3.3V/70A			12V/3A		COOFO	3.3V/100A		12V/10A	-12V/3A	2.5V/3A	MCFGB
3.3V/70A				-5.2V/3A	COOOK	3.3V/100A			-12V/3A	1.8V/3A	MCOGA
3.3V/70A			12V/3A	2.5V/3A	COOFB	3.3V/100A			12V/3A	1.8V/3A	MCOFA
3.3V/70A			-12V/3A	-5.2V/3A	COOGK	3.3V/100A			-12V/3A	-5V/3A	MCOGE
3.3V/70A			12V/3A	1.8V/3A	COOFA	3.3V/100A			-12V/3A	2.5V/3A	MCOGB
3.3V/70A			-12V/3A	1.8V/3A	COOGA	3.3V/100A			12V/3A	2.5V/3A	MCOFB
2.5V/100A		12V/10A	-12V/3A	5V/3A	NBFGD	2.5V/70A		12V/10A	-12V/3A	-5V/3A	BOFGE
2.5V/100A		12V/10A			NBFOO	2.5V/70A		12V/10A	-12V/3A		BOFGO
2.5V/100A		12V/10A		-5V/3A	NBFOE	2.5V/70A		12V/10A		-5V/3A	BOFOE
2.5V/100A		12V/10A	-12V/3A	3.3V/3A	NBFGC	2.5V/70A		12V/10A	-12V/3A	5V/3A	BOFGD
2.5V/100A		12V/10A	-12V/3A	3.3V/3A	NBOGC	2.5V/70A		12V/10A	-12V/3A	3.3V/3A	BOFGC
2.5V/100A		12V/10A	-12V/3A		NBFGO	2.5V/70A		12V/10A			BOFOO
2.5V/100A			-12V/3A	1.8V/3A	NBOGA	2.5V/70A		12V/10A		1.8V/3A	BOFOA
2.5V/100A			12V/3A	1.8V/3A	NBOFA	2.5V/70A			12V/3A	-5.2V/3A	BOOFK
2.5V/100A			12V/3A	3.3V/3A	NBOFC	2.5V/70A			-12V/3A	-5.2V/3A	BOOGK
2.5V/100A		5V/10A			NBJOO	2.5V/70A		12V/10A		3.3V/3A	BOFOC
2.5V/100A		5V/10A		1.8V/3A	NBJOA	2.5V/70A		5V/10A			BOJOO
2.5V/100A			12V/3A		NBOFO	2.5V/70A		12V/10A	-12V/3A	-5.2V/3A	BOFGK
2.5V/100A		12V/10A	-12V/3A	-5.2V/3A	NBFGK	2.5V/70A		5V/10A		1.8V/3A	BOJOA
2.5V/100A		12V/10A		5V/3A	NBFOD	2.5V/70A				-5.2V/3A	BOOOK
1.8V/70A			-12V/3A	-5V/3A	AOOGC	1.8V/70A		12V/10A	-12V/3A	-5V/3A	AOFGE
1.8V/70A			-12V/3A	2.5V/3A	AOOGB	1.8V/70A		12V/10A	-12V/3A		AOFGO
1.8V/70A			12V/3A	2.5V/3A	AOOFB	1.8V/70A		12V/10A		-5V/3A	AOFOE
1.8V/70A			-12V/3A	3.3V/3A	AOOGC	1.8V/70A		12V/10A			AOFOO
1.8V/70A			12V/3A	-5V/3A	AOOFD	1.8V/70A		12V/10A		3.3V/3A	AOFOC
1.8V/70A			-12V/3A	5V/3A	AOOGD	1.8V/70A				5V/3A	AOFOO
1.8V/70A		5V/10A			AOJOO	1.8V/70A		12V/10A		-5.2V/3A	AOFOK
1.8V/70A			12V/3A	3.3V/3A	AOOFB	1.8V/70A		12V/10A		2.5V/3A	AOFOB
1.8V/70A			12V/3A		AOFOF	1.8V/70A		12V/10A	-12V/3A	3.3V/3A	AOFGC
1.8V/70A			-12V/3A	-5.2V/3A	AOOGK	1.8V/70A				3.3V/3A	AOFOC

## APPLICATION NOTES

- Maximum power must not exceed the following: 500 watts for V1 and V2 combined, 171 watts for V3, V4 and V5 combined, or 600W for total unit.
- For units with V1 over 70 amps, that output actually consists of the V1 and V2 outputs in parallel. In this mode the V1 and V2 output pins must be connected to one another and the V1 and V2 current share pins connected to each other. The V1 plus sense and minus sense pins must be connected to the V2 plus sense and minus sense pins, respectively. All connections are external to unit.
- For outputs of 2.5V or lower, the peak-to-peak ripple and noise is specified at 2% maximum.
- The DC Power Good signal monitors the V1, V2 and V3 outputs only.
- DESCRIPTION and INTERCONNECTION OF LOGIC SIGNALS.** ENABLE, DC POWER GOOD, AC POWER FAIL, OVERTEMP WARNING and INHIBIT pin connections come from the equivalent of an open collector circuit with an internal pull up 10K resistor to +5V.

**ENABLE.** This pin must be shorted to ground in order for outputs to function. The connection may also be achieved by means of an external open collector or open FET drain circuit, i.e., when the external transistor is turned on, the power supply is enabled. This is the inverse of the Inhibit function below.

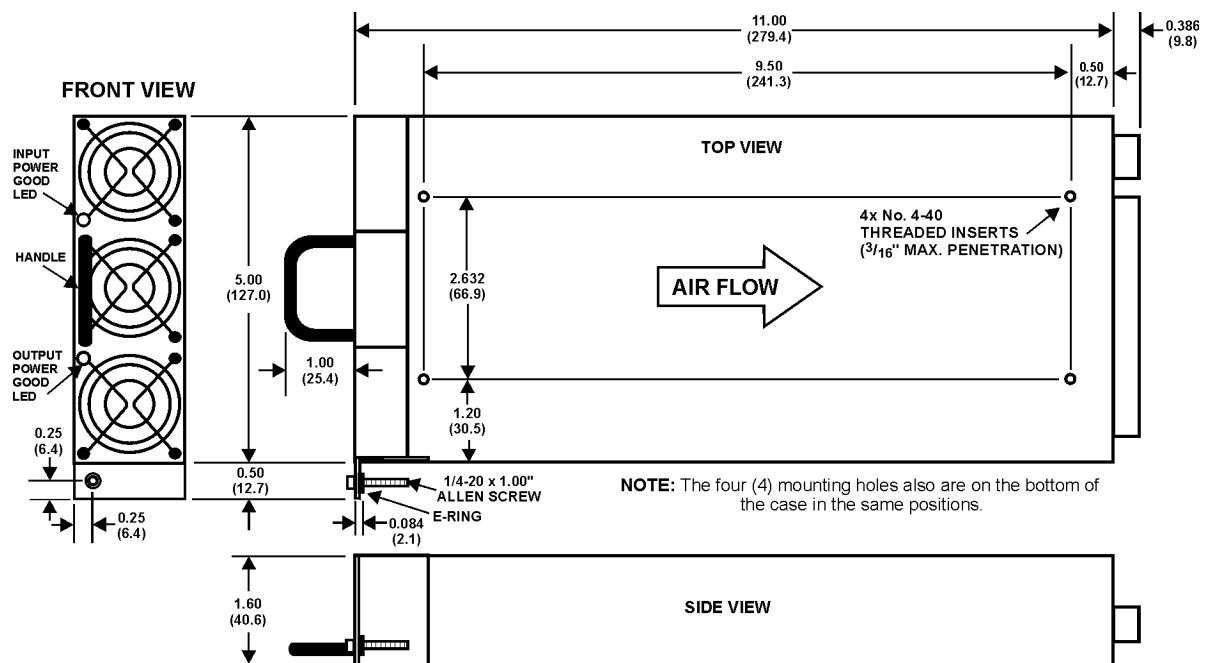
**OUTPUT POWER GOOD.** Provides Logic High signal when V1, V2 and V3 reach a prescribed level.

**INPUT POWER FAIL.** Provides a Logic High signal pulse when the AC line voltage ceases. Pulse occurs a minimum of 4 milliseconds before outputs go out of regulation. Pulse duration is 4 milliseconds up to tens of milliseconds, depending on load. Signal is Logic High rather than low (typical in non-redundant power supplies) so that there is no signal ambiguity when redundant power supplies are operated from different AC phases.

**OVERTEMP. WARNING.** Provides a Logic Low signal when exit air temperature approaches an unacceptable level.

**GLOBAL INHIBIT.** Shuts down the outputs but not the standby supply or the fans. As with the Enable pin above, it is achieved by shorting the pin to ground or turning on an external transistor. Should be connected through a 10K ohm resistor to +5V Standby Output. Acts as the inverse of the Enable pin.

- CONNECTING ALL OUTPUT SIGNALS TOGETHER FOR UNITS IN AN N+1 RACK:** Normally signals are used for identifying status of each module in paralleled unit configuration. If it is desired to connect all the signals together to treat the complete rack as a single power supply, the following (or equivalent) must be done. The Input Power Fail, Output Power Good and Overtemp. Warning signals of each module are each connected to the anode of a BAV99 diode, the other side of which goes to the base of a 2N2222A. The collectors of all the Input Power Fail transistors are connected to form a single Input Power Fail chassis signal. The same is done for the Output Power Good and Overtemp. Warning signals. The resultant system warning signals then give a Logic Low for Input Power Fail and a Logic High for Output Power Good and Overtemperature Warning.
- MTBF.** 200,000 hours at 35°C using Bellcore method.



**NOTE:** The TPCHS Model is shown. The PCHS version does not have handle or mounting bracket with bolt. The AC input version does not have DC input connector (pins 48-50).

ALL DIMENSIONS IN INCHES (mm).  
 All specifications subject to change without notice.

## ***PowerCassette*<sup>®</sup>: I2C SERIAL BUS INTERFACE**

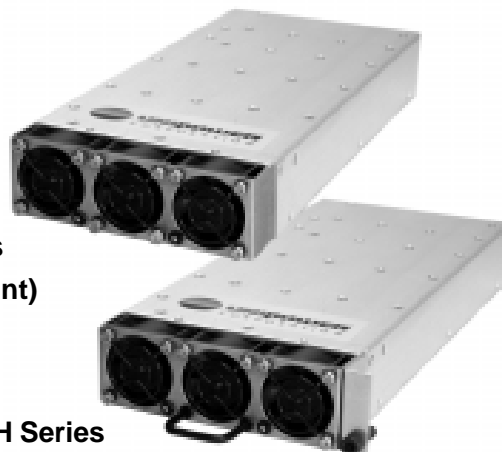
### Status Indication of system critical power supply parameters

#### **FEATURES**

- Industry Standard Communication Interface
- Inventory Control Information
- Status Indication
- Management of System Load
- Imminent Failure Warning
- Fully Integrated with Standard PSU Package

**PCH Series  
(Chassis Mount)**

**TPCH Series  
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**1U HIGH**  
**1.6" x 5" x 10"**  
(41 x 127 x 254 mm)

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#### **DESCRIPTION**

The I2C interface that is incorporated into the PowerCassette includes facilities to monitor various operating parameters within the unit and transmit these to a host computer on demand over an industry standard I2C Serial bus.

Three forms of data are available. These allow the user to monitor the actual status of an individual unit, manage system loading through measurement of the actual load on each output and also control inventory through an inbuilt EEPROM containing specific data about each individual unit.

The implementation of I2C that has been utilized in PowerCassette is a subset of more complete implementations such as IPMI. This data-sheet is intended as a supplement to the data sheet for the PowerCassette family itself and should provide enough information for the system designer to make decisions on how to utilize the available information within his overall system philosophy.

#### **I2C DEVICES EMPLOYED**

##### **PCF8574**

This device is an 8-bit digital register manufactured by Philips.

##### **PCF8591**

This device is a Quad A/D converter manufactured by Philips.

##### **24C02**

This device is a 256 byte EEPROM manufactured by ST

##### **MAX6633**

This is a 12-bit temperature measurement device manufactured by Maxim.

For detailed information about the operation of these devices please consult the original manufacturers' data-sheets.

# SPECIFICATIONS, PowerCassette®: I2C SERIAL BUS INTERFACE

## ELECTRICAL INTERFACE

### Addressing (GA0 and GA1)

Two external address lines are employed allowing up to four PowerCassette modules to be addressed on a single I2C bus.

Module addressing is achieved through hard-wiring the address lines to 0V or the 5V auxiliary supply via a 100R resistor on the system back-plane. In this way it is the location or position of the module rather than any particular module that is identified by an individual address.

### Serial Clock (SCLK)

This line is clocked by the processor which controls the I2C serial bus. It should be tied to +5V via a pull-up resistor in the range 3k to 10k.

### Serial Data (SDA)

This line is a bidirectional data line. It should be tied to +5V via a pull-up resistor in the range 3k to 10k.

### Interrupt

This line provides an interrupt to the processor in the event of a change of status of the digital register.

### BUS speed

The I2C interface as used in PowerCassette is designed to run with a serial clock speed 100kHz.

## OPERATION AND FUNCTIONS

### Digital Functions

Digital status functions are provided by a PCF8574 8-bit I/O port device. When this device is read by the serial bus controller a single 8-bit word provides the following information:

BIT	FUNCTION	GOOD STATE	MEANING
0	Input Power Fail	0	Provides 10ms warning of input supply failure. <sup>1</sup>
1	Output Power Good	1	V1, 2 and 3 are within specified limits.
2	Temperature Warning	1	Internal temperature exceeds 60C.
3	Fan #1 Good	1	Fan running at >80% nominal speed.
4	Fan #2 Good	1	Fan running at >80% nominal speed.
5	Fan #3 Good	1	Fan running at >80% nominal speed.
6	Not Used	1	Logic 1 as default
7	Temperature Alarm	1	Internal temperature exceeds 70C, unit switched off.

Note 1: AC input versions only. Requires use of Interrupt line to provide warning time specified.

### PCF8574 slave address

BIT	7	6	5	4	3	2	1	0	
VALUE	0	1	0	0	0	A1	A0	R/W	

Note: The PCF8574 must only be used in the READ mode.

### EEPROM Functions

The EEPROM is a 2048 bit (256 byte) device which is preprogrammed at the factory with the following data:

ADDRESS RANGE	DATA
0-15	Model Number
16-31	Manufacturing Part Number
32-47	Serial Number
48-63	Modification Level
64-79	Manufacturer
80-95	Country of Manufacture
96-111	Configuration
112-255	Not used

Note:  
Data is organized such that each field of data can be accessed by a page read (16 bytes).

### EEPROM slave address

BIT	7	6	5	4	3	2	1	0	
VALUE	1	0	1	0	0	A1	A0	R/W	

Note: Customers may specify to special order other data which they may require.

### Analogue Functions

Analogue status functions are provided by two PCF8591 4-channel 8-bit A/D converter devices. When these devices are read by the serial bus controller a single 8-bit word provides the following information:

Device: U208				Device: U215			
A/D	FUNCTION	A/D	FUNCTION	A/D	FUNCTION	A/D	FUNCTION
1	V1 voltage	3	V3 voltage	1	V1 current	3	V3 current
2	V2 voltage	4	not used	2	V2 current	4	not used

### Slave addresses

BIT	7	6	5	4	3	2	1	0	Device
VALUE	1	0	0	1	1	A1	A0	R/W	U208
VALUE	1	0	0	1	0	A1	A0	R/W	U215

The PCF8591 devices initially require a control byte (04 Hex) to be written to the configuration register. This control byte sets the device so that on each successive read the data from the next A/D is read. Note that on each read a conversion is started for a particular channel and the result will be read from the previous channel, thus the first result from a sequence of reads should always be discarded.

### A/D converter scaling

To obtain a correct voltage or current measurement it is necessary to employ both scaling and offset factors in the controlling software. Note that all voltage measurements are made inside the PSU module, before the 'ORing' diodes, and are typically 0.5V higher than the actual module output voltage. The following calculation should be employed:

Value = (byte read x scaling factor) + offset

Output Voltage	Scaling Factor	Tolerance	Output Measured
1.8V	0.012	±2%	V1, V2 Voltage
2.5V	0.0147	±2%	V2 Voltage Only
3.3V	0.015	±2%	V1, V2, V3 Voltage
5.0V	0.023	±2%	V1, V2, V3 Voltage
12.0V	0.0547	±2%	V1, V3 Voltage
1.8 to 5V	0.35	10%*	V1, V2 Current
12V	0.175	10%*	V1 Current (12V)
12V	0.05	10%*	V3 Current

### Temperature Measurement Functions

The internal temperature of the unit is measured using a MAX6633. This device provides a 12-bit measurement at a resolution of 0.0625°C.

### MAX6633 slave address

BIT	7	6	5	4	3	2	1	0	
VALUE	1	0	0	0	0	A1	A0	0	

Note: The MAX6633 must only be used in the READ mode.





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