PEC800-12-074xA

AC-DC CRPS Front-End Power Supply

PEC800-12-074xA is a 800 Watt, CRPS AC to DC power supply module with a +12 V main DC output and a +12 V standby output. The power supply operates as a single supply, or N+1 parallel configuration.
PEC800-12-074xA utilizes full digital control architecture for greater efficiency, control and functionality.
This power supply meets international safety standards and displays the CE-Mark for the European Low Voltage Directive (LVD).

Key Features & Benefits

- 80 PLUS Platinum Efficiency
- Input Voltage Range 90 – 264 VAC / 180 – 300 VDC
- Output Voltage 12 VDC (65 A)
- +12 VSB (2.1 A) Standby Output
- Output Power up to 800 W
- Intel Standard CRPS Form Factor
- Dimensions: 185 x 73.5 x 40 mm (7.28 x 2.89 x 1.57 in)
- High Power Density
- Meets 62368 and 60950
- Supports N+1 Redundancy, Cold Redundancy, Internal ORing
- Black Box Recorder, Bootloader
- Clockwise and Counter-Clockwise Fan Rotation
- Supports Power Management Bus Communication Protocol

Applications

- Networking Switches
- Servers & Routers
- Telecommunications

1. ORDERING INFORMATION

PEC	800	-	12	-	074	x	A
Product Family	**Power Level**	**Dash**	**V1 Output**	**Dash**	**Width**	**Airflow**	**Input**
PEC Front-Ends	800 W		12 V		73.5 mm	N: Normal R: Reverse	A: AC

2. INPUT

PARAMETER	DESCRIPTION / CONDITION	MIN	NOM	MAX	UNIT
Input Voltage Ranges*	AC Voltage Range	90	100-240	264	V_{RMS}
	Start-up		85 ± 5		VAC
	Power Off		75 ± 5		VAC
	HVDC (240 V)	180	240	300	VDC
	Start-up		170 ± 5		VDC
	Power Off		160 ± 5		VDC
AC Line Inrush Current				50	A_p
Input Frequency		47	50/60	63	Hz
Power Factor	230 VAC/50 Hz and 115 VAC/60 Hz, 10% load	0.85			
	230 VAC/50 Hz and 115 VAC/60 Hz, 20% load	0.95			
	230 VAC/50 Hz and 115 VAC/60 Hz, 50% load	0.96			
	230 VAC/50 Hz and 115 VAC/60 Hz, 100% load	0.99			
Current iTHD	200 VAC / 230 VAC & 50 Hz / 60 Hz, Output power ≥ 10%			20	%
	200 VAC / 230 VAC & 50 Hz / 60 Hz, Output power >20% & <30%			15	
	200 VAC / 230 VAC & 50 Hz / 60 Hz, Output power ≥ 30%			10	
	200 VAC / 230 VAC & 50 Hz / 60 Hz, Output power ≥ 50%			8	
	200 VAC / 230 VAC & 50 Hz / 60 Hz, Output power ≥ 100%			5	
Efficiency	@10% load (230 VAC / 60 Hz)	85			%
	@20% load (230 VAC / 60 Hz)	90			%
	@50% load (230 VAC / 60 Hz)	94			%
	@100% load (230 VAC / 60 Hz)	91			%
Hold-up Time	@ 100% of max loading	10			ms
12 V_{SB} Hold-up Time	@ 100% load	70			ms
AC Line Sag	0 to 1/2 AC cycle (nom AC voltage ranges, 50/60 Hz)		95		%
	> 1 AC cycle (nom AC voltage ranges, 50/60 Hz)	30			
AC Line Surge	Continuous (nom AC voltage ranges, 50/60 Hz)		10		%
	0 to 1/2 AC cycle (mid-point of nom VAC ranges, 50/60 Hz)		30		
AC Line Isolation	Primary to secondary, reinforced insulation	3000 4242			VAC VDC

* Note: The Brown IN/OUT Hysteresis min is 5 VAC.

1. Maximum input current at low input voltage range is measured at 90 VAC (meets 100-127 VAC), at max load (11 Arms)
2. Maximum input current at high input voltage range is measured at 180 VAC (meets 200-240 VAC), at max load (5.5 Arms)
3. 5.5 Arms maximum while input voltage is 180 VDC.at max load
4. AC Brown-in/out loading is 80% load (low line & high line)

2.1 AC INPUT CONNECTOR

The AC input connector is an IEC 320 C-14 power inlet. This inlet is rated for 10 A / 250 VAC.

3. OUTPUT

PARAMETER	DESCRIPTION / CONDITION	MIN	NOM	MAX	UNIT
Output Voltage	VDC adjusted to 12 VDC +/-0.05 VDC @ 50% load		12		VDC
Voltage Regulation Limits	± 5 %	+11.4	+12	+12.6	V_{RMS}
Max Continuous Output Power				800	W
Output Current		0		65	A
Load Regulation			± 3		%
Line Regulation			± 1		%
Overshoot / Undershoot			± 5		%
Transient Load	Δ Step Load Size *, 50% of Load Max			0.5	A/µs
Capacitive Loading		2200		20000	µF
Output Ripple & Noise	20 MHz BW			120	mVpp
+12V_{SB} OUTPUT					
+12 V_{SB} Output Voltage			+ 12		V_{SB}
Voltage Regulation Limits	± 5 %	+11.4	+12	+12.6	V_{RMS}
+12 V_{SB} Output Current		0		2.1	A
Load Regulation			± 3		%
Line Regulation			± 1		%
Overshoot / Undershoot			± 5		%
Transient Load	Δ Step Load Size = 1 A			0.5	A/µs
Capacitive Loading		100		3100	µF
Output Ripple & Noise	20 MHz BW			120	mVpp

* For dynamic condition +12 V min loading is 1 A

3.1 TIMING REQUIREMENTS

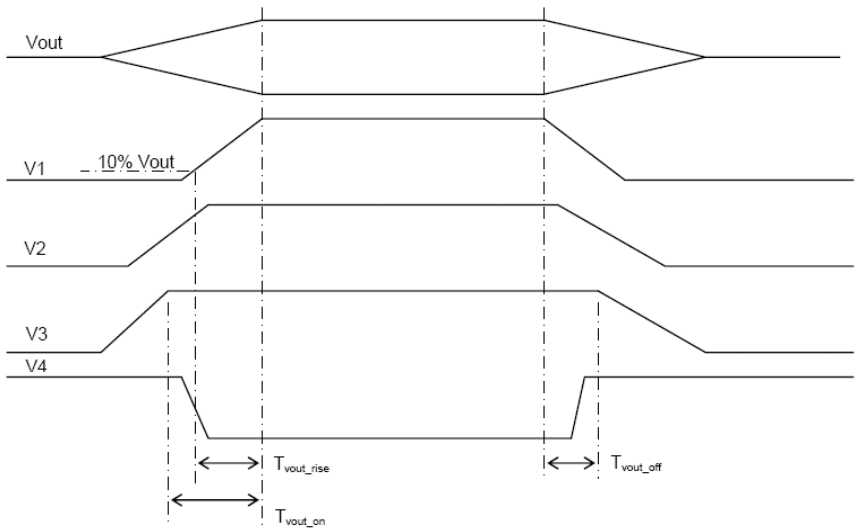

Figure 1. Signal Timing Sequence 1

Timing Values for Signal Timing Sequence 1:

ITEM	DESCRIPTION	MIN	MAX	UNITS
Tvout rise	Output voltage rise time from each main output.	5	70	ms
T12vsb rise	Ouput voltage rise time for the +12 V_{SB} output.	1	50	ms
Tvout_on	All main outputs must be within regulation of each other within this time.		50	ms
Tvout off	All main outputs must leave regulation within this time.		400	ms

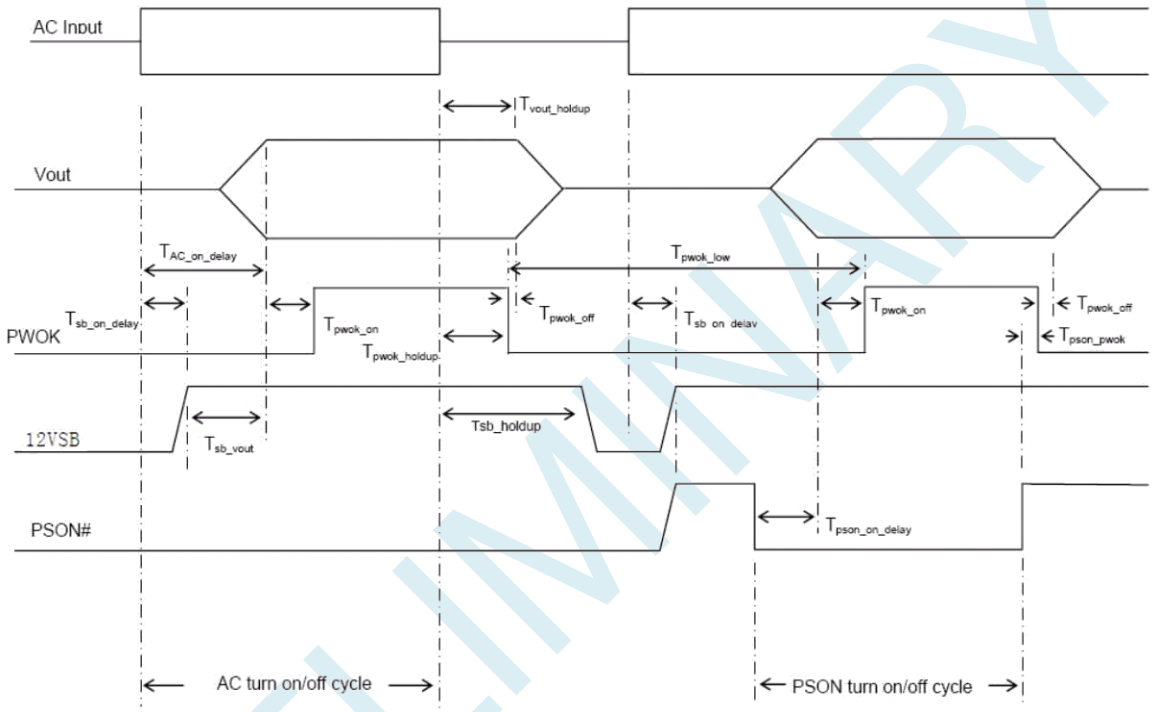

Figure 2. Signal Timing Sequence 2

Timing Values for Signal Timing Sequence 2:

ITEM	DESCRIPTION	MIN	MAX	UNITS
$T_{sb\_on\ delay}$	Delay from AC being applied to 12VSB being within regulation.		1500	ms
$T_{ac\_on\_delay}$	Delay from AC being applied to all output voltages being within regulation.		2500	ms
$T_{vout\ holdup}$	Time 12V output voltage dropping to regulation after loss of AC at 100% load condition.	11		ms
$T_{pwok\ holdup}$	Delay from loss of AC to desertion of PWOK at 100% load condition.	10		ms
$T_{pson\_on\_delay}$	Delay from PSON#active to output voltages within regulation limits.	5	400	ms
$T_{pson\ pwok}$	Delay from PSON# deactivate to PWOK being deserted.		5	ms
T_{pwok_on}	Delay from output voltages within regulation limits to PWOK asserted at turn on.	100	500	ms
$T_{pwok\ off}$	Delay from PWOK de-asserted to +12V dropping out of regulation limits.	1		ms
T_{pwok_low}	Duration of PWOK being in the deserted state during an off/on cycle using AC or the PSON# signal.	100		ms
T_{sb_vout}	Delay from 12 VSB being in regulation to O/Ps being in regulation at AC turn on.	50	2000	ms
$T_{12VSB\ holdup}$	Time the +12 VSB output voltage stays within regulation after loss of AC.	70		ms

4. PROTECTION

Protection circuits inside the power supply cause only the power supply's main outputs to shutdown. If the power supply latches off due to a protection circuit tripping, an AC cycle OFF for 15 sec and a PSON# cycle HIGH for 1 sec are able to reset the power supply.

PARAMETER	DESCRIPTION / CONDITION	MIN	NOM	MAX	UNIT
Slow Over Current Protection (OCP)	Shutdown and latch after MIN/MAX timing	20 ms Rating + 10 A		200 ms Rating + 18 A	
Slow OCW	Slow over current warning (SMBAlert#)	10 ms Rating + 6 A		15 ms Rating + 10 A	
OCPstby	Stby over current protection (shutdown, hiccup mode)	1 ms 2.5 A		100 ms 4.0 A	
Over Voltage Protection (OVP)	+12 V	13.3	14	14.5	V
	+12 V_{SB}	13.3	14	14.5	V
Over Temperature Protection (OTP)	Shutdown				
Short Circuit Protection (SCP)	Shut down and latch off				

4.1 OVERVOLTAGE PROTECTION (OVP)

The power supply over voltage protection will be locally sensed. The power supply will shutdown and latch off after an over voltage condition occurs. This latch will be cleared by toggling the PSON# signal or by an AC power interruption. The values are measured at the output of the power supply's connectors. The voltage should never exceed the maximum levels when measured at the power connectors of the power supply connector during any single point of fail. The voltage should never trip any lower than the minimum levels when measured at the power connector. 12 V_{SB} will be auto-recovered after removing OVP limit.

4.2 OVER TEMPERATURE PROTECTION (OTP)

The power supply will be protected against over temperature conditions caused by loss of fan cooling or excessive ambient temperature. In an OTP condition the PSU will shutdown. When the power supply temperature drops to within specified limits, the power supply will restore power automatically, while the 12 V_{SB} remains always on. The OTP circuit must have built in margin such that the power supply will not oscillate on and off due to temperature recovering condition. The OTP trip level shall have a minimum of 5°C of ambient temperature margin.

4.3 CURRENT LIMITATION (OCP)

The power supply has a current limit to prevent the outputs from exceeding the values shown in table above. If the current limits are exceeded the power supply shuts down and latches off. The latch will be cleared by toggling the PSON# signal or by an AC power interruption. The power supply will not be damaged from repeated power cycling in this condition. 12 V_{SB} will be auto-recovered after removing OCP limit.

4.4 SHORT CIRCUIT PROTECTION (SCP)

The power supply shuts down and latches off for shorting the main outputs. 12 V_{SB} must be capable of being shorted indefinitely. The latch will be cleared by toggling the PSON# signal or by an AC power interruption. The power supply should not be damaged from repeated power cycling in this condition. 12 V_{SB} will be auto-recovered after removing SCP limit.

4.5 OVER POWER PROTECTION (OPP)

The power supply supports over power protection (OPP) level low enough to protect the power supply running in this mode for repeated 1 msec durations at a 1% duty cycle. The power supply should be stable operating at any load point from rated power up to the OPP point.

CRPS-185 Load Requirement for OPP Threshold = (Imax + 49 A) +/-50 W
SMBAlert shall always assert ahead of the OPP threshold being exceeded

4.6 CLOSED LOOP SYSTEM THROTTLING (CLST)

The power supply will always assert the SMBAlert# signal whenever temperature-monitored component in the power supply reaches a warning threshold. Upon reduction of the load within 2msec after the SMBAlert# signal is asserted if the load is reduced to less than the power supply rating; the power supply will continue to operate and not shutdown.

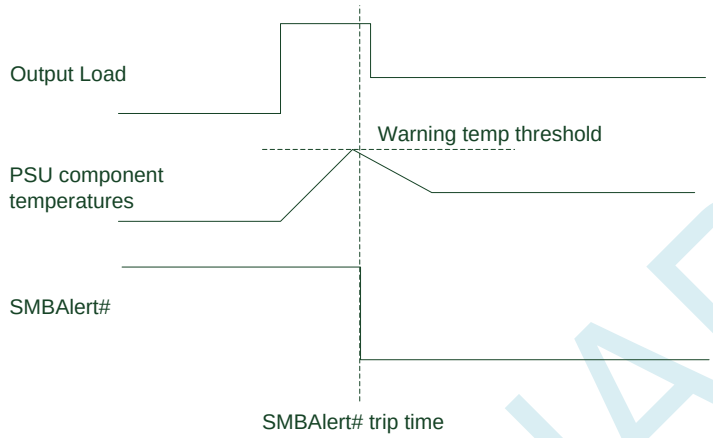

Figure 3. CLST Timing Requirements

4.7 SMART RIDE-THROUGH (SmaRT)

The power supply will assert the SMBAlert# signal < 4 msec after AC input voltage is lost to 0 VAC.

5. ELECTROMAGNETIC COMPATIBILITY

5.1 IMMUNITY

The power supply shall comply with EN55024.

PARAMETER	DESCRIPTION / CONDITION	CRITERION
Electrostatic Discharge	IEC / EN 61000-4-2	B
Radiated Immunity	IEC / EN 61000-4-3	A
Fast Transient / Burst	IEC / EN 61000-4-4	B
Surge Immunity	IEC / EN 61000-4-5 (Line to Earth: 4 kV; Line to Line: 2 kV)	A
Conducted Susceptibility	IEC / EN 61000-4-6	A
Power Frequency Magnetic Field	EN 61000-4-8	
Voltage Dips and Interruptions	IEC / EN 61000-4-11	

5.2 EMISSION

PARAMETER	DESCRIPTION / CONDITION	CRITERION
Conducted & Radiated Emissions	EN 55022 / CISPR 22	Class A 6 dB margin
Voltage Fluctuation and Flicker	IEC 61000-3-3	Class A
Acoustical Noise	Variable speed fan(s) incorporated	TBD dBA

6. SAFETY / APPROVALS

PARAMETER	DESCRIPTION / CONDITION
Agency Approvals	• UL/CSA 60950-1 + UL/CSA 62368-1 (USA/Canada) • EN60950-1 + EN62368-1 (Europe) • IEC60950-1 + IEC62368-1 (International) • CB Certificate & Report, IEC60950-1 (Report to include all country national deviations) • CB Certificate & Report, IEC62368-1 (Report to include all country national deviations)) • CE – Low Voltage Directive 2006/95/EC (Europe) • Nordics -EMKO-TSE (74-SEC) 207/94 • GB4943- CNCA Certification (China)
Leakage Current	Max. 3.5 mA at 264 VAC, 60 Hz

7. ENVIRONMENTAL

PARAMETER	DESCRIPTION / CONDITION	MIN	NOM	MAX	UNIT
Ambient Temperature	Operating	0		+55	°C
	Non-Operating	-40		+70	
Humidity	Operating, relative (non-condensing)	5		85	%
	Non-Operating, relative (non-condensing)	5		95	
Altitude	Operating	0		5 000	m
	Non-Operating	0		15200	m
Mechanical Shock (non-operating)	50 G Trapezoidal Wave, Velocity change = 170 in. / sec				
Vibration (non-operating) sinusoidal	1.5G, pk-pk, 10 Hz-500 Hz–10 Hz, 0.5 octave/min; 2 sweeps per axis				
Vibration, (non-operating) random	2 Grms, 10 Hz-500 Hz, 60 mins per axis				
Thermal Shock (non-operating)	50 cycles, 30°C/min. ≧ transition time ≧ 15°C/min	-40		+70	°C

8. RELIABILITY

PARAMETER	DESCRIPTION / CONDITION	MIN	NOM	MAX	UNIT
Mean time between failures (MTBF)	T_A = 25°C, 100% load, according Telcordia SR-332	200			kh

9. MECHANICAL

PARAMETER	DESCRIPTION / CONDITION	MIN	NOM	MAX	UNIT
Dimensions (W x H x L)			73.5 x 40.0 x 185		mm
			2.89 x 1.57 x 7.28		in
Weight			740		g

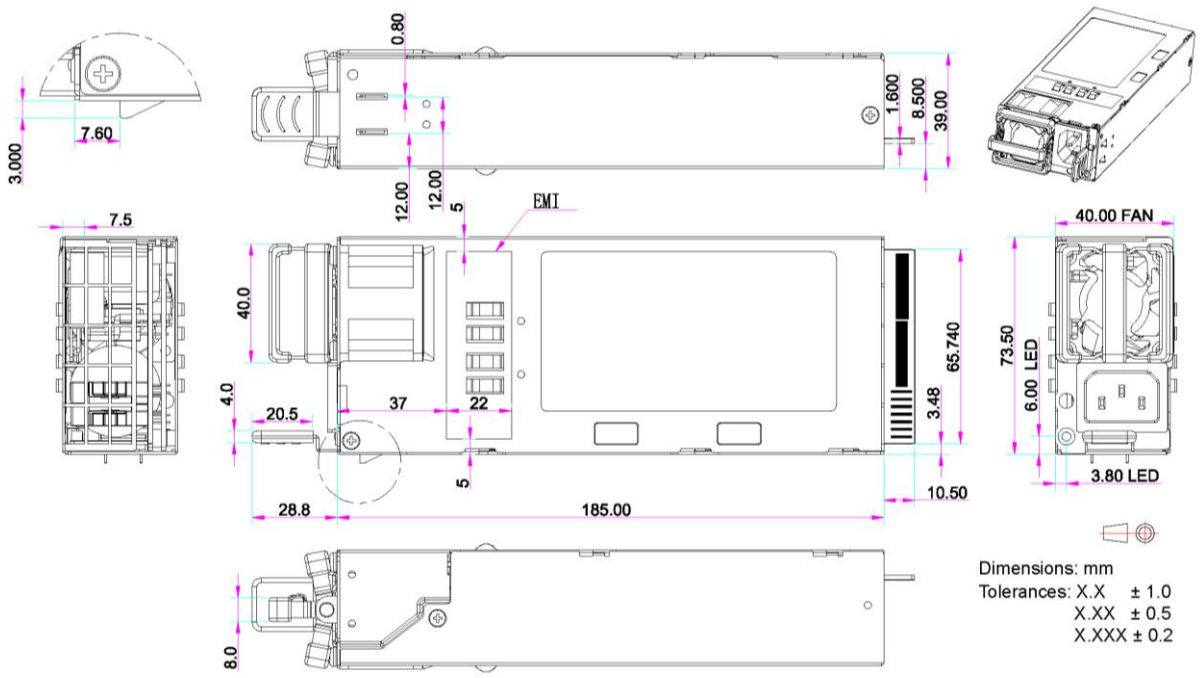

Figure 4. Mechanical Drawing

9.1 AIRFLOW DIRECTION

The normal airflow direction is from the card edge connector side to the AC inlet side of the power supply.

9.2 HANDLE RETENTION

The power supply has a handle to assist extraction. The module can be able to be inserted and extracted without the assistance of tools. The power supply has a latch which retains the power supply into the system and prevents the power supply from being inserted or extracted from the system when the AC power cord is pulled into the power supply.
The handle protects the operator from any burn hazard through the use of the Customer Corporation Industrial designed plastic handle.

9.3 LED MARKING AND IDENTIFICATION

The power supply has a single bi-colored LED for indication of the power supply status. Green & Amber.

POWER SUPPLY CONDITION	LED STATE
Output ON and OK	GREEN
No AC power to all power supplies	OFF
AC present / Only 12VSB on (PS off) or PS in Smart on state	1Hz Blink GREEN
AC cord unplugged or AC power lost; with a second power supply in parallel still with AC input power.	AMBER
Power supply warning events where the power supply continues to operate; high temp, high power, high current, slow fan.	1Hz Blink Amber
Power supply critical event causing a shutdown; failure, OCP, OVP, Fan Fail	AMBER
Power supply FW updating	2Hz Blink GREEN

10. CONNECTORS

10.1 DC OUTPUT CONNECTOR PIN LOCATIONS

The power supply uses a card edge output connection for power and signal that is compatible with a 2x25 Power Card Edge connector (equivalent to 2x25 pin configuration of the FCI power card connector 10035388102LF).

PIN-OUT	DEFINITION	PIN-OUT	DEFINITION
A1-9	GND	B1-9	GND
A10-18	+12V	B10-18	+12V
A19	Power Management Bus SDA	B19	A0 (SMBus address)
A20	Power Management Bus SCL	B20	A1 (SMBus address)
A21	PSON	B21	+12VSB
A22	SMBAlert#	B22	SMART_ON
A23	Return Sense (Remote sense-)	B23	+12V Load Share Bus
A24	+12V Remote Sense (Remote sense+)	B24	PRESENT# (Reserved)
A25	PWOK	B25	NC

Note: B25 is optional signal for PS_KILL or Vin_good;

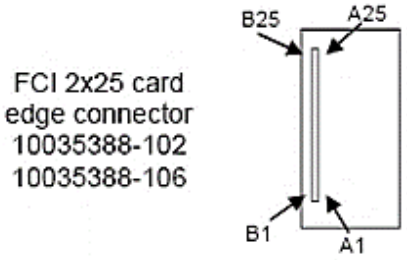

Figure 5. Back DC output golden finger port