

## CP2000AC48TEZ-FB Compact Power Line High Efficiency Rectifier

Input: 100-120/220-240 Vac; Output: 2250W @ 48Vdc; 5 Vdc @ 4W



### Applications

- Wide band power amplifiers

### Features

- Efficiency 95%
- Compact 1RU form factor providing 30 W/in<sup>3</sup>
- 2250W @ 52V from nominal 220 – 240Vac
- 1200W from nominal 100 – 120Vac (for  $V_o > 42Vdc$ )
- Output voltage programmable from 18V – 53Vdc
- PMBus compliant dual I<sup>2</sup>C and RS485 serial busses
- Power factor correction (meets EN/IEC 61000-3-2 and EN 60555-2 requirements)
- Output overvoltage and overload protection
- AC Input overvoltage and undervoltage protection
- Over-temperature warning and protection
- Redundant, parallel operation with active load sharing
- Redundant +5V Aux power
- Remote ON/OFF
- Hot insertion/removal (hot plug)
- Four front panel LED indicators
- UL\* Recognized to UL60950-1, CAN/ CSA† C22.2 No. 60950-1, and VDE‡ 0805-1 Licensed to IEC60950-1
- CE mark meets 2006/95/EC directive§
- Internally controlled Variable-speed fan
- RoHS 6 compliant
- Special Foldback Curve

### Description

The CP2000AC48TEZ-FB Rectifier has an extremely wide programmable output voltage capability and fold-back current limiting features. High-density front-to-back airflow is designed for minimal space utilization and is highly expandable for future growth. This custom rectifier incorporates both RS485 and dual-redundant I<sup>2</sup>C communications busses that allow it to be used in a broad range of applications. Feature set flexibility makes this rectifier an excellent choice for a set of applications requiring operation over a wide output voltage range.

\* UL is a registered trademark of Underwriters Laboratories, Inc.

† CSA is a registered trademark of Canadian Standards Association.

‡ VDE is a trademark of Verband Deutscher Elektrotechniker e.V.

§ This product is intended for integration into end-user equipment. All the required procedures for CE marking of end-user equipment should be followed. (The CE mark is placed on selected products.)

\*\* ISO is a registered trademark of the International Organization of Standards.



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Electrical Specifications

Input					
Parameter	Min	Typ	Max	Units	Notes
Startup Input Voltage Low-line Operation High-line Operation			90 200		
Operating Voltage Range Low-line Configuration High-line Configuration	90 200	100, 110, 120 220 - 240	140 265	Vac	
Surges (no damage)	305				
Input Frequency	47		66	Hz	
Input Current			12 13.5	A	At 110 Vac At 240 Vac
Inrush Transient		25	30	Apk	Measured at 25°C for all line conditions; does not include X-Capacitors charging.
Input Leakage Current		2.5	3.5	mA	Measured at 265Vac, 60Hz
Power Factor	0.96	0.98			From 50% to 100% (2250W @ HL, 1200W @ LL). load
Efficiency <sup>1</sup>	20 - 90% of FL	93	95	%	With or'ing function, aux 5V output, dual/redundant I <sup>2</sup> C and RS485 communications and POE isolation >20% load Test condition: input; 240Vac, 60hz, output; 52Vdc
	>38V	85		%	
Holdup		20		ms	48Vdc, Measurement starts at zero crossing of the ac voltage, and voltage decayed to 40V. ← For loads below 1200W.
		30			
Ride thru	1/2	1		cycle	Tested at nominal 115V and 230V . Complies to CISPR24 standards
Power Fail Warning <sup>2</sup>	3	5		ms	Alarm issued via PFW signal going LO 5 ms prior to the main output decaying below 40Vdc.

Main Output					
Parameter	Min	Typ	Max	Units	Notes
Output Power	1200 2250			W	Above 52Vdc from nominal 90-120Vac upto 55°C. Above 52Vdc from nominal 200-265Vac upto 55°C
Default Set point		48		Vdc	Output floats with respect to frame ground.
Overall Regulation <sup>3</sup>	-1 -2		+1 +2	%	0 - 45C, minimum load 2.5A > 45C
Output Voltage Set Range	18		53	Vdc	Analog margining and RS485
	18		53	Vdc	Set by I <sup>2</sup> C
Output current	1		23	A	1200W @ 52V @ 90-120Vac. 2250W @ 52V @ 200-240Vac. 2000W @ 48V @ 200 - 240Vac
	1		43.3		
	1		41.7		

<sup>1</sup> At 52Vdc, 240Vrms and 25°C.

<sup>2</sup> Internal protection circuits may override the PFW signal and may trigger an immediate shutdown.

<sup>3</sup> Includes all variations due to specified load range, drift, and environmental conditions.

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## Electrical Specifications (continued)

Main Output (continued)																																																																																				
Parameter		Min	Typ	Max	Units	Notes																																																																														
Current Share	$V_o > 42V$ $V_o < 42V$	-5 -10		5 10	%FL	Compared to the average output current delivered by a set of Rectifiers. Loads > 50% FL																																																																														
Output Ripple			60	100	mVrms	Measured with 20MHz bandwidth under any condition of loading. Minimum load is 1A.																																																																														
				500	mVp-p																																																																															
External Bulk Load Capacitance		0		5,000	$\mu F$	External capacitance can be increased but the rectifier will not meet its turn-ON rise time requirement.																																																																														
Turn-On Delay			5		s	Monotonic Turn_On from 30% to 100% of Vnom above -5°C operation. Monotonic Turn_On from 60% to 100% of Vnom below -5°C operation.																																																																														
Rise Time - Standard (PMBus)			100		ms																																																																															
Overshoot -Telecom (RS-485) <sup>4</sup>			5	2	%																																																																															
Load Step Response				50	%FL	$\Delta I/\Delta t$ slew rate 1A/ $\mu s$ . Settling time to within regulation requirements. Minimum load of 2.5 amperes required.																																																																														
$\Delta I$			2.0		Vdc																																																																															
Response Time			2		ms																																																																															
Power Limit - high line		2250			W																																																																															
	Power limit - low line	1200			W																																																																															
The overload current limit threshold should be set $\cong$ 5% above the load envelope shown here																																																																																				
Permissible Load Boundary	<table border="1"> <thead> <tr> <th>Vset</th> <th>Amps</th> </tr> </thead> <tbody> <tr><td>18</td><td>0</td></tr> <tr><td>18</td><td>20.7</td></tr> <tr><td>19</td><td>22.4944</td></tr> <tr><td>20</td><td>24.2889</td></tr> <tr><td>21</td><td>26.0833</td></tr> <tr><td>22</td><td>27.8778</td></tr> <tr><td>23</td><td>29.6722</td></tr> <tr><td>24</td><td>31.4667</td></tr> <tr><td>25</td><td>33.2611</td></tr> <tr><td>26</td><td>35.0556</td></tr> <tr><td>27</td><td>36.85</td></tr> <tr><td>28</td><td>38.6444</td></tr> <tr><td>29</td><td>40.4389</td></tr> <tr><td>30</td><td>42.2333</td></tr> <tr><td>31</td><td>42.8315</td></tr> <tr><td>32</td><td>43.4296</td></tr> <tr><td>33</td><td>44.028</td></tr> <tr><td>34</td><td>44.626</td></tr> <tr><td>35</td><td>45.224</td></tr> <tr><td>36</td><td>45.82</td></tr> <tr><td>37</td><td>46.42</td></tr> <tr><td>38</td><td>46.87</td></tr> <tr><td>39</td><td>46.87</td></tr> <tr><td>40</td><td>46.87</td></tr> <tr><td>41</td><td>46.87</td></tr> <tr><td>42</td><td>46.87</td></tr> <tr><td>43</td><td>46.87</td></tr> <tr><td>44</td><td>46.87</td></tr> <tr><td>45</td><td>46.87</td></tr> <tr><td>46</td><td>46.87</td></tr> <tr><td>47</td><td>46.87</td></tr> <tr><td>48</td><td>46.87</td></tr> <tr><td>49</td><td>45.92</td></tr> <tr><td>50</td><td>45</td></tr> <tr><td>51</td><td>44.12</td></tr> <tr><td>52</td><td>43.27</td></tr> <tr><td>53</td><td>42.35</td></tr> <tr><td>53</td><td>0</td></tr> </tbody> </table>						Vset	Amps	18	0	18	20.7	19	22.4944	20	24.2889	21	26.0833	22	27.8778	23	29.6722	24	31.4667	25	33.2611	26	35.0556	27	36.85	28	38.6444	29	40.4389	30	42.2333	31	42.8315	32	43.4296	33	44.028	34	44.626	35	45.224	36	45.82	37	46.42	38	46.87	39	46.87	40	46.87	41	46.87	42	46.87	43	46.87	44	46.87	45	46.87	46	46.87	47	46.87	48	46.87	49	45.92	50	45	51	44.12	52	43.27	53	42.35	53	0
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System Power Up	Contract terms are for supporting all loads inside the load map. The customer will develop a control interface which maintains the operating voltage and current so as to not exceed the load map.																																																																																			
	Units should be able to be plugged in one at a time and guarantee system start up. Units should stay in current limit for approximately 20 seconds to guarantee restart.																																																																																			

<sup>4</sup> Below -5°C, the rise time is approximately 5 minutes to protect the bulk capacitors.

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