

NCU120 Series – Integrated DIN Rail Single phase / DC input switching power supply, Battery Charger / DC UPS

■ **Main Features:**

- Input: 120...240Vac
- Output: 12 or 24Vdc model dependent
- For lead acid batteries up to 50Ah
- Efficiency up to 86%
- Economic solution for general purpose applications



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READ THIS CAREFULLY BEFORE INSTALLATION!	LEGGERE ATTENTAMENTE PRIMA DELL'INSTALLAZIONE!	A LIRE ATTENTIVEMENT AVANT L'INSTALLATION!
<p>Before operating, read this document thoroughly and retain it for future reference.</p> <p>Non-respect of these instructions may reduce performances and safety of the devices and cause danger for people and property.</p> <p>The products must be installed, operated, serviced and maintained by qualified personnel in compliance with applicable standards and regulations.</p> <p>Don't open the device, it does not contain replaceable components, the tripping of the internal fuse (if included) is caused by an internal failure.</p> <p>Don't repair or modify the device, if malfunction or failure should occur during operation, send unit to the factory for inspection. No responsibility is assumed by TDK-Lambda Switzerland SA for any consequences deriving from the use of this material.</p>	<p>Prima dell'installazione, leggere attentamente questo documento istruzioni e conservarlo per future consultazioni.</p> <p>L'inosservanza delle presenti istruzioni può compromettere le caratteristiche e la sicurezza dell'apparecchio e causare pericolo per le persone e le cose.</p> <p>Il prodotto deve essere installato, utilizzato e riparato da personale qualificato e nel rispetto delle normative vigenti.</p> <p>Non aprire il prodotto, esso non contiene componenti sostituibili, il guasto del fusibile interno (se previsto) è causato da un guasto interno. Non tentare di riparare o modificare il prodotto, se durante il funzionamento si verificano guasti o anomalie, inviarlo al produttore per il controllo.</p> <p>TDK-Lambda Switzerland SA non si assume nessuna responsabilità per qualunque conseguenza derivante dall'uso di questo materiale.</p>	<p>Lire ces instructions avant l'installation, conserver ce manuel pour référence future.</p> <p>Défaut de se conformer à ces instructions peut affecter les caractéristiques et la sécurité du dispositif, et causer du danger aux personnes ou aux biens.</p> <p>Les produits doivent être installés, exploités et entretenus par du personnel qualifié et en conformité avec les règlements.</p> <p>N'ouvrez pas le produit, il ne contient aucune pièce réparable, le déclenchement du fusible interne (le cas échéant) est causé par un défaut interne. Ne pas essayer de réparer ou modifier le produit; si des défaillances se produisent pendant le fonctionnement, retourner le produit au fabricant pour inspection. TDK-Lambda Switzerland SA n'assume aucune responsabilité des conséquences éventuelles découlant de l'utilisation des produits.</p>
<b>CAUTION</b>	<b>ATTENZIONE</b>	<b>AVERTISSEMENT</b>
<p><b>RISK OF BURNS, EXPLOSION, FIRE, ELECTRICAL SHOCK, PERSONAL INJURY.</b></p> <p>Never carry out work on live parts! Danger of fatal injury! The product's enclosure may be hot, allow time for cooling product before touching it. Do not allow liquids or foreign objects to enter into the products.</p> <p>To avoid sparks, do not connect or disconnect the device before having previously turned-off input power and wait for internal capacitors discharge (minimum 1 minute).</p>	<p><b>RISCHIO USTIONI, ESPLOSIONE, INCENDIO, SCOSSA, LESIONI GRAVI.</b></p> <p>Non effettuare mai operazioni sulle parti sotto tensione! Pericolo di lesioni letali! Il contenitore può scottare, lasciar quindi raffreddare il dispositivo prima di toccarlo. Non far entrare liquidi o oggetti estranei nel dispositivo.</p> <p>Per evitare scintille, non collegare o scollegare l'apparecchiatura prima di avere tolto tensione di ingresso e prima che sia avvenuta la scarica dei condensatori interni (min. 1 minuto).</p>	<p><b>RISQUE DE BRULURES, EXPLOSION, INCENDIE, ELECTROCUTION, DOMMAGE AUX PERSONNES.</b></p> <p>Ne jamais effectuer des opérations sur les parties sous tension! Danger de mort! Le boîtier peut produire des brûlures, le laisser refroidir avant de toucher l'appareil. Ne faire pas pénétrer des liquides ou des corps étrangers dans l'appareil. Pour éviter des étincelles, ne pas connecter ou déconnecter l'équipement jusqu'à ce que la tension d'entrée a été supprimée et avant qu'il n'ait eut lieu la décharge des condensateurs internes (minimum 1 minute).</p>
<b>INTENDED USE</b>	<b>USO PREVISTO</b>	<b>UTILISATION</b>
<p>These are isolated devices suitable for SELV and PELV circuitry and are designed to be mounted on DIN rail and installed inside a protective enclosure. They are intended for general use such as in industrial control, communication, and instrumentation equipment.</p> <p>Don't use these devices in applications where malfunction may cause injury or death.</p>	<p>I dispositivi sono isolati, adatti per applicazioni SELV e PELV, sono dotati di aggancio per il montaggio su guida DIN all'interno di quadri elettrici o contenitori di protezione, per l'utilizzo con controllori industriali, unità di comunicazione o apparecchi di misura.</p> <p>Non utilizzare in applicazioni in cui un eventuale guasto può comportare rischio di lesioni o di morte.</p>	<p>Les produits sont isolés, appropriés pour les circuits TBTS et TBTP et sont équipés d'un crochet pour montage sur rail DIN dans des armoires ou conteneurs de protection, pour utilisation avec les contrôleurs industriels, des modules de communication ou des unités de mesure.</p> <p>Ne pas utiliser ces dispositifs dans une application où un dysfonctionnement pourrait entraîner le risque des blessures ou de mort.</p>
<b>ENVIRONMENTAL CHARACTERISTICS</b>	<b>CARATTERISTICHE AMBIENTALI</b>	<b>CARACTÉRISTIQUES ENVIRONNEMENTALES</b>
<p>Installation in a Pollution Degree 2 environment, Overvoltage Category I, according to IEC60664-1.</p> <p>Do not use in wet area or subject to moisture.</p> <p>Carefully recycle the product and related batteries according to local regulations.</p> <p><b>Radio interference!</b> This is an electrical appliance according to EN55032, class A. It may cause radio interference in residential areas.</p>	<p>Usare in ambienti con Grado di Inquinamento 2 e Categoria di Sovratensione I, secondo IEC60664-1.</p> <p>Non far funzionare l'apparecchio in un ambiente umido o soggetto a formazione di condensa. Riciclare il prodotto e le batterie collegate, nel rispetto delle normative locali vigenti.</p> <p><b>Interferenza radio!</b> Questo apparecchio è un dispositivo di classe A secondo lo standard EN55032. Può causare interferenze radio nelle aree residenziali.</p>	<p>Utiliser les produits dans des environnements avec degré de pollution 2, catégorie de surtension I selon IECN60664-1.</p> <p>Ne pas employer l'appareil dans un environnement humide ou soumis à la condensation. Recycler les produits et les batteries, conformément à la réglementation locale.</p> <p><b>Perturbations radioélectriques!</b> Cet appareil est un dispositif de catégorie A selon le standard EN55032. Il peut causer des perturbations radioélectriques dans les zones résidentielles.</p>

DECLARATION OF CONFORMITY				
	<p><b>TDK-LAMBDA SWITZERLAND SA</b> Via Luserte Sud 6, 6572 Quartino - Switzerland Phone: +41-(0)91 840 14 46 / 840 14 48; Fax: +41-(0)91 840 14 47 E-mail: <a href="mailto:TLN.info@tdk.com">TLN.info@tdk.com</a></p>			
<p>This Declaration of Conformity is suitable to the European Standard EN45014 "General criteria for supplier's declaration of conformity". We declare under our sole responsibility that the device included in this box, has passed all processing inspections and the final test and it is in conformity with the product requirements, including all reference codes and supply specifications.</p>				
<p><b>ROHS compliance:</b> the product respects the EC requirements related to ROHS substances, according to "Restriction of Hazardous Substances" as per document 2011/65/UE <b>REACH compliance:</b> the product respects the EC requirements related to REACH SVHC directive (EC) 1907/2006 <b>Note:</b> all the reported information comes from our suppliers, TDK-LAMBDA SWITZERLAND SA has not run any test to evaluate if the specific elements are present.</p>				
<p>All indicated devices are designed according to the latest Reference standards, if not expressly indicated through the official documents or files, they have been tested through our internal pre-compliance testing. Consult directly on <a href="http://www.nextys.com">www.nextys.com</a> the reference standards applied to each model.</p>				
<b>Code</b>	<b>Description</b>			
NCU120-12	Single phase switching power supply with integrated UPS function IN 120 - 240Vac (110 - 345Vdc) / OUT 12Vdc 7.0A			
NCU120-24	Single phase switching power supply with integrated UPS function IN 120 - 240Vac (110 - 345Vdc) / OUT 24Vdc 5.0A			
<b>Certifications and approvals</b>				
<b>Reference standards</b>	<p>2014/35/EU (2014) 2014/30/EU (2014) EN61010-1 EN61010-2-201 UL508 EN61000-6-2 EN61000-6-3</p>	<p>(Low Voltage Directive) (EMC directive) (Safety Standard) (Safety Standard) (Certified - IND. CONT. EQ. 4WX9 file no. E356563) (Generic immunity standard for industrial environments) (Generic emission standard for residential environments)</p>		

**USER INSTRUCTIONS**

<p><b>1) Description:</b> DIN rail mountable primary switched-mode power supply with 100...264Vac (110...345Vdc) input, suitable for Single phase main line and DC line.</p> <p><b>Functions:</b></p> <ul style="list-style-type: none"> <li>• <b>Power supply:</b> these units can be used as standard power supplies with 12-15V/7A (-12 model) and 24V/5A (-24 model) output rating.</li> <li>• <b>Battery charger:</b> for a proper charging the output voltage of the power supply has to be adjusted at ~14V (-12 model) and at ~27V (-24 model). The charging current regulator limits the charging current to ~0.8A.</li> <li>• <b>DC UPS function:</b> in case of the power supply incapacity of supplying the load (mains failure or unit failure) the load will continue to receive power from the battery without ANY interruption, until the mains recovers or the battery reaches the "Deep Discharge Voltage" threshold (10.5V for -12 Version and 20.5V for -24 Version).</li> <li>• <b>Deep discharge protection:</b> disconnects the battery from the load when its voltage is lower than 10.5V (-12 Version) or 20.5V (-24 Version). The higher the charging current the higher the temperature of the battery, therefore the battery life increases if deep discharge is avoided (the battery life depends also by the numbers of the charge/discharge cycles, their durations and by other various factors).</li> <li>• <b>Battery reverse polarity protection:</b> in case of reverse connection of the battery the resettable fuse will trip and protect all circuitry.</li> <li>• <b>Auto-resetting short circuit protection:</b> connected in series to the line fed by the battery (the power supply output is actively protected against short circuit and overload).</li> </ul> <p><b>Status signals:</b> a green LED, a red LED and a dry SPST contact displays the working status of the product, indicating "Load on Power Supply" or "Load on Battery".</p>
<p><b>2) Installation:</b> use DIN-rails according to EN60715. Installation should be made vertically (see Fig.4). For better device stability fix the rail to the wall close to the point where the device is to be mounted. In order to guarantee sufficient convection, we recommend observing a minimum distance to other modules (see Fig.3). The device is provided with a thermal protection; a limited air flow can cause the thermal protection tripping. The SMPS automatically restarts after cooling. To get normal operation reduce the temperature of the air surrounding the power supply, increase the ventilation or reduce the load (see Fig.8).</p>
<p><b>3) Connections:</b> the device is equipped with pluggable screw terminals. To avoid sparks, do not connect or disconnect the connectors before having previously turned-off input power and waited for internal capacitors discharge (minimum 1 minute). In order to comply with UL certification, use appropriate copper cables of indicated cross section, designed for an operating temperatures of: 60°C for ambient up to 45°C 75°C for ambient up to 60°C 90°C for ambient up to 70°C Strip the connecting ends of the wires according to the indication and ensure that all strands of a stranded wire enter the terminal connection (see Fig.5).</p>
<p><b>4) Input protection:</b> the device input is provided with varistors against overvoltage. Input is provided with internal fuses 3.15AT/250Vac, thus an external short circuit/overcurrent protection must be provided by the end user (see Fig.6). For operation on a single-phase system, a protection fuse on the phase must be provided. <b>Surge protection:</b> it is strongly recommended to provide external surge arresters (SPD) according to local regulations.</p>
<p><b>5) AC input connection:</b> the device can be connected to single-phase AC lines with <math>U_{in}</math> 120...240Vac (see Fig.7). Please connect first the PE.</p>
<p><b>6) DC input connection:</b> connect L terminal to (+) positive pole, N terminal to (-) negative pole and <math>\ominus</math> terminal to GND. Rated voltage 110...345Vdc. The device is also suitable for photovoltaic or wind turbine applications (see Fig.7).</p>
<p><b>7) Output connection:</b> the device is suitable for SELV and PELV circuitry. <math>U_{out}</math> can be adjusted with a potentiometer to a wide range (see Fig.1). Check <math>U_{out}</math> before connecting the power supply to the load. With output voltage set to the max. value, the continuous [current x voltage] must not exceed the nominal power.</p>
<p><b>8) Parallel connection and redundancy:</b> not recommended. For redundant connection, use an external isolating device must be used (see accessory device).</p>
<p><b>9) Output protection:</b> the device is protected against overload (OL) / short circuit (SC) / overvoltage (OV) / overtemperature (OT). <b>OL and SC:</b> are controlled by a hiccup mode auto-reset protection with the following behaviour: <b>OL behaviour:</b> Max. <math>OL = I_n \times 1.5</math> with constant output voltage. If the current is <math>\geq I_n \times 1.5</math> the unit enters the OL protection and starts an ON/OFF cycle (hiccup mode). <b>SC behaviour:</b> the device supplies the indicated short circuit peak current for 50ms if the output current exceeds <math>I_n \times 1.5</math> the device enters into a controlled ON/OFF cycles (hiccup mode). The output voltage drops to a voltage value depending on the impedance of the failed load circuit. <b>Output OV circuit protection:</b> the output is protected against potential OV due to internal malfunction or coming from the load for <math>U_{out} \geq U_{nom} \times 1.2 - 1.3</math>, depending on the model. <b>OT protection:</b> turns off the device if the internal temperature exceeds a safe limit. The device restarts automatically after cooling down. To recover to normal operation reduce air temperature surrounding the power supply, increase cooling or reduce load (see Fig.8).</p>
<p><b>10) Feeding DC motors:</b> it is possible to feed DC motors considering that when a motor starts-up under effort its consumption is much higher than the nominal current and it can trigger overcurrent protection (see accessory device). <b>NOTE:</b> motors can generate high conducted noise on the DC line. Therefore it is not recommended to feed on the same line motors and equipment sensitive to noise.</p>
<p><b>11) NOTES:</b></p> <ul style="list-style-type: none"> <li>• The total current sunk by the load and by the battery during the max. current required by the charging process (0.8A), must not exceed 7A (-12 Version), 5A (-24 Version) continuous, thus the max. continuous load must be 6.2A (-12 Version)/ 4.2A (-24 Version).</li> <li>• The charging time of the battery depends on its capacity in Ah, on its charge level, on ambient temperature, on the efficiency status of the battery, its age, on the charging voltage of the device (recommended: 14.4V for -12 version, 27.5V for -24 version).</li> <li>• Normally the charging current of lead batteries must not exceed 10% of rated Ah. Higher charging current reduces battery life, too low charging current leads to a longer charging time and incomplete charge.</li> <li>• Lead batteries in normal charge conditions and efficiency have a good self regulating capacity on charging current, independently from the current supplied by the charger.</li> <li>• To calculate the duration of voltage/current that a battery can supply, refer to the data sheet of the battery. Basically the Ah that a lead battery can supply depends on its efficiency status, on the charge level and other factors such as T ambient (low ambient temperatures reduces the capacity of the battery) ageing reduces the capacity of the battery.</li> </ul> <p><b>Check the correct parameters charging, discharging, life time and other on the datasheet of the battery used for a proper using.</b></p>

Fig.1 Connections	Fig.2 Dimensions	Fig.3 Distances														
<p>Just for reference</p>	<p>(1) AC/DC input                  (2) DC output (load)                  (3) Battery connection                  (4) Diagnostic Output dry contact                  NC load supplied by Power S.                  NO load supplied by Battery                  (5) Green LED: Output on Power S.                  (6) Red LED: output on Battery                  (7) Output voltage adjustment</p> <p>Input AC Line:</p> <ul style="list-style-type: none"> <li>L = Line</li> <li>N = Neutral</li> <li>⊕ = earth ground</li> </ul> <p>Input DC Line:</p> <ul style="list-style-type: none"> <li>L = + Positive DC</li> <li>N = - Negative DC</li> <li>⊕ = earth ground</li> </ul> <p>Output:</p> <ul style="list-style-type: none"> <li>LOAD += Positive DC</li> <li>LOAD -= Negative DC</li> <li>BATT += Positive DC Battery</li> <li>BATT -= Negative DC Battery</li> <li>Dry contact = NC</li> <li>Dry contact = NO</li> </ul>	<table border="1" data-bbox="798 649 1085 761"> <thead> <tr> <th>Dimension</th> <th>mm (inc)</th> </tr> </thead> <tbody> <tr> <td>W</td> <td>54.0 (2.16)</td> </tr> <tr> <td>D</td> <td>110.0 (4.33)</td> </tr> <tr> <td>H</td> <td>115.0 (4.52)</td> </tr> </tbody> </table> <table border="1" data-bbox="1117 649 1484 739"> <thead> <tr> <th>Distance</th> <th>mm (inch)</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>20 (0.8)</td> </tr> <tr> <td>B</td> <td>50 (2.0)</td> </tr> </tbody> </table>	Dimension	mm (inc)	W	54.0 (2.16)	D	110.0 (4.33)	H	115.0 (4.52)	Distance	mm (inch)	A	20 (0.8)	B	50 (2.0)
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Fig.4 Mounting / Dismounting Instructions	
For DIN rail fastening according to IEC 60715 TH35-7.5(-15) Mounting as shown in figure, with input terminals on lower side, with suitable cooling and maintaining a proper distance between adjacent devices as specified in the I.S. manual of each family.	
<b>Mounting:</b>	
<ol style="list-style-type: none"> <li>1. Tilt the unit slightly backwards.</li> <li>2. Fit the unit over the top edge of the rail.</li> <li>3. Slide it downward until it hits the stop.</li> <li>4. Press against the bottom for locking.</li> </ol>	

<b>Dismounting:</b>		
<ol style="list-style-type: none"> <li>1. Pull down the slide clamp lever</li> <li>2. Tilt the unit upward</li> <li>3. Unhook the unit from the rail</li> </ol>	<p>1 &amp; 2</p>	<p>3</p>

<b>Fig.5</b>			
<b>Recommended connecting cable</b>			
	<b>Recommended Tightening torque</b> 0.5-0.6 Nm 4.42-5.30 lbf in		Solid: 2.5mm <sup>2</sup> / 12AWG Stranded: 1.5mm <sup>2</sup> / 12AWG L: 6.0-7.5mm / 0.24-0.30 in

<b>Fig.6</b>	
<b>Input protection</b>	
In order to be UL compliant use Listed Cartridge nonrenewable (JDDZ) fuse Class CC 4AT 250Vac. Fuse 4AT or MCB 4A C curve. For USA and Canada, use the fuse type closest to the European equivalent type.	
<b>Surge protection:</b> it is strongly recommended to provide external surge arresters (SPD) according to local regulations.	

<b>Fig.7</b>			
<b>Input connections</b>			
<b>AC Line</b>		<b>DC Line</b>	

<b>Fig.8</b>	
<b>Environment</b>	
<b>Operating temperature</b> - 40°C...70°C 5...95% r.H. non condensing UL Certified up to 50°C Overtemperature protection	<b>Derating</b> - 0.75W/°C over 50°C for NCU120-12 model - 1.2W/°C over 50°C for NCU120-24 model

<b>Note:</b>
<ul style="list-style-type: none"> <li>Data may change without prior notice in order to improve the product.</li> <li>Please refer to the latest version of the "Instruction Manual" for each product by visiting <a href="http://www.nextys.com">www.nextys.com</a></li> </ul>

<b>See also the products below that can be used in conjunction with NCU120 units:</b>		<i>(accessory device)</i>
<ul style="list-style-type: none"> <li>OR20 20A Active ORing controller</li> <li>OR50 50A Active ORing controller</li> <li>BU150U 150J Buffer Module</li> <li>NBP30 Sealed Lead acid Battery pack</li> </ul>		