

NPSW480 Series – Single, 2 or 3 phases / DC input switching power supply with integrated PFC

■ **Main Features:**

- High efficiency and compact size
- Only 73mm width aluminium enclosure
- 1, 2 or 3 phases input AC 187...550Vac
- Wide DC input range 250...725Vdc
- Active PFC
- Excellent field reliability record
- Usable for broad range of industrial, telecom and renewable energy applications



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READ THIS CAREFULLY BEFORE INSTALLATION!	VOR DER INSTALLATION BITTE FOLGENDE SICHERHEITSHINWEISE BEACHTEN	LEGGERE ATTENTAMENTE PRIMA DELL'INSTALLAZIONE!	A LIRE ATTENTIVEMENT AVANT L'INSTALLATION!
Before operating, read this document thoroughly and retain it for future reference. Non-respect of these instructions may reduce performances and safety of the devices and cause danger for people and property. The products must be installed, operated, serviced and maintained by qualified personnel in compliance with applicable standards and regulations. 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. 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.	Lesen Sie dieses Dokument vor der Inbetriebnahme sorgfältig durch und bewahren Sie es zum späteren Nachschlagen auf. Die Nichtbeachtung dieser Anweisungen kann die Funktion und Sicherheit der Geräte beeinträchtigen und birgt Gefahren für Personen und Eigentum. Die Geräte müssen von qualifiziertem Personal unter Einhaltung der geltenden Normen und Vorschriften installiert, betrieben, gewartet und instand gehalten werden. Öffnen Sie das Gerät nicht, es enthält keine austauschbaren Komponenten, das Auslösen der internen Sicherung (falls vorhanden) ist stets auf tiefergehende Fehler im Schaltkreis zurück zu führen. Reparieren oder modifizieren Sie das Gerät nicht. Sollte während des Betriebs eine Fehlfunktion oder ein Defekt auftreten, schicken Sie das Gerät zur Überprüfung ins Werk. TDK-Lambda Switzerland SA übernimmt keine Haftung für die Folgen, die sich aus dem Einsatz dieses Gerätes ergeben.	Prima dell'installazione, leggere attentamente questo documento istruzioni e conservarle per future consultazioni. L'inosservanza delle presenti istruzioni può compromettere le caratteristiche e la sicurezza dell'apparecchio e causare pericolo per le persone e le cose. Il prodotto deve essere installato, utilizzato e riparato da personale qualificato e nel rispetto delle normative vigenti. 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. TDK-Lambda Switzerland SA non si assume nessuna responsabilità per qualunque conseguenza derivante dall'uso di questo materiale.	Lisez ces instructions avant l'installation, conservez ce manuel pour référence future. Défaut de se conformer à ces instructions peut affecter les caractéristiques et la sécurité du dispositif de danger et de causer aux personnes ou aux biens. Les produits doivent être installés, exploités et entretenus par personnel qualifié et en conformité avec les règlements. N'ouvrez pas le produit, il ne contient aucune pièce remplaçable, 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 ou les dysfonctionnements, le retourner au fabricant pour inspection. TDK-Lambda Switzerland SA n'assume aucune responsabilité des conséquences éventuelles découlant de l'utilisation des produits.
CAUTION	ACHTUNG	ATTENZIONE	AVVERTISSEMENT
RISK OF BURNS, EXPLOSION, FIRE, ELECTRICAL SHOCK, PERSONAL INJURY. 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. 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).	GEFAHR VON VERBRENNUNGEN, EXPLOSIONEN, FEUER, STROMSCHLAG, PERSONENSCHÄDEN. Führen Sie niemals Arbeiten an spannungsführenden Teilen durch! Gefahr von tödlichen Verletzungen! Das Gehäuse des Gerätes kann heiß sein, lassen Sie Zeit zum Abkühlen des Gerätes, bevor Sie es berühren. Lassen Sie keine Flüssigkeiten oder Fremdkörper in die Geräte eindringen. Um Überschlüge zu vermeiden, schließen Sie das Gerät nicht an oder trennen Sie es nicht ohne vorher die Eingangsspannung abgeschaltet zu haben, und warten Sie die Entladung der internen Kondensatoren ab (mindestens 1 Minute).	RISCHIO USTIONI, ESPLOSIONE, INCENDIO, SCOSSA, LESIONI GRAVI. 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. 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).	RISQUE DE BRULURES, EXPLOSION, INCENDIE, ELECTROCUTION, DOMMAGE AUX PERSONNES. Ne jamais effectuer des opérations sur les parties sous tension! Danger de mort! Le récipient peut produire des brulures, le laisser refroidir avant de toucher l'appareil. Ne faites 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 vous avez supprimé la tension d'entrée et avant qu'elle n'ait lieu de décharge des condensateurs internes (minimum 1 minute).

DECLARATION OF CONFORMITY



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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.

ROHS compliance: the product respects the EC requirements related to ROHS substances, according to "Restriction of Hazardous Substances" as per document 2011/65/UE

REACH compliance: the product respects the EC requirements related to REACH SVHC directive (EC) 1907/2006

Note: 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.

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 www.nextys.com the reference standards applied to each model.

Code	Description
NPSW480-24	Single, 2 or 3 phases with integrated PFC switching power supply IN 200 - 500Vac / OUT 24Vdc - 20A
NPSW480-48	Single, 2 or 3 phases with integrated PFC switching power supply IN 200 - 500Vac / OUT 48Vdc - 10A
NPSW480-72	Single, 2 or 3 phases with integrated PFC switching power supply IN 200 - 500Vac / OUT 72Vdc - 6A

Certifications and approvals	    
Reference standards	2014/35/EU (Low Voltage Directive) 2014/30/EU (EMC directive) EN61010-1 (Safety Standard) EN61010-2-201 (Safety Standard) UL508 (Certified - IND. CONT. EQ. 4WX9 file no. E356563) UL61010-1 (Certified - IND. CONT. EQ. 4WX9 file no. E356563) UL61010-2-201 (Certified - IND. CONT. EQ. 4WX9 file no. E356563) EN61000-6-2 (Generic immunity standard for industrial environments) - EN61000-4-2 (Electrostatic discharge immunity test) - EN61000-4-3 (Radiated, radio-frequency, electromagnetic field immunity test) - EN61000-4-4 (Electrical fast transient/burst immunity test) - EN61000-4-5 (Surge immunity test) - EN61000-4-6 (Immunity to conducted disturbances, induced by radio-frequency fields test) - EN61000-4-8 (Power frequency magnetic field immunity test) - EN61000-4-11 (Voltage dips, short interruptions and voltage immunity test) EN61000-6-4 (Generic emission standard for industrial environments) - EN55011 (CISPR11 - EMC)

USER INSTRUCTIONS

- 1) Description:** DIN rail mountable primary switched-mode power supply with 187...550Vac or 250...725Vdc input (UL not evaluated), suitable for single, 2 or 3 phases main line and DC line.
- 2) Installation:** 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).
- 3) Connections:** 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 $> 85^{\circ}\text{C}$.
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).
- 4) Input protection:** the device input is provided with varistors against overvoltage. Input isn't provided with internal fuses, thus an external short circuit/overcurrent protection must be provided by the end user (see Fig.6).
For operation on a single phase, 2 or 3 phases system, a protection fuse on each phases must be provided.
Surge protection: it is strongly recommended to provide external surge arresters (SPD) according to local regulations.
- 5) AC input connection:** the device can be connected to single phase AC lines with U_{in} 230Vac and to 2 or 3 phases conductor of 3 phase lines with U_{in} 200...500Vac (see Fig.7). Ensure that the PE conductor is properly connected.
Please connect first the PE.
- 6) DC input connection:** connect L/L1 terminal to (+) positive pole, N/L2 terminal to (-) negative pole, L3 do not connect and  terminal to GND. Rated voltage 250...725Vdc (UL not evaluated).
The device is also suitable for photovoltaic or wind turbine applications (see Fig.7).
- 7) Output connection:** the device is suitable for **SELV** and **PELV** circuitry. Pay attention NPSW480-72 is not **SELV**.
 U_{out} can be adjusted with a potentiometer to a wide range (see Fig.1).
Check U_{out} 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.
If the output current exceed 15A the load must be wired to the power supply using all the four poles of the output connector.
- 8) Parallel connection and redundancy:** the power supplies can be connected in parallel to increase power. Since there is not a built-in current (load) sharing, an external active redundancy or active load sharing device to correctly balance the current between the devices shall be used. To achieve a near-correct current balance, it is recommended to set U_{out} uniformly (± 100 mV) on each unit, not to exceed 80% of the nominal load for each unit and to use symmetrical wiring to ensure uniform current distribution.
For redundant connection, an external diode module (O-ring) device must be used (see accessory device).
With regard to parallel wiring, both positive (+/+) and negative (-/-) poles shall always be used. This prevents the current flowing through only one device in the event of failure of one of the units, exceeding the 80% limit.
In any case, it is recommended not to use more than two units connected in parallel for power and redundancy. In case more than two devices are needed, please contact technical support.
- 9) Output protection:** the device is protected against overload (OL) / short circuit (SC) / overvoltage (OV) / overtemperature (OT).
OL and SC: are controlled by a hiccup mode auto-reset protection with the following behaviour:
OL behaviour: Max. $OL = I_n \times 1.4$ with constant output voltage for max 1s. If the current is $1.1 \geq I_n \geq 1.4$ the unit enters the OL protection and starts an ON/OFF cycle (hiccup mode).
SC behaviour: the device supplies the indicated short circuit peak current for 150ms if the output current exceeds $I_n \times 1.5$ 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.
Output OV circuit protection: the output is protected against potential OV due to internal malfunction or coming from the load for $U_{out} \geq U_{nom} \times 1.2 - 1.3$, depending on the model.
OT protection: 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).
- 10) Feeding DC motors:** 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).
NOTE: 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.
- 11) Operation with Battery:** when a battery is connected in parallel to the Output for backup purposes (see accessory device).
- 12) Environmental:** these products are IP20 (according to IEC 60529, not UL evaluated), and therefore chemicals/solvents, cleaning agents and other liquids must not be used.
- 13) Environment:** these power supplies are SMPS for use in applications within a Pollution Degree 2, overvoltage category II environment (overvoltage category III according to EN50178). Do not use in wet area or subject to moisture. These products are designed for indoor use only.
- 14) Intended use:** 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.
If the power supply is used in a way not specified in this manual, the protection provided by the equipment may be impaired. Don't use these devices in applications where malfunction may cause injury or death.
- 15) Radio interference:** this is an electrical appliance according to EN55032, class A. They may cause radio interference in residential areas.

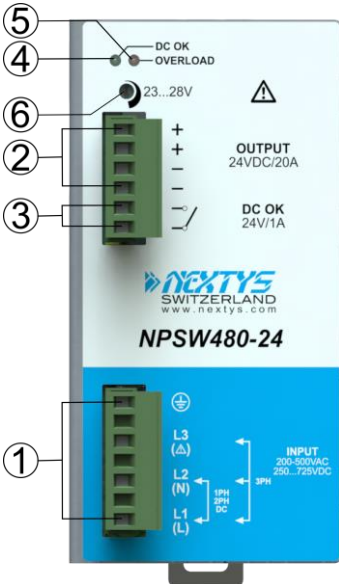
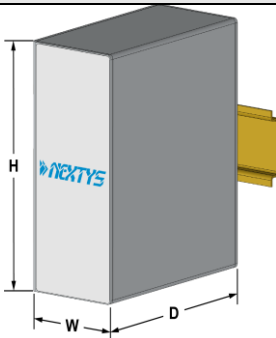
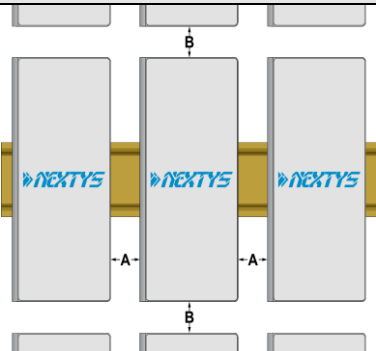
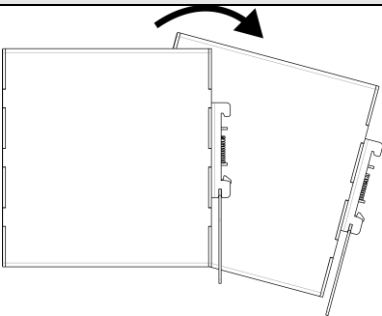
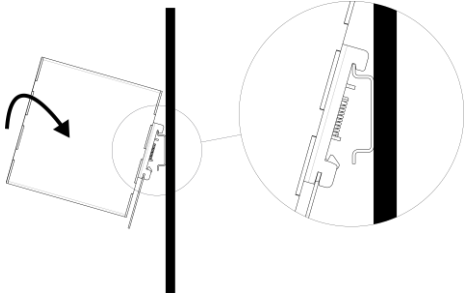
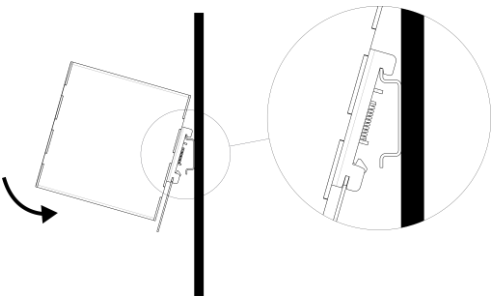
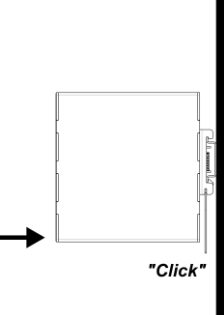
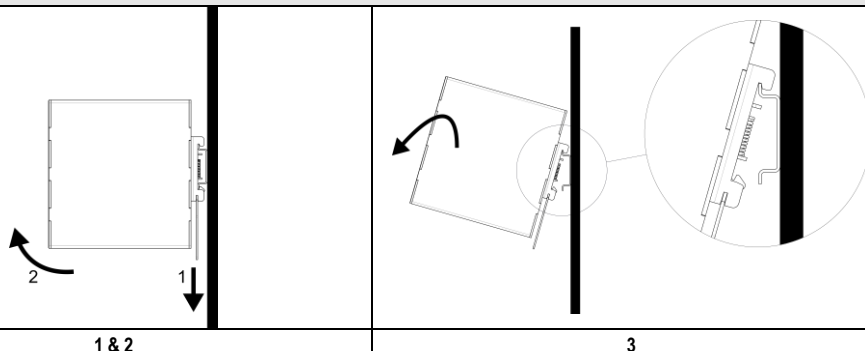
Fig.1 Connections	Fig.2 Dimensions	Fig.3 Distances														
 Just for reference	 <table><tr><th>Dimension</th><th>mm (inch)</th></tr><tr><td>W</td><td>73 (2.83)</td></tr><tr><td>D</td><td>125 (4.92)</td></tr><tr><td>H</td><td>140 (5.52)</td></tr></table>	Dimension	mm (inch)	W	73 (2.83)	D	125 (4.92)	H	140 (5.52)	 <table><tr><th>Distance</th><th>mm (inch)</th></tr><tr><td>A</td><td>20 (0.8)</td></tr><tr><td>B</td><td>100 (3.9)</td></tr></table>	Distance	mm (inch)	A	20 (0.8)	B	100 (3.9)
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(1) AC/DC input (2) DC output (load) (3) Diagnostic Output (dry contact, NC output OK) Not present on 72V model (4) Green LED: Output OK (5) Red LED: Overload (6) Output voltage adjustment Input AC Line: Single phase - L = Line - N = Neutral - L3 = Do not connect - I = Earth ground 2 phases - L1 = Phase 1 - L2 = Phase 2 - L3 = Do not connect - I = Earth ground 3 phases - L1 = Phase 1 - L2 = Phase 2 - L3 = Phase 3 - I = Earth ground Input DC Line: - L1(L) = + Positive DC - L2(N) = - Negative DC - L3 = Do not connect - I = Earth ground Output: + = Positive DC - = Negative DC - Dry contact = NC																

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.	
Mounting:	
1. Tilt the unit slightly backwards 2. Fit the unit over the top edge of the rail 3. Slide it downward until it hits the stop 4. Press against the bottom for locking	
 1	
 2	
 3	
 4	

Dismounting:

1. Pull down the slide clamp lever
2. Tilt the unit upward
3. Unhook the unit from the rail

**Fig.5****Recommended connecting cable**

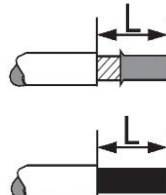
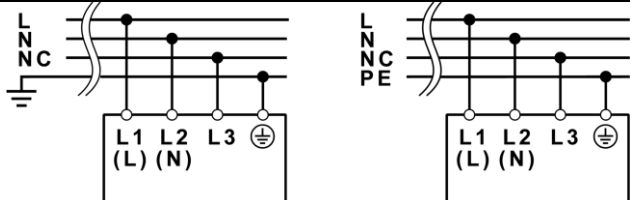
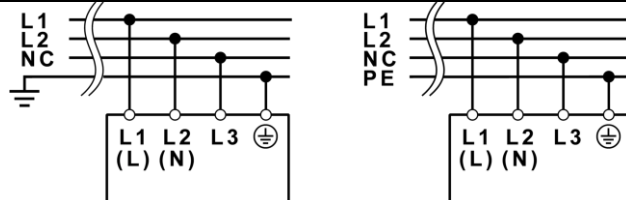
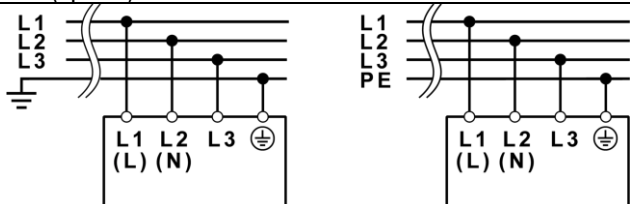
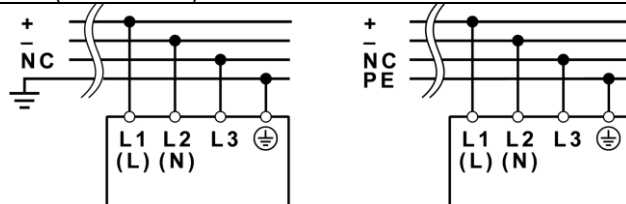
	Recommended Tightening torque				Cable size (solid and stranded)		
	MFG	Nm	lbf in		MFG	mm²	AWG
	Dinkle	0.51	4.5		Dinkle	2.5 – 0.2	12 – 28
	ULO	0.51	4.5		ULO	2.5 – 0.2	12 – 28
	Anytek	0.57	5	Anytek	2.5 – 0.34	12 – 24	
	Deca	0.57	5	Deca	2.5 – 0.34	12 – 24	
	Sauro	0.79	7	Sauro	2.5 – 0.05	12 – 30	
	Würth	0.57	5	Würth	3.3 – 0.2	12 – 24	
				Stripping length			
				7 - 8mm / 0.28 - 0.32in			

Fig.6**Input protection**

In order to be UL compliant use Listed Cartridge nonrenewable (JDDZ) fuse Class CC 6AT 600Vac.
 Fuse 6AT or MCB 6A C curve or 4A D curve.
 For USA and Canada, use the fuse type closest to the European equivalent type.

Surge protection: it is strongly recommended to provide external surge arresters (SPD) according to local regulations.

Fig.7**Input connections****AC Line (Single phase)****AC Line (2 phases)****AC Line (3 phases)****DC Line (UL not evaluated)****Fig.8****Environment****Operating temperature**

- 40°C...70°C
 5...95% r.H. non condensing
 UL Certified up to 45°C
 Overtemperature protection
 UL certified up to 2000m

Derating (UL not evaluated)

- 10W/°C over 45°C

Note:

- Data may change without prior notice in order to improve the product
- Please refer to the latest version of the "Instruction Manual" for each product by visiting www.nextys.com

See also the products below that can be used in conjunction with NPSW480 units (UL not evaluated)		(accessory device)
▪ OR20	20A Active ORing controller	
▪ OR50	50A Active ORing controller	
▪ DCU20	20A High performance DC UPS	
▪ DCW20	960W Combo DC-UPS / DC-DC Converter	
▪ BU150U	150J Buffer Module	
▪ NUPS12/24	Battery charger and DC UPS Module	
▪ NUPS960	40A DC UPS Module	
▪ MBC2K	2000W Motor brake controller	
▪ NBP30	Sealed Lead acid Battery pack	
▪ NCP12	Super Capacitors Module	
▪ NDW240	240W Programmable DC/DC Converter	
▪ NEF210	DC Overcurrent Protector / Static Switch	