


Short Form Installation Manual			
Models	DCW20 - 960W COMBO DC UPS / DC-DC Converter		TDK-Lambda Switzerland SA. Via Luserte Sud 6, 6572 Quartino – Switzerland Phone: +41-(0)91 8401446 / 8401448; Fax: +41-(0)91 8401447
File No.:	I.M.DCW20	Rev.:	A02








Use latest device Documentation, Software and Firmware to ensure reliable operation of the system
(downloadable from www.nextys.com)



 POWERMASTER	 Windows	 DIGITAL POWER				
						

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. 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 conservarle 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.</p> <p>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>
CAUTION	ATTENZIONE	AVVERTISSEMENT
<p>RISK OF BURNS, EXPLOSION, FIRE, ELECTRICAL SHOCK, PERSONAL INJURY.</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>RISCHIO USTIONI, ESPLOSIONE, INCENDIO, SCOSSA, LESIONI GRAVI.</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>RISQUE DE BRULURES, EXPLOSION, INCENDIE, ELECTROCUTION, DOMMAGE AUX PERSONNES.</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>
INTENDED USE	USO PREVISTO	UTILISATION
<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>
ENVIRONMENTAL CHARACTERISTICS	CARATTERISTICHE AMBIENTALI	CARACTÉRISTIQUES ENVIRONNEMENTALES
<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>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>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>

Declaration of Conformity					
		<p>TDK-LAMBDA SWITZERLAND SA 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: TLN.info@tdk.com</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>ROHS compliance: the product respects the EC requirements related to ROHS substances, according to "Restriction of Hazardous Substances" as per document 2011/65/UE</p> <p>REACH compliance: the product respects the EC requirements related to REACH SVHC directive (EC) 1907/2006</p> <p>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.</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 www.nextys.com the reference standards applied to each model.</p>					
Code	Description				
DCW20	Combo DC UPS / DC-DC Converter 960W				
Certifications and approvals					
Reference standards	<p>2014/35/EU (2014)</p> <p>2014/30/EU (2014)</p> <p>UL508</p> <p>EN61010-1</p> <p>EN61010-2-201</p> <p>EN61000-6-2</p> <p>EN61000-6-3</p>	<p>(Low Voltage Directive)</p> <p>(EMC directive)</p> <p>(Certified - IND. CONT. EQ. 4WX9 file no. E356563)</p> <p>(Safety Standard)</p> <p>(Safety Standard)</p> <p>(Generic immunity standard for industrial environments)</p> <p>(Generic emission standard for residential environments)</p>			

System Description

DCW20 is a microprocessor controlled unit that can perform 2 functions:

1. UPS rated 960W/20A usable in any system rated 12...48Vdc
2. DC/DC converter (non isolated) rated 960W/20A usable in any combination of IN/OUT voltages 12...48Vdc

For the UPS function you may use 1 battery of 12V, independently of the operating load voltage. For any supply voltages (12...48Vdc) it may use also multiple battery configuration (10...58Vdc). DCW20 monitors the voltage coming from a DC power supply and in case of power failure a backup battery is supplying the energy to the load. In normal condition the battery is kept charged by an integrated battery charger supporting various battery chemistries.

As a DC/DC converter (no battery present) the input has to be connected to the battery connector.

The input voltage is converted to any output voltage as per the set-up.

Connections: the device is equipped with pluggable screw terminals or screw type header. 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 temperature of:

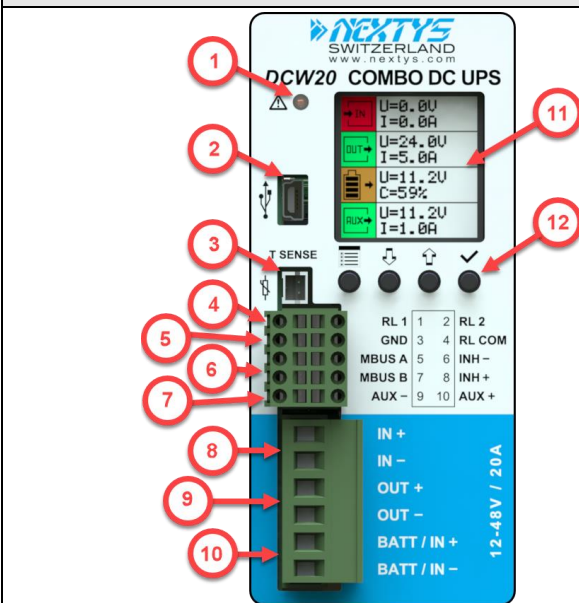
60°C for ambient up to 45°C

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 as shown below and ensure that all strands of a stranded wire enter the terminal connection.

Connections and User interface



- 1. Alarm LED indicator:** ON when the unit is in backup. Blinks at 1Hz rate in case of error.
- 2. Modbus RTU over USB:** Used to connect a PC running POWERMASTER or custom application for remote monitoring and controlling. Firmware update is also possible through USB connection.
- 3. Temperature sensor:** Optional temperature sensor (P/N: WNTC-2MT) to measure the battery temperature for protection and temperature compensated charge method.
- 4. Relays dry contacts:** 2 relays are present for remote monitoring.
- 5. Modbus RTU over RS485:** Used to connect a PC running for remote monitoring and controlling. Firmware update is also possible through RS485 connection.
- 6. Inhibit input:** A voltage between 5VDC and 30VDC applied to this input activates the inhibit function.
- 7. Auxiliary output supply:** Maximum 5A supply from the battery (unregulated).
- 8. Input connection:** 2 poles are provided for input connection. This must be connected to a power supply rated 12...48VDC.
- 9. Output connection:** 2 poles are provided for output connection. It must be connected to the load to be backed up.
- 10. Battery connection:** 2 poles are provided for battery connection. This must be connected to the battery. Please respect the correct polarity.
- 11. Display area:** provides information regarding the device status.
- 12. Control keys:** 4 push buttons are provided to navigate through the menus and to select the various functions.

User Interface

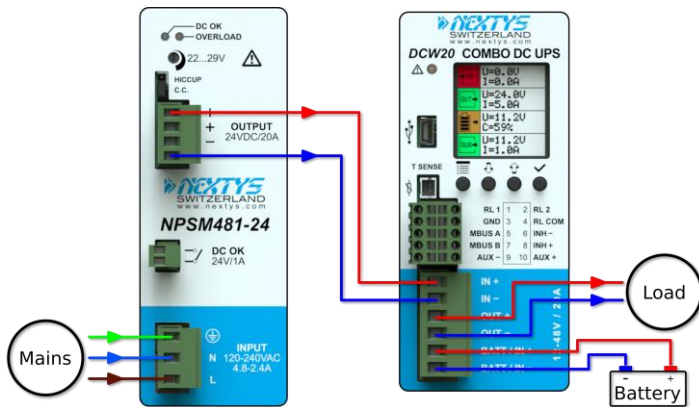
Symbols	Name	Function / Description
	MENU Key	Scrolls between menus.
	DOWN Key	Scrolls down menus and values.
	UP Key	Scrolls up menus and values.
	OK Key	Confirms selection.
	INPUT	The measured input voltage and current is shown in this section.
	OUTPUT	The measured output voltage and current is shown in this section.
	BATTERY	The battery voltage, current, temperature, resistance and charge are shown in this section. During charging and discharging the symbol background color changes to orange and the number of bars drawn inside reflects the charge status. During discharging and charging an arrow drawn beside the symbol reflects the direction of the current flowing through the battery, pointing towards the battery during charging. Battery section is not present in DC-DC mode.
	AUXILIARY	The measured auxiliary output voltage and current is shown in this section.

MODE displayed

UPS status screen	DC-DC status screen	Alarm screen

Operating MODE

UPS Mode



UPS Mode:

In UPS mode the DCW20 protects a load from unwanted power interruption in case of mains failure. An example of UPS connection is given on to the side. When the input is present DCW20 acts as a bypass, connecting the input to the output via the input switch. Meanwhile, if required, the battery is charged. During bypass there is no voltage conversion, therefore the output supply voltage is equal to the input voltage.

In case of power outage, the DCW20 takes energy from the battery to keep the output regulated at "Nominal output voltage".

Backup:

The system is in backup mode if the supply for the output is sourced from the battery (input supply missing). During backup the battery is monitored continuously to prevent over discharge.

A programmable backup timer is also implemented in order to fix a maximum backup time during power outages. This allows preserving the battery life and shortening the recharge time, avoiding discharging the battery when not needed. During backup the internal Coulomb counter is used to give an estimate of the residual charge of the battery.

Backup starts when the output voltage is lower than 90% of the "Nominal output voltage".

Battery charger:

The battery charger supports various chemistries such Lead-Acid, Nickel, Lithium and Super-capacitors. Other charging algorithms can be implemented by request (contact factory).

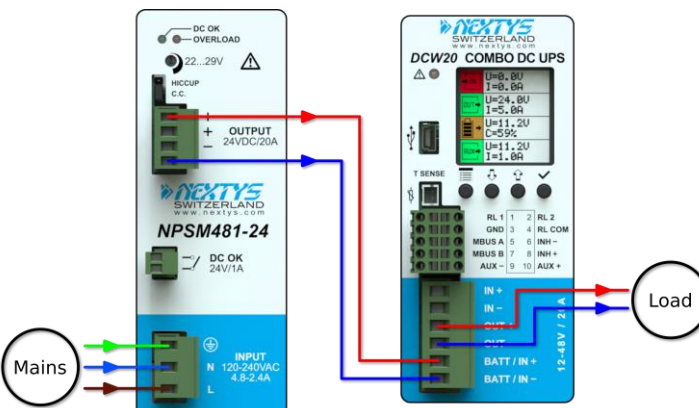
The battery charger automatically reduces the current to avoid exceeding the maximum input current in case of high current load.



Warnings:

- In order to avoid potentially hazardous situations including fire hazard, safety recommendations must be followed. Only authorized staff can install the unit.
- For Lithium cells the balancing and protection circuit must be included in the battery pack.
- For Nickel batteries the use of the external temperature sensor is mandatory. The sensor must be placed in contact with the battery.

DC-DC Mode



DC-DC Mode:

DCW20 can be used as a high performance DC/DC converter. An example of DC/DC connection is given on to the side.

Any voltage between 10V to 55V can be converted to any voltage between 10V to 55V (step-up and step-down operation) with up to 20A input or output current.

Input and output are protected against over current with user settable limits. When used as a DC/DC converter the input supply must be connected to the battery connector as shown on to the side.

Additional Functions



Battery health monitor

- **Internal resistance measurement:** The resistance is periodically measured. The internal resistance is a good indicator of the battery health status; a sudden increase of the internal resistance indicates a potential problem on the battery or on the battery wiring.
- **Temperature measurement:** The battery temperature is monitored through an optional temperature sensor (P/N: WNTC-2MT). The battery charger takes into account the battery temperature and provides a temperature compensated charging voltage. In case of over or under temperature the system disconnects the battery to prevent damage.
- **Coulomb counter:** Estimates the remaining battery capacity and consequently the available backup time.
- **Deep discharge protection:** It protects against the deep discharge of the battery which can lead to its irreversible damage.

Cold Start:

The cold start is a procedure that allows turning ON the UPS without the input power. This procedure is used to turn ON the UPS to operate during a power interruption. This practice is also a method to see if the battery connected to the DCW20 is functional. In cold start the DCW20 will remain ON for at least 60 seconds independently from the battery voltage being under the deep discharge threshold, the inhibit input and the backup timer. After the first 60 seconds the device stays ON until the battery is not deep discharged, the backup timer is not expired or the inhibit input is not active. If the input supply returns during cold start the device reverts to normal operation.

To cold start the DCW20:

- Press and hold simultaneously the  and  buttons until you see the welcome message on the screen. On the status screen the "Cold start" text is written beside the input icon.
- Release the buttons.

PC shutdown and automatic restart:

- **PC shutdown:** In case the DCW20 is used to supply a PC it is possible to automatically shut down the PC after an adjustable time of backup. For this the PC must run the POWERMASTER application (provided free) and must be connected through Modbus. Optionally POWERMASTER can call a task on the PC before shutting down,

for example to backup some sensitive data.

- **Automatic restart:** DCW20 is able to automatically restart a PC which was powered OFF by mistake, for example in case of the Operating System (OS) crash. The user may adjust an output current threshold and a timer used for detecting the PC OFF status. In order to restart the PC the DCW20 toggles the output OFF and then ON again. User must enable in the PC BIOS the automatic start in case of supply ON.

Power ON screen:

This screen is shown at power ON. It shows the device name, serial number and firmware version.

Status:

This is the default view where the user can find the most relevant information about the device status. The system always falls back to this view after 60s of inactivity (no key pressed).

Settings:

All the device settings are configurable from this menu. Use the UP/DOWN KEY to navigate through the parameters. Press the OK KEY to enter/exit the editing mode. In editing mode use the UP/DOWN KEY to change the highlighted value.

Info:

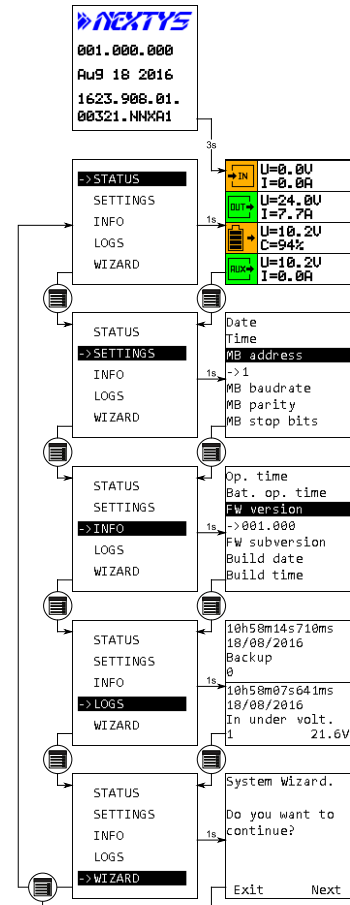
Device information such as firmware version, serial number and device name is visible from this menu.

Logs:

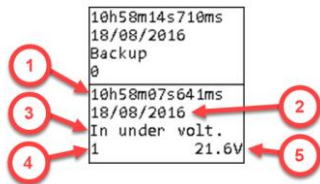
All the alarms and event are logged in a circular buffer and visible from this screen. Use the UP/DOWN KEY to navigate through the logs.

Wizard:

The wizard helps the user to configure the system through a series of screens.



LOGS



1. **Time:** time at which the log occurred.
2. **Date:** date at which the log occurred.
3. **Name:** unique log name
4. **Primary value:** optional.
5. **Secondary value:** optional.

Every event is logged in the device FLASH memory. From the log menu the user can view their history. Use the UP/DOWN KEYS to navigate between logs, 2 logs are visible simultaneously on the LCD. Logs are of 3 different kinds: **info**, **alarms** and **events**. All **info** and **alarms** have an associated Modbus field with the current status (0 if inactive or 1 if active). For **info** and **alarms** a log is generated at each status transaction. In case of active alarm the front LED and the buzzer turn ON.

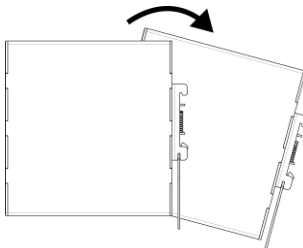
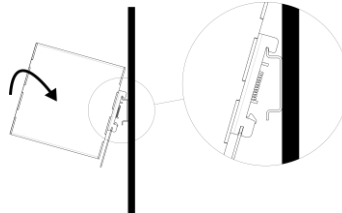
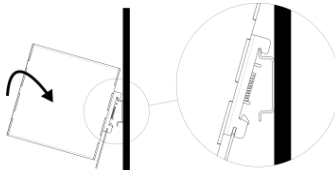
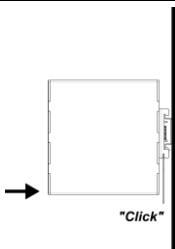
Alarms		
Type	LCD name	Description
Battery disconnected	Bat. discon.	Active when no battery is detected by DCW20.
Battery Ri too high	Bat Ri too high	Active when measured battery internal resistance exceed the alarm threshold
Battery under temperature	Bat under temp.	Active when the battery measured temperature (using the optional external sensor) is under the threshold specified in "Battery min. temperature" field. If active the battery charged is disabled.
Battery over temperature	Bat over temp.	Active when the battery measured temperature (using the optional external sensor) exceed the threshold specified in "Battery max. temperature" field. If active the battery charged is disabled.
Battery lifetime elapsed	Bat lifetime	Active when the actual calculated battery lifetime exceeds the threshold specified in "Battery lifetime" field.
Battery charge failure	Bat charge fail	Active when DCW20 could not charge the battery correctly. When active, the battery charger is disabled. Disconnect the battery to reset the alarm.
Battery SoC < 25%	Bat SoC 25%	Active when the battery State of Charge is under 25% of the nominal full charge capacity.
Battery over discharge current	Bat over dis. I	Active when the measured battery discharge current reaches the threshold specified in "Battery max. discharge current" field.
Battery low	Bat low	Active when the measured battery voltage is under the threshold specified in "Battery low voltage" field.
Battery deep discharged	Bat deep disch.	Active when the battery measured voltage is under the threshold specified in "Battery deep discharge voltage" field.
Backup	Backup	Active when the system is in backup.
Input under voltage	In under volt.	Active when the measured input voltage is under 90% of the "Nominal output voltage" field.
Input over voltage	In over volt.	Active when the measured input voltage exceeds 120% of the "Nominal output voltage" field.
Output under voltage	Out under volt.	Active when the measured output voltage is under 90% of the "Nominal output voltage" field.
Output over voltage	Out over volt.	Active when the measured output voltage exceeds 120% of the "Nominal output voltage" field.
Output overload	Out overload	Active when the measured output current reaches the threshold specified in "Max. output current" field.
Input over current	In over cur.	Active when the measured input current reaches the threshold specified in "Max. input current" field.
Auxiliary output overload	Aux overload	Active when an excessive load is detected on the auxiliary output.
External temperature sensor error	Ext. T error	Active when the external temperature sensor is not connected while it's use is mandatory like in NiMH battery charging.

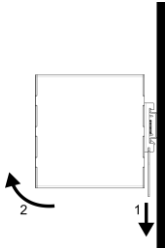
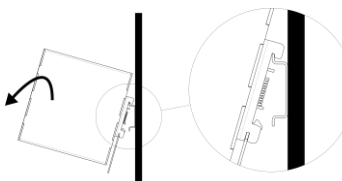
Backup time left < 25%	Bkp left 25%	Active when the system is in backup and the maximal backup time is less than the "Max. backup time" filed.
Warning over temperature	Warn. over T	Active when the internal temperature is high. If the temperature increases more the device may switch OFF.
Error over temperature	Error over T	Active when the internal temperature is too high. To prevent damage the device switches OFF.

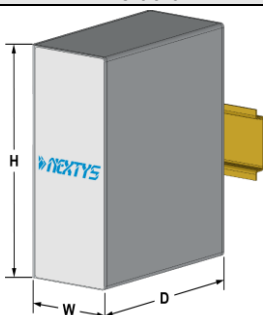
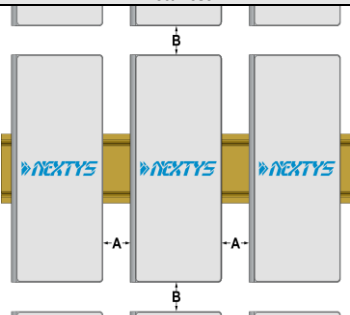
Events		
Type	LCD name	Description
Power ON event	Power on	Generated at every time the DCW20 is turned ON.
Shutdown event	Shutdown	Shutdown reason: 1 - Deep discharge 2 - Max. backup time elapsed 3 - Shutdown command 4 - Reset command 5 - Inhibit signal
Battery cycle triggered by	Bat. cycle triggered by	0 - Schedule 1 - User
Battery cycle ended by	Bat. cycle ended by	Battery cycle end reason: 1 - State of charge 2 - Time limit 3 - Input under voltage 4 - Battery in charge 5 - User

Mounting / Dismounting Instructions

For DIN rail mounting 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 User manual.

Mounting		
<ol style="list-style-type: none"> 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. 	 <p>1</p>	 <p>2</p>
	 <p>3</p>	 <p>4</p>

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

Dimensions		Distances	
			
Dimension	mm	Distance	mm
W	54.0	A	20
H	115.0	B	50
D	110.0		
