


<b>Short Form Installation Manual</b>			 TDK-Lambda Switzerland SA. Via Luserte Sud 6, 6572 Quartino – Switzerland Phone: +41-(0)91 8401446 / 8401448; Fax: +41-(0)91 8401447
<b>Models</b>	<b>NEF210 – Dual DC Overcurrent Protector 2...10A</b>		
<b>File No.:</b>	<b>I.M.NEF210</b>	<b>Rev.:</b>	








**Use latest device Documentation, Software and Firmware to ensure reliable operation of the system**  
 (downloadable from [www.nextys.com](http://www.nextys.com))



	 					
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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. 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><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>
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>

<b>Declaration of Conformity</b>					
		<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</p> <p><b>REACH compliance:</b> the product respects the EC requirements related to REACH SVHC directive (EC) 1907/2006</p> <p><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>				
NEF210	Dual DC Overcurrent Protector 2...10A / Static Switch				
<b>Certifications and approvals</b>					
<b>Reference standards</b>	2014/35/EU (2014) 2014/30/EU (2014) EN61010-1 EN61010-2-201 UL508 EN50178 EN61000-6-2 - EN61000-4-2 - EN61000-4-3 - EN61000-4-4 - EN61000-4-5 EN61000-6-3 EN55011	(Low Voltage Directive) (EMC directive) (Safety Standard) (Safety Standard) (Certified - IND. CONT. EQ. 4WX9 file no. E356563) (Safety Standards) (Generic immunity standard for industrial environments) (Electrostatic discharge immunity test) (Radiated, radio-frequency, electromagnetic field immunity test) (Electrical fast transient/burst immunity test) (Surge immunity test) (Generic emission standard for residential environments) (CISPR11 - EMC)			

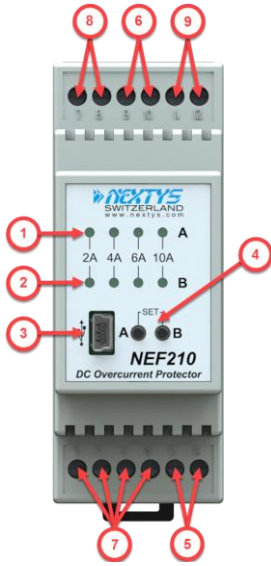
### System Description

NEF210 is a microprocessor controlled unit that can perform 2 functions:

1. DC overcurrent protector with two output channels rated 2...10A usable in any system rated 10...31Vdc
2. Static relay with two output channels rated 10A usable in any system rated 10...31Vdc

NEF210 is used on critical applications to protect DC loads that require selectivity. This unit monitors the load current of a maximum of two output channels and, in case of load failure, isolates the load to protect the components connected to the system.

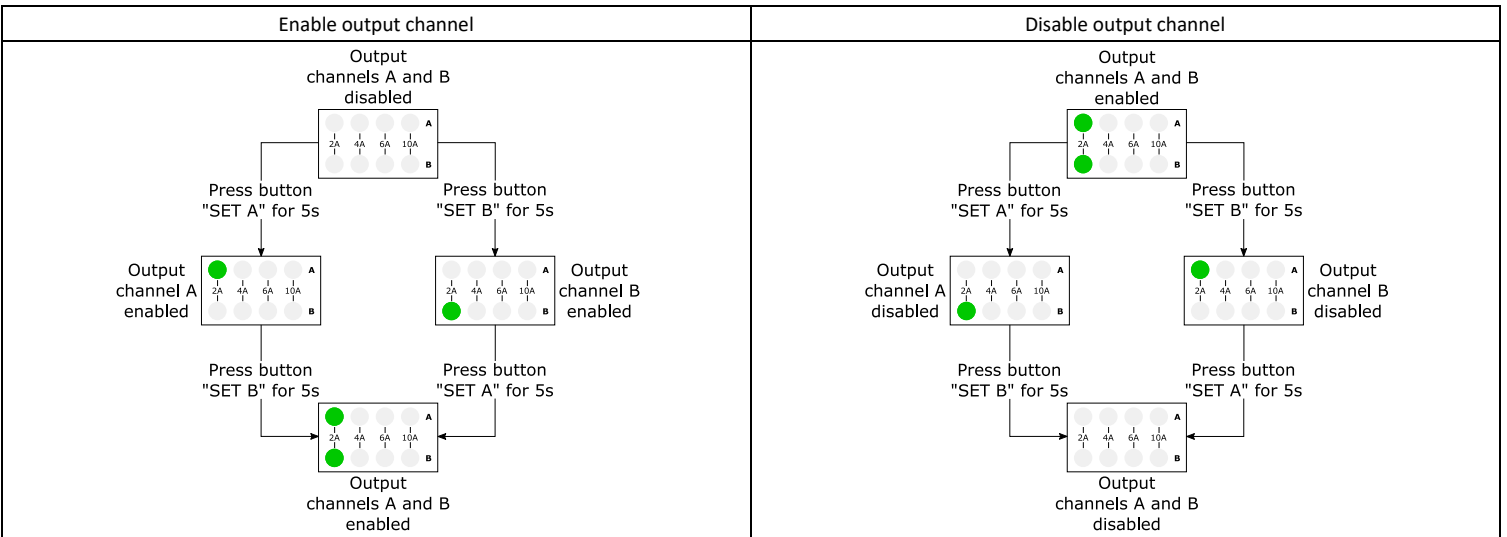
### Connections and User interface



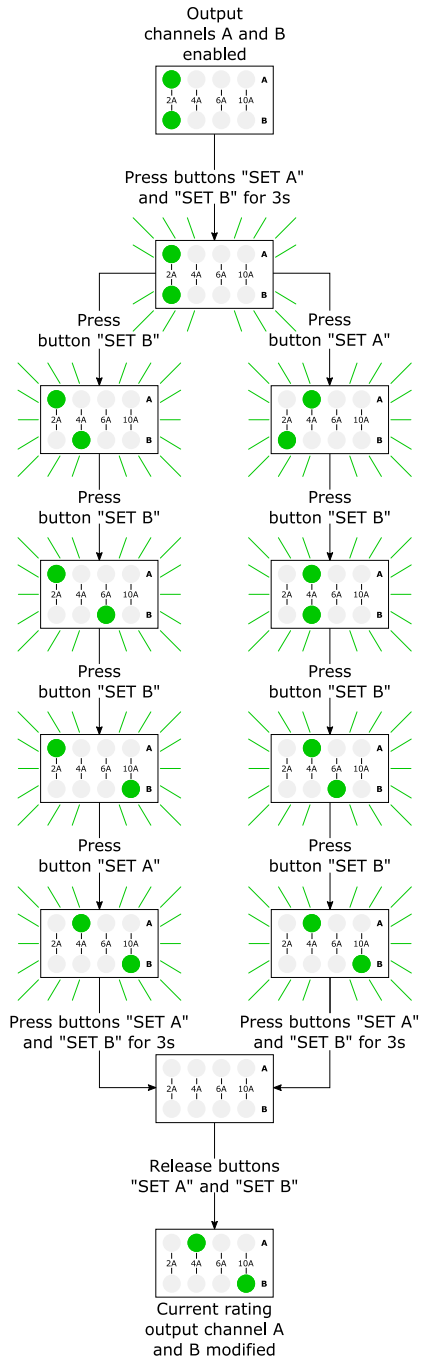
1. **LEDs channel A:** if the output channel A is enabled, the LED related to the selected current rating is *ON*. All the four LEDs blink at 1Hz rate in case of trip.
  2. **LEDs channel B:** if the output channel B is enabled, the LED related to the selected current rating is *ON*. All the four LEDs blink at 1Hz rate in case of trip.
  3. **Modbus 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.
  4. **Control keys:** two push buttons are provided to select various functions.
  5. **Reset/Inhibit input:** a signal between 5Vdc and 30Vdc applied to this input, depending on the function selected, rearm (in case of tripping) or inhibits the two output channels.
  6. **Output OK output:** a diagnostic output is present for remote monitoring.
  7. **Input connection:** two "+" and two "-" poles (rated 10A/pole) are provided for input connection. They must be connected to a power supply rated 10...31Vdc with a maximum rated current of 20A.
- If the input current is higher than 10A, use all the four poles of the connector.**
8. **Channel A output connection:** two poles are provided for channel A output connection. It must be connected to the load to be protected with a maximum rated current of 10A.
  9. **Channel B output connection:** two poles are provided for channel B output connection. It must be connected to the load to be protected with a maximum rated current of 10A.

### User Interface

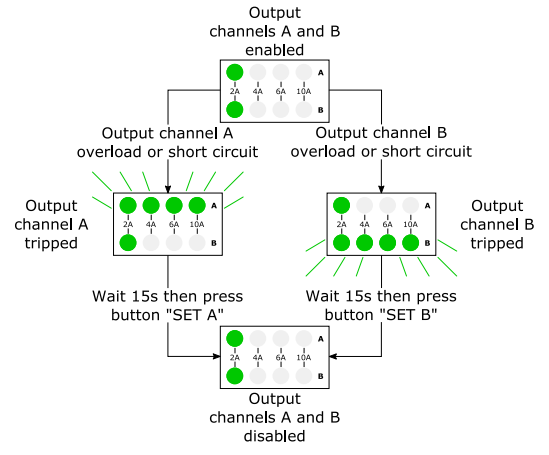
Name	Function / Description
SET A Key	<ul style="list-style-type: none"> <li>Enable/Disable output channel A</li> <li>Select current rating channel A</li> <li>Rearm channel A</li> </ul>
SET B Key	<ul style="list-style-type: none"> <li>Enable/Disable output channel B</li> <li>Select current rating channel B</li> <li>Rearm channel B</li> </ul>



Modify current rating output channel

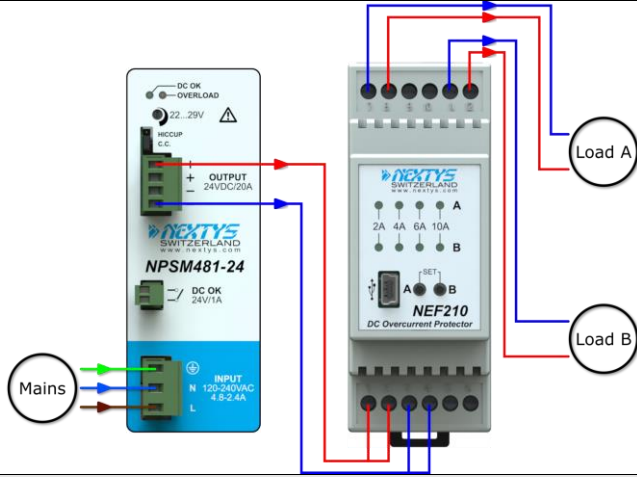


Rearm output channel after trip



## Operating MODE

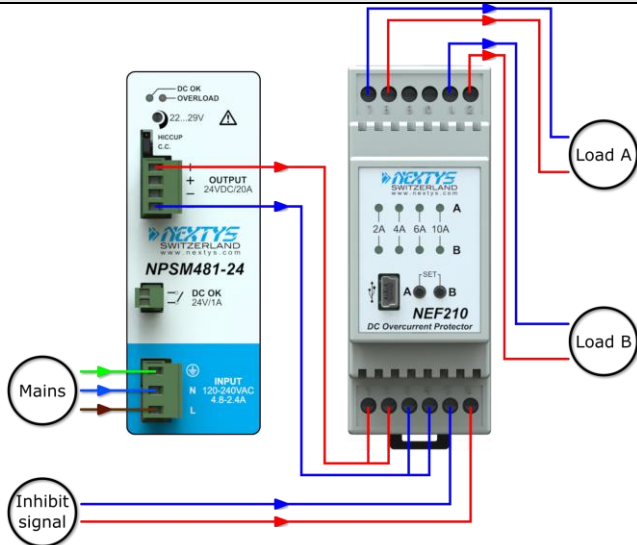
### Fuse Mode



#### Fuse Mode:

In fuse mode, the NEF210 protects up to two loads against overload and short circuit. On each output channel an overcurrent protection is implemented. When an overload or a short circuit is detected, the corresponding channel is switched *OFF* according to the tripping characteristics. The trip of an output channel is reported to the user visually by blinking the LEDs of the output channel and through the **POWERMASTER** application or corresponding Modbus field. The output channels are individually configurable. A LED shows the current rating selected. An example of Fuse connection is given on the side.

### Static Relay Mode



#### Static Relay Mode:

The NEF210 can be used as a static relay. An advantage compared to a traditional static relay is that the two outputs are protected against overload and short circuit. The output channels can be enabled/disabled separately through the **POWERMASTER** application, the Modbus field or together through the Reset/Inhibit input. The output channels are individually configurable. An example of Static Relay connection is given on the side.

## Additional Functions

#### Tripping characteristics:

NEF210 implements an active current limitation. When the device detects an overload or a short circuit, the overcurrent protector limits the load current. If one of the outputs will switch *OFF*, the other channel will remain enabled.

**Overload:** NEF210 is in this state when the load current is in the range between 1 and 1.5 times the nominal current (if the current rating selected is 2A, 4A or 6A) or between 1 and 1.2 times the nominal current (if the current rating selected is 10A). When the NEF210 detects an overload, its behavior is the same as a traditional fuse. In this situation, the time that elapses between the overload detection and the channel switch *OFF* will depend on three factors:

- Rated current selected
- Time-current characteristic selected
- Output current

**Short circuit:** NEF210 is in this state when the load current is over 1.5 times the nominal current (if the current rating selected is 2A, 4A or 6A) or 1.2 times the nominal current (if the current rating selected is 10A). When the NEF210 detects a short circuit, the load current is limited (constant current) before the channel switch *OFF*, as described in the following table:

Current rating	Short circuit current limited to	Channel switch <i>OFF</i> after
2A	3A	100ms
4A	6A	100ms
6A	9A	100ms
10A	12A	100ms

The short circuit current is also limited depending on the input and output voltages as the protection algorithm limits the power dissipated by NEF210 to 100W per channel.

#### Warning at 90% of the configured nominal current:

NEF210 has a function that warns the user if the current has exceeded 90% of the configured nominal current. When 90% of the selected current load is reached the information is provided to the user visually by blinking the LED of the output channel (blinking frequency 2Hz) and through the **POWERMASTER** application or corresponding Modbus field. The alarm is switched *OFF* if the current drops below the threshold of 0.2A.

#### Automatic rearm:

NEF210 has implemented an automatic rearm function. This function autonomously rearms an output channel following a switch *OFF*. For safety reasons, the channel will be rearmed only 20 seconds after the event. If the output channel trips for 3 times consecutively after the automatic rearm, the function will be disabled until the load fault is resolved.

#### Undervoltage lockout:

NEF210 has an undervoltage lockout function that can be enabled. This function switches *OFF* the output channel in the event of the voltage dropping below the set threshold for a time longer than that of the parameter "Time before undervoltage lockout trip".

LOGS	
Every event is logged in the device FLASH memory. From the "Logs" panel of the <b>POWERMASTER</b> application the user can view their history. The fields are also accessible via Modbus at the specified address. Logs are of 3 different kinds: <b>info</b> , <b>alarms</b> and <b>events</b> . All <b>info</b> and <b>alarms</b> have an associated Modbus field representing the current status (0 if inactive or 1 if active). For <b>info</b> and <b>alarms</b> a log is generated at each status transaction.	

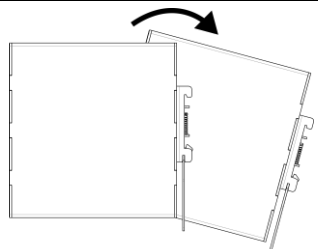
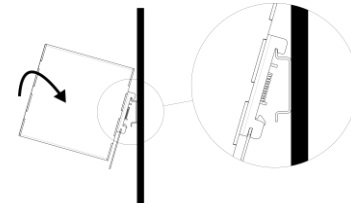
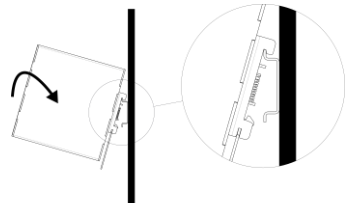
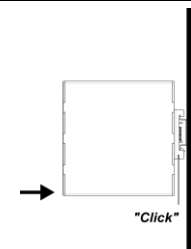
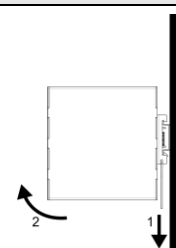
Info	
Type	Description
Activated CH A	Active when the channel A is enabled.
Activated CH B	Active when the channel B is enabled.
Rearm CH A	Active when a rearm request of the channel A is detected.
Rearm CH B	Active when a rearm request of the channel B is detected.
Inhibit	Active if the inhibit signal is asserted.
USB powered	Active if the NEF210 is powered by USB only.
Input undervoltage	Active when an input undervoltage on the NEF210 is detected.

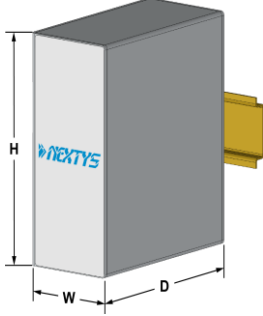
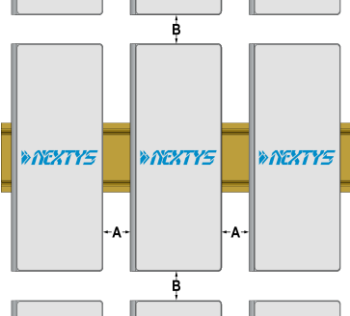
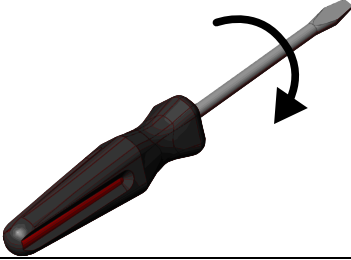
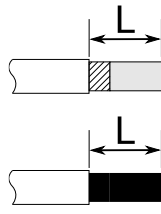
Alarms	
Type	Description
Fuse CH A trip	Active when the channel A is tripped.
Overtemperature CH A	Active when an overtemperature on the channel A is detected.
Failure CH A	Active when a hardware failure on the channel A is detected.
Undervoltage lockout CH A	Active when an undervoltage on the channel A is detected.
Overload CH A	Active when an overload on the channel A is detected.
Current CH A > 90%	Active if the current on the channel A has reached 90% of the nominal selected.
Fuse CH B trip	Active when the channel B is tripped.
Overtemperature CH B	Active when an overtemperature on the channel B is detected.
Failure CH B	Active when a hardware failure on the channel B is detected.
Undervoltage lockout CH B	Active when an undervoltage on the channel B is detected.
Overload CH B	Active when an overload on the channel B is detected.
Current CH B > 90%	Active if the current on the channel B has reached 90% of the nominal selected.

Events	
Type	Description
Power ON event	Generated at every time the NEF210 is turned ON.

### 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"> <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>	 <p>1</p>	 <p>2</p>
	 <p>3</p>	 <p>4</p>
	Dismounting	
	<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>

Dimensions		Distances	
			
<b>Dimension</b>	<b>mm</b>	<b>Distance</b>	<b>mm</b>
W	35.0	A	10
H	90.0	B	10
D	61.5		
<b>Recommended connecting cable</b>			
	<b>Recommended Tightening torque</b> <b>IN / OUT / SIGNALS connections</b> 0.5Nm 5 Lb.in		<b>IN / OUT / SIGNALS connections</b> Solid: 2.5mm <sup>2</sup> / 12AWG Stranded: 2.5mm <sup>2</sup> / 12AWG L: 6.0-7.0mm / 0.24-0.28in