

DATASHEET

LINEAR CONTROLLED – NLN SERIES

TABLETOP MODELS UP TO 1400W
RACK-MOUNTED MODELS UP TO 1400W – ON REQUEST



PRODUCT PROPERTIES AND DATA

FUNCTION:

The NLN series power supplies (**N**iederspannungs-**L**ineargeregelte-**N**etzgeraete, Low Voltage Linear Controlled Power Supplies) are highly stable, rapidly programmable DC power supplies with low ripple.

CHARACTERISTICS:

- Robust design with linear control
- Excellent EMC properties and low residual ripple due to linear controlled circuit principle
- Rapidly programmable in connection with analog or digital interface
- Short discharge time at the output due to lack of output capacitor
- Permanently short-circuit and flash-over proof
- Can be operated indefinitely with rated current in case of a short-circuit
- Inrush current limiting from 700W rated power
- Sensor connections to compensate for voltage drops in the load lines. The stated value of the Maximum output voltage always refers to the output terminals.
- Voltage and current control with automatic transfer and control mode display with LEDs
- 4½-digit digital display for current and voltage in all power classes
- Voltage and current are set using a ten-turn potentiometer with a lockable precision dial
- Set-point display via a button
- Set-point adjustment possible with disabled output
- Push-button switch for output voltage (OUTPUT)
- Any load type; in principle, any passive two-terminal network is possible

POSSIBLE OPTIONS:

- Coarse/fine-potentiometers (99% / 1%) for more accurate adjustment of voltage and / or current
- Analog Programming/Interface
- Analog Programming/Interface, floating
- Computer interfaces -IEEE 488, RS 232, RS 422, Profibus DP, USB, LAN (more on request)
- Higher stability

More options and special solutions on request. Some options may involve changes to the description of the unit - especially concerning the mechanical design.

HIGH-VOLTAGE POWER SUPPLY OPERATING MODES:

The power supplies can be operated in the LOCAL, ANALOG (optional) and DIGITAL (optional) operating modes.

TECHNICAL SPECIFICATIONS

All data given here apply for voltage and current control during internal operation (LOCAL) and refer to the maximum output values.

DIMENSIONS:

Depending on the output voltage and/or power, either a ½19" or 19" desktop housing. The maximum rated power for 19" desktop devices is 1400W. The height and depth of the low-voltage power supply depends on its power rating and output voltage. Detailed information can be found in the type table at the end of this document. A special version as 19" rack-mounted or with optional rack adapter is available.

ELEKTRISCHE SPEZIFIKATION:

Mains connection:	230V ±10% 47 - 63 Hz The N and PE (protective earth) connections are always required!
Protection class:	I
Overvoltage category:	II
Output:	Output values, voltage / current, see front panel or type table
Short-circuit resistance:	The power supply is short-circuit and flash-over proof. The maximum current can be drawn at any output voltage, even in the event of a short-circuit.
Output polarity:	Isolated, each output connection can be earthed. Exception: If a non-isolated Analog Programming/Interface is installed, the A- output pole is earthed.
Output isolation:	Each output pole can be maximally ±500V higher than PE. Exception: If a non-isolated Analog Programming/Interface is installed, the A- output pole is earthed.
Voltage setting range:	Using the VOLTAGE potentiometer, approx. 0.1% to 100% of the rated value
Current setting range:	Using the CURRENT potentiometer, approx. 0.1% to 100% of the rated value
Setting resolution:	$\pm 1 \times 10^{-3}$ of nominal value with potentiometer on front panel $\pm 1 \times 10^{-5}$ of nominal value with fine potentiometer 1×10^{-4} of nominal value with Option interface
Displays:	DVM for voltage and current, range ±20000 LEDs for status messages
Reproduzierbarkeit:	±1 x 10 ⁻³ vom Nennwert mit Potentiometer an der Frontplatte ±1 x 10 ⁻⁴ vom Nennwert mit der Option Schnittstelle
Residual ripple:	<math>< 5 \times 10^{-4}</math> of rated value +30mVss (measuring bandwidth 30Hz to 10MHz) <math>< 1,5 \times 10^{-4}</math> vom Nennwert + 10mV RMS
Control time	
Voltage control:	<math>< 1</math> ms typical 500µs at load change from 10% to 100%, or from 100% to 10%
Current control:	<math>< 1</math> ms with load changes <math>< 10\%</math>, depending on type
Setting time:	<math>< 1</math> ms, depending on type, for changes in the output voltage from 10% to 90% or from 90% to 10%
Setting time at rated load:	<math>< 1</math> ms depending on device type with output voltage changes from 0% to 100% or 100% to 0%
Discharge time constant:	With output free of load, the discharge time constant can be between 1 and 10s (depending on device type)) The discharge time constant with output free of load can be in a range of ms.
Inrush current limiting:	From 700W as standard
Sensor connections	compensate for voltage drops in the load lines (this applies for devices up to 350V output voltage)
Power loss:	approx. 25% of the rated power with rated load approx. 125% of the rated power in short circuit with rated current

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Control deviation:	with $\pm 10\%$ network change: $< \pm 2 \times 10^{-5}$ of rated value, for 0 to 100% load change: $< 2 \times 10^{-4}$ of rated value, over 8 hours: $< \pm 2 \times 10^{-4}$ of the rated value, with temperature changes: $< \pm 2 \times 10^{-4}/K$ of rated value
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AMBIENT CONDITIONS:

Operation:	
Operation location:	Only for use in dry indoor areas
Temperature:	0°C bis +40°C
Humidity:	Max. relative humidity 80% up to 31°C, decreasing linearly down to 50% relative humidity at 40°C
Altitude:	Up to 2000m above sea level
Pollution degree:	1
Protection type:	IP20
Cooling:	The heat generated in the power supply unit is dissipated by convection or, in the case of high-power units, by forced ventilation.
Transport / Storage:	
Temperature:	-20°C bis +50°C
Humidity:	No precipitation and max. relative humidity of 80%
Storage rooms:	Dust-free and dry

DC POWER SUPPLY COMPONENTS

FRONT VIEW WITH CONTROLS:

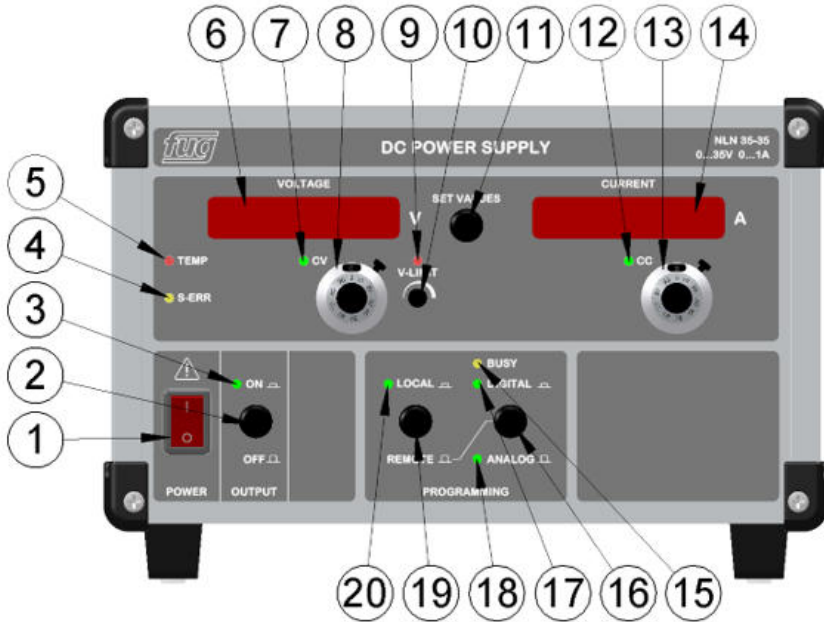


Figure: NLN 35 - 35. Different dimensions apply for DC power supplies with higher power

1	AC power switch with indicator light Disconnects the power supply from the mains, two-pole switching	11	SET VALUES Switch displays between Set-point mode and Actual output mode, displays flash when in set point mode.
2	DC output ON (OUTPUT) There is no mains disconnection!	12	LED for constant current control mode (Constant Current)
3	DC output ON LED Lights up green when the controller and therefore the power stage is operating (OUTPUT ON)	13	Lockable ten-turn potentiometer for current adjustment
4	S-ERR LED for errors at the sensor connections or sensor lines	14	Current display flashing: Set point not flashing: Actual value
5	Over-temperature LED, internal device temperature too high, fan failure or contaminated fan. (Use depends on type)	15	(Optional) LED BUSY displays data traffic on the digital interface
6	Voltage display flashing: Set point; not flashing: Actual value	16	(Optional) Switching the operational mode between REMOTE/ANALOG and REMOTE/DIGITAL
7	LED for constant voltage control mode (Constant Voltage)	17	(Optional) LED indicating digital programming active
8	Lockable ten-turn potentiometer for voltage adjustment	18	(Optional) LED indicating Analog Programming/Interface active
9	LED for active voltage set-point limitation	19	(Optional) Switching the operation mode between LOCAL and REMOTE
10	Set-point limit adjustment for voltage V-LIMIT (can only be operated with a tool)	20	(Optional) LED indicating Local control mode active

REAR VIEW WITH AC INPUT:

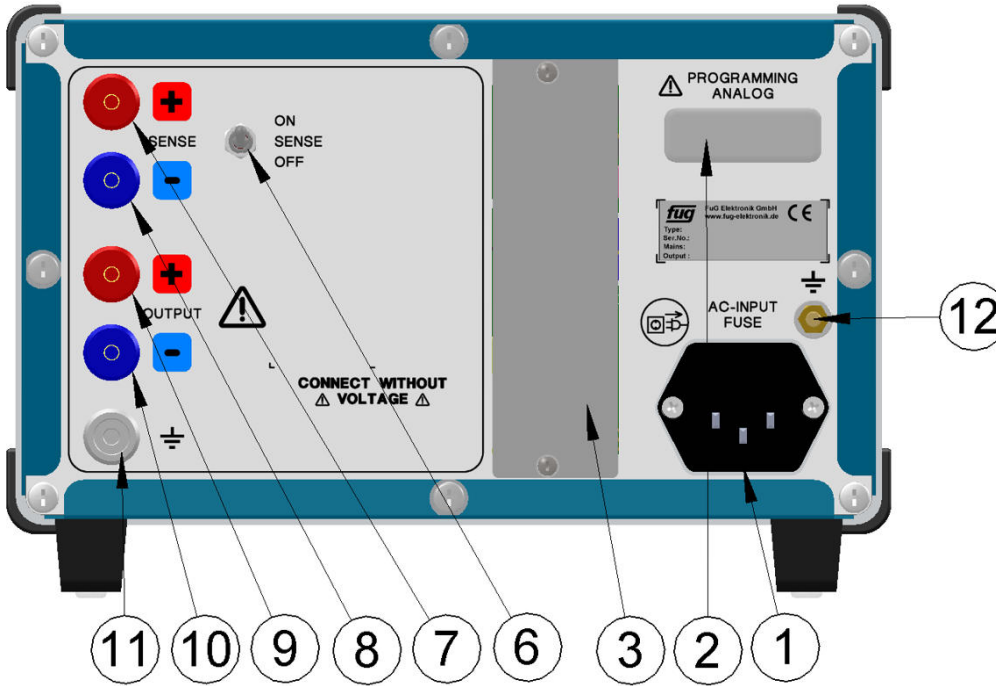


Figure: NLN 35 - 35. For DC power supplies with higher or other voltages, other dimensions may apply. The elements' layout may vary from that power shown here.

1	AC input with mains fuses, up to 700W IEC connector (as shown) with integrated fuse, at 1400W, C20 mains cable in accordance with IEC60320-C20, equipped with automatic circuit breaker.
2	(Optional) 15-pin Sub-D connector for Analog Programming/Interface
3	(Optional) Slot for digital interface (e.g.: IEEE-488, RS232, USB, LAN, ...)
6	Switch for sensor SENSE ON / OFF
7	Connection for sensor line S+ (SENSE)
8	Connection for sensor line S- (SENSE)
9	Output +
10	Output -
11	Earthing plug socket: This connection can be connected to the ground of the load; this applies for devices with an output current $\leq 20A$
12	Earth bolt: This connection can be connected to the mains PE

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TYPE TABLE

Type	Voltage	Current	Width	Height	Depth	Weight
NLN 35 - 6,5	0 - 6,5 V	0 - 5 A	½19" / 222 mm	3 HE / 133 mm	350 mm	5 kg
NLN 140 - 6,5	0 - 6,5 V	0 - 10 A	19" / 443 mm	3 HE / 133 mm	350 mm	10 kg
NLN 350 - 6,5	0 - 6,5 V	0 - 30 A	19" / 443 mm	4 HE / 177 mm	450 mm	19 kg
NLN 700 - 6,5	0 - 6,5 V	0 - 60 A	19" / 443 mm	4 HE / 177 mm	550 mm	38 kg
NLN 1400 - 6,5	0 - 6,5 V	0 - 120 A	19" / 443 mm	7 HE / 310 mm	550 mm	50 kg
NLN 35 - 12,5	0 - 12,5 V	0 - 2,5 A	½19" / 222 mm	3 HE / 133 mm	350 mm	5 kg
NLN 140 - 12,5	0 - 12,5 V	0 - 8 A	19" / 443 mm	3 HE / 133 mm	350 mm	10 kg
NLN 350 - 12,5	0 - 12,5 V	0 - 20 A	19" / 443 mm	4 HE / 177 mm	450 mm	19 kg
NLN 700 - 12,5	0 - 12,5 V	0 - 50 A	19" / 443 mm	4 HE / 177 mm	550 mm	38 kg
NLN 1400 - 12,5	0 - 12,5 V	0 - 80 A	19" / 443 mm	7 HE / 310 mm	550 mm	50 kg
NLN 35 - 20	0 - 20 V	0 - 1,5 A	½19" / 222 mm	3 HE / 133 mm	350 mm	5 kg
NLN 140 - 20	0 - 20 V	0 - 6 A	19" / 443 mm	3 HE / 133 mm	350 mm	10 kg
NLN 350 - 20	0 - 20 V	0 - 15 A	19" / 443 mm	4 HE / 177 mm	450 mm	19 kg
NLN 700 - 20	0 - 20 V	0 - 30 A	19" / 443 mm	4 HE / 177 mm	550 mm	35 kg
NLN 1400 - 20	0 - 20 V	0 - 60 A	19" / 443 mm	7 HE / 310 mm	550 mm	50 kg
NLN 35 - 35	0 - 35 V	0 - 1 A	½19" / 222 mm	3 HE / 133 mm	350 mm	5 kg
NLN 140 - 35	0 - 35 V	0 - 4 A	19" / 443 mm	3 HE / 133 mm	350 mm	10 kg
NLN 350 - 35	0 - 35 V	0 - 10 A	19" / 443 mm	4 HE / 177 mm	450 mm	19 kg
NLN 700 - 35	0 - 35 V	0 - 20 A	19" / 443 mm	4 HE / 177 mm	550 mm	35 kg
NLN 1400 - 35	0 - 35 V	0 - 40 A	19" / 443 mm	7 HE / 310 mm	550 mm	50 kg
NLN 35 - 65	0 - 65 V	0 - 500 mA	½19" / 222 mm	3 HE / 133 mm	350 mm	5 kg
NLN 140 - 65	0 - 65 V	0 - 2 A	19" / 443 mm	3 HE / 133 mm	350 mm	10 kg
NLN 350 - 65	0 - 65 V	0 - 5 A	19" / 443 mm	4 HE / 177 mm	450 mm	19 kg
NLN 700 - 65	0 - 65 V	0 - 10 A	19" / 443 mm	4 HE / 177 mm	550 mm	35 kg
NLN 1400 - 65	0 - 65 V	0 - 20 A	19" / 443 mm	7 HE / 310 mm	550 mm	50 kg
NLN 35 - 125	0 - 125 V	0 - 250 mA	½19" / 222 mm	3 HE / 133 mm	350 mm	5 kg
NLN 140 - 125	0 - 125 V	0 - 1 A	19" / 443 mm	3 HE / 133 mm	350 mm	10 kg
NLN 350 - 125	0 - 125 V	0 - 2,5 A	19" / 443 mm	4 HE / 177 mm	450 mm	19 kg
NLN 700 - 125	0 - 125 V	0 - 5 A	19" / 443 mm	4 HE / 177 mm	550 mm	30 kg
NLN 1400 - 125	0 - 125 V	0 - 10 A	19" / 443 mm	7 HE / 310 mm	550 mm	50 kg
NLN 35 - 200	0 - 200 V	0 - 150 mA	½19" / 222 mm	3 HE / 133 mm	350 mm	5 kg
NLN 140 - 200	0 - 200 V	0 - 600 mA	19" / 443 mm	3 HE / 133 mm	350 mm	10 kg
NLN 350 - 200	0 - 200 V	0 - 1,5 A	19" / 443 mm	4 HE / 177 mm	450 mm	19 kg
NLN 700 - 200	0 - 200 V	0 - 3 A	19" / 443 mm	4 HE / 177 mm	550 mm	30 kg
NLN 1400 - 200	0 - 200 V	0 - 6 A	19" / 443 mm	7 HE / 310 mm	550 mm	50 kg
NLN 35 - 350	0 - 350 V	0 - 100 mA	½19" / 222 mm	3 HE / 133 mm	350 mm	5 kg
NLN 140 - 350	0 - 350 V	0 - 400 mA	19" / 443 mm	3 HE / 133 mm	350 mm	10 kg
NLN 350 - 350	0 - 350 V	0 - 1 A	19" / 443 mm	4 HE / 177 mm	450 mm	19 kg
NLN 700 - 350	0 - 350 V	0 - 2 A	19" / 443 mm	4 HE / 177 mm	550 mm	25 kg
NLN 1400 - 350	0 - 350 V	0 - 4 A	19" / 443 mm	7 HE / 310 mm	550 mm	50 kg

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NLN	35 - 500	0 - 500 V	0 - 60 mA	½19" / 222 mm	3 HE / 133 mm	350 mm	5 kg
NLN	140 - 500	0 - 500 V	0 - 250 mA	19" / 443 mm	3 HE / 133 mm	350 mm	10 kg
NLN	350 - 500	0 - 500 V	0 - 600 mA	19" / 443 mm	4 HE / 177 mm	450 mm	19 kg
NLN	700 - 500	0 - 500 V	0 - 1,2 A	19" / 443 mm	4 HE / 177 mm	550 mm	25 kg
NLN	1400 - 500	0 - 500 V	0 - 2,5 A	19" / 443 mm	7 HE / 310 mm	550 mm	50 kg

All specifications are subject to change without further notice.