

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 regulation
- Excellent EMC properties and low residual ripple due to linear controlled circuit principle
- Rapidly programmable in connection with analog or digital interface
- No output capacitor. Short discharge time at the output.
- Permanently short-circuit and flash-over proof
- Can be operated indefinitely with rated current in case of a short-circuit
- Units with 700W rated power and more: Inrush current limiter
- Sense line connections to compensate voltage drop in the load lines. The stated value of the Maximum output voltage always refers to the output terminals.
- Voltage and current control mode with automatic transition and LED-indicators
- 4½-digit digital displays 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

We will be pleased to advise you – contact us at: sales@fug-elektronik.de or +49 8039 400 77 0.

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.

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.

ELEKTRICAL SPECIFICATION:

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 type table at the end of this document
Short-circuit protection:	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 terminal can be earthed. Exception: If a non-isolated Analog Programming Interface is installed, the A+ output pole is earthed.
Output insulation:	Each output pole can be put on a potential max. ±500V against 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
Reproducibility:	$\pm 1 \times 10^{-3}$ vom Nennwert mit Potentiometer an der Frontplatte $\pm 1 \times 10^{-4}$ vom Nennwert mit der Option Schnittstelle
Residual ripple:	< 5×10^{-4} of rated value +30mVpp (measuring bandwidth 30Hz to 10MHz) < $1,5 \times 10^{-4}$ vom Nennwert + 10mV RMS
Control time	
Voltage control:	<1ms typical 500µs at load change from 10% to 100%, or from 100% to 10%
Current control:	<1ms with load changes <10%, depending on type
Setting time:	<1ms, depending on type, for changes in the output voltage from 10% to 90% or from 90% to 10%
Setting time at rated load:	<1ms depending on device type with output voltage changes from 0% to 100% or 100% to 0%
Discharge time constant:	The discharge time constant with open output will be in the ms range.
Inrush current limiting:	Standard for 700W and above.
Sense line connections	compensate for voltage drop in the load lines (this applies for devices up to 350V output voltage) Voltage drop up to 5% (but at least 1V) of the nominal voltage will be compensated.
Power loss:	approx. 25% of the rated power with rated load approx. 125% of the rated power in short circuit with rated current
Control deviation:	with ±10% network change: < $\pm 2 \times 10^{-5}$ of rated value, for 0 to 100% load change: < 2×10^{-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:

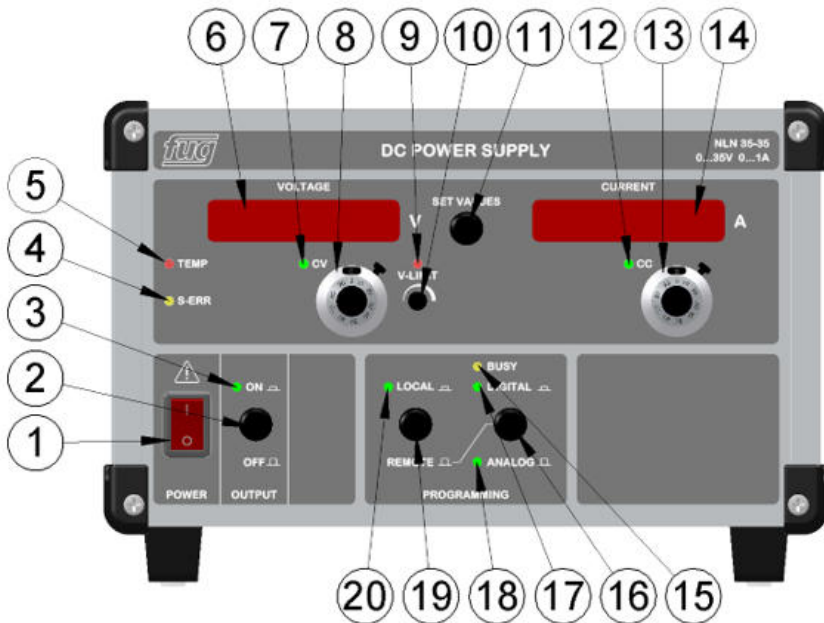


Figure: NLN 35 - 35. Different dimensions apply for DC power supplies with higher power

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

REAR VIEW WITH INPUTS / OUTPUTS:

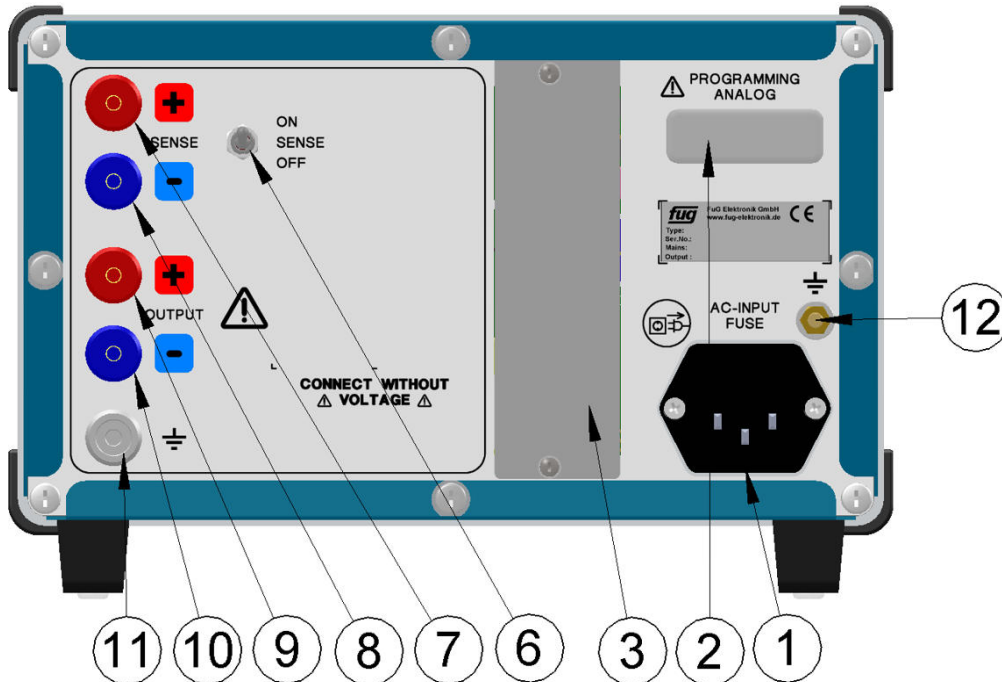


Figure: NLN 35 - 35. For DC power supplies with higher power or other voltage, other dimensions may apply. The arrangement of the elements may be different from that, shown here.

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 SENSE ON / OFF
7	Connection for sense line S+ (SENSE)
8	Connection for sense 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	Earthing bolt: For additional connection to the mains ground

SCOPE OF DELIVERY

- Power supply
- Safety instruction brochure (paper) and operation manual (cloud based in digital form)
- Mains input cable (For single phase mains: with CEE-7/7, for 3 phase mains: open end for plug to be assembled)
- Mating connectors for control inputs and outputs (Excluded commercially available cables for digital interfaces)

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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

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Type	Voltage	Current	Width	Height	Depth	Weight
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
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.

Please feel free to contact our sales team for any further questions:

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