

# Low voltage power supplies double stabilized

## Series NTN from 6,5 V to 350 V / 35 W to 100 kW



Design Example

NTN 700 - 125  
125V / 5A

### Features:

- Simple construction
- Short circuit proof and unlimited operation with full current in short circuit condition
- Voltage and current regulation with automatic and sharp transition; control modes indicated by LEDs
- Voltage and current setting via 10-turn potentiometers with precision scale; the adjusting knob can be locked
- 4½ digit DVM for voltage and current (for table-top models)
- Sense terminals for the compensation of voltage drop on the load lines. The nominal voltage always refers to the output terminals
- Parallel and series connection possible
- Suitable also for inductive and capacitive loads
- Safety interlock loop and internal interlock is standard on three-phase units
- Elapsed-hour meter as a standard on three-phase units

### Function:

The mains voltage is transformed to the appropriate level. On the secondary side of the transformer is a thyristor controlled rectifier stage (phase cutting circuit), the output of which is used to charge a capacitor bank. This capacitor bank is also connected to the final series regulating transistor output stage. By controlling the conduction angle of the thyristors after each zero-crossing of the sinusoidal voltage, the flow of energy is regulated in such a way as to have a defined voltage drop across the final series transistor stage (pre-regulation). The performance of the final series transistor stage defines the final stability of the output voltage (main regulation).

### Design:

- Up to 140W nominal power ½19" table-top case
- For 350W nominal power or higher 19" table-top case
- 19" Rack-adapters for mounting into a 19" rack are available as accessory
- For 7kW nominal power or higher 19" cabinet. Height depending on type. The side covers are detachable and the rear door is lockable.
- All cabinets are equipped with fork-lift-compatible plinths and removable crane-eyes.
- Single cabinets up to 38U are easily transportable by fork-lift.

- Cooling is carried out via convection or built-in fans, with the air being exhausted (depending upon type) either via the rear or the top. For high power units water cooling can also be used.

### Output:

- Output isolation:  
The output is floating, maximum operating voltage with respect to earth: ±500V. Either the positive or the negative terminal may be connected to earth. For units equipped with the analog programming: the "0V" of the analog programming is connected to the positive output.
- Output terminals:  
Up to 20A output current, 4mm safety connectors are used on the rear side. For currents up to 300A - clamps are fitted whilst for higher currents we use copper bars.

### Technical Data:

- Mains connection:  
Up to 1400W nominal power: 230V ±10% 47Hz to 53Hz  
For 2800W and higher: 400V ±10% 47Hz to 53Hz; two-phase  
For 7000W and higher: 400V ±10% 47Hz to 53Hz; three-phase
- Ambient temperature: 0°C to +40°C

The following data applies for voltage and current regulation, and refers to the rated value (unless otherwise stated): (For explanations please refer to Definitions and Terms on page 54.)

- Setting range:  
from approx. 0,1% to 100%
- Setting resolution:  
±1 x 10<sup>-4</sup>
- Residual ripple (0 - 10MHz):  
<1 x 10<sup>-4</sup>pp + 10mVpp

- Recovery time:  
Voltage control:  
<50µs for load changes from 10% to 100% or from 100% to 10%.

Current control:  
<500ms for load changes causing an output change of less than 10% of the rated voltage.

Units with output voltage >65V, will switch off for a short time at high and fast load changes.

- Setting time at nominal load:  
100ms to 500ms for changes of the output voltage from 10% to 90% or 90% to 10%
- Discharge time constant for output without load:  
approx. 2sec. to 60sec., depending on type
- Deviation:  
For ±10% mains voltage variation:  
<± 1 x 10<sup>-5</sup>  
For no load / full load:  
<2 x 10<sup>-4</sup>  
Over 8 hours under constant conditions:  
<±1 x 10<sup>-4</sup>  
Within the temperature range:  
<±1 x 10<sup>-4</sup>/K

### Possible Options:

- Coarse/fine-potentiometers (99% / 1%) for more accurate adjustment of voltage and / or current
- Analog programming (The positive output has to be earthed; see also page 44)
- Analog programming, floating (see page 44)
- Computer interfaces - IEEE 488, RS 232, RS 422, Profibus DP, USB, LAN (more on request) (see page 46)
- Roller blades for cabinet units
- Higher stability (see page 48)
- Power limitation (see page 48)

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

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## Series NTN from 6,5 V to 350 V / 35 W to 100 kW



Type	Voltage	Current	Width	Height	Depth	Weight
NTN 35 - 6,5	0 - 6,5 V	0 - 5 A	½19" / 222 mm	3 U / 133 mm	350 mm	5 kg
NTN 140 - 6,5	0 - 6,5 V	0 - 10 A	½19" / 222 mm	3 U / 133 mm	350 mm	8 kg
NTN 350 - 6,5	0 - 6,5 V	0 - 30 A	19" / 443 mm	3 U / 133 mm	450 mm	18 kg
NTN 700 - 6,5	0 - 6,5 V	0 - 60 A	19" / 443 mm	4 U / 177 mm	450 mm	30 kg
NTN 1400 - 6,5	0 - 6,5 V	0 - 120 A	19" / 443 mm	7 U / 310 mm	550 mm	70 kg
NTN 2800 - 6,5 2)	0 - 6,5 V	0 - 250 A	19" / 443 mm	9 U / 399 mm	650 mm	120 kg
NTN 4200 - 6,5 3)	0 - 6,5 V	0 - 400 A	19" / 600 mm	29 U / 1500 mm	600 mm	300 kg
NTN 7000 - 6,5 3)	0 - 6,5 V	0 - 600 A	19" / 600 mm	38 U / 2000 mm	800 mm	360 kg
NTN 10500 - 6,5 3)	0 - 6,5 V	0 - 1000 A	19" / 600 mm	38 U / 2000 mm	800 mm	500 kg
NTN 14000 - 6,5 3)	0 - 6,5 V	0 - 1500 A	19" / 600 mm	38 U / 2000 mm	800 mm	550 kg
NTN 21000 - 6,5 3)	0 - 6,5 V	0 - 2000 A	19" / 600 mm	38 U / 2000 mm	800 mm	650 kg
NTN 28000 - 6,5 3)	0 - 6,5 V	0 - 2500 A	2 x 19" / 1200 mm	38 U / 2000 mm	800 mm	1000 kg
NTN 35000 - 6,5 3)	0 - 6,5 V	0 - 3000 A	2 x 19" / 1200 mm	38 U / 2000 mm	800 mm	1300 kg
NTN 35 - 12,5	0 - 12,5 V	0 - 2,5 A	½19" / 222 mm	3 U / 133 mm	350 mm	5 kg
NTN 140 - 12,5	0 - 12,5 V	0 - 8 A	½19" / 222 mm	3 U / 133 mm	350 mm	8 kg
NTN 350 - 12,5	0 - 12,5 V	0 - 20 A	19" / 443 mm	3 U / 133 mm	350 mm	17 kg
NTN 700 - 12,5	0 - 12,5 V	0 - 50 A	19" / 443 mm	4 U / 177 mm	450 mm	29 kg
NTN 1400 - 12,5	0 - 12,5 V	0 - 80 A	19" / 443 mm	4 U / 177 mm	550 mm	50 kg
NTN 2800 - 12,5 2)	0 - 12,5 V	0 - 150 A	19" / 443 mm	7 U / 310 mm	650 mm	110 kg
NTN 4200 - 12,5 2)	0 - 12,5 V	0 - 250 A	19" / 443 mm	9 U / 399 mm	650 mm	150 kg
NTN 7000 - 12,5 3)	0 - 12,5 V	0 - 500 A	19" / 600 mm	38 U / 2000 mm	800 mm	340 kg
NTN 10500 - 12,5 3)	0 - 12,5 V	0 - 800 A	19" / 600 mm	38 U / 2000 mm	800 mm	480 kg
NTN 14000 - 12,5 3)	0 - 12,5 V	0 - 1000 A	19" / 600 mm	38 U / 2000 mm	800 mm	520 kg
NTN 21000 - 12,5 3)	0 - 12,5 V	0 - 1500 A	19" / 600 mm	38 U / 2000 mm	800 mm	600 kg
NTN 28000 - 12,5 3)	0 - 12,5 V	0 - 2000 A	19" / 600 mm	38 U / 2000 mm	800 mm	900 kg
NTN 35000 - 12,5 3)	0 - 12,5 V	0 - 2500 A	2 x 19" / 1200 mm	38 U / 2000 mm	800 mm	1300 kg
NTN 50000 - 12,5 3)	0 - 12,5 V	0 - 4000 A	2 x 19" / 1200 mm	38 U / 2000 mm	800 mm	1500 kg
NTN 35 - 20	0 - 20 V	0 - 1,5 A	½19" / 222 mm	3 U / 133 mm	350 mm	5 kg
NTN 140 - 20	0 - 20 V	0 - 6 A	½19" / 222 mm	3 U / 133 mm	350 mm	8 kg
NTN 350 - 20	0 - 20 V	0 - 15 A	19" / 443 mm	3 U / 133 mm	350 mm	17 kg
NTN 700 - 20	0 - 20 V	0 - 30 A	19" / 443 mm	4 U / 177 mm	450 mm	26 kg
NTN 1400 - 20	0 - 20 V	0 - 60 A	19" / 443 mm	4 U / 177 mm	550 mm	50 kg
NTN 2800 - 20 2)	0 - 20 V	0 - 120 A	19" / 443 mm	7 U / 310 mm	550 mm	80 kg
NTN 4200 - 20 2)	0 - 20 V	0 - 200 A	19" / 443 mm	9 U / 399 mm	550 mm	110 kg
NTN 7000 - 20 3)	0 - 20 V	0 - 300 A	19" / 600 mm	29 U / 1500 mm	600 mm	300 kg
NTN 10500 - 20 3)	0 - 20 V	0 - 500 A	19" / 600 mm	38 U / 2000 mm	800 mm	440 kg
NTN 14000 - 20 3)	0 - 20 V	0 - 600 A	19" / 600 mm	38 U / 2000 mm	800 mm	480 kg
NTN 21000 - 20 3)	0 - 20 V	0 - 800 A	19" / 600 mm	38 U / 2000 mm	800 mm	580 kg
NTN 28000 - 20 3)	0 - 20 V	0 - 1200 A	19" / 600 mm	38 U / 2000 mm	800 mm	800 kg
NTN 35000 - 20 3)	0 - 20 V	0 - 1500 A	19" / 600 mm	38 U / 2000 mm	800 mm	1200 kg
NTN 50000 - 20 3)	0 - 20 V	0 - 2500 A	2 x 19" / 1200 mm	38 U / 2000 mm	800 mm	1400 kg

2) Two phase mains connection  
3) Three phase mains connection

# Low voltage power supplies double stabilized

## Series NTN from 6,5 V to 350 V / 35 W to 100 kW



Type	Voltage	Current	Width	Height	Depth	Weight
NTN 35 - 35	0 - 35 V	0 - 1 A	½19" / 222 mm	3 U / 133 mm	350 mm	5 kg
NTN 140 - 35	0 - 35 V	0 - 4 A	½19" / 222 mm	3 U / 133 mm	350 mm	8 kg
NTN 350 - 35	0 - 35 V	0 - 10 A	19" / 443 mm	3 U / 133 mm	350 mm	17 kg
NTN 700 - 35	0 - 35 V	0 - 20 A	19" / 443 mm	4 U / 177 mm	450 mm	27 kg
NTN 1400 - 35	0 - 35 V	0 - 40 A	19" / 443 mm	4 U / 177 mm	550 mm	47 kg
NTN 2800 - 35 2)	0 - 35 V	0 - 80 A	19" / 443 mm	7 U / 310 mm	550 mm	70 kg
NTN 4200 - 35 2)	0 - 35 V	0 - 120 A	19" / 443 mm	9 U / 399 mm	550 mm	110 kg
NTN 7000 - 35 3)	0 - 35 V	0 - 200 A	19" / 600 mm	20 U / 1100 mm	600 mm	280 kg
NTN 10500 - 35 3)	0 - 35 V	0 - 300 A	19" / 600 mm	29 U / 1500 mm	600 mm	420 kg
NTN 14000 - 35 3)	0 - 35 V	0 - 400 A	19" / 600 mm	38 U / 2000 mm	800 mm	460 kg
NTN 21000 - 35 3)	0 - 35 V	0 - 600 A	19" / 600 mm	38 U / 2000 mm	800 mm	530 kg
NTN 28000 - 35 3)	0 - 35 V	0 - 800 A	19" / 600 mm	38 U / 2000 mm	800 mm	750 kg
NTN 35000 - 35 3)	0 - 35 V	0 - 1000 A	19" / 600 mm	38 U / 2000 mm	800 mm	950 kg
NTN 70000 - 35 3)	0 - 35 V	0 - 2000 A	2 x 19" / 1200 mm	38 U / 2000 mm	800 mm	1500 kg
NTN 35 - 65	0 - 65 V	0 - 500 mA	½19" / 222 mm	3 U / 133 mm	350 mm	5 kg
NTN 140 - 65	0 - 65 V	0 - 2 A	½19" / 222 mm	3 U / 133 mm	350 mm	8 kg
NTN 350 - 65	0 - 65 V	0 - 5 A	19" / 443 mm	3 U / 133 mm	350 mm	15 kg
NTN 700 - 65	0 - 65 V	0 - 10 A	19" / 443 mm	4 U / 177 mm	350 mm	24 kg
NTN 1400 - 65	0 - 65 V	0 - 20 A	19" / 443 mm	4 U / 177 mm	450 mm	42 kg
NTN 2800 - 65 2)	0 - 65 V	0 - 40 A	19" / 443 mm	5 U / 221 mm	550 mm	55 kg
NTN 4200 - 65 2)	0 - 65 V	0 - 60 A	19" / 443 mm	9 U / 399 mm	550 mm	110 kg
NTN 7000 - 65 3)	0 - 65 V	0 - 100 A	19" / 600 mm	20 U / 1100 mm	600 mm	280 kg
NTN 10500 - 65 3)	0 - 65 V	0 - 150 A	19" / 600 mm	29 U / 1500 mm	600 mm	390 kg
NTN 14000 - 65 3)	0 - 65 V	0 - 200 A	19" / 600 mm	38 U / 2000 mm	800 mm	440 kg
NTN 21000 - 65 3)	0 - 65 V	0 - 300 A	19" / 600 mm	38 U / 2000 mm	800 mm	510 kg
NTN 28000 - 65 3)	0 - 65 V	0 - 400 A	19" / 600 mm	38 U / 2000 mm	800 mm	720 kg
NTN 35000 - 65 3)	0 - 65 V	0 - 500 A	19" / 600 mm	38 U / 2000 mm	800 mm	900 kg
NTN 70000 - 65 3)	0 - 65 V	0 - 1000 A	2 x 19" / 1200 mm	38 U / 2000 mm	800 mm	1400 kg
NTN 700 - 125	0 - 125 V	0 - 5 A	19" / 443 mm	4 U / 177 mm	350 mm	24 kg
NTN 1400 - 125	0 - 125 V	0 - 10 A	19" / 443 mm	4 U / 177 mm	450 mm	42 kg
NTN 2800 - 125 2)	0 - 125 V	0 - 20 A	19" / 443 mm	5 U / 221 mm	550 mm	55 kg
NTN 4200 - 125 2)	0 - 125 V	0 - 30 A	19" / 443 mm	9 U / 399 mm	550 mm	110 kg
NTN 7000 - 125 3)	0 - 125 V	0 - 50 A	19" / 600 mm	20 U / 1100 mm	600 mm	250 kg
NTN 10500 - 125 3)	0 - 125 V	0 - 80 A	19" / 600 mm	29 U / 1500 mm	600 mm	300 kg
NTN 14000 - 125 3)	0 - 125 V	0 - 100 A	19" / 600 mm	29 U / 1500 mm	600 mm	400 kg
NTN 21000 - 125 3)	0 - 125 V	0 - 150 A	19" / 600 mm	38 U / 2000 mm	800 mm	490 kg
NTN 28000 - 125 3)	0 - 125 V	0 - 200 A	19" / 600 mm	38 U / 2000 mm	800 mm	680 kg
NTN 35000 - 125 3)	0 - 125 V	0 - 250 A	19" / 600 mm	38 U / 2000 mm	800 mm	850 kg
NTN 50000 - 125 3)	0 - 125 V	0 - 400 A	19" / 600 mm	38 U / 2000 mm	800 mm	1200 kg
NTN 100000 - 125 3)	0 - 125 V	0 - 800 A	2 x 19" / 1200 mm	38 U / 2000 mm	800 mm	1700 kg

2) Two phase mains connection  
3) Three phase mains connection

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## Series NTN from 6,5 V to 350 V / 35 W to 100 kW



Type	Voltage	Current	Width	Height	Depth	Weight
NTN 700 - 200	0 - 200 V	0 - 3 A	19" / 443 mm	4 U / 177 mm	350 mm	24 kg
NTN 1400 - 200	0 - 200 V	0 - 6 A	19" / 443 mm	4 U / 177 mm	450 mm	42 kg
NTN 2800 - 200 2)	0 - 200 V	0 - 12 A	19" / 443 mm	5 U / 221 mm	550 mm	55 kg
NTN 4200 - 200 2)	0 - 200 V	0 - 20 A	19" / 443 mm	9 U / 399 mm	550 mm	90 kg
NTN 7000 - 200 3)	0 - 200 V	0 - 30 A	19" / 600 mm	20 U / 1100 mm	600 mm	240 kg
NTN 10500 - 200 3)	0 - 200 V	0 - 50 A	19" / 600 mm	29 U / 1500 mm	600 mm	360 kg
NTN 14000 - 200 3)	0 - 200 V	0 - 60 A	19" / 600 mm	29 U / 1500 mm	600 mm	400 kg
NTN 21000 - 200 3)	0 - 200 V	0 - 100 A	19" / 600 mm	38 U / 2000 mm	800 mm	490 kg
NTN 28000 - 200 3)	0 - 200 V	0 - 120 A	19" / 600 mm	38 U / 2000 mm	800 mm	650 kg
NTN 35000 - 200 3)	0 - 200 V	0 - 150 A	19" / 600 mm	38 U / 2000 mm	800 mm	800 kg
NTN 50000 - 200 3)	0 - 200 V	0 - 250 A	19" / 600 mm	38 U / 2000 mm	800 mm	1200 kg
NTN 100000 - 200 3)	0 - 200 V	0 - 500 A	2 x 19" / 1200 mm	38 U / 2000 mm	800 mm	1600 kg
NTN 700 - 350	0 - 350 V	0 - 2 A	19" / 443 mm	4 U / 177 mm	350 mm	24 kg
NTN 1400 - 350	0 - 350 V	0 - 4 A	19" / 443 mm	4 U / 177 mm	450 mm	42 kg
NTN 2800 - 350 2)	0 - 350 V	0 - 8 A	19" / 443 mm	5 U / 221 mm	550 mm	55 kg
NTN 4200 - 350 2)	0 - 350 V	0 - 12 A	19" / 443 mm	9 U / 399 mm	550 mm	90 kg
NTN 7000 - 350 3)	0 - 350 V	0 - 20 A	19" / 600 mm	20 U / 1100 mm	600 mm	240 kg
NTN 10500 - 350 3)	0 - 350 V	0 - 30 A	19" / 600 mm	29 U / 1500 mm	600 mm	275 kg
NTN 14000 - 350 3)	0 - 350 V	0 - 40 A	19" / 600 mm	29 U / 1500 mm	600 mm	400 kg
NTN 21000 - 350 3)	0 - 350 V	0 - 60 A	19" / 600 mm	38 U / 2000 mm	800 mm	490 kg
NTN 28000 - 350 3)	0 - 350 V	0 - 80 A	19" / 600 mm	38 U / 2000 mm	800 mm	650 kg
NTN 35000 - 350 3)	0 - 350 V	0 - 100 A	19" / 600 mm	38 U / 2000 mm	800 mm	800 kg
NTN 70000 - 350 3)	0 - 350 V	0 - 200 A	2 x 19" / 1200 mm	38 U / 2000 mm	800 mm	1350 kg
NTN 100000 - 350 3)	0 - 350 V	0 - 300 A	2 x 19" / 1200 mm	38 U / 2000 mm	800 mm	1600 kg

- 2) Two phase mains connection
- 3) Three phase mains connection

### Design Example



**NTN 4200M - 200**  
200V / 20A  
Customised version  
with polarity reversal



**NTN 10500 - 200**  
200V / 50A