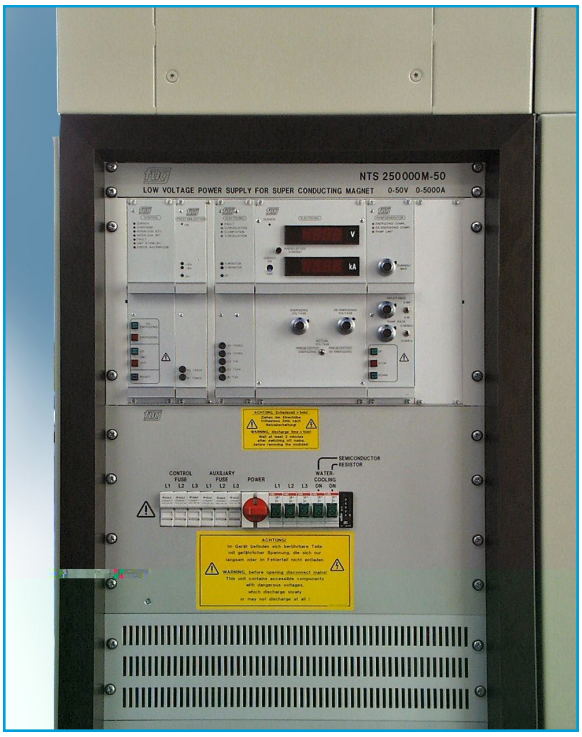
Power supplies for superconducting coils
Series NTS to 65 V / to 10000 A



Design examples

NTS 250000M - 50
Front plate

Features:

- High efficiency
- Short circuit proof and with unlimited operation at full current in short-circuit condition
- Sense terminals for the compensation of the voltage drop on the power lines. By presetting the voltage, a linear current ramp can be generated
- Energizing and de-energizing voltage can be preset with a single potentiometer
- Constant voltage operation for linear up and down control
- Linear de-energization, with reverse voltage permitted up to the nominal value of the output voltage (2-quadrant operation)
- Interlock loop to monitor the external load and internal loop as a standard

Function:

Designed specifically for superconducting coil applications. This power supply family is series regulated, via a set of parallel transistors, which are driven from a pre-regulation stage which utilises phase controlled thyristors. In this manner, the power lost across the output transistors is kept to minimum. Thus, the final control element always has a low power dissipation in energizing and static constant current mode.
In de-energizing mode, the transistor stage is working as a current sink and the power is dissipated by means of either air or water cooling.

Cooling:

Up to approx. 1000A (or approx. 5kW de-energizing power), air cooling. For higher currents, or higher powers, water cooling.

Design:

- Up to 200A (or approx. 2.5 kW) in 19'' table-top cases or plug-in units.
- Units with higher current or power are supplied as 19" cabinets on roller blades. The side panels can be removed, the rear door can be locked.
- All cabinets have removable crane-eyes.

Output:

- Output isolation:

  The output is floating. Operating voltage with respect to earth: for air cooled units max. ±300V DC, for water cooled units max. ±100V DC.
- Output terminals:

  Up to 100A, clamps on the rear. 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 700W and higher:
  400V ±10% 47Hz to 53Hz, three-phase
- Ambient temperature:

  0°C to +40°C

All following data are guide values and will be modified according to the specification.
(For explanations please refer to Definitions and Terms)

- Setting range for current:
  from approx. 0,1% to 100%
- Setting range for voltage:
  from -100% to +100%
- Setting resolution:
  $\pm 1 \times 10^{-4}$ to $\pm 1 \times 10^{-6}$
- Residual ripple (Voltage 0-20MHz):
  approx. 1×10^{-3}pp
- Residual ripple (Current 0-20MHz):
  $\pm 1 \times 10^{-4}$pp to $\pm 1 \times 10^{-6}$pp
  depending on inductivity of the load
- Run up time:
  from 1sec. to 100 hours
- Deviation:
  For ±10% mains voltage variation:
  $< \pm 1 \times 10^{-5}$
  For no load / full load:
  $< 2 \times 10^{-4}$
  Over 8 hours under constant conditions:
  $< \pm 1 \times 10^{-4}$ to $\pm 1 \times 10^{-5}$
  Within the temperature range:
  $< \pm 1 \times 10^{-4}$ to $\pm 5 \times 10^{-6}$ /K

Possible Options:

- Analog programming (see page 44)
- Analog programming, floating (see page 44)
- DVM with higher resolution
- Computer interfaces - IEEE 488, RS 232, RS 422, Profibus DP, USB, LAN (more on request) (see page 46)
- Higher stability
- Current control by electronic ramp with digital control; rise and fall times are adjustable manually or via computer interface
- Current limit setting either manually or via computer interface. Resolution up to 1×10^{-5} for external setting
- High speed turn-off input with adjustable threshold
- Quench detector to monitor the magnet
- Fast de-energizing in the event of quench or mains failure: A DC circuit breaker or a semiconductor switch disconnects the power supply from the magnet. De-energization takes place with a power resistor, actuated at quench, or via an external circuit
- Short circuit switch (Current source 100mA for heating a sector of the superconducting circuit)
- Water cooling

More options and special solutions on request.

For this type of power supplies we don't indicate a range of standard types since it is meaningful to adapt the power and equipment of the units for each single application.

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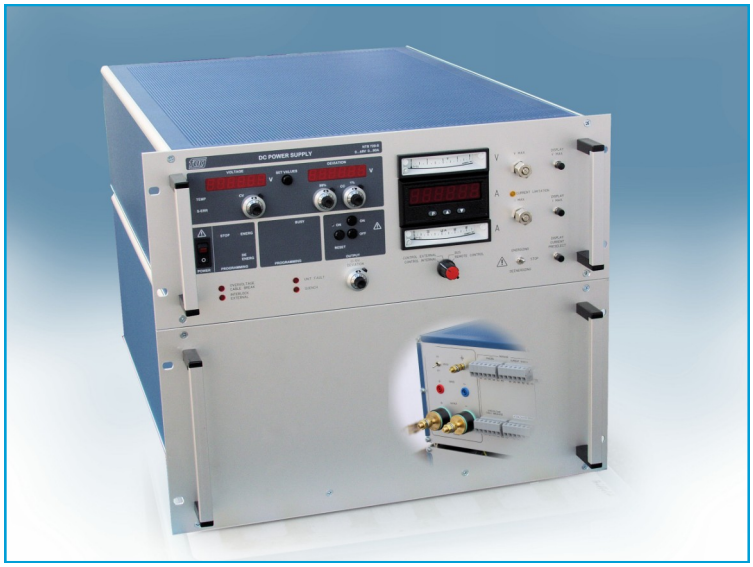
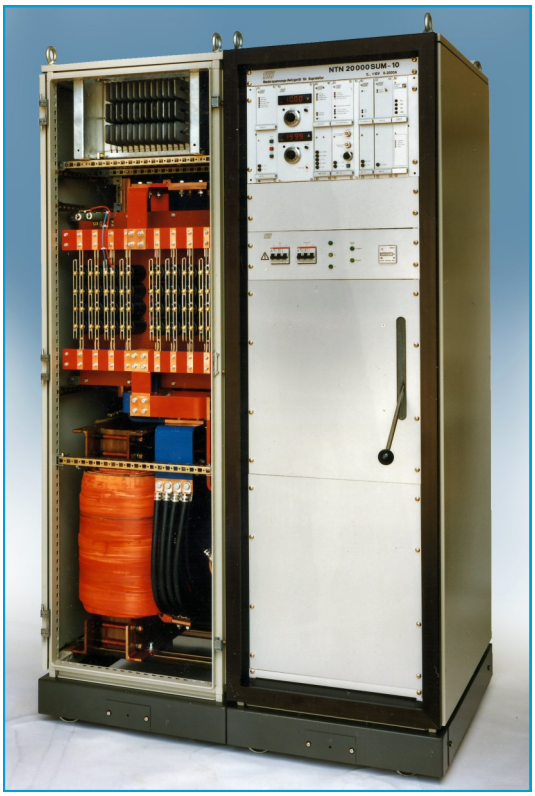


NTS 720 - 8 mod.
8V / 90A
customer specific design for
high temperature super
conductor



NTS 20000M - 10
10V / 2000A

NTS 250000M - 50
50V / 5000A

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