



HIGH VOLTAGE POWER SUPPLY

HIGHEST RELIABILITY FOR HV AND VACUUM PROCESS APPLICATIONS
FROM 1 kV–150 kV AND 2 kW– 21 kW UP TO 210 kW IN PARALLEL MODE



**J. Schneider
Elektrotechnik**

AT THE FOREFRONT OF THE TECHNOLOGICAL DEVELOPMENT HIGH VOLTAGE POWER SUPPLIES

At J. Schneider Elektrotechnik the departments key account management and development work close together. They build a competent team of sales engineers, of hardware and software developers, electronic engineers and skilled workers. These specialists observe the market, the clients' needs and the scientific developments to identify the most important trends in high voltage and vacuum processes. This enables us to develop the most sophisticated high voltage power supplies that the global market needs for its future applications.

A WIDE RANGE OF STANDARDIZED OR CUSTOMIZED SOLUTIONS FOR YOUR REQUIREMENTS

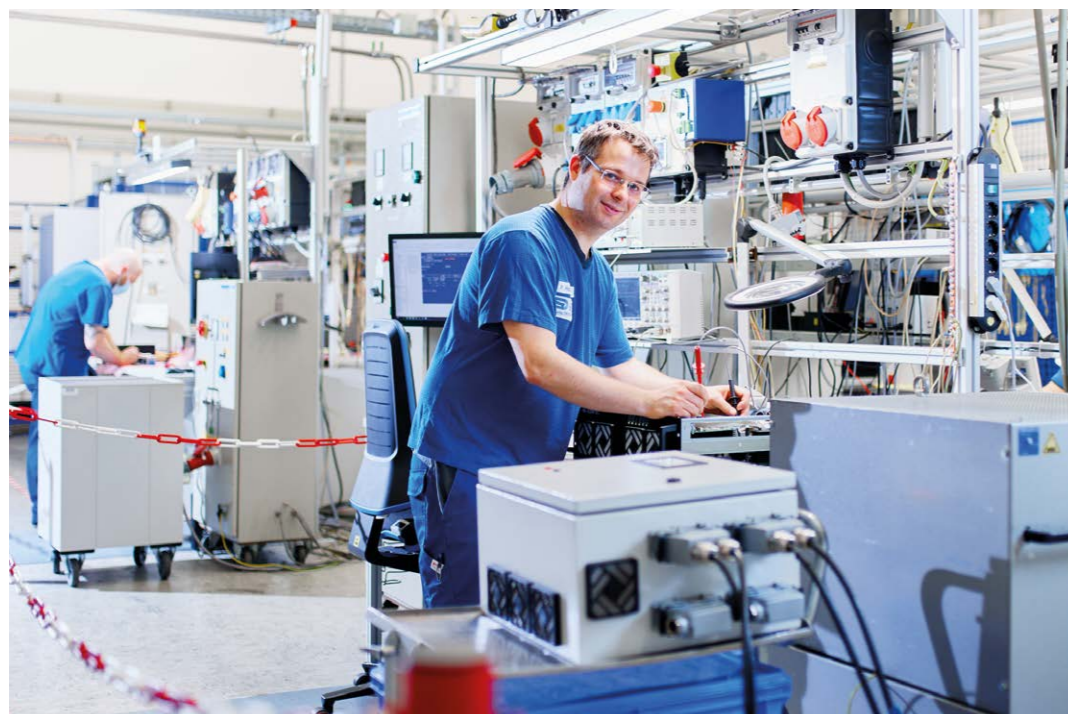
In this brochure you find an overview of a wide range of solutions for your high voltage applications. If you don't find the right devices that meet your requirements, we would be pleased to develop a customized solution for you.

JUST ONE SINGLE SOURCE FROM DEVELOPMENT TO SERVICE

Development, production, distribution and service all come from J. Schneider Elektrotechnik GmbH. Therefore you can rely on a close teamwork in each stage of the lifecycle. Further developments are made close to the market requirements, customer specified modifications are realized in close cooperation between sales and development department. Very good product knowledge guarantees an optimized service and maintenance.

HIGHEST QUALITY MADE IN GERMANY

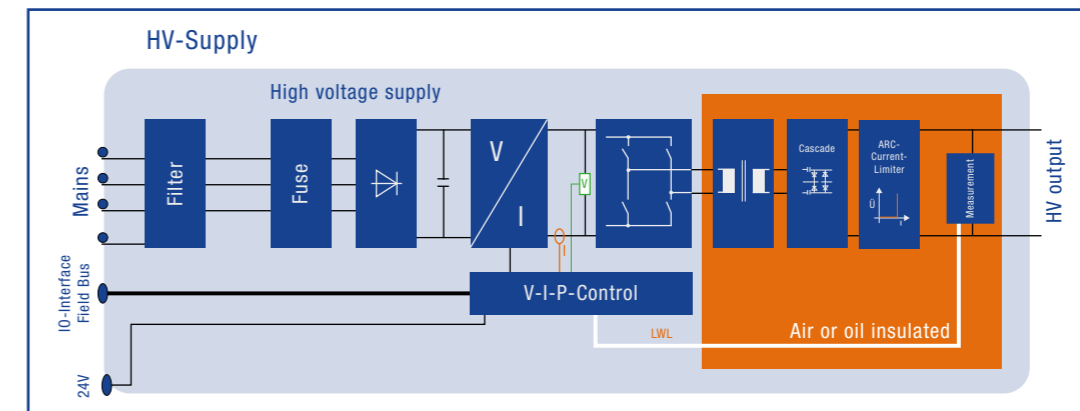
All J. Schneider high voltage power supplies are developed and produced in our plant in Germany. Before delivery each of these power supplies undergoes a final device test and a burn-in test.



PROVEN CIRCUIT TOPOLOGY

The high voltage power supplies include a modern current fed converter technology, a digital regulation and a configurable arc management. The extreme compact high voltage devices use our patented current limitation, which restricts the output current to max. five times of the nominal output current. Therefore the process runs more smoothly and stable, which leads to better results.

For more convenient control every high voltage power supply is delivered with a galvanic isolated analogue/digital I/O-interface and RS232-interface. The interfaces are partially powered by a separate 24 V supply. This ensures communication with the high voltage device even when the interlock circuit is open.



ADVANTAGES AT A GLANCE

- Rugged current fed technology
- High frequency design for fast transient response and low output ripple
- High efficiency through the partial use of SiC (silicon carbide) modules
- Very low stored output energy
- Patented arc current limitation to max. 5 times nominal current
- Very fast and adjustable arc detection and fast response
- Easy adjust of control and steering parameters due to digital technology
- Fully digital control leads to
 - Fast control loop
 - Fast reaction on unsteady events e.g. an arc
 - Smooth tuning of the process
- Logging of the essential supply data for the most supplies
- Bootloader for service and software updates

PRODUCTION

All J. Schneider high voltage power supplies are developed and produced in Germany. Before delivery, each module undergoes a final device test and a burn-in test at 40 °C ambient temperature under full load. Each device has a unique serial number, which ensures traceability over the entire life cycle of the product.

THE HV TEC SERIES OVERVIEW

CAPTEC FOR PRECISE CHARGING

The capacitor charge power supplies type **CAPTEC** are switch-mode power supplies that charge the connected capacitor to the desired DC voltage. Up to 10 kV the devices are air insulated and from 10 kV up to 60 kV they are oil insulated. Individual modules are available in these power types 2, 3, 5, 10 and 21 kW. The individual modules can be connected in parallel operation to increase the output power.

GLOWTEC FOR HIGH VOLTAGE GLOW PROCESSES

The power supplies of the **GLOWTEC DC** series are specially adapted for high voltage plasma processes like glow processes. Due to the extensive voltage and power range as well as the various adjustment possibilities, the devices are successfully used in a great variety of other applications, too. Options for the devices are an integrated interlock for the safe separation of the power converter from the mains, a patented arc current limitation which restricts current peaks to five times of the rated current as well as an arc counter.

Within this series we also offer the **GLOWTEC DCp**, a high voltage power supply with an unipolar pulsed output voltage at an output frequency of 76 kHz, and the **GLOWTEC AC**, a high voltage power supply with a bipolar pulsed output voltage at an output frequency of 38 kHz and a voltage range from 2 to 5 kV AC or 8 kV AC on request.

VAPTEC FOR ELECTRON BEAM EVAPORATION PROCESSES

The power supplies of the **VAPTEC** series are specially designed for electron beam evaporation processes. This series includes the high voltage power supply NHCR which provides an output voltage of 8 or 10 kV DC as well as the necessary cathode heat transformer NDRG and the XY-sweep amplifier RNTR. In the 2 or 3 kW version the high voltage power supplies also include the cathode heat transformer in the cabinet.

Improved evaporation processes use an ion source to accelerate the electrons. Therefore we have also developed the necessary ion source supply NDOR in the **VAPTEC** series.

LITEC FOR LINEAR ION SOURCES

The high voltage power supplies of the **LITEC** series are developed for the requirements of linear ion sources that work according to the anode layer principle. The **LITEC** devices are available with two different output voltages of 3 or 5 kV and output ratings of 6 and 12 kW. The **LITEC** series is water-cooled and therefore built very compactly.

WELTEC FOR E-BEAM WELDING AND MORE

The power supplies of the **WELTEC** series are specially developed for e-beam welding, e-beam melting, industrial x-ray applications and sterilization applications. They are water-/oil-cooled and it is possible to integrate the necessary auxiliary equipment such as heat or Wehnelt supply. They are available with output voltages of 60, 120 or 150 kV and with output ratings of 5, 10 and 15 kW.

SERIES OVERVIEW	POWER [kW]	1 KV AIR ISOLATED	2 KV AIR ISOLATED	3 KV AIR ISOLATED	5 KV AIR ISOLATED	8 KV AIR ISOLATED	10 KV AIR ISOLATED / OIL ISOLATED	20 KV OIL ISOLATED	30 KV OIL ISOLATED	40 KV OIL ISOLATED	50 KV OIL ISOLATED	60 KV OIL ISOLATED	120 KV OIL ISOLATED	150 KV OIL ISOLATED	Number of possible parallel devices to increase power	Interfaces: analogue / digital and RS232	Touch Panel	Fieldbus: Profibus, EtherCat, CAN, Profinet
CAPTEC	2	✓	✓	✓	✓	✓									7	S	0	0
CAPTEC	3	✓	✓	✓	✓	✓									7	S	0	0
CAPTEC	5	✓	✓	✓	✓	✓	✓								7	S	0	0
CAPTEC	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	7 (2)	S	0	0
CAPTEC	15										✓	✓	✓	✓	2	S	0	0
CAPTEC	21				✓		✓	✓	✓	✓					7	S	0	0
GLOWTEC DC	1,5		✓	✓	✓	✓										S	0	0
GLOWTEC DC	3		✓	✓	✓	✓										S	0	0
GLOWTEC DC	5		✓	✓	✓	✓	✓								7	S	0	0
GLOWTEC DC	10		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	7 (2)	S	0	0
GLOWTEC DC	15										✓	✓	✓	✓	2	S	0	0
GLOWTEC DC	21						✓	✓	✓	✓					7	S	0	0
GLOWTEC DCp / AC	5		✓	✓	✓	✓									7/2	S	0	0
GLOWTEC DCp / AC	10		✓	✓	✓	✓									7/2	S	0	0
GLOWTEC DCp / AC	20		✓	✓	✓	✓									7/2	S	0	0
VAPTEC	2					✓									0	S	0	0
VAPTEC	3					✓									0	S	0	0
VAPTEC	5					✓	✓								7	S	0	0
VAPTEC	10					✓	✓								7	S	0	0
VAPTEC	20						✓	✓	✓	✓		✓			7	S	0	0
LITEC	6			✓	✓										10	S	S	0
LITEC	12			✓	✓										10	S	S	0
WELTEC	7.5											✓	✓	✓	2	S	0	0
WELTEC	10											✓	✓	✓	2	S	0	0
WELTEC	15											✓	✓	✓	2	S	0	0

- ✓ = air cooled
- ✓ = water cooled
- ✓ = on request
- S = Standard
- 0 = Option



FOR PRECISE CHARGING

CAPACITOR CHARGE POWER SUPPLY | CAPTEC

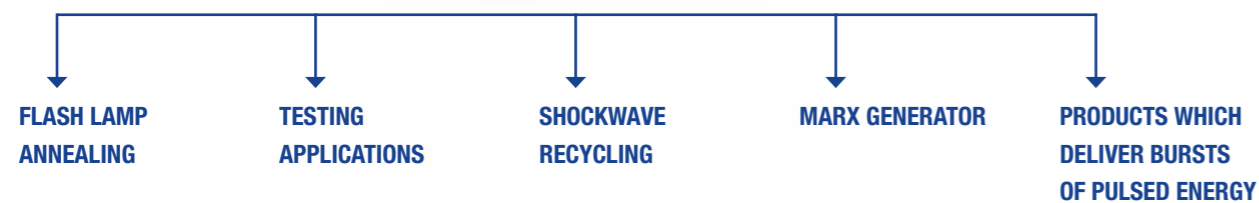
The capacitor charge power supplies type **CAPTEC** are switch-mode power supplies that work with the state-of-the-art current fed converter technology. By the use of this technology the output of the power supply acts like a current source, which is ideal for the charge of capacitors. The regulation of current, voltage and power reaches excellent precision by the use of the digital regulation board.

After the device has been switched on, the power supply unit charges the connected capacitor to the set point value U_{out} . The charging time depends on the capacity as well as the adjusted set points for I_{out} and P_{out} . When the device has reached the desired output voltage, the power supply switches off automatically. This can be reported via all interfaces. If the output voltage falls below the adjusted value, the power supply stays inactive until the adjusted pause time is over before it starts again autonomously with the next charging cycle. The release does not have to be removed during the charging and discharging phase. A counter keeps the current number of loads since the last release. If the capacitor to be charged must be held in the charged state for an extended period of time, it is possible to activate the so-called „maintenance charge“. The power supply always charges the capacitor according to the adjusted value as soon as the actual value of the output voltage deviates by a defined quantity.

Standard	Description	Options
- Analogue and digital I/O-interface	- Up to 10 kV air cooled and air insulated	- Profibus, Canbus or EtherCat
- RS232-interface	- Above 10 kV oil insulated	
- Digital regulation (U,I,P)	- Remote control	
- No output voltage overshoot	(RS232 ↔ Hyper terminal) possible	
- Conservation charging		

APPLICATIONS

CAPACITOR CHARGE



BASIC TECHNICAL DATA

MAINS

Input voltage: 3 x 400 V AC ± 10 %
 Frequency: 50 / 60 Hz ± 5 %

OUTPUT

Output voltage: continuous, stable adjustment
 from 0 to rated voltage/current/power
 1 kV to 60 kV
 Output power: 1 kJ/sec to 7.5 kJ/sec up to 60 kV
 (higher voltages on request)
 1 kJ/sec to 10.5 kJ/sec up to 40 kV
 (higher powers realized by parallel connection)

INTERFACES

Analogue set point: 0–10 V for voltage/current/power directly proportional
 Analogue monitor: 0–10 V voltage/current/power directly proportional
 Digital inputs / outputs: enable HV, HV ok, error
 RS232: PLC mode or Terminal mode
 Field bus: please see page options

SELECTION TABLE CAPTEC

MAXIMUM OUTPUT RATING				MODULE DIMENSION	COOLING	ISOLATION	MODULE NUMBER
kV _{DC}	mA	kW	J/sec	(H X W X D)			* specify polarity N for negative, P for positive
1	2000	2	1000	3HU x 19" x 580 mm *a.)	Air	Air	CAPTEC 0012k0
1	3000	3	1500	3HU x 19" x 580 mm *a.)	Air	Air	CAPTEC 0013k0
1	5000	5	2500	4HU x 19" x 660 mm *b.)	Air	Air	CAPTEC 0015k0
1	10000	10	5000	4HU x 19" x 660 mm *b.)	Air	Air	CAPTEC 00110k
2	1000	2	1000	3HU x 19" x 580 mm *a.)	Air	Air	CAPTEC 0021k0
2	1500	3	1500	3HU x 19" x 580 mm *a.)	Air	Air	CAPTEC 0021k5
2	2500	5	2500	4HU x 19" x 660 mm *b.)	Air	Air	CAPTEC 0022k5
2	5000	10	5000	4HU x 19" x 660 mm *b.)	Air	Air	CAPTEC 0025k0
3	500	1.5	750	3HU x 19" x 580 mm *a.)	Air	Air	CAPTEC 003500
3	1000	3	1500	3HU x 19" x 580 mm *a.)	Air	Air	CAPTEC 0031k0
3.3	1500	5	2500	4HU x 19" x 660 mm *b.)	Air	Air	CAPTEC 3k31k5
3.3	3000	10	5000	4HU x 19" x 660 mm *b.)	Air	Air	CAPTEC 3k33k0
5	400	2	750	3HU x 19" x 580 mm *a.)	Air	Air	CAPTEC 005400*
5	600	3	1500	3HU x 19" x 580 mm *a.)	Air	Air	CAPTEC 005600*
5	1000	5	2500	4HU x 19" x 660 mm *b.)	Air	Air	CAPTEC 0051k0*
5	2000	10	5000	4HU x 19" x 660 mm *b.)	Air	Air	CAPTEC 0052k0*
4	5000	20	10000	3HU x 19" x 600 mm *c.)	Water	Air	CAPTEC 0045k0*
8	250	2	750	3HU x 19" x 580 mm *a.)	Air	Air	CAPTEC 008250*
8	375	3	1500	3HU x 19" x 580 mm *a.)	Air	Air	CAPTEC 008375*
8	625	5	2500	4HU x 19" x 660 mm *b.)	Air	Air	CAPTEC 008625*
8	1250	10	5000	4HU x 19" x 660 mm *b.)	Air	Air	CAPTEC 0081k2*
10	500	5	2500	4HU x 19" x 660 mm *b.)	Air	Air	CAPTEC 010500*
10	1000	10	5000	4HU x 19" x 660 mm *b.)	Air	Air	CAPTEC 0101k0*
20	500	10	5000	7HU x 19" x 725 mm *d.)	Water	Oil	CAPTEC 020500*
20	1050	21	10500	7HU x 19" x 725 mm *d.)	Water	Oil	CAPTEC 0201k0*
30	333	10	5000	7HU x 19" x 725 mm *d.)	Water	Oil	CAPTEC 030333*
30	700	21	10500	7HU x 19" x 725 mm *d.)	Water	Oil	CAPTEC 030700*
40	250	10	5000	7HU x 19" x 725 mm *d.)	Water	Oil	CAPTEC 040250*
40	525	21	10500	7HU x 19" x 725 mm *d.)	Water	Oil	CAPTEC 040525*
50	200	10	5000	10HU x 19" x 725 mm *e.)	Water	Oil	CAPTEC 050200*
50	300	15	7500	10HU x 19" x 725 mm *e.)	Water	Oil	CAPTEC 050300*
60	166	10	5000	10HU x 19" x 725 mm *e.)	Water	Oil	CAPTEC 060166*
60	250	15	7500	10HU x 19" x 725 mm *e.)	Water	Oil	CAPTEC 060250*

Higher voltages on request

FOR HIGH VOLTAGE GLOW PROCESSES AND MORE

HIGH VOLTAGE POWER SUPPLY | GLOWTEC DC OR DCp OR AC

The glow discharge power supplies of the **GLOWTEC** series are switch-mode power supplies that work with the state-of-the-art current fed converter technology. By the use of this technology the output of the power supply acts like a current source, which is ideal for the use in glow discharge and high voltage plasma processes. Current, voltage and power reach excellent precision due to digital regulation.

Each of these power supplies comes with an integrated configurable arc management. For simple DC glow discharge processes the **GLOWTEC DC** is the right choice. It limits the output current by a resistor. For more sophisticated DC processes a patented and optionally integrated arc current limitation is available. It restricts the output current to max. five times of the nominal current during an arc.

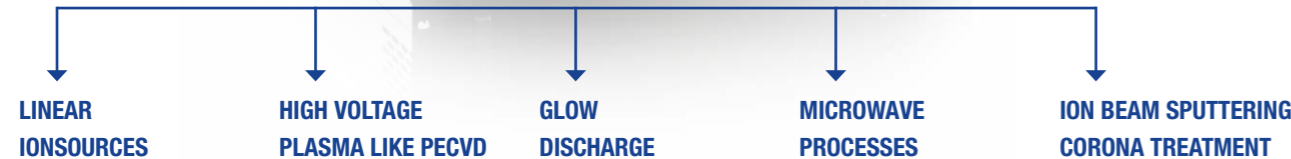
TWO MORE DEVICES IN THIS SERIES: THE GLOWTEC DCp AND THE GLOWTEC AC

The **GLOWTEC DCp** delivers a square wave unipolar pulsed output voltage up to 5 kV (8 kV on request) at an output frequency of 76 kHz and the **GLOWTEC AC** a bipolar pulsed output voltage up to 5 kV (8 kV on request) at an output frequency of 38.5 kHz. The duty cycle can be adjusted in a wide range from 1 up to 11.8 µsec.

Standard	Description	Options
- Analogue and digital I/O-interface	- Up to 10 kV air cooled and air insulated	- Profibus, Canbus or EtherCat
- RS232-interface	- Above 10 kV oil insulated	
- Digital regulation (U,I,P)	- Remote control	
- Configurable arc management	(RS232 ↔ Hyper terminal) possible	
- Up to 5 kV potential free output (from 5 kW)		

APPLICATIONS

PRE CLEANING



BASIC TECHNICAL DATA

MAINS

Input voltage: 3 x 400 V AC ± 10 %
 Frequency: 50 / 60 Hz ± 5 %

OUTPUT

Output voltage V_{av} : continuous, stable adjustment from 0 to rated voltage/current/power
 2 kV to 60 kV
 Output power: 2 kW to 15 kW (21 kW) (higher power can be realized by parallel connection)
 Nom. output frequency DC: pure DC
 Nom. output frequency DCp: unipolar pulsed 76 kHz
 Nom. output frequency AC: bipolar pulsed 38.5 kHz
 Duty cycle (DCp and AC): adjustable from 7.6 % to 93.8 % (1 to 12.2 µsec)

INTERFACES

Analogue set point: 0–10 V for voltage/current/power directly proportional
 Analogue monitor: 0–10 V voltage/current/power directly proportional
 Digital inputs / outputs: enable HV, HV ok, error
 RS232: PLC mode or Terminal mode
 Field bus: please see page options

SELECTION TABLE GLOWTEC

MAXIMUM OUTPUT RATING			MODULE DIMENSION	COOLING	DC MODULE NUMBER	DCp MODULE NUMBER	AC MODULE NUMBER
kV _{DC}	mA	kW	(H X W X D)		* specify polarity N for negative, P for positive	square wave unipolar pulsed output	square wave bipolar pulsed output
2	1000	2	3HU x 19" x 580 mm *a.)	Air	GLOWTEC 0021k0		
2	1500	3	3HU x 19" x 580 mm *a.)	Air	GLOWTEC 0021k5		
2	2500	5	4HU x 19" x 660 mm *b.)	Air	GLOWTEC 0022k5	GLOWTEC DCp 0022k5	GLOWTEC AC 0022k5
2	5000	10	4HU x 19" x 660 mm *b.)	Air	GLOWTEC 0025k0	GLOWTEC DCp 0025k0	GLOWTEC AC 0025k0
3	500	1,5	3HU x 19" x 580 mm *a.)	Air	GLOWTEC 0030k6		
3	1000	3	3HU x 19" x 580 mm *a.)	Air	GLOWTEC 0031k0		
3.3	1500	5	4HU x 19" x 660 mm *b.)	Air	GLOWTEC 3k31k5	GLOWTEC DCp 3k31k5	GLOWTEC AC 3k31k5
3.3	3000	10	4HU x 19" x 660 mm *b.)	Air	GLOWTEC 3k33k0	GLOWTEC DCp 3k33k0	GLOWTEC AC 3k33k0
5	400	2	3HU x 19" x 580 mm *a.)	Air	GLOWTEC 005400		
5	600	3	3HU x 19" x 580 mm *a.)	Air	GLOWTEC 005600		
5	1000	5	4HU x 19" x 660 mm *b.)	Air	GLOWTEC 0051k0	GLOWTEC DCp 0051k0	GLOWTEC AC 0051k0
5	2000	10	4HU x 19" x 660 mm *b.)	Air	GLOWTEC 0052k0	GLOWTEC DCp 0052k0	GLOWTEC AC 0052k0
8	250	2	3HU x 19" x 580 mm *a.)	Air	GLOWTEC 008250*		
8	375	3	3HU x 19" x 580 mm *a.)	Air	GLOWTEC 008375*		
8	625	5	4HU x 19" x 660 mm *b.)	Air	GLOWTEC 008625*	GLOWTEC DCp 008625 ¹	GLOWTEC AC 008625 ¹
8	1250	10	4HU x 19" x 660 mm *b.)	Air	GLOWTEC 0081k2*	GLOWTEC DCp 0081k2 ¹	GLOWTEC AC 0081k2 ¹
10	500	5	4HU x 19" x 660 mm *b.)	Air	GLOWTEC 010500*		
10	1000	10	4HU x 19" x 660 mm *b.)	Air	GLOWTEC 0101k0*		
10	2100	21	6HU x 15" x 600 mm *c.)	Water	GLOWTEC 0102K0		
20	500	10	7HU x 19" x 725 mm *d.)	Water	GLOWTEC 020500*		
20	1050	21	7HU x 19" x 725 mm *d.)	Water	GLOWTEC 0201k0*		
30	333	10	7HU x 19" x 725 mm *d.)	Water	GLOWTEC 030333*		
30	700	21	7HU x 19" x 725 mm *d.)	Water	GLOWTEC 030700*		
40	250	10	7HU x 19" x 725 mm *d.)	Water	GLOWTEC 040250*		
40	525	21	7HU x 19" x 725 mm *d.)	Water	GLOWTEC 040525*		
50	200	10	10HU x 19" x 725 mm *d.)	Water	GLOWTEC 050200*		
50	300	15	10HU x 19" x 725 mm *d.)	Water	GLOWTEC 050300*		
60	166	10	10HU x 19" x 725 mm *d.)	Water	GLOWTEC 060166*		
60	250	15	10HU x 19" x 725 mm *d.)	Water	GLOWTEC 060250*		

¹ On request

FOR ELECTRON BEAM EVAPORATION PROCESSES

E-BEAM POWER SUPPLY | VAPTEC

The **VAPTEC** series is specially designed for electron beam evaporation processes. This series contains the high voltage power supply NHCR as well as the necessary cathode heat transformer NDRG and the XY-sweep amplifier RNTR.

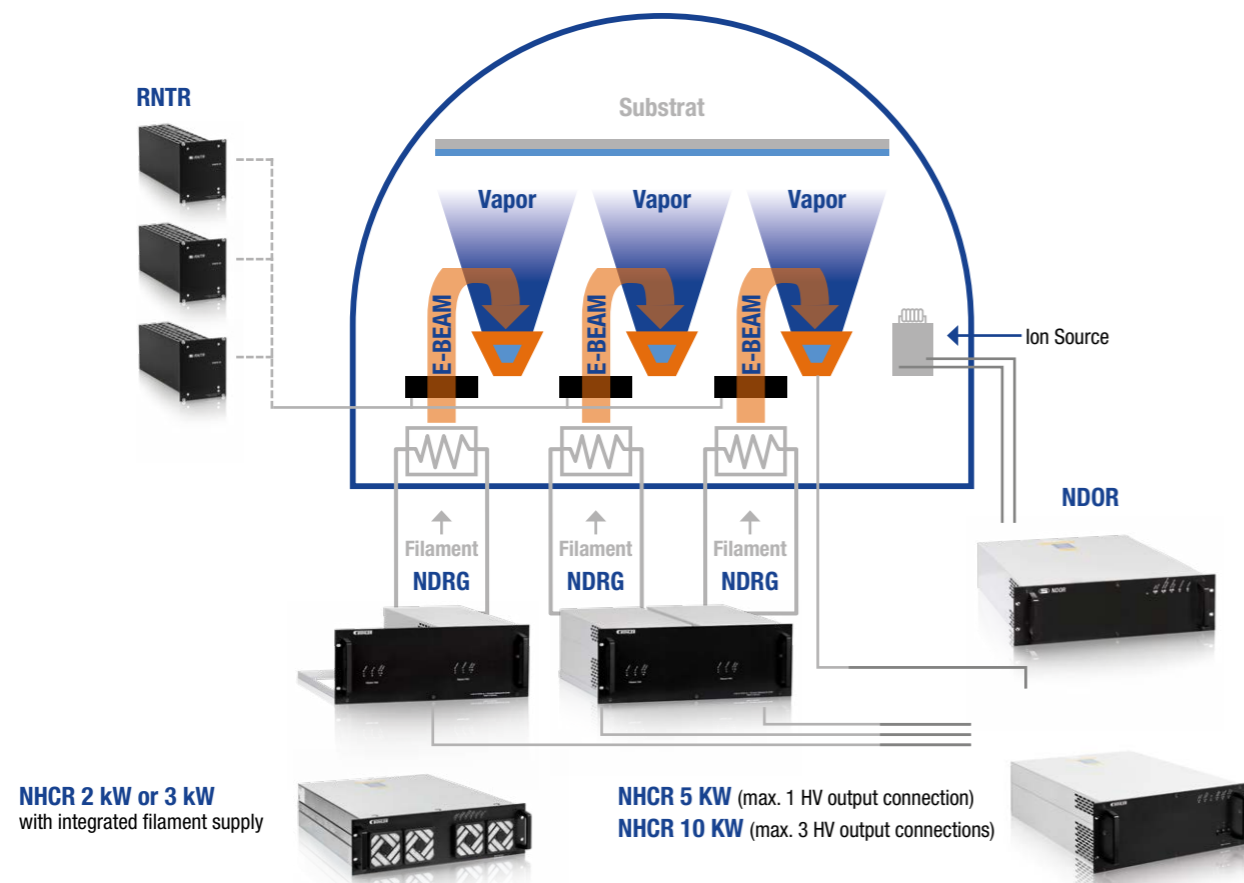
The newly developed NHCR is a switch-mode power supply with the state of the art current fed converter technology including a digital regulation, a configurable arc management and our patented arc current limitation. If an arc is recognized, the patented arc current limitation restricts the output current peaks up to max. five times of the rated current.

Three versions are available: with 2, 3, 5, 10 and 20 kW. The 2 and 3 kW models include the cathode heat transformer in one cabinet. Both deliver an output voltage of 8 kV. The 5, 10 and 20 kW model has an output voltage of 10 kV. The integrated cathode transformer of the 2 and 3 kW versions provides a heat current of 26 or 35 A at an output voltage of 8 V DC.

Ion supply NDOR: As most evaporation processes use an ion source to accelerate the electrons, the necessary ion supply NDOR was developed for the **VAPTEC** series. It includes the anode power supply, the filament supply and measurements for the neutralization current.

The XY-sweep amplifier RNTR is a power amplifier designed to drive inductive loads. Typically it works as a power source. This power amplifier is used to drive the coil device of the horizontal deflection circuit of the electron beam for the purpose of uniform material evaporation. Usually the beam in these applications should be deflected horizontally in both the X and Y directions. Therefore the deflection stage has two independent channels.

E-BEAM EVAPORATION



BASIC TECHNICAL DATA

MAINS

Input voltage: NHCR: 3 x 400 V AC \pm 10 %
 NDRG: 2 x 400 V AC \pm 10 %
 NDOR: 3 x 400 V AC \pm 10 %
 Frequency: 50 / 60 Hz \pm 5 %

OUTPUT

Output NHCR: continuous, stable adjustment
 from 0 to rated voltage/current/power
 Output NDRG: continuous, stable adjustment
 from 0 to rated current
 Output NDOR: More details please see selection table below

INTERFACES

Analogue set point: 0–10 V for voltage/current/power
 directly proportional
 Analogue monitor: 0–10 V voltage/current/power
 directly proportional
 Digital inputs / outputs: enable HV, HV ok, error
 RS232 for NHCR: PLC mode or Terminal mode
 Field bus for NHCR: please see page options

SELECTION TABLE VAPTEC

MAXIMUM OUTPUT RATING						MODULE DIMENSION	COOLING	MODULE NUMBER
NHCR HIGH VOLTAGE POWER SUPPLY			FILAMENT POWER SUPPLY			(H X W X D)		
kV _{DC}	mA	KW	VDC	A	W			
-8	250	2	8	26	208	3HU x 19" x 580 mm *a.)	Air	VAPTEC 008250
-8	375	3	8	35	280	3HU x 19" x 580 mm *a.)	Air	VAPTEC 008375
-10	500	5	-	-	-	4HU x 19" x 660 mm *b.)	Air	VAPTEC 010500
-10	1000	10	-	-	-	4HU x 19" x 660 mm *b.)	Air	VAPTEC 01001k
-10	2000	20	-	-	-	6HU x 19" x 600 mm *b.)	Water	VAPTEC 0102k0
-20	1050	21	-	-	-	7HU x 19" x 725 mm *d.)	Water	VAPTEC 021k0
-30	700	21	-	-	-	7HU x 19" x 725 mm *d.)	Water	VAPTEC 030700
-40	525	21	-	-	-	7HU x 19" x 725 mm *d.)	Water	VAPTEC 040525
-60	350	21	-	-	-	9HU x 19" x 725 mm *d.)	Water	VAPTEC 060350
NDRG FILAMENT POWER SUPPLY			INCLUDED REGULATIONS			(H X W X D)		
VDC	A	W	FILAMENT	EMISSION				
8	35	280	yes	yes		4HU x 19" x 450 mm	Air	NDRG 0850
6	55	330	yes	yes		4HU x 19" x 450 mm	Air	NDRG 0655
6	55	330	yes	no		4HU x 19" x 450 mm	Air	NDRG 0655
NDOR ANODE POWER SUPPLY			FILAMENT POWER SUPPLY			(H X W X D)		
VDC	A	W	VAC	A	W			
180	6	1080	40	25	1000	4HU x 19" x 400 mm	Air	NDOR 180006
300	10	3000	40	25	1000	3HU x 19" x 640 mm	Air	NDOR 300010
RNTR INPUT VOLTAGE U _i			OUTPUT VOLTAGE U _o (2 CHANNELS)			(H X W X D)		
VDC			VDC	A				
24 +/-10 %			= U _i - 2.5	0-3A		3HU x 21TE x 300 mm	Air	RNTR 2403

FOR FOR LINEAR ION SOURCES HIGH VOLTAGE DC POWER SUPPLY | LITEC

The high voltage power supplies of the **LITEC** series are water-cooled and specially designed for the requirements of linear ion sources that are developed after the anode layer principle. They are available with output voltages of 3 and 5 kV and output power of 6 and 12 kW. The **LITEC** series is characterized by a sophisticated arc management, flexibly adjustable via touch panel and due to the water-cooling by an extremely compact design. In addition, both the positive or the negative pole of the output can be connected to ground. To increase the power the **LITEC** devices can be used in parallel mode.

Used together with a linear anode layer gridless ion source, typical applications are pre-cleaning, etching, surface modification, ion beam sputter deposition (IBD) and ion beam assisted deposition (IBAD).

Standard	Description	Options
<ul style="list-style-type: none"> - Analogue and digital I/O-interface - RS232-interface - Digital regulation (U,I,P) - Configurable arc management (up to four parameter sets storeable) - Parallel mode to increase power - Integrated Touch Panel 	<ul style="list-style-type: none"> - Devices are available with different output voltages - Remote control (RS232 ↔ Hyper terminal) possible 	<ul style="list-style-type: none"> - Profibus, Canbus or EtherCat

APPLICATIONS

PRE CLEANING



BASIC TECHNICAL DATA

MAINS

Input voltage: 3 x 400 V AC ± 10 %
Frequency: 50 / 60 Hz ± 5 %

OUTPUT

(POSITIVE OR NEGATIVE OUTPUT COULD BE GROUNDED)

Nom. output voltage V: please see selection table
Nom. output power kW: please see selection table
Nom. output current A: please see selection table

INTERFACES

Touch panel built-in as standard: for more details please see page "options"
Analogue set point: 0–10 V for voltage/current/power directly proportional
Analogue monitor: 0–10 V voltage/current/power directly proportional
Digital inputs / outputs: enable HV, HV ok, error
RS232: PLC mode or Terminal mode
Field bus: please see page options

SELECTION TABLE LITEC

MAXIMUM OUTPUT RATING			MODULE DIMENSION	COOLING	ISOLATION	MODULE NUMBER
kV _{DC}	mA	kW	(H X W X D)			
3	2000	6	4HU x 19" x 650 mm	Water	Air	LITEC 0032k0
3	4000	12	4HU x 19" x 650 mm	Water	Air	LITEC 0034k0
5	1200	6	4HU x 19" x 650 mm	Water	Air	LITEC 0051k2
5	2400	12	4HU x 19" x 650 mm	Water	Air	LITEC 0052k4

FOR E-BEAM WELDING AND MORE

E-BEAM WELDING POWER SUPPLY | WELTEC

The power supplies of the **WELTEC** series are specially developed for e-beam welding, e-beam melting, industrial x-ray applications and sterilization applications. The high voltage power supplies come with the current fed converter technology, a digital regulation, our patented arc current limitation as well as a configurable arc management. The arc current limitation restricts the output current in case of an arc. Therefore the process runs more smoothly and stable. The **WELTEC** devices are water-/oil-cooled and can be featured with more auxiliary equipment such as heat or Wehnelt supply. They are available with output voltages of 60, 120 or 150 kV and with output ratings of 7.5, 10 and 15 kW.

- | | | |
|---|---|--|
| Standard | Description | Options |
| <ul style="list-style-type: none"> - Analogue and digital I/O-interface - RS232-interface - Digital regulation (U,I,P) - Configurable arc management (up to four parameter sets store able) - Bootloader for service | <ul style="list-style-type: none"> - Device are available with different output voltages - Remote control (RS232 ↔ Hyper terminal) possible | <ul style="list-style-type: none"> - Profibus, Canbus or EtherCat |

APPLICATIONS

E-BEAM WELDING

is a fusion welding process in which a beam of high-velocity electrons is applied to two materials to be joined.



BASIC TECHNICAL DATA

MAINS

Input voltage: 3 x 400 V AC ± 10 %
 Frequency: 50 / 60 Hz ± 5 %

OUTPUT

Output voltage: continuous, stable adjustment
 from 0 to rated voltage/current/power
 More details please see selection table below

INTERFACES

Touch panel: for more details please see page "options"
 Analogue set point: 0–10 V for voltage/current/power directly proportional
 Analogue monitor: 0–10 V voltage/current/power directly proportional
 Digital inputs / outputs: enable HV, HV ok, error
 RS232: PLC mode or Terminal mode
 Field bus: please see page options

SELECTION TABLE WELTEC

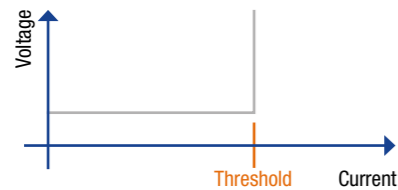
MAXIMUM OUTPUT RATING			MODULE DIMENSION	COOLING	ISOLATION	MODULE NUMBER
kV _{oc}	mA	kW	(H X W X D)			
60	125	7.5	14HU x 19" x 725 mm *d.)	Water	Oil	WELTEC 060125
60	166	10	14HU x 19" x 725 mm *d.)	Water	Oil	WELTEC 060166
60	250	15	14HU x 19" x 725 mm *d.)	Water	Oil	WELTEC 060250
120	62	7.5	1020 x 19" x 764 mm *d.)	Water	Oil	WELTEC 120062
120	83	10	1020 x 19" x 764 mm *d.)	Water	Oil	WELTEC 120083
120	125	15	1020 x 19" x 764 mm *d.)	Water	Oil	WELTEC 120125
150	50	7.5	1020 x 19" x 764 mm *d.)	Water	Oil	WELTEC 150050
150	66	10	1020 x 19" x 764 mm *d.)	Water	Oil	WELTEC 150066
150	100	15	1020 x 19" x 764 mm *d.)	Water	Oil	WELTEC 150100

OUTPUT WEHNELT 1/2 (lays on -150 kV)	
Nominal output voltage	0 up to -3 kV (measured from anode -150 up to -153 kV)
Adjustment range	0 up to -3 kV
Nominal output power	150 W
Accuracy	0,01 % of I _{a,max}
Ripple	0,5 % _{SS} of I _{a,max}
Dynamics	<5 μsec / 1 kV (≥200 V/μsec)

OUTPUT FILAMENT (lays on -150 kV)	
Nominal output voltage	12 V
Nominal output current	50 A
Adjustment range	0 – 50 A
Accuracy	0,25 % of I _{r,max}
Ripple	1 % _{SS} of I _{r,max}

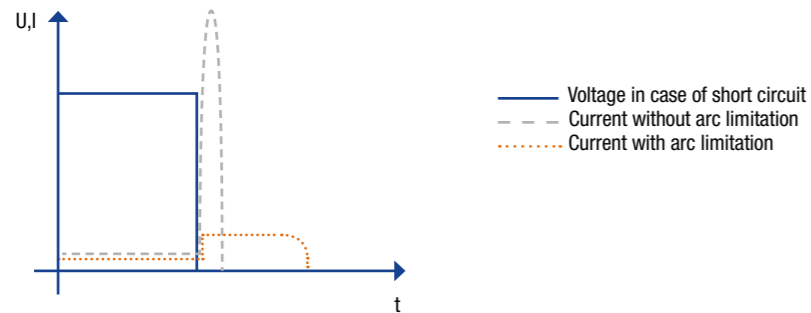
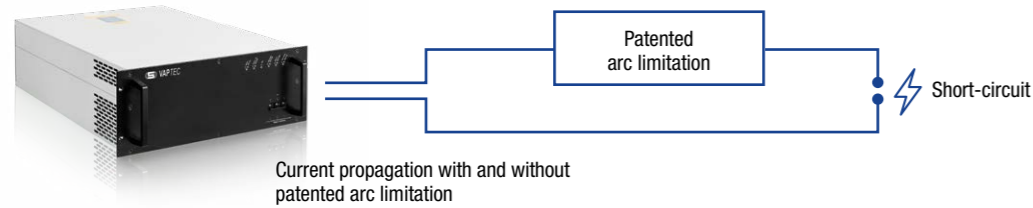
FOR SAFER AND SMOOTHER PROCESSES PATENTED ARC LIMITATION

The patented arc current limitation works like a non-linear resistance. Until the current reaches a specific level, it has low ohm resistance. Once that level is exceeded, the resistance increases proportionally, so that the current remains constant, whatever voltage applies. Therefore the process runs more smoothly and stable.



Once the current threshold is reached, current remains constant despite increasing voltage. The resistance progressively increases in this area.

The arc current limiter is switched into the high voltage circuit like a resistance. If an arc occurs, it is absolutely certain, that the current is limited to the threshold level.



Without arc current limiting, current peaks up to 1000 times of the rated current can occur. Our patented arc current limitation keeps current peaks down to 4 times of the rated current, at the very most.

ADVANTAGES

- Prolonged life of filament in electronic beam guns
- Processes, such as coating, run more smoothly as arcs are suppressed, instantly
 - Almost complete elimination of the contamination of deposited films which normally arises from the extremely high currents associated with arcs
 - Higher stoichiometry
 - Enhanced equipment reliability
 - Due to the very small current fluctuations (di/dt), there are fewer breakdowns. This leads to cost savings on such items as cables, filters and surge-voltage protection devices.
- The arc current limiter can be configured to meet your specific requirements. Versions for continuous current levels up to 10 A or voltages of up to 150 kV are already provided.

MORE CONVENIENT OPERATION VIA PC OR PLC RS232-INTERFACE *

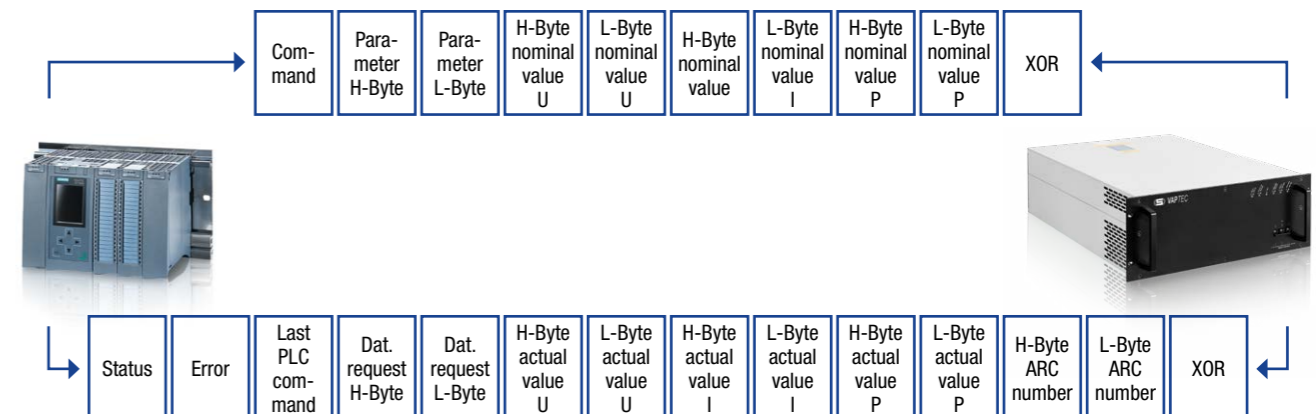
With the RS232-interface the nominal values for the output can be adjusted more conveniently and the corresponding actual values or error messages can be read out easily. Furthermore the unit can be released via PC or PLC. With this RS232 service interface further adjustments and parametrization of the high voltage power unit are very easy. Two modes are available: Terminal mode or PLC mode.

TERMINAL MODE

In Terminal mode the power supply communicates with a simple terminal program such as Hyper-Terminal or TeraTerm for example.

PLC MODE

In PLC mode the power supply communicates with a PLC. The PLC has to send a byte-sequence of specified numbers of bytes to the power supply. The power supply will answer with a status-sequence of specified numbers of bytes.



* The RS232 Interface is suitable for basic start-up. For further communication (integration in system, etc.) we recommend to use a field bus interface.

DIMENSIONS

Front view *a.):



Back view *a.):



Front view *b.):



Back view *b.):



Front view *c.):



Back view *c.):



Front view *d.) or e.):



Back view *d.) or e.):



OPTIONS

OPTION 1: WEB SERVER – INDUSTRY 4.0: CONVENIENT WEB INTERFACE

To meet the requirements of Industry 4.0, we offer an integrated web server for the high-voltage power supply units. The web server makes it possible to access a web interface in any web browser via the IP address of the high-voltage power supply unit. With its responsive design and high performance, the web interface offers clear monitoring of setpoint and actual values, unit and status information, error display and unit parameterisation.

Optionally, we offer a built-in 4.3" touch display with capacitive user interface to enable monitoring and parameterisation of the high-voltage power supply unit without external devices.



OPTION 2: FIELDBUS-INTERFACES

For easy communication with a PLC there are 4 different fieldbus slave modules available:

CANopen:

1 x Sub-D9 male, up to 1 Mbit/s

PROFIBUS DP:

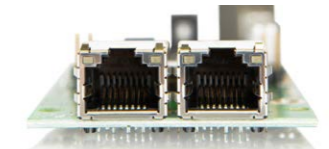
1 x Sub-D9 female, DP-V1, up to 12 Mbit/s

PROFINET I/O-RT:

2 x RJ45, 100 Mbit/s, Class B Slave

EtherCAT:

2 x RJ45, 100 Mbit/s, up to 1 ms cycle time



NECESSARY CHANGES AT THE ORDER NUMBER FOR THE OPTIONS

NHCRXXXE 01 0 01

01 = Standard digital- / analogue interface
 20 = Additional PROFIBUS DP
 30 = Additional CANopen
 40 = Additional EtherCAT
 50 = Additional PROFINET

0 = Without touch panel in front plate (if it is not already integrated in standard)
 1 = With touch panel in front plate (for some types of devices, the touch panel could not be integrated into the front plate)

MORE POWER IN PARALLEL MODE HV SYSTEM SOLUTIONS

The high voltage power supplies of the **CAPTEC**, **GLOWTEC**, **VAPTEC**, **LITEC** and **WELTEC** series can work in parallel mode to increase the output power. For this purpose the power supplies can be connected in parallel with optical fiber cables. One of the power supplies has to be configured as master and the others as slave. The total power is divided proportionally between the connected devices.

On request J. Schneider can install the devices in the required control cabinet. The assembly includes:

- All necessary pre-fuses
- The necessary auxiliary voltages
- The necessary interlock circuit
- If necessary, cooling water circuit
- The desired sub distribution

The maximum possible total output per device series can be seen in the following table.

MODULE	NO. OF MAX. PARALLEL UNITS	VOLTAGE RANGE	POWER RANGE FROM – TO MAX.
CAPTEC	7	1 kV–10 kV	10 kW–70 kW
	7	20 kV–40 kV	21 kW–147 kW
	2	50 kV–60 kV	15 kW–30 kW
GLOWTEC DC	7	2 kV–10 kV	10 kW–70 kW
	7	20 kV–40 kV	21 kW–147 kW
	2	50 kV–60 kV	15 kW–30 kW
GLOWTEC DCp	7	2 kV–5 kV	10 kW–70 kW
GLOWTEC AC	2	2 kV–5 kV	10 kW–70 kW
VAPTEC	7	8 kV–10 kV	10 kW–70 kW
	7	20 kV–60 kV	21 kW–147 kW
LITEC	10	2 kV or 5 kV	12 kW–120 kW
WELTEC	2	60 kV–150 kV	15 kW–30 kW

The control cabinets are constructed according to the DIN VDE 0100 regulations the protective conductor system is tested according to DIN VDE 0100, part 600; Insulation and functional testing largely carried out in accordance with DIN VDE 0113 / 06.93 EN 60204.



VAPTEC
10 kV / 120 kW

SPECIALIZED IN INDIVIDUAL POWER SUPPLY SOLUTIONS CUSTOMIZED SOLUTIONS

This catalogue contains our standard product portfolio of power supplies for high voltage and vacuum process applications. In addition we often develop customized power supply solutions. So if you did not find the matching power supply for your application or your specification, please let us know and do not hesitate to contact us.

It is often possible to modify a standard power supply to meet your specific requirements. Should this not be the best solution, our team of highly qualified development engineers is pleased to develop and produce an individual power supply system for your application.



VAPTEC
Elektronbeam supply with integrated heat transformer
-8 kV / 3 kW
8 V / 35 A



PLASMA TEC AC
air cooled
3 kV bipolar / 7,5 kW



VAPTEC
Elektronbeam supply with
- 10 kV / 10 kW



VAPTEC
Ripple generator for 10 kV

INPUT- / OUTPUT CONNECTORS / CABLES

INPUT CONNECTORS / CABLES

For the high voltage power supplies up to 10 kV and up to 10 kW no special mains input plugs are needed.
On these devices, power input cable is connected directly to the feed-through terminals of the line filter.

ARTICLE NUMBER	USABLE FOR	CABLE TYP	CABLE LENGTH		
	CAPTEC GLOWTEC VAPTEC ($V_{out} < 10$ kV) ($P_{out} \leq 10$ kW)	Oiflex 5 x 4 mm ²		No special plug required. Directly connected at the terminals of the line filter.	
NDC70739F01002	LITEC or for CAPTEC GLOWTEC VAPTEC ($V_{out} < 10$ kV) ($P_{out} \leq 10$ kW)	–	–	Harting plug 4 mm ²	–
NDC41117F02002		Oiflex 5 x 4 mm ²	2 meter	Harting plug 4 mm ²	Open
NDC41117F04002		Oiflex 5 x 4 mm ²	4 meter	Harting plug 4 mm ²	Open
NDC41117F06002		Oiflex 5 x 4 mm ²	6 meter	Harting plug 4 mm ²	Open
NDC41117F08002		Oiflex 5 x 4 mm ²	8 meter	Harting plug 4 mm ²	Open
NDC41117F10002	Oiflex 5 x 4 mm ²	10 meter	Harting plug 4 mm ²	Open	
NDC71018F01002	CAPTEC GLOWTEC VAPTEC ($V_{out} < 10$ kV) ($P_{out} \leq 20$ kW)	–	–	Harting plug 6 mm ²	–
NDC41117F02002		Oiflex 5 x 6 mm ²	2 meter	Harting plug 6 mm ²	Open
NDC41117F04002		Oiflex 5 x 6 mm ²	4 meter	Harting plug 6 mm ²	Open
NDC41117F06002		Oiflex 5 x 6 mm ²	6 meter	Harting plug 6 mm ²	Open
NDC41117F08002		Oiflex 5 x 6 mm ²	8 meter	Harting plug 6 mm ²	Open
NDC41117F10002		Oiflex 5 x 6 mm ²	10 meter	Harting plug 6 mm ²	Open

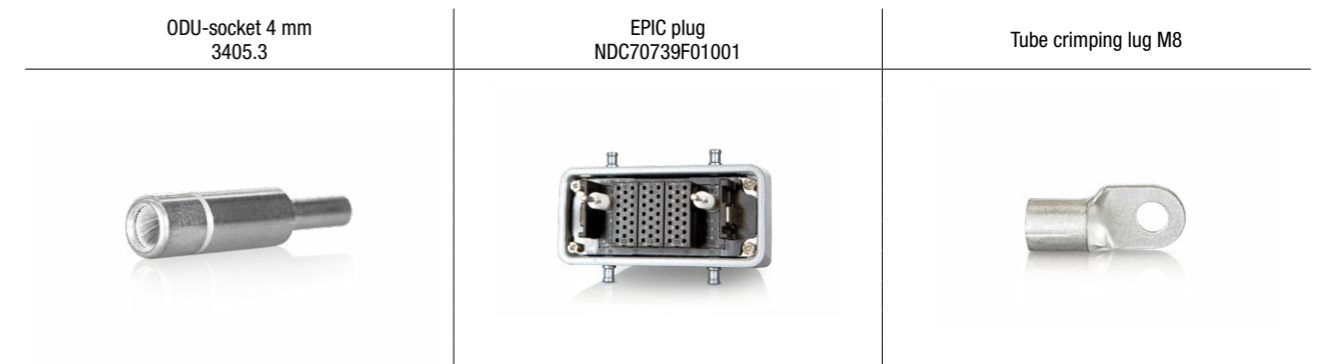
OUTPUT CONNECTORS / CABLES

The high voltage cables, shown in the table below, as well as the plugs and sockets are suitable for voltages up to 10 kV DC. We are also capable to offer cables and plugs for higher voltages.

ARTICLE NUMBER	USABLE FOR	CABLE TYP	CABLE LENGTH		
3405.3	CAPTEC GLOWTEC VAPTEC from NHCR => universal (up to max. 10 kV)	–	–	ODU-socket 4 mm	–
NHC41001E02001		RG213	2 meter	ODU-socket 4 mm	Open
NHC41001E04001		RG213	4 meter	ODU-socket 4 mm	Open
NHC41001E06001		RG213	6 meter	ODU-socket 4 mm	Open
NHC41001E08001		RG213	8 meter	ODU-socket 4 mm	Open
NHC41001E10001		RG213	10 meter	ODU-socket 4 mm	Open
NHC41001E12001		RG213	12 meter	ODU-socket 4 mm	Open
NHC41001E14001		RG213	14 meter	ODU-socket 4 mm	Open
NHC41001E16001		RG213	16 meter	ODU-socket 4 mm	Open
NHC41001E18001		RG213	18 meter	ODU-socket 4 mm	Open
NHC41001E20001		RG213	20 meter	ODU-socket 4 mm	Open

OUTPUT CONNECTORS / CABLES

ARTICLE NUMBER	USABLE FOR	CABLE TYP	CABLE LENGTH		
NHC41001E02002	CAPTEC GLOWTEC VAPTEC from NHCR => ground (up to max. 10 kV)	RG213	2 meter	ODU-socket 4 mm	Tube crimping lug M8
NHC41001E04002		RG213	4 meter	ODU-socket 4 mm	Tube crimping lug M8
NHC41001E06002		RG213	6 meter	ODU-socket 4 mm	Tube crimping lug M8
NHC41001E08002		RG213	8 meter	ODU-socket 4 mm	Tube crimping lug M8
NHC41001E10002		RG213	10 meter	ODU-socket 4 mm	Tube crimping lug M8
NHC41001E12002		RG213	12 meter	ODU-socket 4 mm	Tube crimping lug M8
NHC41001E14002		RG213	14 meter	ODU-socket 4 mm	Tube crimping lug M8
NHC41001E16002		RG213	16 meter	ODU-socket 4 mm	Tube crimping lug M8
NHC41001E18002		RG213	18 meter	ODU-socket 4 mm	Tube crimping lug M8
NHC41001E20002		RG213	20 meter	ODU-socket 4 mm	Tube crimping lug M8
NHC41001E02003	VAPTEC from NHCR => NDRG (up to max. 10 kV)	RG213	2 meter	ODU-socket 4 mm	ODU-socket 4 mm
NHC41001E04003		RG213	4 meter	ODU-socket 4 mm	ODU-socket 4 mm
NHC41001E06003		RG213	6 meter	ODU-socket 4 mm	ODU-socket 4 mm
NHC41001E08003		RG213	8 meter	ODU-socket 4 mm	ODU-socket 4 mm
NHC41001E10003		RG213	10 meter	ODU-socket 4 mm	ODU-socket 4 mm
NHC41001E12003		RG213	12 meter	ODU-socket 4 mm	ODU-socket 4 mm
NHC41001E14003		RG213	14 meter	ODU-socket 4 mm	ODU-socket 4 mm
NHC41001E16003		RG213	16 meter	ODU-socket 4 mm	ODU-socket 4 mm
NHC41001E18003		RG213	18 meter	ODU-socket 4 mm	ODU-socket 4 mm
NHC41001E20003		RG213	20 meter	ODU-socket 4 mm	ODU-socket 4 mm
NDC70739F01001	LITEC	–	–	EPIC plug	–
NHC41117E02003		RG213	2 meter	EPIC plug	Open
NHC41117E04003		RG213	4 meter	EPIC plug	Open
NHC41117E06003		RG213	6 meter	EPIC plug	Open
NHC41117E08003		RG213	8 meter	EPIC plug	Open
NHC41117E10003		RG213	10 meter	EPIC plug	Open
NHC41117E12003		RG213	12 meter	EPIC plug	Open
NHC41117E14003		RG213	14 meter	EPIC plug	Open
NHC41117E16003		RG213	16 meter	EPIC plug	Open
NHC41117E18003		RG213	18 meter	EPIC plug	Open
NHC41117E20003		RG213	20 meter	EPIC plug	Open



More cable types for further types on request



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