APS series of 4-Quadrant Amplifiers

4-QUADRANT VOLTAGE / CURRENT AMPLIFIER

Fig. 1: APS 1000 Frontpanel

The relating standards:
IEC/EN 61000-3-2
IEC/EN 61000-3-3
IEC/EN 61000-3-11
IEC/EN 61000-3-12
IEC/EN 60146-1-1
IEC/EN 61000-2-2
IEC/EN 61000-4-4
IEC/EN 61000-4-5
IEC/EN 61000-4-8
IEC/EN 61000-4-11
IEC/EN 61000-4-13
IEC/EN 61000-4-14
IEC/EN 61000-4-17
IEC/EN 61000-4-27
IEC/EN 61000-4-28
IEC/EN 61000-4-29
IEC/EN 61000-4-34
IEC/EN 61131-2
IEC/EN 61496-1
IEC/EN 61800-3
IEC/EN 62040-2
MIL-STD-461
MIL-STD-704
MIL-STD-1275
RTCA DO-160
SEMI F47-0706

NEW: Constant current mode

The adjustable and desired output current is automatically regulated and stabilized according to the user's preferences. The only limitation is the amplifier's performance characteristic

- ✓ Touch panel operation 7" 800x480
- ✓ Very high peak-load ability (up to 2 … 3 ms)
- ✓ Very low internal resistance
- ✓ Very fast slew rate > 52V/µs
  (rise time < 5µs at 230Vrms as required by IEC/EN 61000-4-11)
- ✓ Extremely low harmonic distortion - even under very non-linear load conditions
- ✓ Operates from DC up to 10kHz large signal bandwidth (-3dB) - optional up to 30kHz
- ✓ Small signal bandwidth up to 50kHz or 100kHz
- ✓ High long-term overload characteristic (up to 1-hour)
- ✓ High short-term overload characteristic (for 5 … 10mins.)
- ✓ Sink operation mode included – real 4-quadrant operation mode
- ✓ Current and voltage limitation adjustable

VOLTAGE AND CURRENT MODE OPERATION
REFERENCE SOURCE FOR ALL APPLICATIONS

VERY FAST RISE AND FALL TIME

Due to the very fast slew rate of >52V/µs the APS is fully compliant according to the requirements of IEC/EN 61000-4-11 in practice.

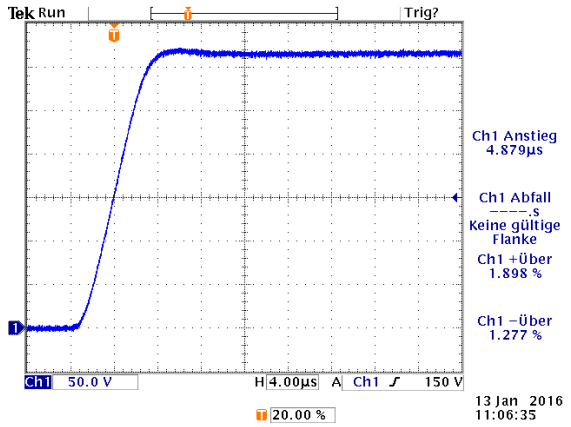


Fig. 2: rise time of the output voltage

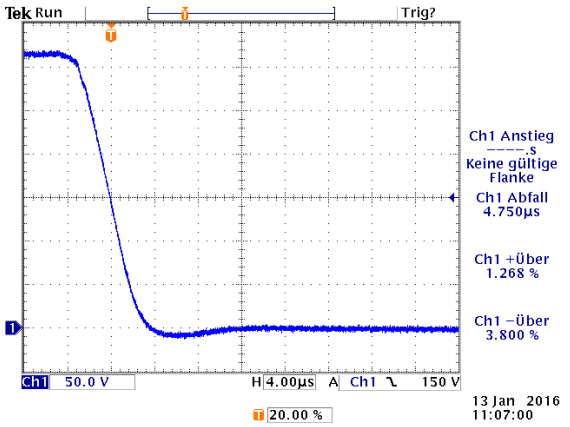


Fig. 3: fall time of the output voltage

EXTREMELY HIGH LOADABILITY

150% of rating is available in the case of a real load. Amplifier stability is absolutely assured when operating with either inductive or capacitive loads.

The sink mode power capability is approx. 30% of the source mode capability.

DC-Simulation

DC Signals can easily be generated using the directly coupled ironless amplifier output-stage

All test devices requiring a DC content within their input current can be supplied without problems.

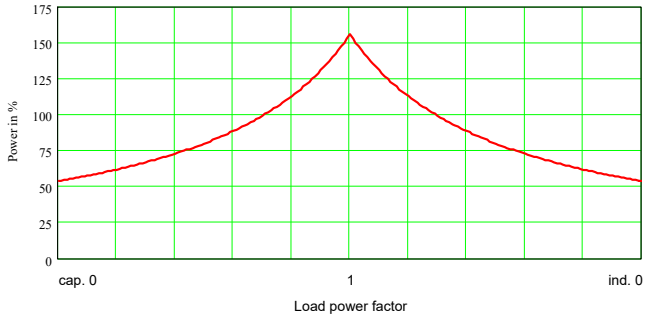


Fig. 4: APS Performance characteristic

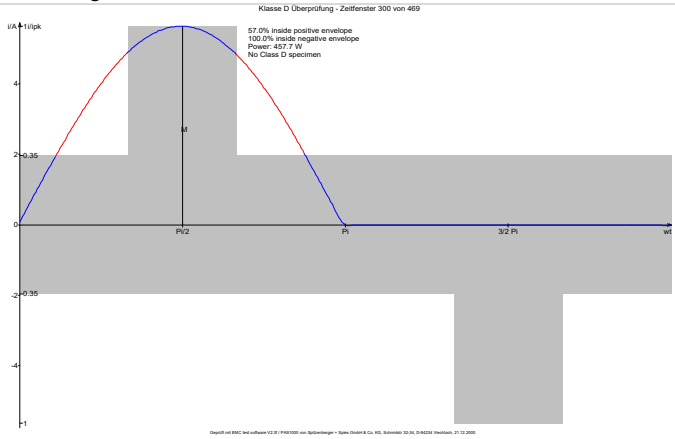


Fig. 5: APS DC Characteristic

TOUCH-PANEL USER INTERFACE

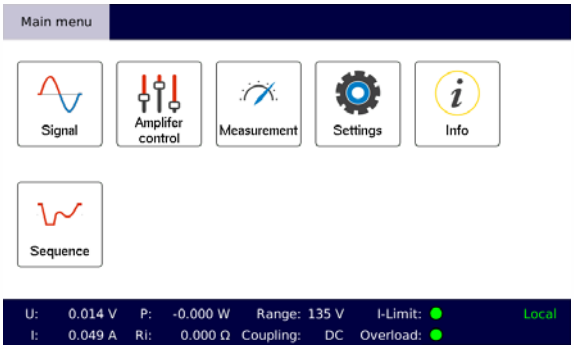


Fig. 6: Main menu

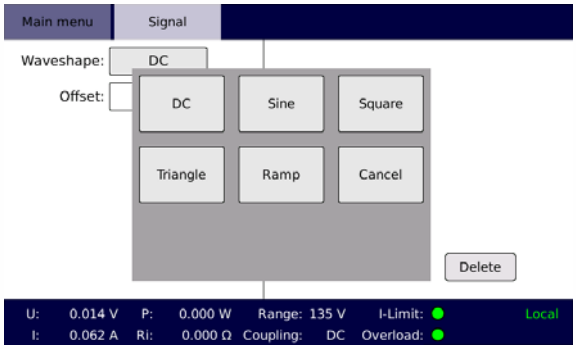


Fig. 7: Selection of the out signal waveshape

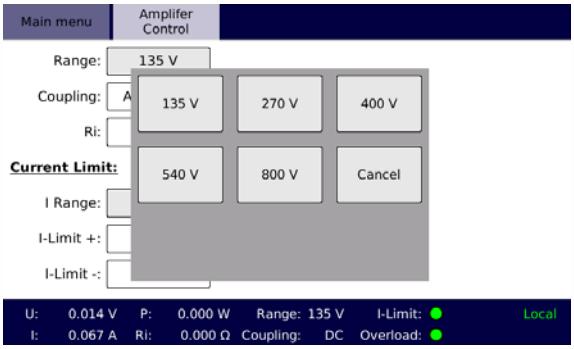


Fig. 8: Selection of the output voltage range

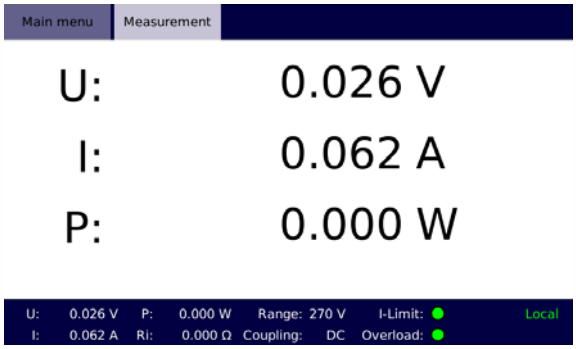
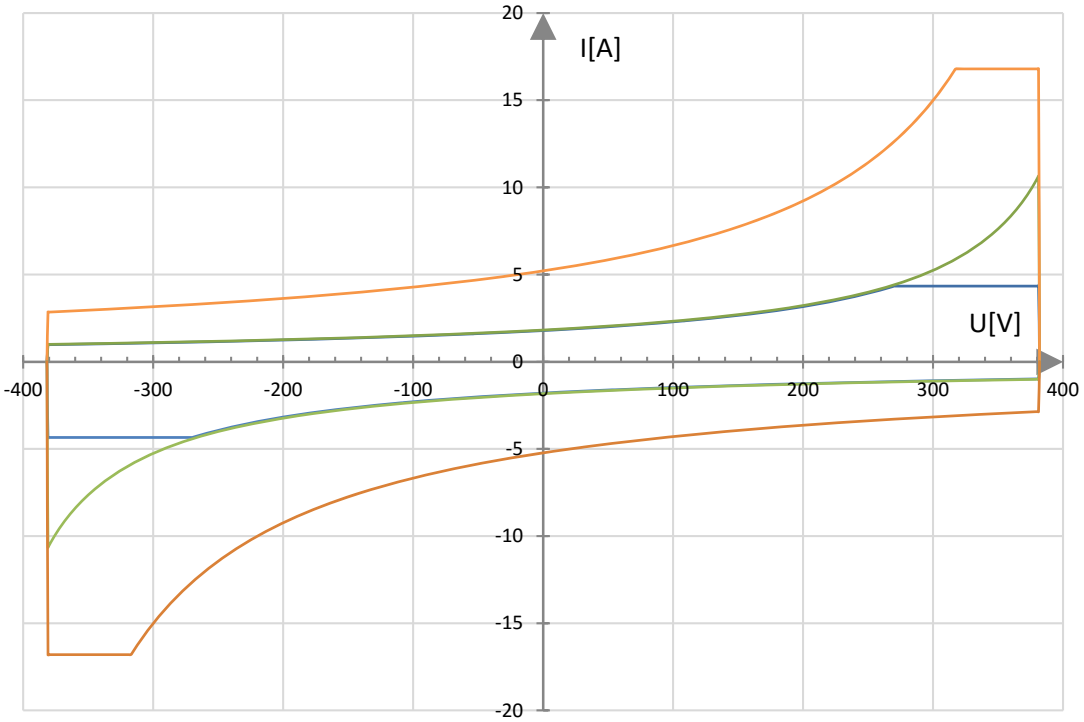
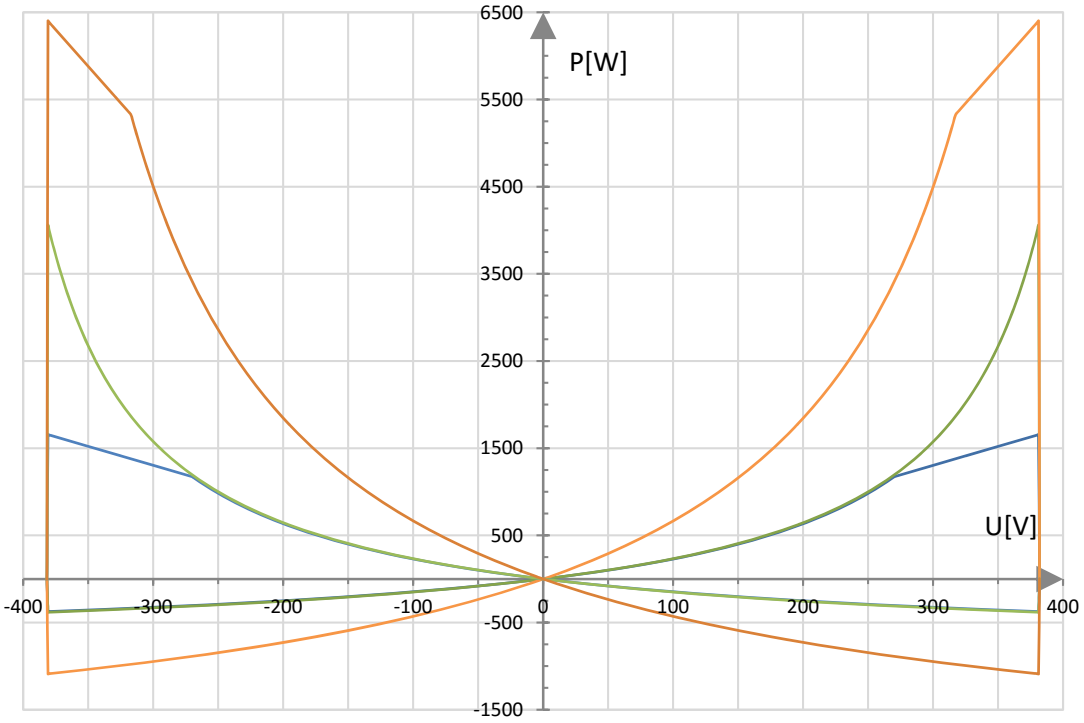


Fig. 9: Measurement unit display

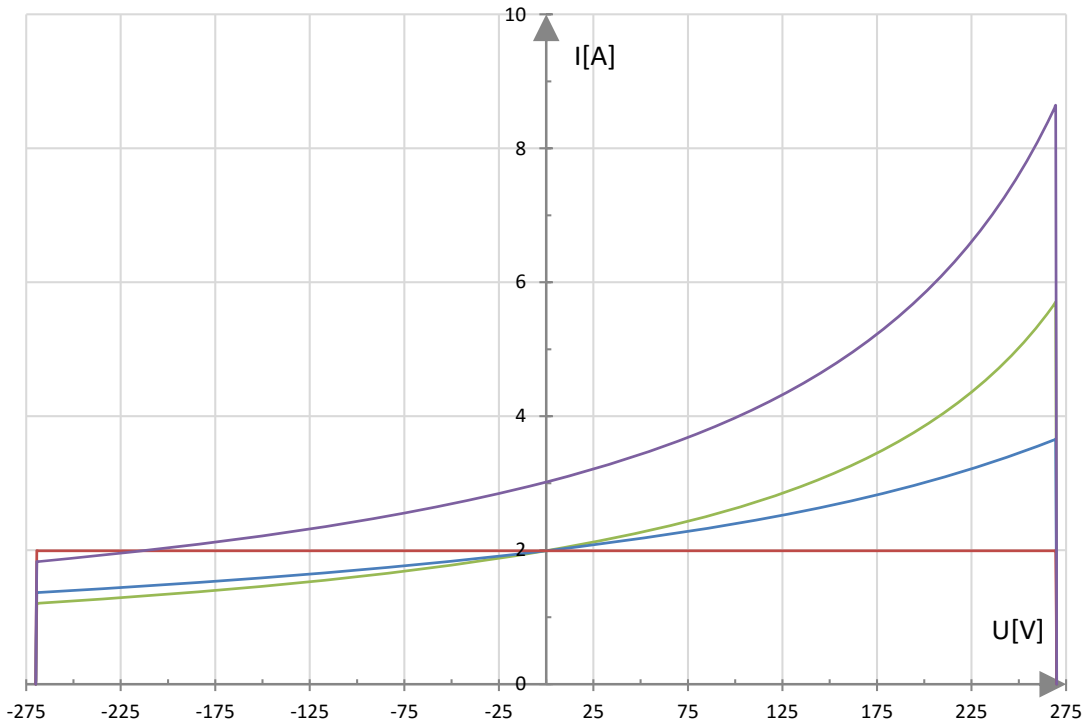
APS 1000 - DC CURRENT CHARACTERISTIC - $I_{max,cont}$, $I_{max,short}$, $I_{max,peak}$



APS 1000 - DC POWER CHARACTERISTIC - $P_{max,cont}$, $P_{max,short}$, $P_{max,peak}$



APS 1000 – AC CURRENT CHARACTERISTIC - $I_{cont,cos\ 1}$, $I_{cont,cos\ 0.7}$, $I_{cont,cos\ 0}$, $I_{short,\ cos\ 1}$



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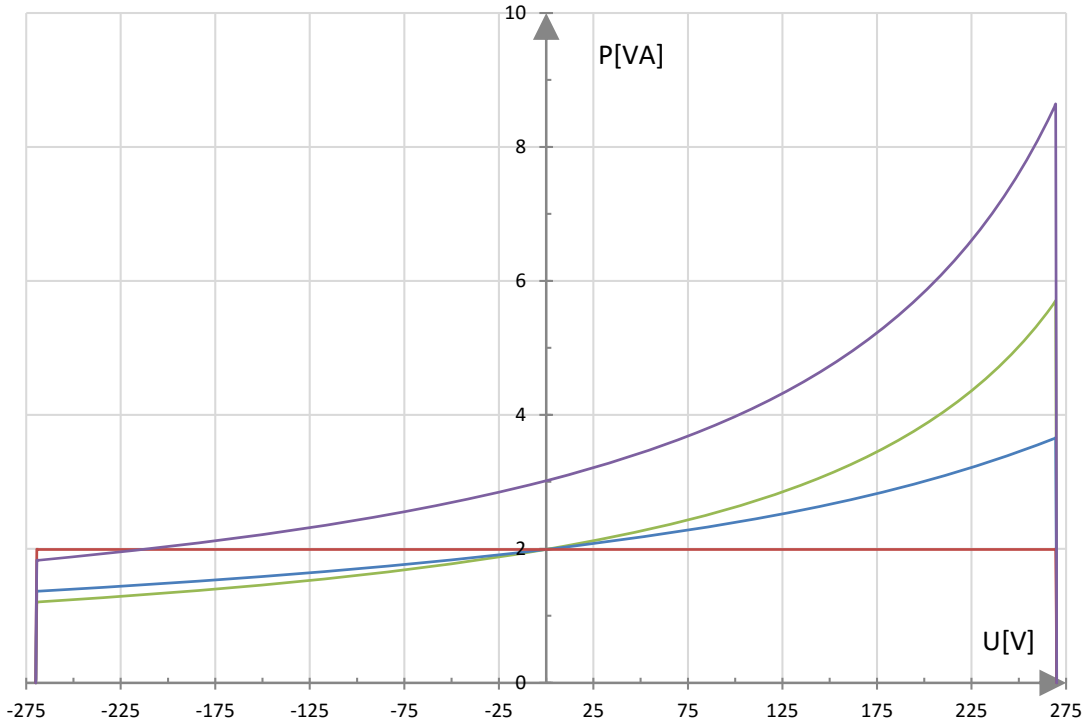
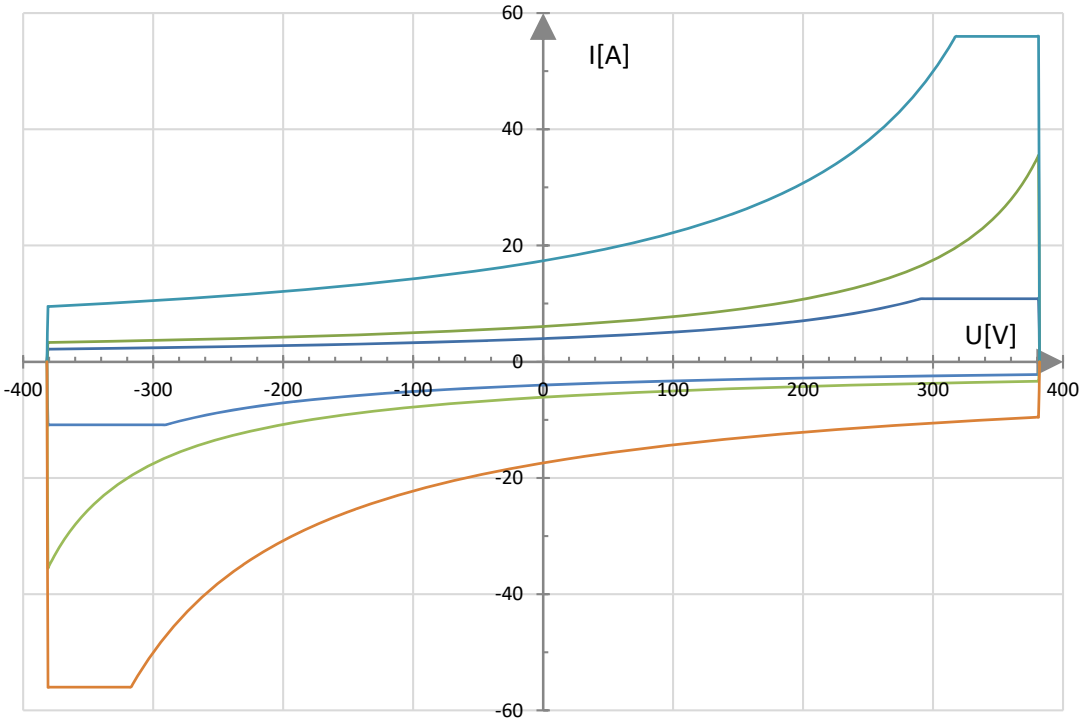


APS 2500 - DC CURRENT CHARACTERISTIC - $I_{max,cont}$, $I_{max,short}$, $I_{max,peak}$



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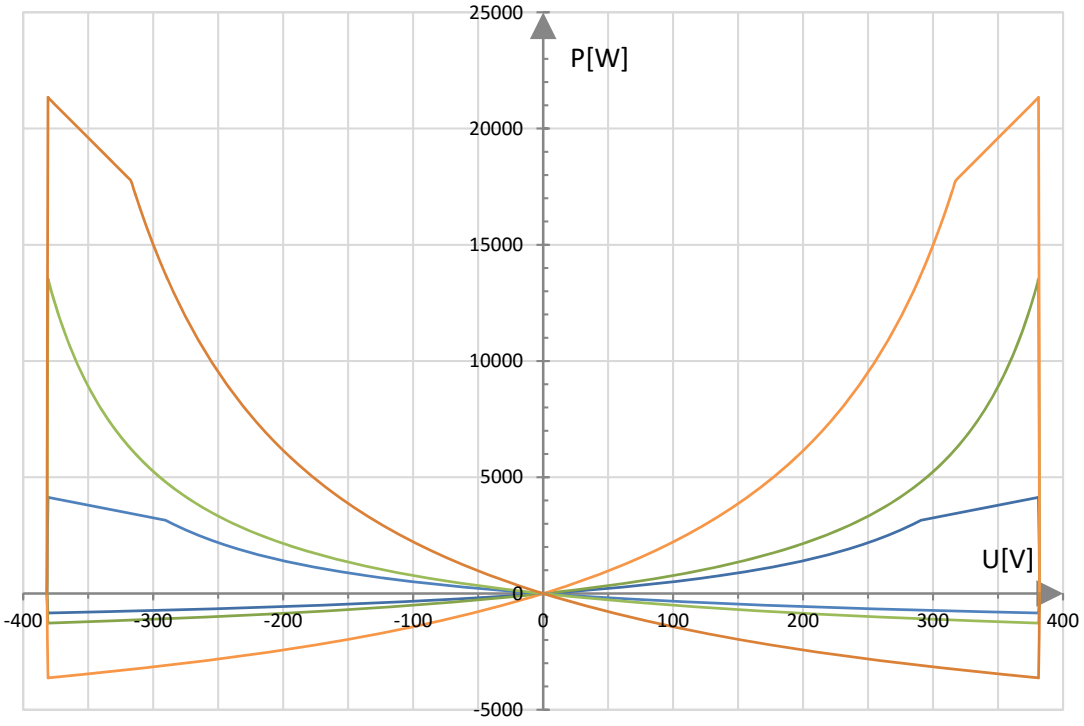

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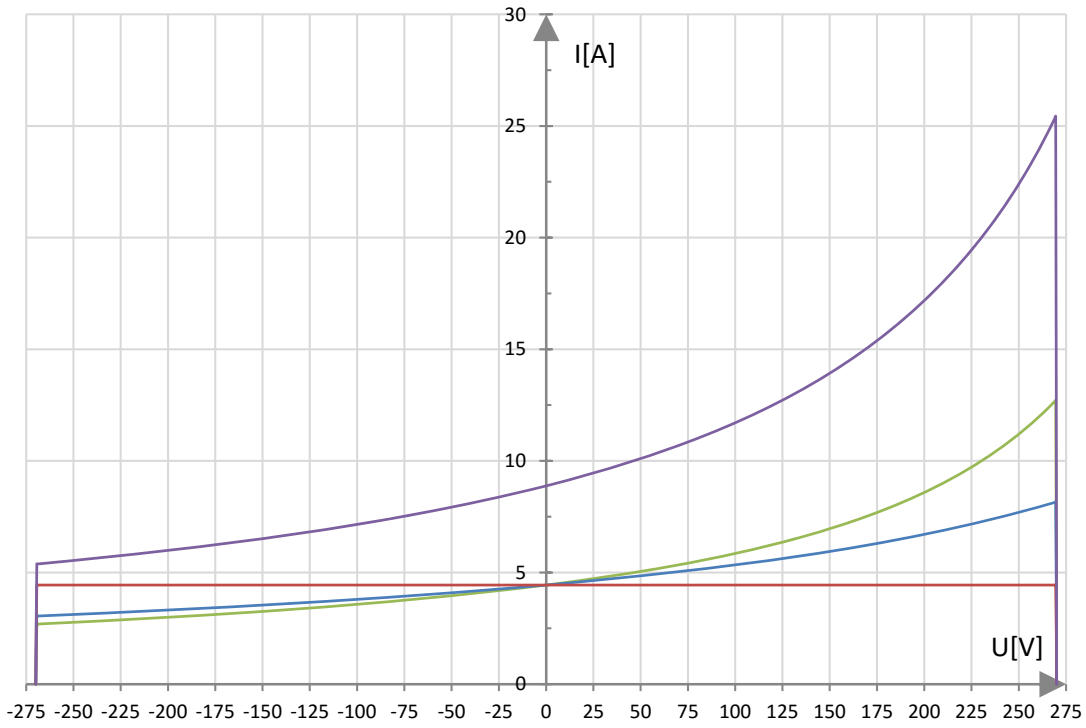

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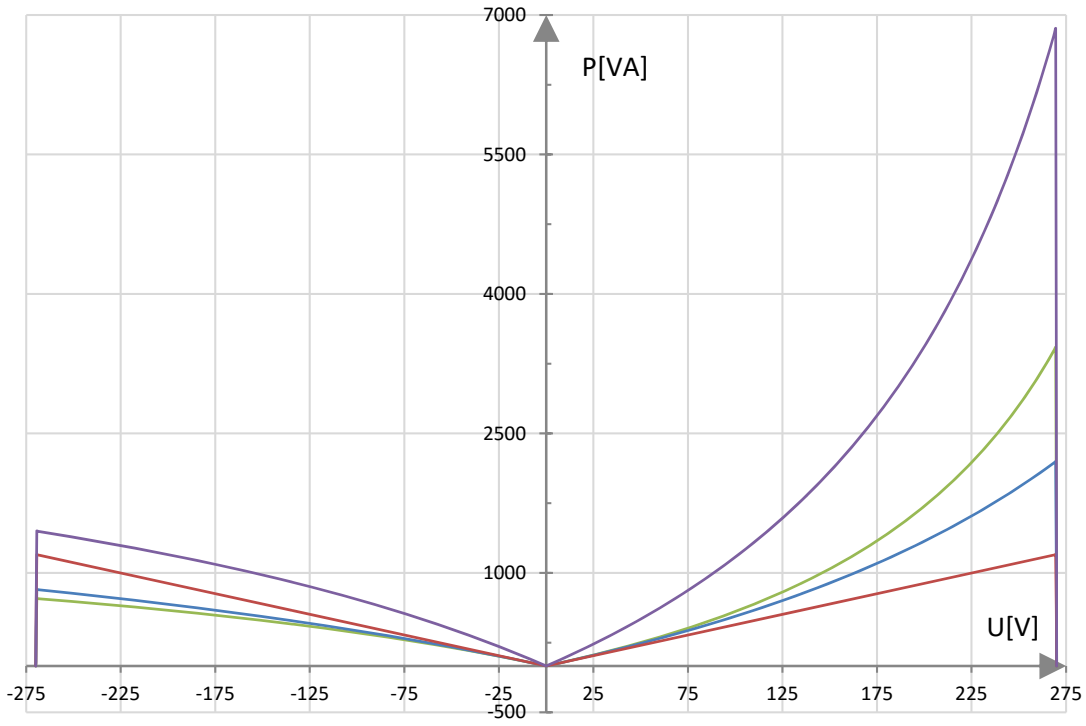
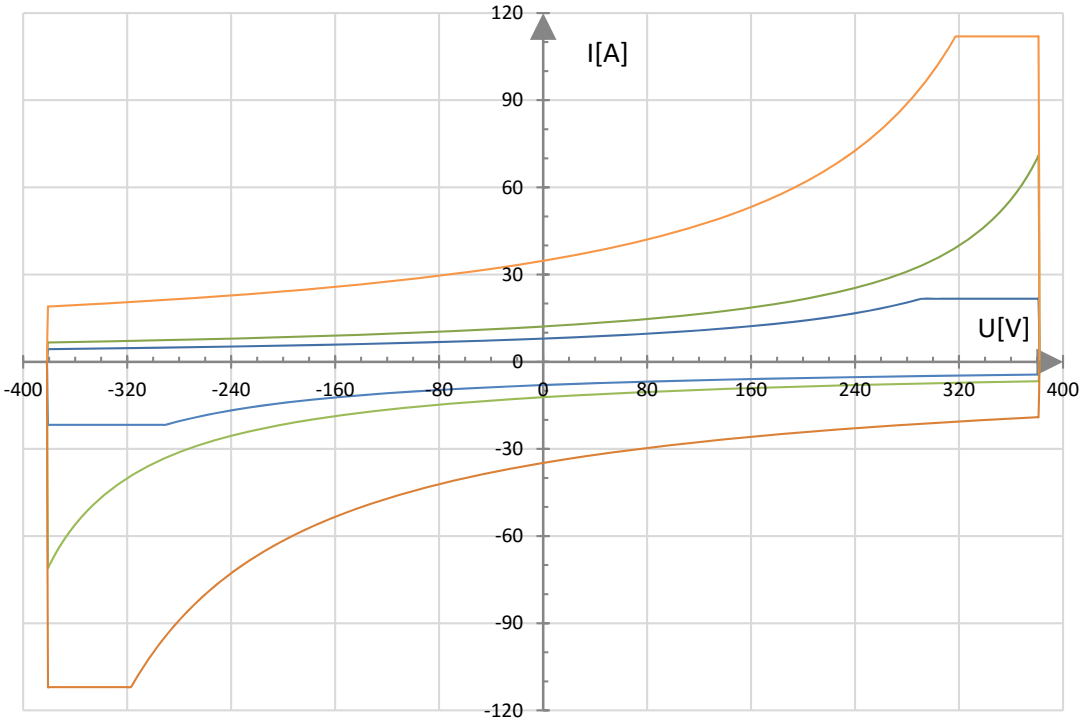
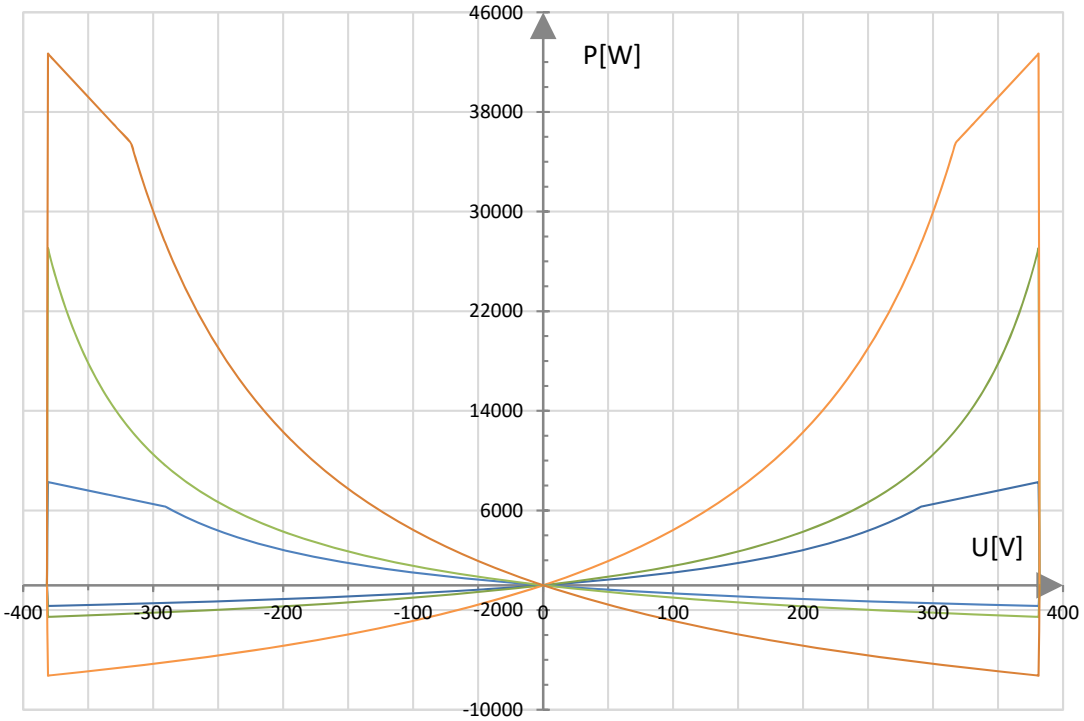


APS 5000 - DC CURRENT CHARACTERISTIC - $I_{max,cont}$, $I_{max,short}$, $I_{max,peak}$



APS 5000 - DC POWER CHARACTERISTIC - $P_{max,cont}$, $P_{max,short}$, $P_{max,peak}$



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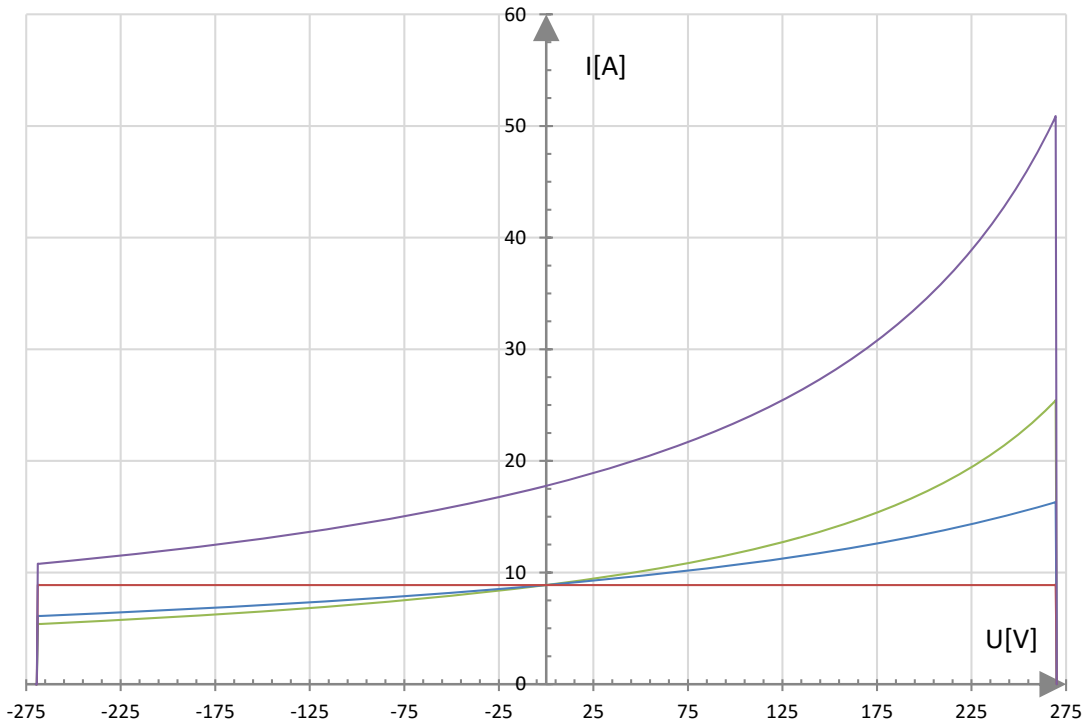

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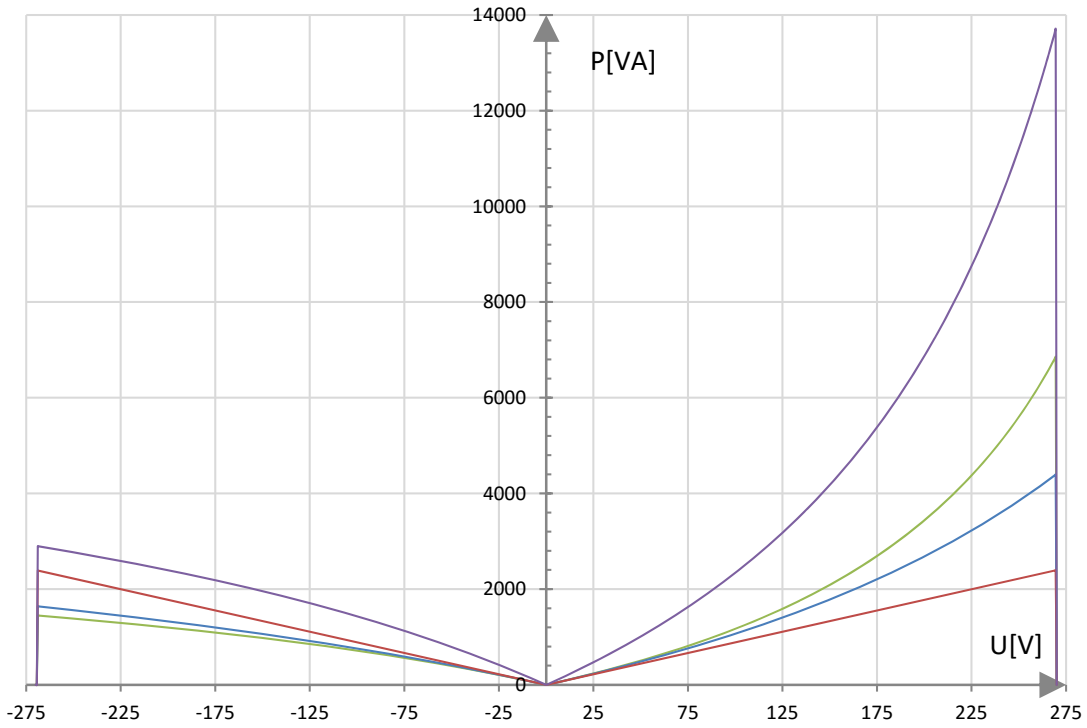
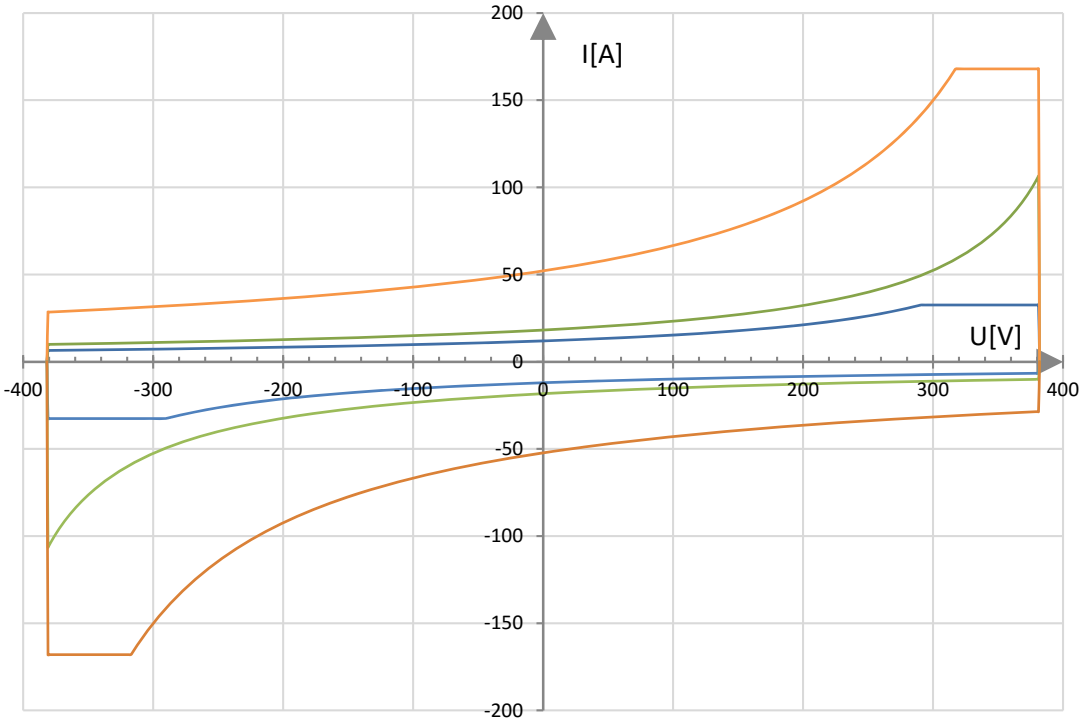
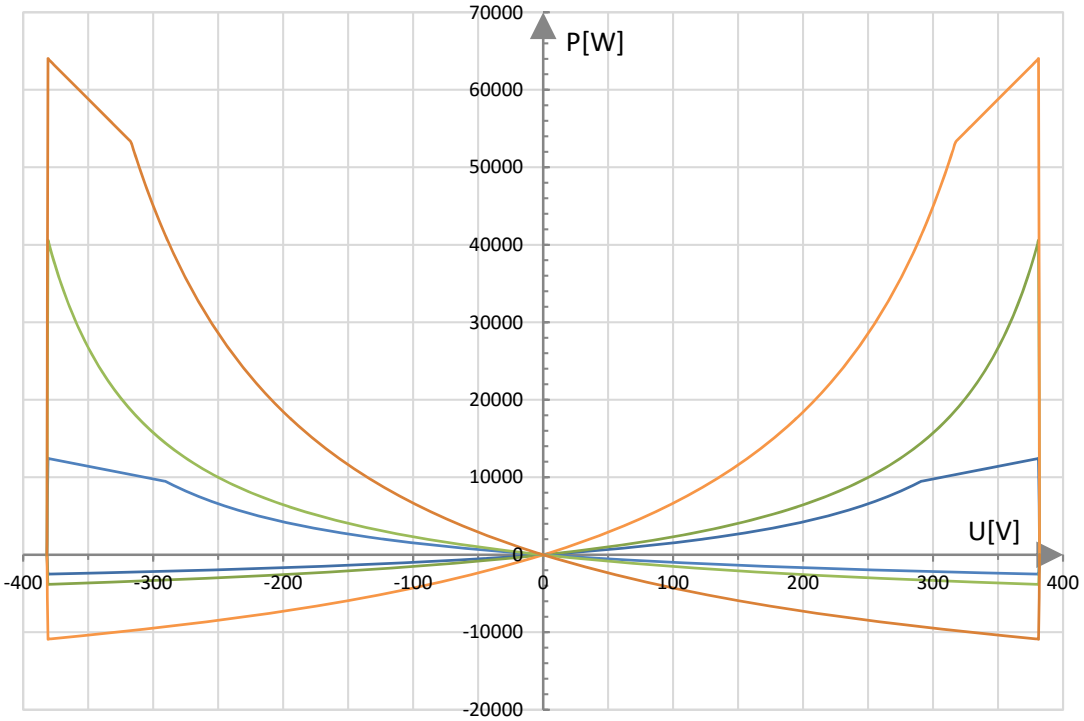


APS 7500 - DC CURRENT CHARACTERISTIC - $I_{max,cont}$, $I_{max,short}$, $I_{max,peak}$



APS 7500 - DC POWER CHARACTERISTIC - $P_{max,cont}$, $P_{max,short}$, $P_{max,peak}$



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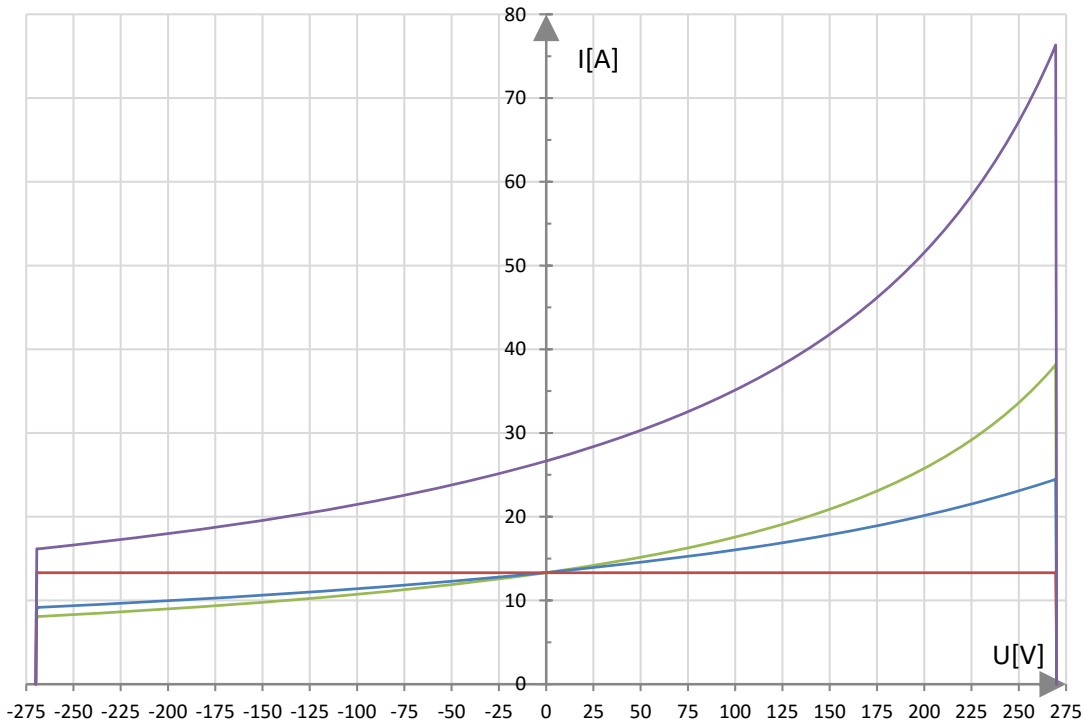

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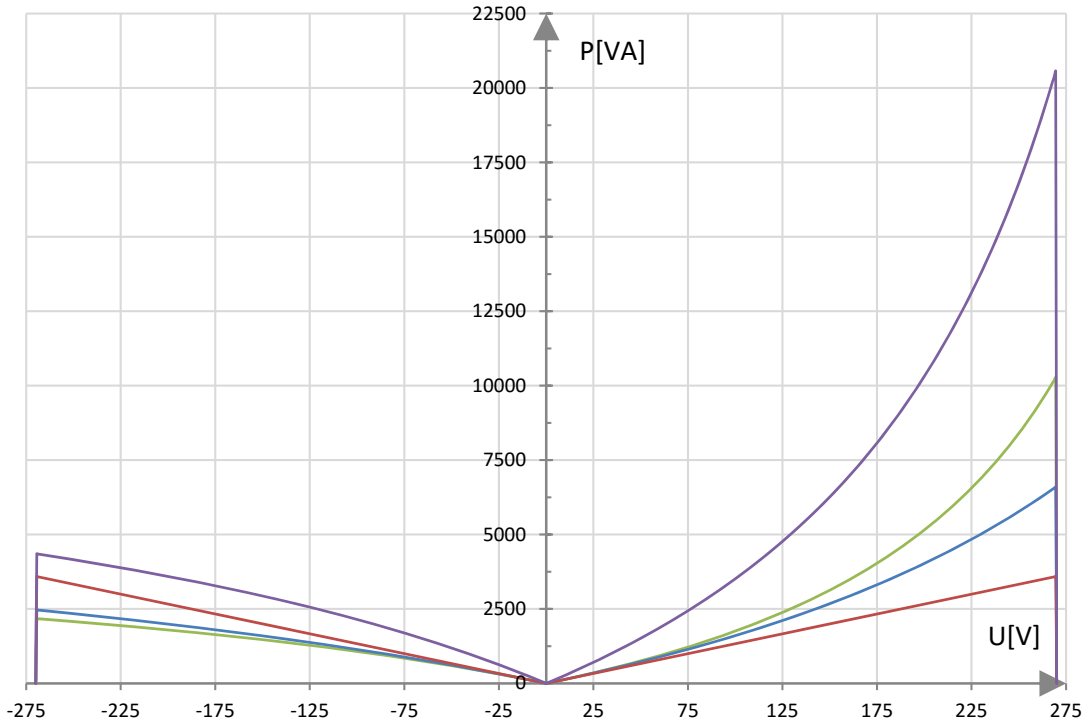

TECHNICAL DATA - GENERAL

		APS Series
Nominal voltage	*AC:*	$135V_{rms}$ / $270V_{rms}$
Voltage mode	*DC:*	±191V / ±382V
Load regulation		*Max. 0,1%*
Line regulation		*< 1.5x10^{-4} per 10V line-voltage change*
Frequency range		DC … *10*kHz (-3dB)
Slew rate		*> 52V/µs (rise time < 5µs at 230V_{rms} according to IEC/EN 61000-4-11)*
Harmonic distortion		Max. / Typ.
	135V / DC … 450Hz:	0,3% / 0,1%
	135V / 450Hz … 1kHz:	2,5% / 1,5%
	135V / 1kHz … 10kHz:	0,1% / 0,05%
	270V / DC … 450Hz:	0,6% / 0,3%
	270V / 450Hz … 10kHz:	on request
Protection circuits		overload / short circuit / over temperature
Input	*Max. voltage:*	±5V_p ±10V_p ±16V_p
	Impedance:	approx. 8kΩ
Interface		Ethernet 100MBit
Internal control oscillator		
	Type:	4-channel synthesizer
	Wave form:	DC, Sine, Rectangle, Triangle, DC Offset, Arbitrary
	Amplitude resolution:	17Bit
	Frequency range:	DC … 1MHz
	Frequency resolution:	1µHz
	Frequency accuracy	25ppm
	Memory depth:	1MSample
	Synth functions:	ADD, AM, FM, PM
	Sequence memory:	1024 steps
Ambient temperature		0°C up to 40°C
Relative Humidity		max. 80% for temperatures <31°C, decreasing linearly to 50% at 40°C

TECHNICAL DATA – APS 1000 / 2500 / 5000

			APS 1000	APS 2500	APS 5000
Power DC		*- continuous:* *- approx. 1h:*	1000W 1500W	2500W 3750W	5000W 7500W
Short-time power			2000VA	5000VA	10000VA
Peak power		*- at 135V:* *- at 270V:*	3200VA_p 6400VA_p	10500VA_p 21000VA_p	21000VA_p 42000VA_p
Peak current			23A_p	77A_p	155A_p
Power Supply *(±10%, 50Hz … 60Hz):*			230V Schuko	230V/400V CEE	
Protection:			16A	3 x 16A	3 x 20A
Housing	*Amplifier:*		19”, 4U	19”, 5U	19”,7U
	approx. dimensions (mm):		178x483x700	222x483x700	311x483x700
	Power Supply:		included	19”, 5U	19” 5U
	approx. dimensions (mm):		-	222x483x700	222x483x700
Weight	*Amplifier (approx.):*		45kg	30kg	45kg
	Power Supply (approx.):		-	85kg	100kg

TECHNICAL DATA – APS 7500 / 10000 / 15000

			APS 7500	APS 10000	APS 15000
Power DC		*- continuous:* *- approx. 1h:*	7500W 11250W	10000W 15000W	15000W 22500W
Short-time power			15000VA	20000VA	30000VA
Peak power		*- at 135V:* *- at 270V:*	31500VA_p 63000VA_p	42000VA_p 84000VA_p	63000VA_p 126000VA_p
Peak current			233A_p	311A_p	466A_p
Power Supply *(±10%, 50Hz … 60Hz):*			230V/400V CEE		
Protection:			on request		
Housing	*Amplifier:*				
	approx. dimensions (mm):				
	Power Supply:				
	approx. dimensions (mm):				
Weight	*Amplifier (approx.):*				
	Power Supply (approx.):				

APS SERIES ADD-ONS AND OPTIONS

Options		
Interfaces		IEEE488, RS232, RS485 (USB Host, USB Device on request)
Adjustable internal impedance		0 … 10 Ω, 0 … 100mH
06: Output voltage monitor		(electrically isolated)
07: Output current monitor		(electrically isolated)
11-33Z:	Additional voltage range	0 … $33V_{rms}$ ($\pm47V_{DC}$)
11-56Z:	Additional voltage range	0 … $56V_{rms}$ ($\pm79V_{DC}$)
11-240Z:	Additional voltage range	0 … $240V_{rms}$ ($\pm339V_{DC}$)
11-300:	Special voltages [5]	0 … $150V_{rms}$ ($\pm212V_{DC}$) / 0 … $300V_{rms}$ ($\pm424V_{DC}$)
11-300Z:	Special voltage and additional voltage range [5]	0 … $60V_{rms}$ ($\pm85V_{DC}$) / 0 … $150V_{rms}$ ($\pm212V_{DC}$) / 0 … $300V_{rms}$ ($\pm424V_{DC}$)
11-630DC:	Additional DC-voltage range	0 … $+630V_{DC}$ *in combination with option 11-300 or 11-300Z*
17-300:	Floating output [6]	$300V_{rms}$
21:	Parallel operation mode [7]	(DC … 5kHz)
28-540/C:	Voltage transformer [8]	Other voltages on request
29-xxx/C:	High voltage transformer [8]	1000V and above values on request