

## DC Sources LAB SMS/E

3 – 10 kW



▶ 19" x 2 U x 440 – 600 mm

## DC Sources LAB HP/E

5 – 195 kW



▶ 19" x 3 U x 620 mm

### OVERVIEW

- 3 kW to 195 kW
- Output voltages up to 1,500 V (2,000 V)
- Output currents up to 9,750 A
- Quiet operation, ensuring that it is pleasant to work within the vicinity of the unit
- Constant current and voltage
- Standard integrated ATI 5/10 galvanically isolated analogue interface: 0 – 5 V or 0 – 10 V (user selectable) and RS232
- Digital interfaces IEEE488, RS485, USB and LAN (optional)
- "High speed" feature (optional)  
The secondary rise and fall time for the DC output voltage is shortened by a factor of 10 in comparison to the standard times, on average.
- Autorange function optional down to 33%
- Special versions available on request

## PRODUCT EXAMPLES LAB SMS/E

Type	Power W	Voltage V	Current A	Dimensions
LAB/SMS/E 315	3000	0 – 15	0 – 200	19" x 2 U x 440 mm
LAB/SMS/E 335	3000	0 – 35	0 – 90	19" x 2 U x 440 mm
LAB/SMS/E 345	3000	0 – 45	0 – 70	19" x 2 U x 440 mm
LAB/SMS/E 370	3000	0 – 70	0 – 45	19" x 2 U x 440 mm
LAB/SMS/E 3100	3000	0 – 100	0 – 30	19" x 2 U x 440 mm
LAB/SMS/E 3150	3000	0 – 150	0 – 20	19" x 2 U x 440 mm
LAB/SMS/E 3300	3000	0 – 300	0 – 10	19" x 2 U x 440 mm
LAB/SMS/E 3600	3000	0 – 600	0 – 5	19" x 2 U x 440 mm
LAB/SMS/E 3800	3000	0 – 800	0 – 4	19" x 2 U x 440 mm
LAB/SMS/E 31000	3000	0 – 1000	0 – 3	19" x 2 U x 440 mm
LAB/SMS/E 31200	3000	0 – 1200	0 – 2.6	19" x 2 U x 440 mm
LAB/SMS/E 31500	3000	0 – 1500	0 – 2	19" x 2 U x 440 mm
LAB/SMS/E 420	4000	0 – 20	0 – 200	19" x 2 U x 440 mm
LAB/SMS/E 435	4000	0 – 35	0 – 115	19" x 2 U x 440 mm
LAB/SMS/E 445	4000	0 – 45	0 – 90	19" x 2 U x 440 mm
LAB/SMS/E 470	4000	0 – 70	0 – 60	19" x 2 U x 440 mm
LAB/SMS/E 4100	4000	0 – 100	0 – 40	19" x 2 U x 440 mm
LAB/SMS/E 4150	4000	0 – 150	0 – 30	19" x 2 U x 440 mm
LAB/SMS/E 4300	4000	0 – 300	0 – 15	19" x 2 U x 440 mm
LAB/SMS/E 4600	4000	0 – 600	0 – 7	19" x 2 U x 440 mm
LAB/SMS/E 4800	4000	0 – 800	0 – 5	19" x 2 U x 440 mm
LAB/SMS/E 41000	4000	0 – 1000	0 – 4	19" x 2 U x 440 mm
LAB/SMS/E 41200	4000	0 – 1200	0 – 3.4	19" x 2 U x 440 mm
LAB/SMS/E 41500	4000	0 – 1500	0 – 2.7	19" x 2 U x 440 mm
LAB/SMS/E 525	5000	0 – 25	0 – 200	19" x 2 U x 440 mm
LAB/SMS/E 535	5000	0 – 35	0 – 150	19" x 2 U x 440 mm
LAB/SMS/E 545	5000	0 – 45	0 – 120	19" x 2 U x 440 mm
LAB/SMS/E 570	5000	0 – 70	0 – 75	19" x 2 U x 440 mm
LAB/SMS/E 5100	5000	0 – 100	0 – 50	19" x 2 U x 440 mm
LAB/SMS/E 5150	5000	0 – 150	0 – 35	19" x 2 U x 440 mm
LAB/SMS/E 5300	5000	0 – 300	0 – 17	19" x 2 U x 440 mm
LAB/SMS/E 5600	5000	0 – 600	0 – 8.5	19" x 2 U x 440 mm
LAB/SMS/E 5800	5000	0 – 800	0 – 6.25	19" x 2 U x 440 mm
LAB/SMS/E 51000	5000	0 – 1000	0 – 5	19" x 2 U x 440 mm
LAB/SMS/E 51200	5000	0 – 1200	0 – 4.2	19" x 2 U x 440 mm
LAB/SMS/E 51500	5000	0 – 1500	0 – 3.4	19" x 2 U x 440 mm
LAB/SMS/E 615	6000	0 – 15	0 – 400	19" x 2 U x 600 mm
LAB/SMS/E 620	6000	0 – 20	0 – 300	19" x 2 U x 600 mm
LAB/SMS/E 635	6000	0 – 35	0 – 175	19" x 2 U x 600 mm
LAB/SMS/E 645	6000	0 – 45	0 – 140	19" x 2 U x 600 mm
LAB/SMS/E 670	6000	0 – 70	0 – 90	19" x 2 U x 600 mm
LAB/SMS/E 6100	6000	0 – 100	0 – 60	19" x 2 U x 600 mm
LAB/SMS/E 6150	6000	0 – 150	0 – 40	19" x 2 U x 600 mm
LAB/SMS/E 6300	6000	0 – 300	0 – 20	19" x 2 U x 600 mm
LAB/SMS/E 6600	6000	0 – 600	0 – 10	19" x 2 U x 600 mm
LAB/SMS/E 6800	6000	0 – 800	0 – 7.5	19" x 2 U x 600 mm
LAB/SMS/E 61000	6000	0 – 1000	0 – 6	19" x 2 U x 600 mm
LAB/SMS/E 61200	6000	0 – 1200	0 – 5	19" x 2 U x 600 mm
LAB/SMS/E 61500	6000	0 – 1500	0 – 4	19" x 2 U x 600 mm

## PRODUCT EXAMPLES LAB SMS/E

Type	Power W	Voltage V	Current A	Dimensions
LAB/SMS/E 820	8000	0 – 20	0 – 440	19" x 2 U x 600 mm
LAB/SMS/E 825	8000	0 – 25	0 – 320	19" x 2 U x 600 mm
LAB/SMS/E 835	8000	0 – 35	0 – 230	19" x 2 U x 600 mm
LAB/SMS/E 845	8000	0 – 45	0 – 180	19" x 2 U x 600 mm
LAB/SMS/E 870	8000	0 – 70	0 – 115	19" x 2 U x 600 mm
LAB/SMS/E 8100	8000	0 – 100	0 – 80	19" x 2 U x 600 mm
LAB/SMS/E 8150	8000	0 – 150	0 – 55	19" x 2 U x 600 mm
LAB/SMS/E 8300	8000	0 – 300	0 – 30	19" x 2 U x 600 mm
LAB/SMS/E 8600	8000	0 – 600	0 – 15	19" x 2 U x 600 mm
LAB/SMS/E 8800	8000	0 – 800	0 – 10	19" x 2 U x 600 mm
LAB/SMS/E 81000	8000	0 – 1000	0 – 8	19" x 2 U x 600 mm
LAB/SMS/E 81200	8000	0 – 1200	0 – 6.7	19" x 2 U x 600 mm
LAB/SMS/E 81500	8000	0 – 1500	0 – 5.4	19" x 2 U x 600 mm
LAB/SMS/E 1020	10000	0 – 20	0 – 500	19" x 2 U x 600 mm
LAB/SMS/E 1035	10000	0 – 35	0 – 350	19" x 2 U x 600 mm
LAB/SMS/E 1045	10000	0 – 45	0 – 250	19" x 2 U x 600 mm
LAB/SMS/E 1070	10000	0 – 70	0 – 175	19" x 2 U x 600 mm
LAB/SMS/E 10100	10000	0 – 100	0 – 100	19" x 2 U x 600 mm
LAB/SMS/E 10150	10000	0 – 150	0 – 75	19" x 2 U x 600 mm
LAB/SMS/E 10300	10000	0 – 300	0 – 40	19" x 2 U x 600 mm
LAB/SMS/E 10600	10000	0 – 600	0 – 17	19" x 2 U x 600 mm
LAB/SMS/E 10800	10000	0 – 800	0 – 13	19" x 2 U x 600 mm
LAB/SMS/E 101000	10000	0 – 1000	0 – 10	19" x 2 U x 600 mm
LAB/SMS/E 101200	10000	0 – 1200	0 – 8.4	19" x 2 U x 600 mm
LAB/SMS/E 101500	10000	0 – 1500	0 – 7	19" x 2 U x 600 mm

Other versions on request

## PRODUCT EXAMPLES LAB HP/E

Type	Power W	Voltage V	Current A	Dimensions
LAB/HP/E 520	5000	0 – 20	0 – 250	19" x 3 U x 620 mm
LAB/HP/E 540	5000	0 – 40	0 – 125	19" x 3 U x 620 mm
LAB/HP/E 580	5000	0 – 80	0 – 65	19" x 3 U x 620 mm
LAB/HP/E 5100	5000	0 – 100	0 – 50	19" x 3 U x 620 mm
LAB/HP/E 5150	5000	0 – 150	0 – 35	19" x 3 U x 620 mm
LAB/HP/E 5300	5000	0 – 300	0 – 17	19" x 3 U x 620 mm
LAB/HP/E 5600	5000	0 – 600	0 – 8.5	19" x 3 U x 620 mm
LAB/HP/E 5800	5000	0 – 800	0 – 6.25	19" x 3 U x 620 mm
LAB/HP/E 51000	5000	0 – 1000	0 – 5	19" x 3 U x 620 mm
LAB/HP/E 51200	5000	0 – 1200	0 – 4	19" x 3 U x 620 mm
LAB/HP/E 51500	5000	0 – 1500	0 – 3.4	19" x 3 U x 620 mm
LAB/HP/E 1020	10000	0 – 20	0 – 500	19" x 3 U x 620 mm
LAB/HP/E 1040	10000	0 – 40	0 – 250	19" x 3 U x 620 mm
LAB/HP/E 1080	10000	0 – 80	0 – 130	19" x 3 U x 620 mm
LAB/HP/E 10100	10000	0 – 100	0 – 100	19" x 3 U x 620 mm
LAB/HP/E 10150	10000	0 – 150	0 – 70	19" x 3 U x 620 mm
LAB/HP/E 10300	10000	0 – 300	0 – 34	19" x 3 U x 620 mm
LAB/HP/E 10600	10000	0 – 600	0 – 17	19" x 3 U x 620 mm
LAB/HP/E 10800	10000	0 – 800	0 – 13	19" x 3 U x 620 mm
LAB/HP/E 101000	10000	0 – 1000	0 – 10	19" x 3 U x 620 mm
LAB/HP/E 101200	10000	0 – 1200	0 – 8	19" x 3 U x 620 mm
LAB/HP/E 101500	10000	0 – 1500	0 – 7	19" x 3 U x 620 mm

## PRODUCT EXAMPLES LAB HP/E

Type	Power W	Voltage V	Current A	Dimensions
LAB/HP/E 1520	15000	0 – 20	0 – 750	19" x 3 U x 620 mm
LAB/HP/E 1540	15000	0 – 40	0 – 375	19" x 3 U x 620 mm
LAB/HP/E 1580	15000	0 – 80	0 – 195	19" x 3 U x 620 mm
LAB/HP/E 15100	15000	0 – 100	0 – 150	19" x 3 U x 620 mm
LAB/HP/E 15150	15000	0 – 150	0 – 100	19" x 3 U x 620 mm
LAB/HP/E 15300	15000	0 – 300	0 – 50	19" x 3 U x 620 mm
LAB/HP/E 15600	15000	0 – 600	0 – 25	19" x 3 U x 620 mm
LAB/HP/E 15800	15000	0 – 800	0 – 19	19" x 3 U x 620 mm
LAB/HP/E 151000	15000	0 – 1000	0 – 15	19" x 3 U x 620 mm
LAB/HP/E 151200	15000	0 – 1200	0 – 12	19" x 3 U x 620 mm
LAB/HP/E 151500	15000	0 – 1500	0 – 10	19" x 3 U x 620 mm

Other versions on request

## MODEL NUMBER DESCRIPTION

LAB /	HP	15	150 / 3P400	LAN	Mod
DC-Source	Series	Output power	Output voltage Input voltage description	Interface option	Modification

## OPTIONS

Appendix	Description
../230	230 / 207 – 253 VAC Input
../3P208	3 x 208 / 187 – 229 VAC Input
../3P400	3 x 400 / 360 – 440 VAC Input
../3P440	3 x 440 / 396 – 484 VAC Input
../3P480	3 x 480 / 432 – 528 VAC Input
../400Hz	400 Hz Input
../DC	250...750 VDC Input
../ATE	Without Manual Operation
../LT IEEE	IEEE488 Interface
../LTRS485	RS485 Interface
../LTRS232	RS232 Interface
../LAN	LAN Interface
../USB	USB Interface
../2000V	2000 V output voltage (application must be known. Please contact us.)

## LINE INPUT

Device Power	LAB HP/E									
	LAB SMS/E									
	3 kW	4 kW	5 kW	6 kW	8 kW	10 kW	15 kW	20 kW	30 kW	45 kW
Connection	3 wire (1P+N+E) / 5 wire (3P+N+E)									
Input 1P/230	1 x 230 VAC (207 – 253 VAC 47 – 63 Hz)									
Input 3P/200	3 x 200 VAC (180 – 220 VAC 47 – 63 Hz)									
Input 3P/208	3 x 208 VAC (187 – 229 VAC 47 – 63 Hz)									
Input 3P/400	3 x 400 VAC (360 – 440 VAC 47 – 63 Hz)									
Input 3P/440	3 x 440 VAC (396 – 484 VAC 47 – 63 Hz)									
Input 3P/480	3 x 480 VAC (432 – 528 VAC 47 – 63 Hz)									
Max. allowed non symmetry (3P-System)	< 3 %									
Input current 1P/230 model <sup>1,2</sup>	22 A	28 A	33 A	x <sup>14</sup>	x <sup>14</sup>	x <sup>14</sup>	x <sup>14</sup>	x <sup>14</sup>	x <sup>14</sup>	x <sup>14</sup>
Input current 3P/200 model <sup>1,2</sup>	15	20	25	30	40	50	74	99	148	221
Input current 3P/208 model <sup>1,2</sup>	14 A	19 A	23 A	28 A	37 A	46 A	69 A	92 A	138 A	207 A
Input current 3P/400 model <sup>1,2</sup>	7.5 A	10 A	11.5 A	15 A	20 A	22.9 A	34.4 A	45.8 A	68.7 A	103.1 A
Input current 3P/440 model <sup>1,2</sup>	7 A eff	9 A	11 A	14 A	18 A	21 A	32.5 A	42 A	63.5 A	95 A
Input current 3P/480 model <sup>1,2</sup>	6.5 A	8 A	10 A	12.5 A	16.5 A	19.5 A	30.0 A	39 A	58 A	87 A
Inrush transient current <sup>2</sup>	< 25	< 25	< 25	< 51	< 51	< 51	< 76	< 102	< 153	< 229
Norminal current Internal Fuse 3P/400 model	15 A	15 A	15 A	30 A	30 A	30 A	45 A	60 A	90 A	135 A
Recommended Supply Breaker 3P/400 model (value and curve)	16 A Type D/K	16 A Type D/K	16 A Type D/K	32 A Type D/K	32 A Type D/K	32 A Type D/K	40 A Type D/K	63 A Type D/K	80 A Type D/K	120 A Type D/K
Leakage current	< 35 mA									
cos phi	> 0.7									
Harmonic Content <sup>3</sup>	50 Hz = 72 %   100 Hz = 2 %   150 Hz = 0.9 %   200 Hz = 0.1 %   250 Hz = 11 %   350 Hz = 0.6 %									
Efficiency Type	94 %									

<sup>1</sup> For nominal current and nominal voltage

<sup>2</sup> For nominal input voltage

<sup>3</sup> Total harmonic distortion input current ([%]/lin)

<sup>4</sup> 250 A is the maximum possible current for an 5 kW Unit

<sup>5</sup> If the rippel is not specified, the maximum allowed rippel is 0.2 % of F.S.

<sup>6</sup> The measurement of the peak peak rippel is strongly dependent of the measurement setup

<sup>7</sup> The given accuracy is also all interfaces valid

<sup>8</sup> Notices: The relative accuracy will not change.

Only the absolute value will be change because the nominal Values of the "unit" are change

<sup>9</sup> A higher number is possible, ask the manufactor

<sup>10</sup> The LAB HP/E unit can also build up at 30 kW, 45 kW, 60 kW, 75 kW and 90 kW units

<sup>11</sup> The ripple measurement methode of ET System is specifid at application note : ET Rippel-Spec

<sup>12</sup> Ther rippel specification are reservation to change on the part of manufactor

<sup>13</sup> Device Is at the moment only avalibale with highspped output (Low output cap)

<sup>14</sup> Not as standard unit available

LINE INPUT	LAB HP/E (Single Cabinet Version)							
	60 kW	75 kW	90 kW	100 kW	125 kW	150 kW	180 kW	195 kW
Device Power								
Connection	3 wire (1P+N+E) / 5 wire (3P+N+E)							
Input 1P/230	1 x 230 VAC (207 – 253 VAC 47 – 63 Hz)							
Input 3P/200	3 x 200 VAC (180 – 220 VAC 47 – 63 Hz)							
Input 3P/208	3 x 208 VAC (187 – 229 VAC 47 – 63 Hz)							
Input 3P/400	3 x 400 VAC (360 – 440 VAC 47 – 63 Hz)							
Input 3P/440	3 x 440 VAC (396 – 484 VAC 47 – 63 Hz)							
Input 3P/480	3 x 480 VAC (432 – 528 VAC 47 – 63 Hz)							
Max. allowed non symmetry (3P-System)	< 3 %							
Input current 1P/230 model <sup>1,2</sup>	x <sup>14</sup>	x <sup>14</sup>	x <sup>14</sup>	x <sup>14</sup>	x <sup>14</sup>	x <sup>14</sup>	x <sup>14</sup>	x <sup>14</sup>
Input current 3P/200 model <sup>1,2</sup>	295	370	444	494	617	740	888	962
Input current 3P/208 model <sup>1,2</sup>	276 A	345 A	414 A	460 A	575 A	690 A	828 A	897 A
Input current 3P/400 model <sup>1,2</sup>	137.5 A	172.5 A	207 A	230 A	287.5 A	345 A	414 A	448.5 A
Input current 3P/440 model <sup>1,2</sup>	127 A	162.5 A	195 A	217 A	271 A	325 A	390 A	422.5 A
Input current 3P/480 model <sup>1,2</sup>	117 A	150 A	180 A	200 A	250 A	300 A	360 A	390 A
Inrush transient current <sup>2</sup>	< 305	< 380	< 456	< 506	< 633	< 760	< 912	< 988
Norminal current Internal Fuse 3P/400 model	180 A	200 A	250 A	300 A	359 A	400 A	500 A	500 A
Recommended Supply Breaker 3P/400 model (value and curve)	150 A Type D/K	200 A Type D/K	230 A Type D/K	250 A Type D/K	320 A Type D/K	380 A Type D/K	450 A Type D/K	490 A Type D/K
Leakage current	< 100 mA							
cos phi	> 0.7							
Harmonic Content <sup>3</sup>	50 Hz = 72 %   100 Hz = 2 %   150 Hz = 0.9 %   200 Hz = 0.1 % 250 Hz = 11 %   350 Hz = 0.6 %							
Efficiency Type	94 %							

<sup>1</sup> For nominal current and nominal voltage

<sup>2</sup> For nominal input voltage

<sup>3</sup> Total harmonic distortion input current ([%]/lin)

<sup>4</sup> 250 A is the maximum possible current for an 5 kW Unit

<sup>5</sup> If the rippel is not specified, the maximum allowed rippel is 0.2 % of F.S.

<sup>6</sup> The measurement of the peak peak rippel is strongly dependent of the measurement setup

<sup>7</sup> The given accuracy is also all interfaces valid

<sup>8</sup> Notices: The relative accuracy will not change.

Only the absolute value will be change because the nominal Values of the "unit" are change

<sup>9</sup> A higher number is possible, ask the manufactor

<sup>10</sup> The LAB HP/E unit can also build up at 30 kW, 45 kW, 60 kW, 75 kW and 90 kW units

<sup>11</sup> The ripple measurement methode of ET System is specifid at application note : ET Rippel-Spec

<sup>12</sup> Ther rippel specification are reservation to change on the part of manufactor

<sup>13</sup> Device Is at the moment only avalibale with highspped output (Low output cap)

<sup>14</sup> Not as standard unit available

## OUTPUT

	LAB HP/E																	
	LAB SMS/E																	
Control quality	Static Regulation	± 0.1 % of F.S.																
	Line Regulation voltage	± 0.02 % F.S.																
	Line Regulation current	± 0.02 % F.S.																
	Load Regulation voltage	± 0.05 % F.S. ± 2 mV																
	Load Regulation current	± 0.05 % F.S. ± 20 mA																
	Dynamic Responce Time @ Load Step 10 – 90 %	< 3 ms																
Output current	Output voltage / [V]	15	20	25	35	40	45	70	80	100	150	300	600	800	1000	1200	1500	
	SMS/E: 3 kW Unit/ [A]	200	x	x	90	x	70	45	x	x	20	10	5	x	3	2,6	2	
	SMS/E: 4 kW Unit/ [A]	x	200	x	115	x	90	60	x	x	30	15	7	x	4	3,4	x	
	SMS/E: 5 kW Unit/ [A]	x	250	200	150	125	120	75	65	50	35	17	8,5	6,5	5	4,2	3,3	
	SMS/E: 6 kW Unit/ [A]	400	300	x	175	x	140	90	x	x	40	20	10	x	6	5	x	
	SMS/E: 8 kW Unit/ [A]	x	440	320	230	x	180	115	x	x	55	30	15	x	8	6,7	x	
	SMS/HP/E: 10 kW Unit/ [A]	x	500	x	350	250	250	175	130	100	75	40	17	13	10	8	6,6	
	HP/E: 15 kW Unit/ [A]	x	750	x	x	375	x	x	195	150	100	50	25	19	15	12	10	
	Other combinations of voltage and current also possible, ask the manufactory																	
	Basic calculation of possible combinations are:																	
	Pout = Vout x Iout   Pmax for one unit 90 kW   Vmax = 1500 V   Cmax = 250 A each 5 kW																	
Rippel and Noise <sup>1)</sup>	Voltage Ripple (p-p) 20 MHz	40 <sup>12</sup>	80 <sup>12</sup>	80 <sup>12</sup>	80 <sup>12</sup>	140 <sup>12</sup>	140 <sup>12</sup>	140 <sup>12</sup>	140 <sup>12</sup>	140 <sup>12</sup>	900 <sup>12</sup>	900 <sup>12</sup>	350 <sup>12</sup>	350 <sup>12</sup>	400 <sup>12</sup>	850 <sup>12</sup>	900 <sup>12</sup>	
	Voltage Ripple (p-p) 300 kHz	15 <sup>12</sup>	35 <sup>12</sup>	35 <sup>12</sup>	35 <sup>12</sup>	60 <sup>12</sup>	60 <sup>12</sup>	60 <sup>12</sup>	60 <sup>12</sup>	60 <sup>12</sup>	400 <sup>12</sup>	400 <sup>12</sup>	250 <sup>12</sup>	250 <sup>12</sup>	300 <sup>12</sup>	500 <sup>12</sup>	550 <sup>12</sup>	
	Voltage Ripple (rms) <sup>5</sup> mV 20 MHz	15 <sup>12</sup>	35 <sup>12</sup>	35 <sup>12</sup>	35 <sup>12</sup>	60 <sup>12</sup>	60 <sup>12</sup>	60 <sup>12</sup>	60 <sup>12</sup>	60 <sup>12</sup>	400 <sup>12</sup>	400 <sup>12</sup>	150 <sup>12</sup>	150 <sup>12</sup>	150 <sup>12</sup>	150 <sup>12</sup>	200 <sup>12</sup>	
	Voltage Ripple (rms) <sup>5</sup> mV 300 kHz	10 <sup>12</sup>	25 <sup>12</sup>	25 <sup>12</sup>	25 <sup>12</sup>	40 <sup>12</sup>	40 <sup>12</sup>	40 <sup>12</sup>	40 <sup>12</sup>	40 <sup>12</sup>	300 <sup>12</sup>	300 <sup>12</sup>	100 <sup>12</sup>	100 <sup>12</sup>	100 <sup>12</sup>	100 <sup>12</sup>	150 <sup>12</sup>	
	Current Ripple (p-p)	< 0.5 % of F.S.																
	Current Ripple (rms)	< 0.4 % of F.S.																
Isolation	Primary / Secondary	3000 VAC																
	DC-Output / Earth	500 VDC										2000 VDC						
	Primary / Earth	2150 VDC																
Output speed	Rise Time, Full load	6 ms	6 ms	6 ms	6 ms	12 ms	12 ms	12 ms	20 ms	20 ms	20 ms	20 ms	20 ms	40 ms	40 ms	40 ms	6 ms <sup>13</sup>	
	Rise Time, No load	5 ms	5 ms	5 ms	5 ms	10 ms	10 ms	10 ms	10 ms	10 ms	10 ms	10 ms	10 ms	10 ms	20 ms	20 ms	5 ms <sup>13</sup>	
	Fall Time, Full Load	15 ms	15 ms	15 ms	15 ms	20 ms	20 ms	20 ms	20 ms	20 ms	40 ms	40 ms	50 ms	60 ms	80 ms	100 ms	25 ms <sup>13</sup>	
	Fall Time, No Load	5 s to get below 50 V																
Accuracy	Rel. Accuracy ± [%] <sup>7</sup>																	
	Voltage [V] 0.25	0.038	0.050	0.063	0.088	0.100	0.113	0.175	0.200	0.250	0.375	0.750	1.500	2.000	2.500	3.000	3.750	
	Current [A] 0.4	1.000	1.000	0.800	0.600	0.500	0.480	0.300	0.260	0.200	0.140	0.068	0.034	0.026	0.020	0.017	0.013	
	Relative Accuracy for Sens Operation (worst case) [%] <sup>7</sup>																	
	Voltage [V] 0.5	0,075	0,100	0,125	0,175	0,200	0,225	0,350	0,400	0,500	0,750	1,500	3,000	4,000	5,000	6,000	7,500	
	Max. Sens Voltage over nominal Voltage	± 1 % of F.S.																
Max. Sens Voltage inside the nominal Voltage range	5 % of F.S. (if higher voltage is needed ask manufactory)																	

## OUTPUT

		LAB HP/E			
		LAB SMS/E			
Resolution voltage	Resolution voltage	15 V – 99.99 V		100 V – 999.9 V	1000 V – 1500 V
	Display				
	Voltage Setting resolution	00.00			
	Current Setting resolution	00.00			
Resolution current	Resolution current	0 A – 9.999 A	10 A – 99.99 A	100 A – 999.9 A	1000 A – 9999 A
	Display				
	Voltage Setting resolution	00.00			
	Current Setting resolution	00.00			
Device Function	OVP	Over Voltage Protection: is adjustable between 0 % and 120 % of Voltage full range			
	OCP	Over Current Protection: is realised by the current setpoint, the output current can not go over the set output current			
	OTP	Over Temperature Protection: if the internal heat sink temperature is go above 90°C the device will automatical shut down			
	UI-MODE	Voltage and Current Operation Mode: Voltage and current are settable			



## INTERFACE

### Analog Interface

Digital outputs (CV, Standby, Error)	Output type: Open collector with pull-up resistor 10 k $\Omega$ after +5 V Isinkmax: 50 mA
Digital inputs (Ext. Control, Standby)	Input resistance: 47 k $\Omega$ Maximum input voltage: 50 V High level: Uin > 2 V Low level: Uin < 0.8 V
Analog outputs (Xmon)	Output resistance: 100 $\Omega$ Minimum permissible load resistance: 2 k $\Omega$ Minimum load resistance for 0.1 % accuracy: 100 k $\Omega$
Analog inputs (Xset)	Input resistance: 1 M $\Omega$ Maximum permissible input voltage: 25 V
Reference voltage	Reference voltage Uref: 10 V $\pm$ 10 mV Output resistance: < 10 $\Omega$ Maximum output current: 10 mA (not short-circuit-proof)
5 V – supply voltage	Output voltage: 5 V $\pm$ 300 mV Maximum output current: 50 mA (not short-circuit-proof)
Programming Response Time	< 10 ms

### RS232

Signal inputs (Rx, D, CTS)	Maximum input voltage: $\pm$ 25 V Input resistance: 5 k $\Omega$ (Type) Switching thresholds: UH < -3 V, UL > +3 V
Signal outputs (Tx, D, RTS)	Output voltage (at RL > 3 k $\Omega$ ): min $\pm$ 5 V, Type $\pm$ 9 V, max $\pm$ 10 V Output resistance: < 300 $\Omega$ ; Short circuit current: Type $\pm$ 10 mA

### RS485

Maximum input voltage	$\pm$ 5 V
Input resistance	> 12 k $\Omega$
Output current	$\pm$ 60 mA Max
High level	Ud > 0.2 V
Low level	Ud < -0.2 V

## EMC AND SAFETY STANDARDS

Safety standard	EN 60950
Emission	EN 61000-6-4:2007
Immunity	EN 61000-6-2:2005
Measurement, control- and laboratory equipment	EN 61010-1:2010

## AMBIENT CONDITIONS

Cooling	Fans
Operating temperature	0 – 50°C
Storage temperature	-20°C – 70°C
Humidity	< 80 %
Operating height	< 2000 m
Weight / Dimension LAB SMS/E 3 – 5 kW	18 kg / 19" x 2 U x 440 mm
Weight / Dimension LAB SMS/E 6 – 10 kW	25 kg / 19" x 2 U x 600 mm
Weight / Dimension-LAB HP/E	5 kW 19 kg, 10 kW 26 kg, 15 kW 33 kg / 19" x 3 U x 620 mm
FAN Volume	42 – 43 dB