

Prüfbericht - Nr.: 21113774_001 <i>Test Report No.:</i>		Seite 1 von 30 <i>Page 1 of 30</i>	
Auftraggeber: <i>Client:</i>	APC Denmark ApS Silcon Alle, DK 6000 Kolding		
Gegenstand der Prüfung: <i>Test item:</i>	Uninterruptible Power Systems (UPS)		
Bezeichnung: <i>Identification:</i>	SUVT15KF, SUVT30KF SUVT20KH, SUVT40KH	Serien-Nr.: <i>Serial No.:</i>	-----
Wareneingangs-Nr.: <i>Receipt No.:</i>	-----	Eingangsdatum: <i>Date of receipt:</i>	-----
Prüfort: <i>Testing location:</i>	APC Denmark, Kolding		
Prüfgrundlage: <i>Test specification:</i>	Efficiency Test under consideration of IEC/ EN 62040-1-1 Uninterruptible Power Systems (UPS) Part 1-1: General and safety requirements for UPS used in operator access areas Annex M Examples of reference load conditions IEC/ EN 62040-3 Uninterruptible power systems (UPS) Part 3: Method of specifying the performance and test requirements Annex E Reference non-linear load		
Prüfergebnis: <i>Test Result:</i>	Der vorstehend beschriebene Prüfgegenstand wurde geprüft und entspricht oben genannter Prüfgrundlage. <i>The a. m. test item passed.</i>		
Prüflaboratorium: <i>Testing Laboratory:</i>	TÜV Rheinland Product Safety GmbH Am Grauen Stein, 51105 Köln		
zusammengestellt/ compiled by:		kontrolliert/ checked by:	
29.09.2004	V. Studzinski	29.09.2004	V. Ebinghaus
Datum <i>Date</i>	Name <i>Name</i>	Unterschrift <i>Signature</i>	Unterschrift <i>Signature</i>
Sonstiges/ Other Aspects:			
Abkürzungen:		Abbreviations:	
ok / P =	entspricht Prüfgrundlage	ok / P =	passed
fail / F =	entspricht nicht Prüfgrundlage	fail / F =	failed
n.a. / N =	nicht anwendbar	n.a. / N =	not applicable
<p>Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens.</p> <p><i>This test report relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any safety mark on this or similar products.</i></p>			

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Measuring Test Instruments

Measuring Instruments	Manufacturer	Equipment Ident.-No.	Last Calibration Date
Power Analyzer 27D615433	Yokogawa WT1600	R&D 1893	2004 06 04
Power Analyzer 22-222802	Voltech PM3000A	R&D 1126	2004 03 04
Current Transformer			
T1 CT 100:1 22-221613	Voltech CT1000	1666	2004 02 09
T2 CT 100:1 22-1611	Voltech CT1000	1667	2004 02 09
T3 CT 100:1 221612	Voltech CT1000	1668	2004 02 09
T4 CT 100:1 8866	Voltech CT1000	1685	2004 01 06
T5 CT 100:1 8990	Voltech CT1000	1844	2004 03 15
T6 CT 100:1 8868	Voltech CT1000	1687	2004 01 06
Rshunt 1 mOhm	T&M Research W-8-001-2	0114	2004 02 25
Rshunt 1 mOhm	T&M Research W-8-001-2	0109	2004 02 25
(refer to page 4 for test set up)			

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1. Requirements and Agreements

Request of testing was the efficiency measurement of different UPS models with a resistive load, an inductive load and a computer load.

The tested UPS systems got investigated under consideration of the following requirements and standards.

IEC/ EN 62040-1-1 Uninterruptible Power Systems (UPS)

Part 1-1: General and safety requirements for UPS used in operator access areas

Annex M Examples of reference load conditions

IEC/ EN 62040-3 Uninterruptible power systems (UPS)

Part 3: Method of specifying the performance and test requirements

Annex E Reference non-linear load

The presented UPS system was operated by APC personnel. Measuring equipment was calibrated and suitable for testing. Conducted single measurements are recorded and documented as result of the independent witness test.

2. Information about the devices under test (DUT)

APC has provided for testing four different models of the Smart UPS VT series rated as follow.:

Model	Output Power	Output Power	Output Voltage	Frequency
SUVT15KF	15 kVA	12 kW	3 ph 208 V AC	60Hz nominal
SUVT30KF	30 kVA	24 kW	3 ph 208 V AC	60Hz nominal
SUVT20KH	20 kVA	16 kW	3 ph 400 V AC	50Hz nominal
SUVT40KH	40 kVA	32 kW	3 ph 400 V AC	50Hz nominal

DUT's provided for test are engineering samples. Documentation of assembling of the DUT's are not part of these report.

3. Description of the Test Set-up

Mains input voltage has been adjusted to

- -13% of the nominal voltage (Low mains)
- nominal voltage (Nominal mains)
- +13% of the nominal voltage(High mains)
-

The EUT was connected at all voltages to

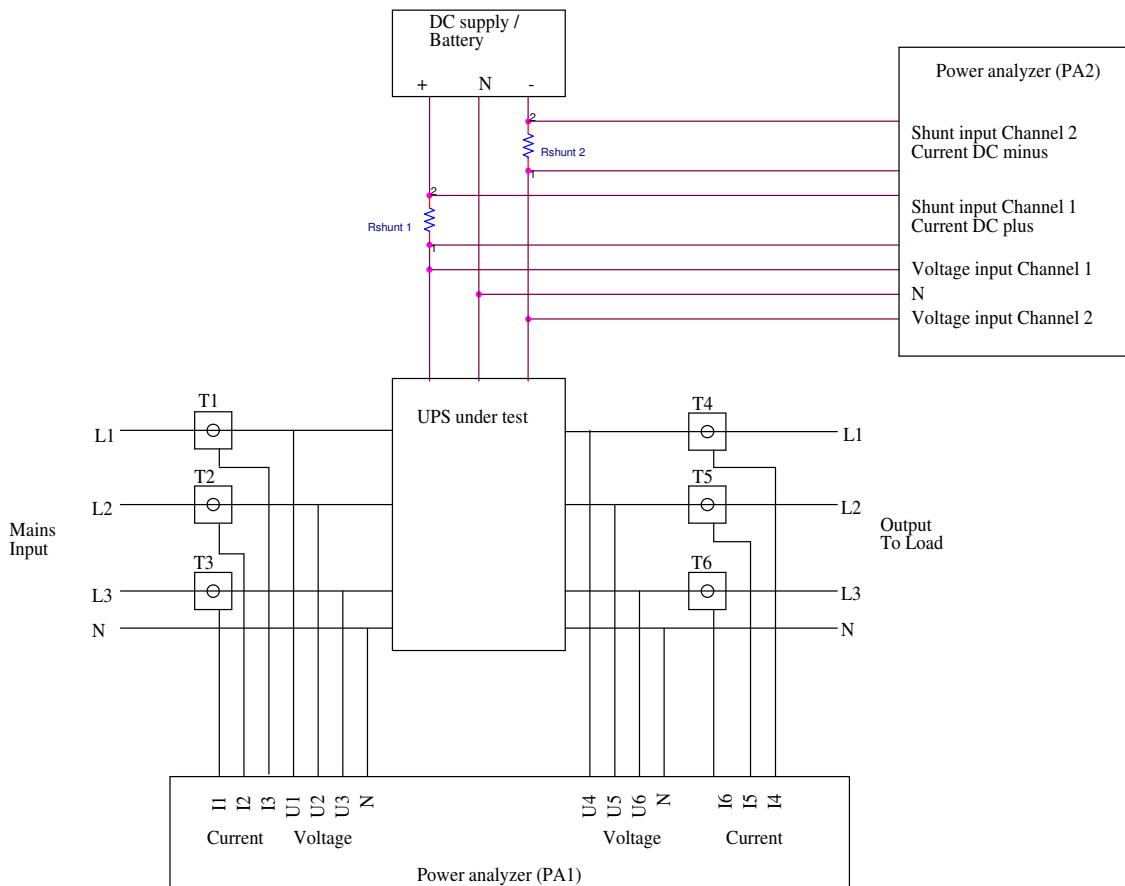
resistive load
 inductive load
 SMPS load

All tests are onsite measurements at APC Denmark facility.
 Each test result value is computed of an average of 10 single measurements.
 Mains distortion and mains frequency have been observed during the tests.

Batteries were removed and a 192 V DC supply of the battery circuit was assumed as connected to full loaded batteries.

Refer for the test setup to the photodocumentation also.

Test circuit for efficiency test SUVT



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SMPS load for UPS test

Load used for SUVT20KF and SUVT40KF						
Load type	Vac L-N	Frequency	Nominal	Calculated values according to EN62040-1-1		
			S (per phase)	Rs	C	R1
	V	Hz	kVA	Ohm	µF	Ohm
1	230	50	1,1	1,92	1383	108,5
2	230	50	4,1	0,52	5155	29,1

Actual values in APC SMPS load			Simulated current *	Voltage source	Simulated S
Rs	C	R1			
Ohm	µF	Ohm	A	V/Hz	VA
1,8	1500	108	5,65	230/50	1300
0,5	5150	30	19,36	230/50	4453

Load used for SUVT15KH and SUVT30KH						
Load type	Vac L-N	Frequency	Nominal	Calculated values according to EN62040		
			S (per phase)	Rs	C	R1
	V	Hz	kVA	Ohm	µF	Ohm
1	120	60	0,3	1,92	1155	108,2
2A	120	60	1,15	0,50	4427	28,2
3	120	60	2,1	0,27	8083	15,5

Actual values in APC SMPS load			Simulated current *	Voltage source	Simulated S
Rs	C	R1			
Ohm	µF	Ohm	A	V/Hz	VA
1,8	1500	108	2,83	120/60	340
0,5	4400	30	9,98	120/60	1198
0,3	9740	15,6	17,2	120/60	2064

All values for reactive power (S) are per phase.

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Load type 1:

Load designed for max. 9.9kVA 3 phase at 230V L-N.

The load is split into 3 sections, each 3.3kVA (1.1kVA per phase)

Load type 2 and 2A:

Load designed for use at 208V/415V phase-phase voltage. The load is built of load sections which can be coupled in series or parallel, depending on the voltage. And the capacitance value can be adjusted for 50/60Hz by adding/removing connections to some capacitors. There are 3 identical sections each 12.3kVA (4.3kVA per phase) at 230V L-N and 3.45kVA (1.15kVA per phase) at 120V L-N, which can be connected in parallel to increase the load.

Load type 3:

Load designed for use at 240V/480V phase-phase voltage. The load is built of load sections which can be coupled in series or parallel, depending on the voltage. There are 6 identical sections each 6.3kVA (2.1kVA per phase), which can be connected in parallel to increase the load.

* Simulated current: Simulated in power (S) with the actual values in APC SMPS load. The voltage used is an ideal sinusoidal voltage generator with 230VAC/50Hz or 120V/60Hz

208V/60Hz		Nom. Load	15 kVA				30 kVA			
			VA	25%	50%	75%	100%	25%	50%	75%
Load type 1	Step 1	900				1		1		
	Step 2	900			1	1		1		
	Step 3	900		1	1		1			
Load type 2A	Step 1	3450	1	1					1	1
	Step 2	3450		1	1				1	1
	Step 3	3450							1	
Load type 3	Step 1	6300			1	1	1	1	1	1
	Step 2	6300				1		1	1	1
	Step 3	6300								1
	Step 4	6300								1
	Step 5	6300								
	Step 6	-								
Total calculated load	VA		3450	7800	11550	14400	7200	14400	22950	32100
Total calculated load %			23,0%	52,0%	77,0%	96,0%	24,0%	48,0%	76,5%	107,0%

400V/50Hz		Nom. Load	20 kVA				40 kVA			
			VA	25%	50%	75%	100%	25%	50%	75%
Load type 1	Step 1	3300	1		1	1	1	1	1	1
	Step 2	3300				1	1	1		
	Step 3	3300								
Load type 2	Step 1	12300		1	1	1		1	1	1
	Step 2	12300							1	1
	Step 3	12300								1
Total calculated load	VA		3300	12300	15600	18900	6600	18900	27900	40200
Total calculated load %			16,5%	61,5%	78,0%	94,5%	16,5%	47,3%	69,8%	100,5%

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SUVT15KF
 Rated power 15 kVA
 12 kW

Inductive load

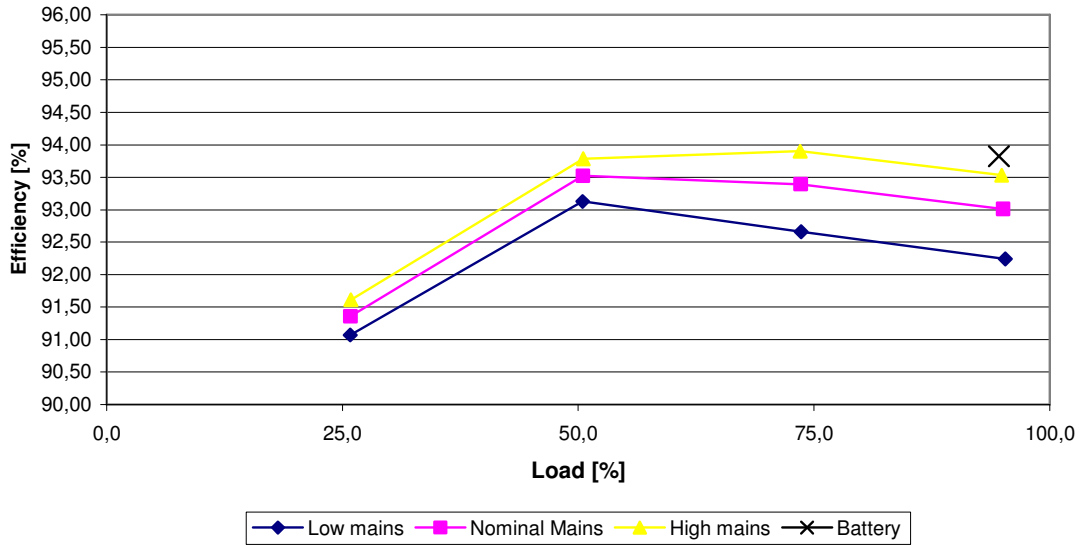
	P in	S in	P out	S out	Load	Loss	Efficiency
	W	VA	W	VA	%	W	%
Low mains	3403,39	3410,79	3099,53	3855,26	25,8	303,88	91,07
	6503,94	6515,49	6057,06	7719,54	50,5	446,90	93,13
	9537,46	9548,09	8837,20	11340,61	73,6	700,25	92,66
	12393,26	12404,03	11431,86	14820,53	95,3	961,43	92,24

	P in	S in	P out	S out	Load	Loss	Efficiency
	W	VA	W	VA	%	W	%
Nominal Mains	3394,88	3407,05	3101,44	3859,46	25,8	293,39	91,36
	6481,39	6494,09	6061,39	7719,46	50,5	420,03	93,52
	9454,65	9385,16	8829,94	11334,95	73,6	624,69	93,39
	12264,79	12277,09	11407,79	14798,21	95,1	857,01	93,01

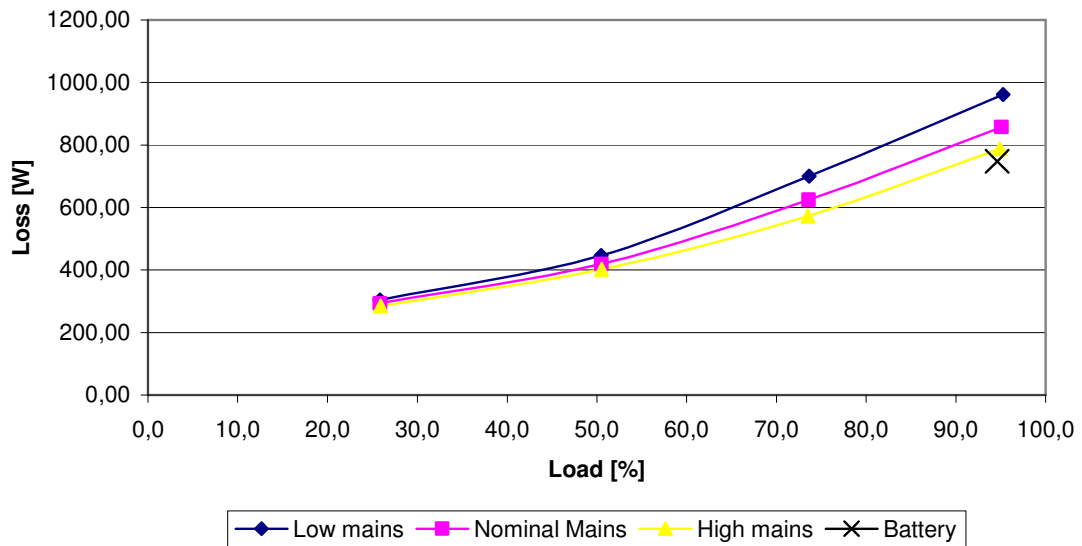
	P in	S in	P out	S out	Load	Loss	Efficiency
	W	VA	W	VA	%	W	%
High mains	3393,23	3412,68	3108,71	3862,41	25,9	284,55	91,61
	6467,51	6480,96	6065,47	7716,72	50,5	402,04	93,78
	9395,50	9411,46	8822,58	11328,68	73,5	572,90	93,90
	12177,30	12192,60	11389,58	14783,37	94,9	787,70	93,53

	P in		P out	S out	Load	Loss	Efficiency
	W		W	VA	%	W	%
Battery	12099,1		11351,8	14741,82	94,6	747,3	93,82

SUVT15KF Efficiency vs. Load. Inductive load



SUVT15KF Loss vs. Load. Inductive load



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SUVT15KF
 Rated power

15kVA
 12kW

Resistive load

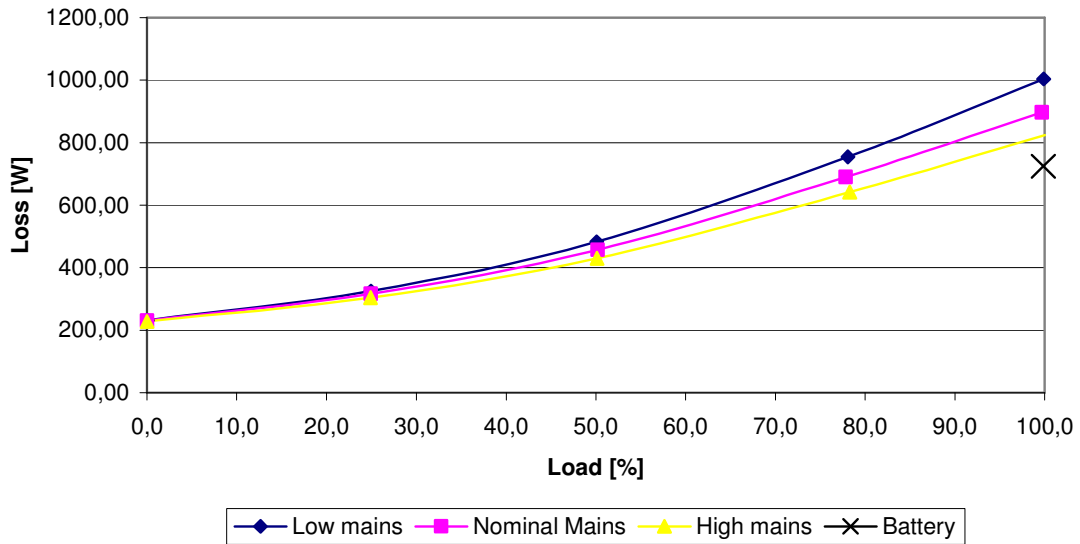
	P in	S in	P out	S out	Load	Loss	Efficiency
	W	VA	W	VA	%	W	%
Low mains	235,91	308,53	4,31	10,86	0,0	231,59	1,83
	3316,97	3324,24	2991,62	2991,69	24,9	325,35	90,19
	6496,75	6507,55	6013,85	6013,98	50,1	482,84	92,57
	10124,17	10134,27	9369,70	9369,81	78,1	754,44	92,55
	12989,53	13000,67	11986,09	11986,16	99,9	1003,46	92,27

	P in	S in	P out	S out	Load	Loss	Efficiency
	W	VA	W	VA	%	W	%
Nominal Mains	230,96	341,06	0,09	6,62	0,0	230,87	0,04
	3309,95	3322,18	2993,13	2993,22	24,9	316,80	90,43
	6479,27	6431,16	6022,41	6022,47	50,2	456,85	92,95
	10033,65	10046,06	9343,82	9343,87	77,9	689,85	93,12
	12861,79	12873,87	11964,64	11964,74	99,7	897,17	93,02

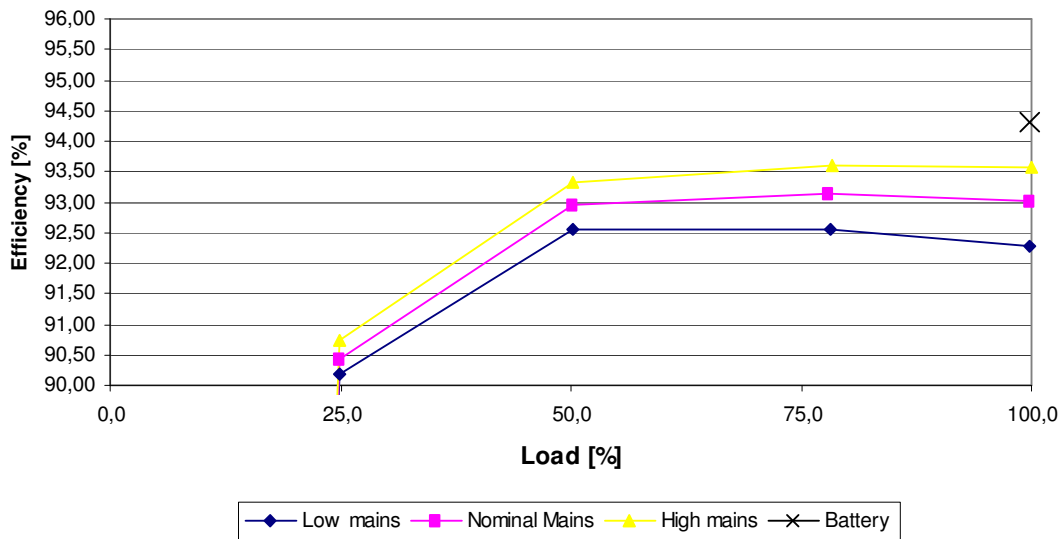
	P in	S in	P out	S out	Load	Loss	Efficiency
	W	VA	W	VA	%	W	%
High mains	228,13	371,02	0,09	6,62	0,0	228,04	0,04
	3290,80	3310,78	2986,32	2986,38	24,9	304,44	90,75
	6448,14	6460,62	6017,71	6017,78	50,1	430,42	93,32
	10037,74	10052,77	9395,71	9395,81	78,3	642,02	93,60
	12827,77	12842,17	12002,74	12002,82	100,0	825,00	93,57

	P in		P out	S out	Load	Loss	Efficiency
	V%		W	W	%	W	%
Battery	12708,7		11983,8	11983,9	99,9	724,9	94,30

SUVT15KF Loss vs. Load. Resistive load



SUVT15KF Efficiency vs. Load. Resistive load



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SUVT15KF
 Rated power 15kVA
 12kW

SMPS load

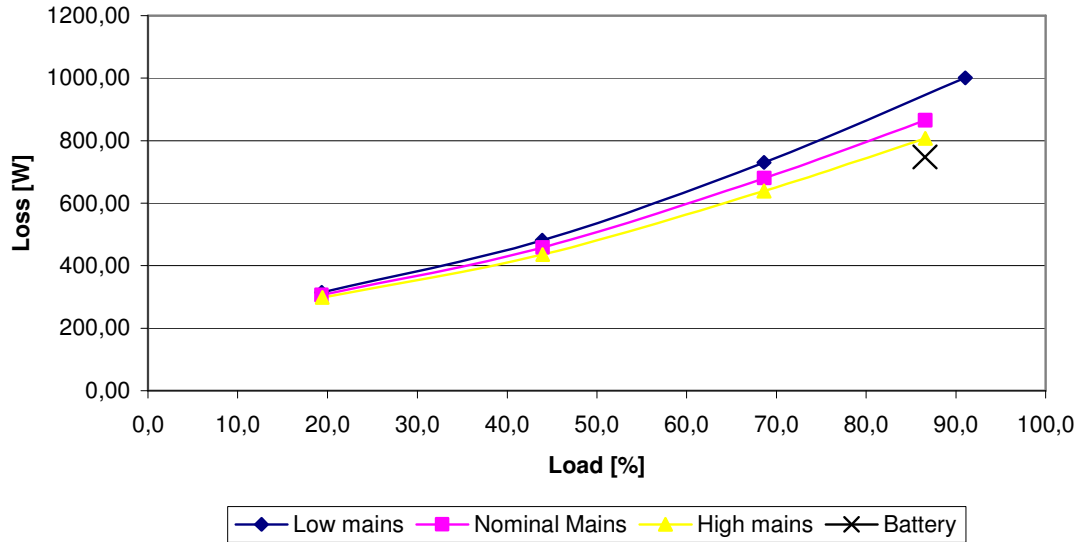
	P in	S in	P out	S out	Load	Loss	Efficiency
	W	VA	W	VA	%	W	%
Low mains	2635,43	2644,08	2320,89	3337,39	19,3	314,54	88,06
	5751,30	5764,63	5269,71	7377,07	43,9	481,60	91,63
	8965,04	8979,51	8234,24	11302,82	68,6	730,80	91,85
	11928,82	11944,22	10927,63	14832,08	91,1	1001,19	91,61

	P in	S in	P out	S out	Load	Loss	Efficiency
	W	VA	W	VA	%	W	%
Nominal Mains	2628,19	2643,80	2321,70	3338,68	19,3	306,49	88,34
	5734,87	5747,93	5277,01	7390,16	44,0	457,86	92,02
	8919,87	8936,97	8239,15	11306,77	68,7	680,75	92,37
	11258,39	11275,98	10392,96	14066,72	86,6	865,46	92,31

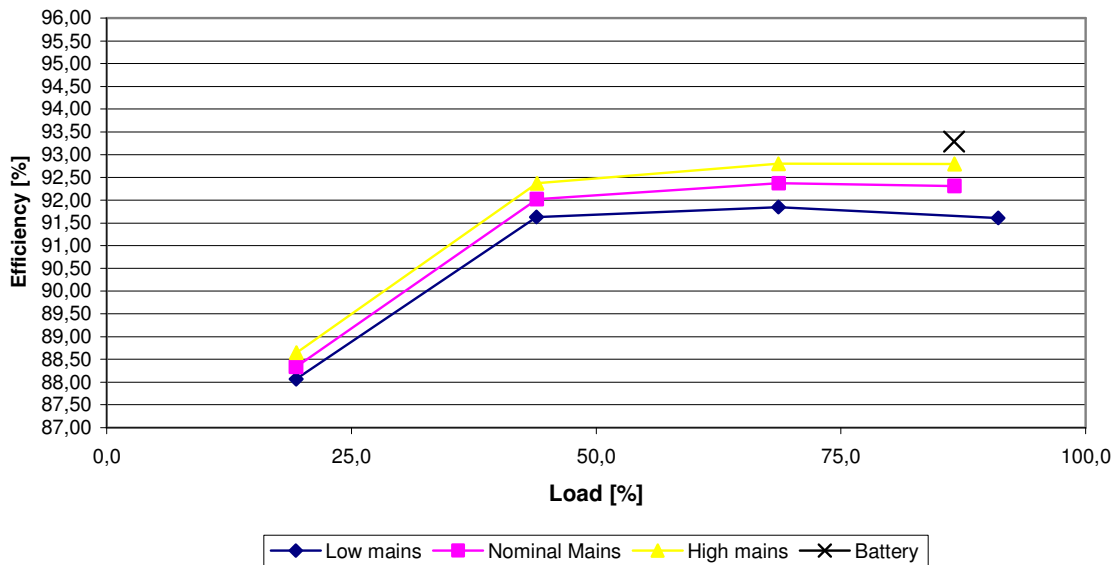
	P in	S in	P out	S out	Load	Loss	Efficiency
	W	VA	W	VA	%	W	%
High mains	2624,63	2649,77	2326,72	3350,87	19,4	297,91	88,65
	5712,93	5728,30	5277,00	7389,96	44,0	435,94	92,37
	8875,56	8895,27	8236,31	11307,62	68,6	639,23	92,80
	11199,46	11220,44	10392,29	14071,92	86,6	807,15	92,79

	P in		P out	S out	Load	Loss	Efficiency
	W		W	VA	%	W	%
Battery	11136,0		10388,5	14065,24	86,6	747,5	93,29

SUVT15KF Loss vs. Load. SMPS load



SUVT15KF Efficiency vs. Load. SMPS load



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SUVT30KF
 Rated power 30kVA
 24kW

Inductive load

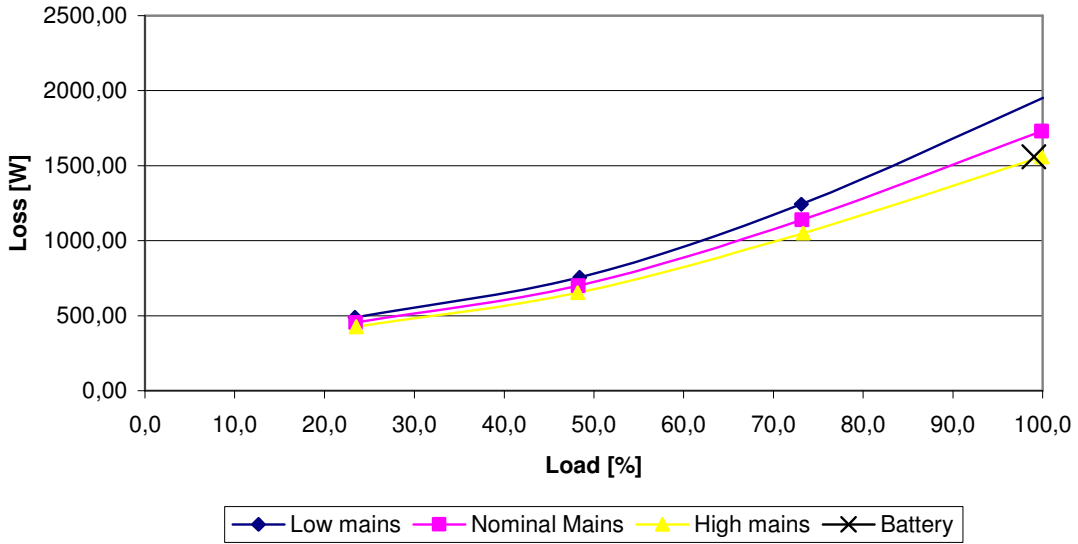
	P in	S in	P out	S out	Load	Loss	Efficiency
	W	VA	W	VA	%	W	%
Low mains	6105,96	6122,25	5617,37	7448,97	23,4	488,56	92,00
	12378,53	12404,25	11622,51	14995,04	48,4	756,00	93,89
	18789,94	18813,52	17547,03	22410,12	73,1	1242,89	93,39
	25957,89	25983,86	24007,36	30188,78	100,0	1950,56	92,49

	P in	S in	P out	S out	Load	Loss	Efficiency
	W	VA	W	VA	%	W	%
Nominal Mains	6089,30	6114,32	5633,86	7476,57	23,5	455,51	92,52
	12285,51	12310,44	11585,46	14968,93	48,3	700,07	94,30
	18702,01	18729,48	17563,03	22423,21	73,2	1138,96	93,91
	25702,46	25730,08	23972,30	30172,81	99,9	1730,13	93,27

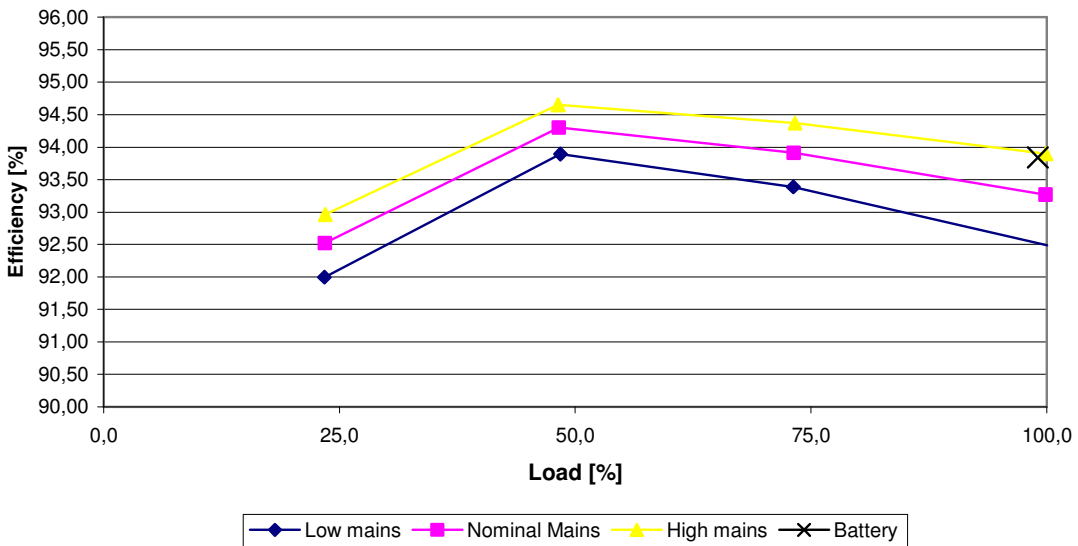
	P in	S in	P out	S out	Load	Loss	Efficiency
	W	VA	W	VA	%	W	%
High mains	6069,56	6108,44	5642,39	7488,76	23,5	427,17	92,96
	12215,84	12242,49	11562,63	14952,07	48,2	653,21	94,65
	18648,38	18680,70	17598,18	22444,60	73,3	1050,18	94,37
	25533,93	25566,74	23975,05	30155,60	99,9	1558,91	93,89

	P in		P out	S out	Load	Loss	Efficiency
	W		W	VA	%	W	%
Battery	25327,0		23767,4	30061,3	99,0	1559,6	93,84

SUVT30KF Loss vs. Load. Inductive load



SUVT30KF Efficiency vs. Load. Inductive load



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SUVT30KF
 Resistive load
 Rated power

30kVA
 24kW

Resistive load

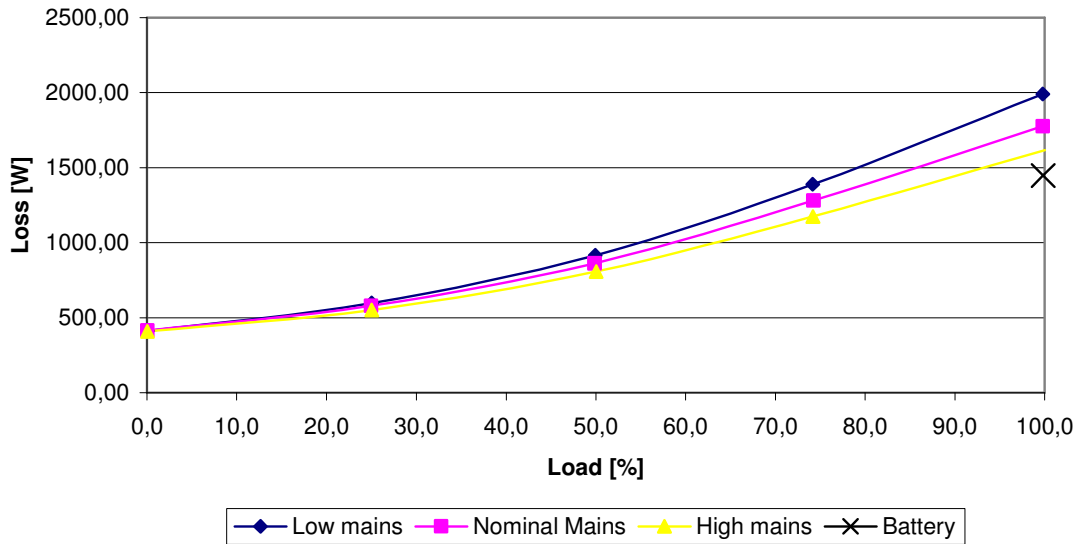
	P in	S in	P out	S out	Load	Loss	Efficiency
	W	VA	W	VA	%	W	%
Low mains	416,07	558,25	4,33	10,84	0,0	411,74	1,04
	6607,07	6620,40	6009,53	6009,61	25,0	597,52	90,96
	12904,00	12926,15	11987,68	11987,79	49,9	916,32	92,90
	19184,50	19206,00	17795,24	17795,37	74,1	1389,27	92,76
	25943,86	25967,70	23953,02	23953,34	99,8	1990,86	92,33

	P in	S in	P out	S out	Load	Loss	Efficiency
	W	VA	W	VA	%	W	%
Nominal Mains	419,39	576,98	4,32	10,84	0,0	415,07	1,03
	6575,28	6595,12	5995,90	5995,94	25,0	579,38	91,19
	12832,47	12855,21	11970,41	11970,51	49,9	862,04	93,28
	19103,12	19129,29	17821,52	17821,64	74,3	1281,65	93,29
	25730,64	25756,08	23955,34	23955,67	99,8	1775,33	93,10

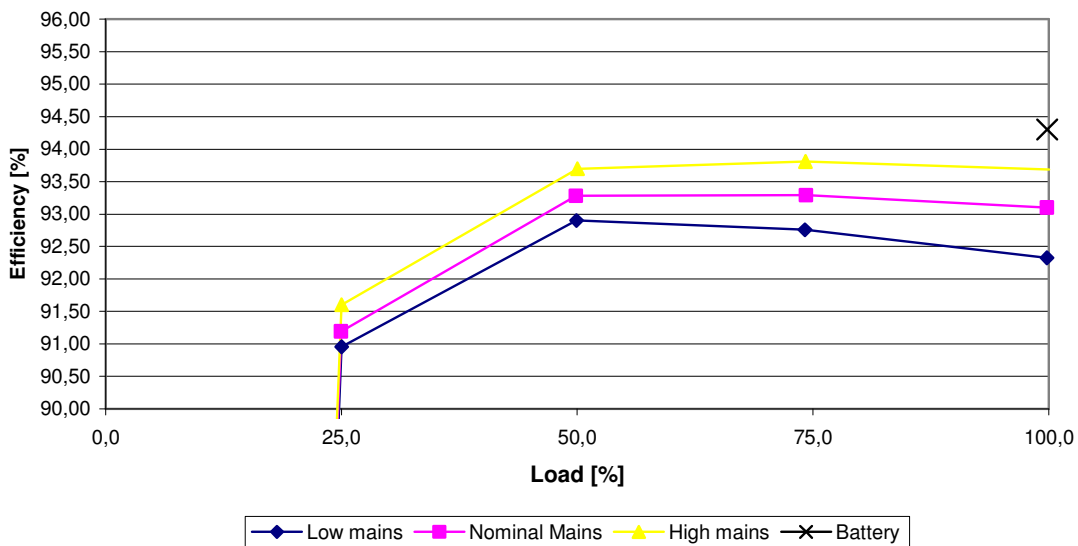
	P in	S in	P out	S out	Load	Loss	Efficiency
	W	VA	W	VA	%	W	%
High mains	412,56	611,36	4,32	10,84	0,0	408,24	1,05
	6560,28	6593,12	6009,38	6009,47	25,0	550,88	91,60
	12818,38	12841,33	12010,64	12010,77	50,0	807,71	93,70
	18982,12	19012,29	17806,59	17806,79	74,2	1175,51	93,81
	25622,20	25652,73	24004,46	24004,78	100,0	1617,76	93,69

	P in		P out	S out	Load	Loss	Efficiency
	W		W	VA	%	W	%
Battery	25407,0		23959,1	23959,47	99,8	1447,9	94,30

SUVT30KF Loss vs. Load. Resistive load



SUVT30KF Efficiency vs. Load. Resistive load



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SUVT30KF
 Rated power

30kVA
 24kW

SMPS load

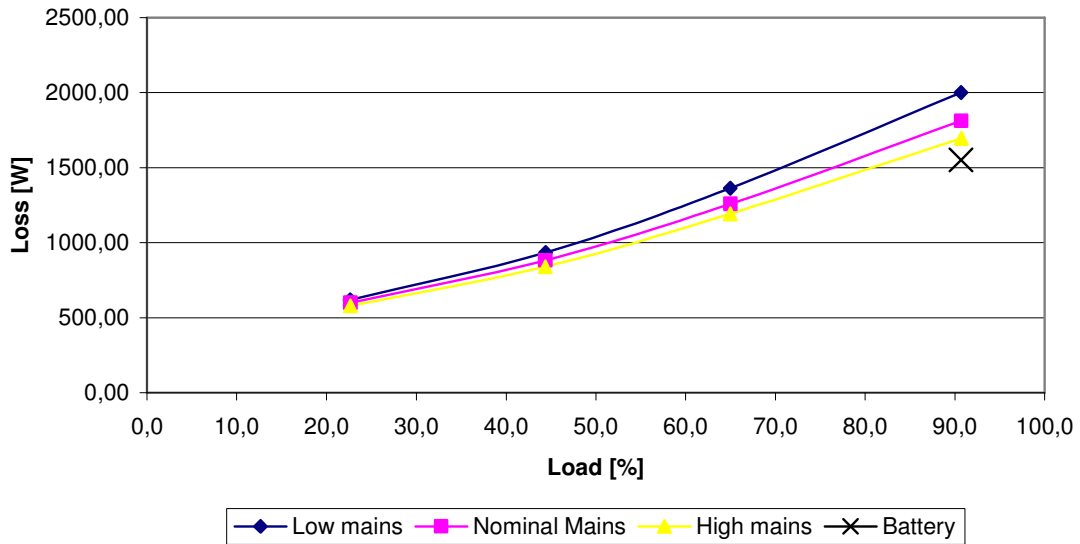
	P in	S in	P out	S out	Load	Loss	Efficiency
	W	VA	W	VA	%	W	%
Low mains	6050,33	6063,61	5431,57	7680,23	22,6	618,75	89,77
	11587,23	11612,74	10653,49	14744,44	44,4	933,74	91,94
	16956,10	16985,23	15591,89	21304,89	65,0	1364,21	91,95
	23767,41	23798,72	21766,74	29175,69	90,7	2000,64	91,58

	P in	S in	P out	S out	Load	Loss	Efficiency
	W	VA	W	VA	%	W	%
Nominal Mains	6040,25	6061,17	5440,24	7706,17	22,7	600,00	90,07
	11533,40	11557,37	10651,83	14742,60	44,4	881,57	92,36
	16864,33	16898,08	15605,44	21333,11	65,0	1258,89	92,54
	23585,08	23620,51	21772,02	29195,44	90,7	1813,08	92,31

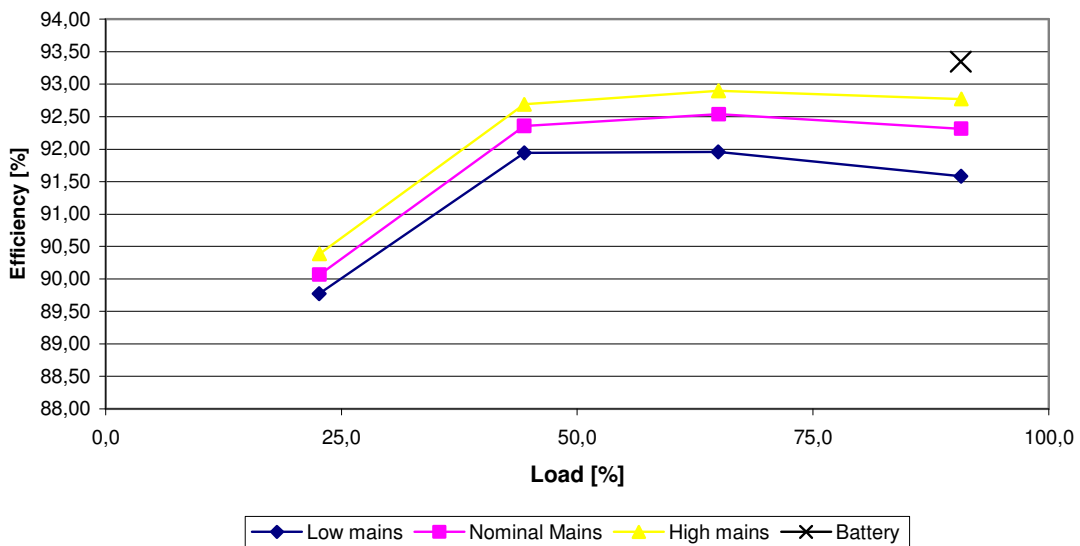
	P in	S in	P out	S out	Load	Loss	Efficiency
	W	VA	W	VA	%	W	%
High mains	6019,61	6053,13	5440,97	7708,70	22,7	578,66	90,39
	11491,69	11517,76	10651,54	14741,94	44,4	840,17	92,69
	16789,24	16825,26	15596,87	21312,27	65,0	1192,43	92,90
	23464,98	23505,99	21769,34	29187,72	90,7	1695,62	92,77

	P in		P out	S out	Load	Loss	Efficiency
	W		W	VA	%	W	%
Battery	23312,0		21760,5	29174,74	90,7	1551,5	93,34

SUVT30KF Loss vs. Load. SMPS load



SUVT30KF Efficiency vs. Load. SMPS load



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SUVT20KH
 Rated power 20kVA
 16kW

Inductive load

	Load	P out	S out	P in	Loss	Efficiency
	%	W	VA	W	W	%
Low mains	16,7	2670,6	3345,2	2848,6	178,0	93,75
	34,3	5454,4	6861,7	5717,6	263,2	95,40
	69,7	11128,4	13942,9	11681,0	552,6	95,27
	99,4	15382,9	19887,5	16221,9	839,1	94,83

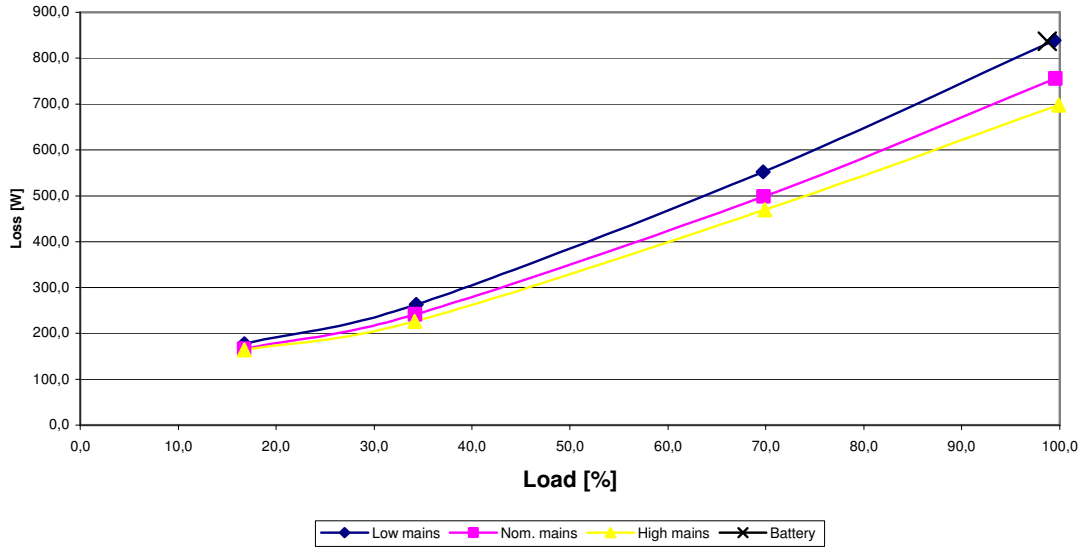
	Load	P out	S out	P in	Loss	Efficiency
	%	W	VA	W	W	%
Nom. mains	16,7	2679,6	3345,0	2846,2	166,6	94,15
	34,2	5427,0	6839,0	5668,5	241,5	95,74
	69,8	11141,4	13952,8	11639,7	498,2	95,72
	99,6	15416,9	19912,9	16172,3	755,4	95,33

	Load	P out	S out	P in	Loss	Efficiency
	%	W	VA	W	W	%
High mains	16,7	2685,1	3348,3	2849,2	164,1	94,24
	34,2	5415,0	6830,9	5641,1	226,1	95,99
	69,9	11175,9	13983,3	11645,6	469,7	95,97
	99,9	15492,5	19979,4	16190,6	698,1	95,69

	Load	P out	S out	P in	Loss	Efficiency
	%	W	VA	W	W	%
Battery	98,7	15223,56	19746,44	16060,54	837,0	94,79

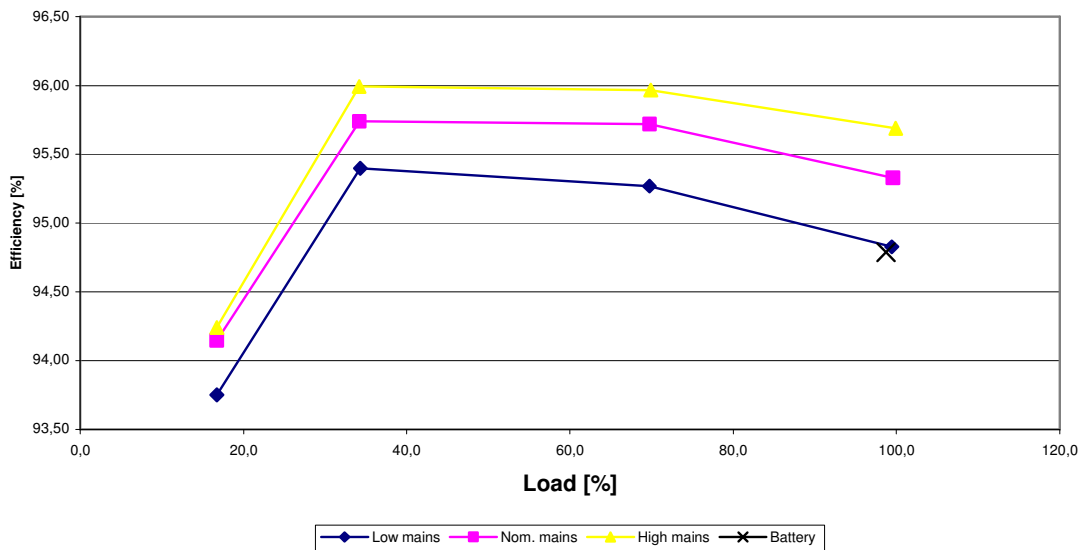
SUVT20KH

Loss vs. Load. Inductive load



SUVT20KH

Efficiency vs. Load. Inductive load



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SUVT20KH
 Rated power 20kVA
 16kW

Resistive load

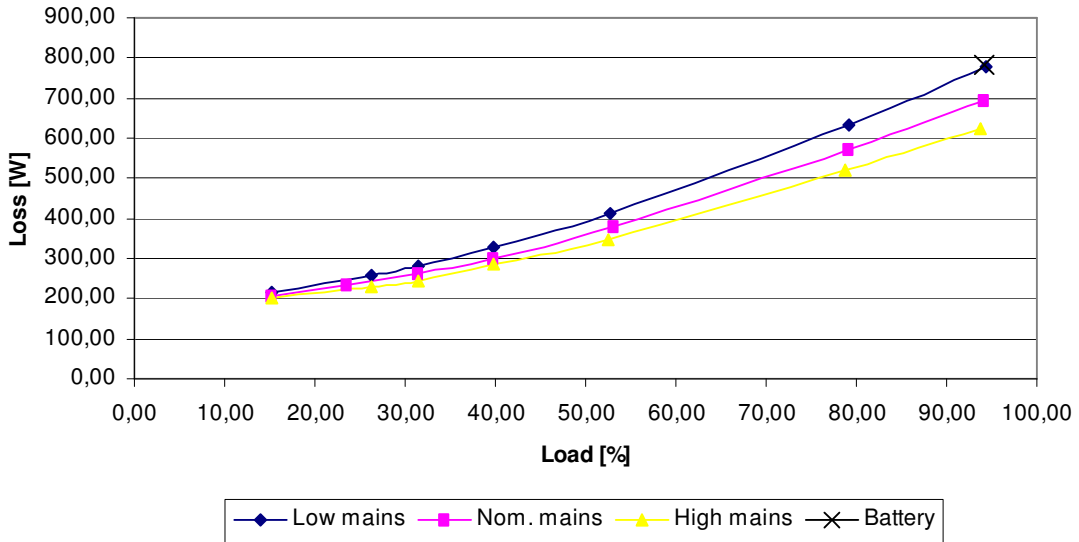
	LOAD	P in	P out	P bat	Loss	Efficiency
	%	W	W	W	W	%
Low mains	15,24	2652,64	2438,60	0,00	214,04	91,93
	26,29	4461,90	4206,34	0,00	255,56	94,27
	31,46	5315,49	5034,11	0,00	281,38	94,71
	39,81	6697,33	6369,50	0,00	327,83	95,11
	52,78	8856,94	8444,67	0,00	412,28	95,35
	79,13	13295,56	12660,56	0,00	635,00	95,22
	94,42	15883,00	15107,11	0,00	775,89	95,11

	LOAD	P in	P out	P bat	Loss	Efficiency
	%	W	W	W	W	%
Nom. mains	15,25	2647,49	2439,60	0,00	207,89	92,15
	23,49	3994,13	3758,26	0,00	235,87	94,09
	31,50	5301,33	5039,68	0,00	261,66	95,06
	39,76	6663,98	6361,90	0,00	302,08	95,47
	53,12	8877,90	8499,31	0,00	378,59	95,74
	79,08	13227,44	12653,44	0,00	574,00	95,66
	94,23	15768,78	15077,11	0,00	691,67	95,61

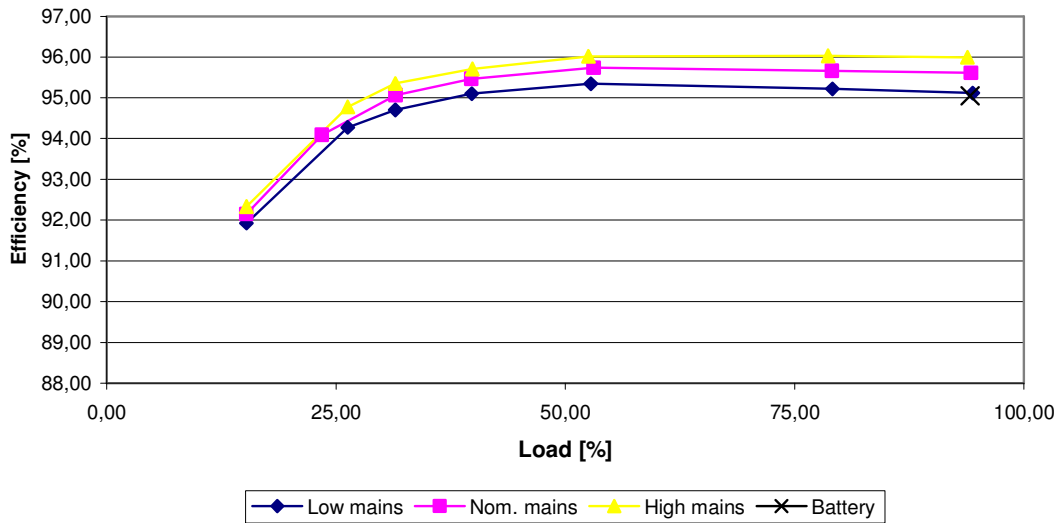
	LOAD	P in	P out	P bat	Loss	Efficiency
	%	W	W	W	W	%
High mains	15,24	2641,48	2438,97	0,00	202,51	92,33
	26,28	4436,80	4205,16	0,00	231,64	94,78
	31,47	5280,58	5035,13	0,00	245,44	95,35
	39,86	6664,33	6378,33	0,00	286,00	95,71
	52,54	8755,13	8406,54	0,00	348,59	96,02
	78,65	13103,78	12583,56	0,00	520,22	96,03
	93,83	15639,22	15013,44	0,00	625,78	96,00

Battery	LOAD	P in	P out	P bat	Loss	Efficiency
	%	W	W	W	W	%
	94,15		15063,22	15848,11	784,88	95,05

SUVT20KH Loss vs. Load. Resistive load



SUVT20KH Efficiency vs. Load. Resistive load



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SUVT20KH
 Rated power

20kVA
 16kW

SMPS load

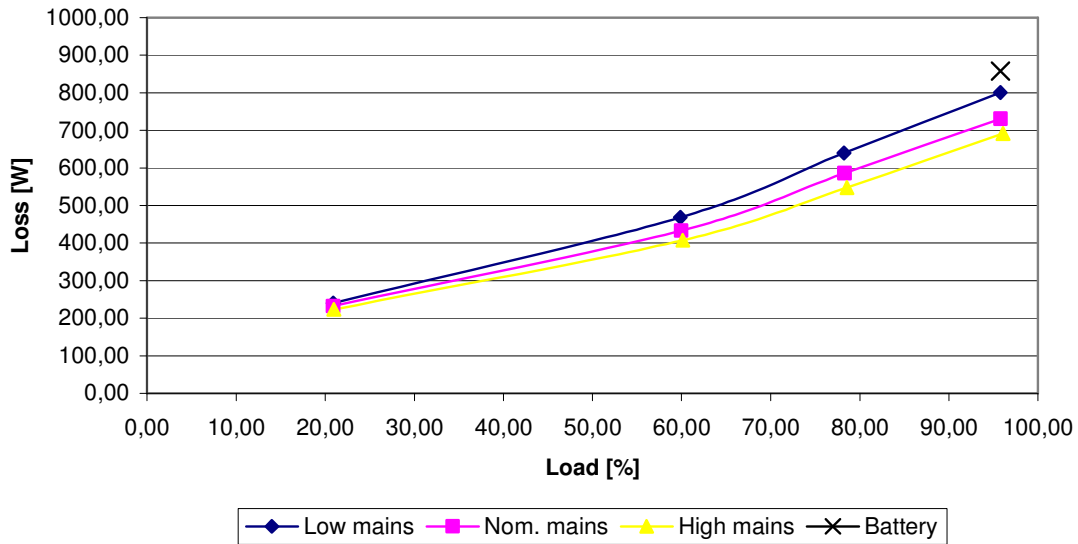
	LOAD	P in	P out	P bat	Loss	Efficiency
	%	W	W	W	W	%
Low mains	20,88	3081,10	2841,17	0,00	239,93	92,21
	59,86	8893,00	8424,53	0,00	468,47	94,73
	78,21	11758,00	11117,89	0,00	640,11	94,56
	95,78	14567,22	13766,89	0,00	800,33	94,51

	LOAD	P in	P out	P bat	Loss	Efficiency
	%	W	W	W	W	%
Nom. mains	20,90	3072,50	2840,20	0,00	232,30	92,44
	59,95	8867,61	8434,60	0,00	433,01	95,12
	78,29	11713,00	11126,78	0,00	586,22	95,00
	95,83	14506,44	13775,11	0,00	731,33	94,96

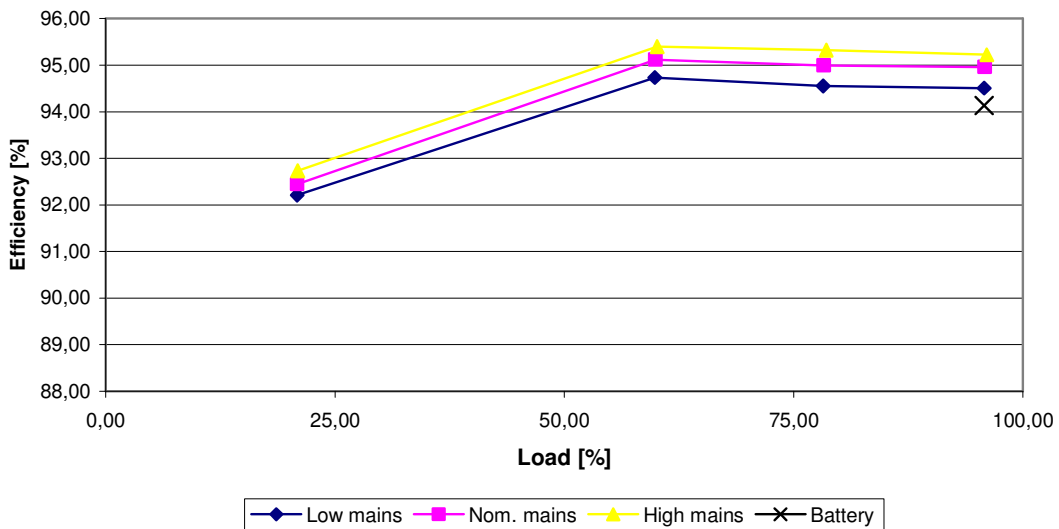
	LOAD	P in	P out	P bat	Loss	Efficiency
	%	W	W	W	W	%
High mains	20,96	3074,46	2850,93	0,00	223,52	92,73
	60,12	8856,97	8449,52	0,00	407,44	95,40
	78,55	11704,22	11156,56	0,00	547,67	95,32
	96,08	14495,22	13803,33	0,00	691,89	95,23

1	LOAD	P in	P out	P bat	Loss	Efficiency
	%	W	W	W	W	%
	95,77		13767,22	14625,00	857,78	94,13

SUVT20KH Loss vs. Load. SMPS load



SUVT20KH Efficiency vs. Load. SMPS load



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SUVT40KH
 Rated power 40kVA
 32kW

Inductive load

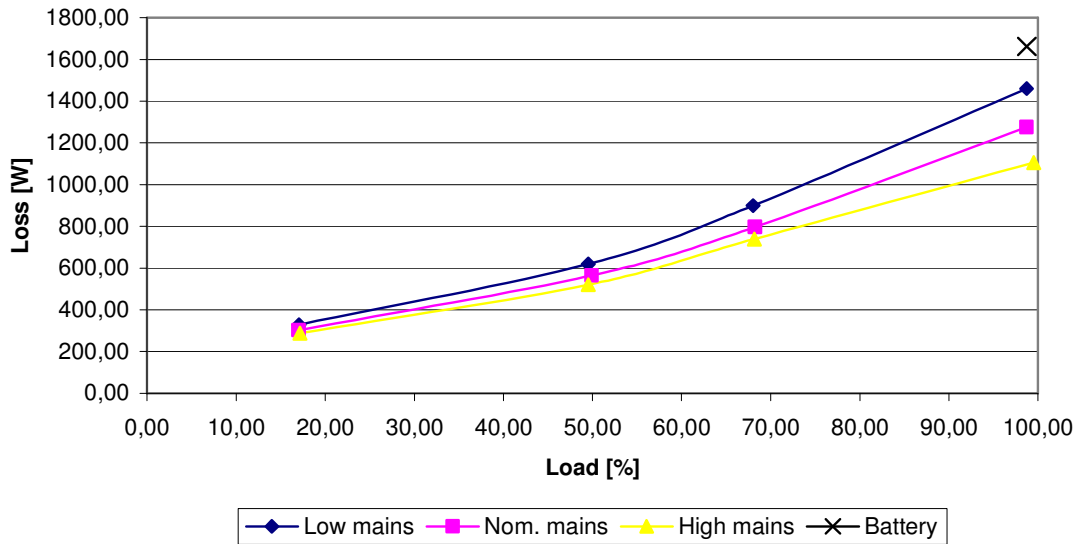
	LOAD	P in	P out	P bat	Loss	Efficiency
	%	W	W	W	W	%
Low mains	17,03	5746,66	5418,33	0,00	328,32	94,29
	49,51	16043,22	15423,89	0,00	619,33	96,14
	68,01	22550,89	21651,56	0,00	899,33	96,01
	98,71	32203,11	30743,33	0,00	1459,78	95,47

	LOAD	P in	P out	P bat	Loss	Efficiency
	%	W	W	W	W	%
Nom. mains	17,01	5727,61	5424,33	0,00	303,28	94,70
	49,91	16185,22	15620,44	0,00	564,78	96,51
	68,25	22575,67	21778,89	0,00	796,78	96,47
	98,72	32012,33	30737,11	0,00	1275,22	96,02

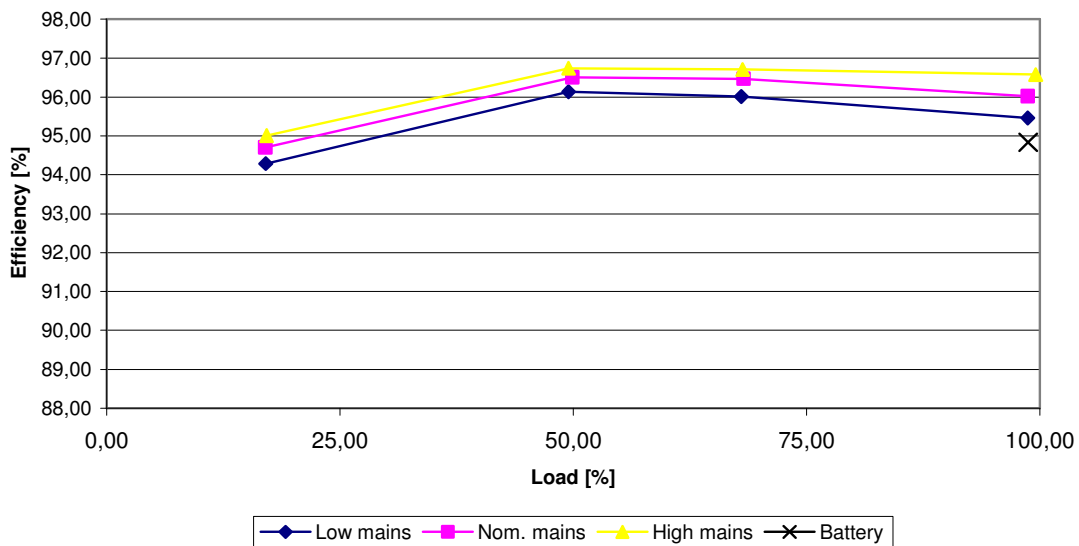
	LOAD	P in	P out	P bat	Loss	Efficiency
	%	W	W	W	W	%
High mains	17,14	5765,02	5477,27	0,00	287,76	95,01
	49,51	15937,89	15418,33	0,00	519,56	96,74
	68,15	22449,56	21710,00	0,00	739,56	96,71
	99,54	32273,11	31167,89	0,00	1105,22	96,58

	LOAD	P in	P out	P bat	Loss	Efficiency
	%	W	W	W	W	%
Battery	98,74		30531,78	-32194,00	1662,22	94,84

SUVT40KH Loss vs. Load. Inductive load P.F. 0.8



SUVT40KH Efficiency vs. Load. Inductive load P.F. 0.8



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SUVT40KH
 Rated power

40kVA
 32kW

Resistive load

	LOAD	P in	P out	P bat	Loss	Efficiency
	%	W	W	W	W	%
Low mains	5,2%	1962	1650	0,00	312	84,07%
	7,6%	2749	2429	0,00	320	88,34%
	14,8%	5093	4739	0,00	354	93,05%
	26,1%	8804	8364	0,00	440	95,00%
	46,7%	15591	14939	0,00	653	95,81%
	73,0%	24395	23365	0,00	1029	95,78%
	99,1%	33161	31712	0,00	1449	95,63%

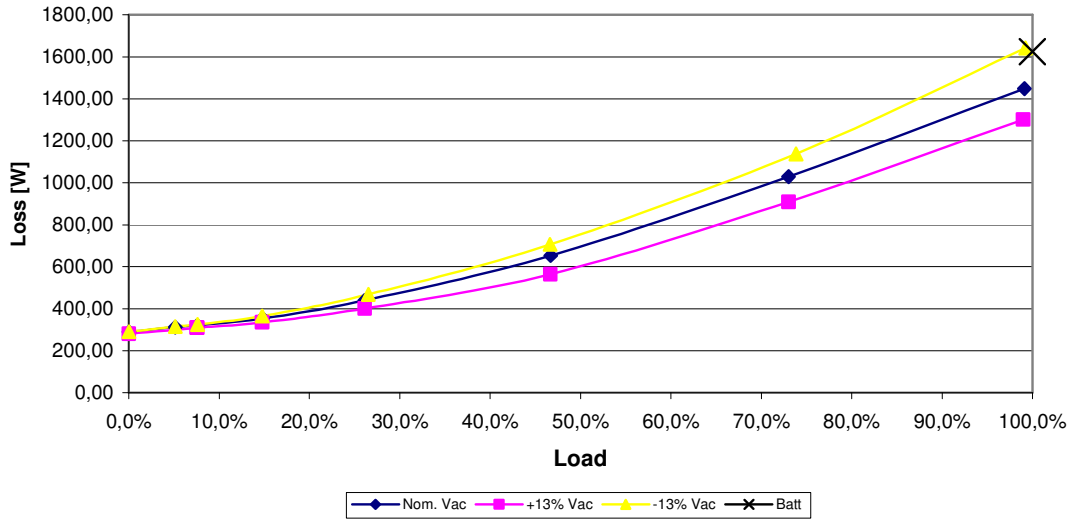
	LOAD	P in	P out	P bat	Loss	Efficiency
	%	W	W	W	W	%
Nom. mains	7,6%	2731	2422	0,00	309	88,68%
	7,6%	2742	2433	0,00	309	88,72%
	14,8%	5067	4732	0,00	335	93,38%
	26,1%	8765	8364	0,00	401	95,43%
	46,7%	15497	14932	0,00	565	96,35%
	73,0%	24276	23367	0,00	909	96,26%
	99,0%	32969	31667	0,00	1302	96,05%

	LOAD	P in	P out	P bat	Loss	Efficiency
	%	W	W	W	W	%
High mains	5,2%	1967	1652	0,00	315	83,98%
	7,6%	2769	2443	0,00	326	88,23%
	14,8%	5092	4726	0,00	366	92,81%
	26,5%	8957	8488	0,00	469	94,76%
	46,6%	15626	14919	0,00	707	95,48%
	73,9%	24773	23635	0,00	1138	95,41%
	99,2%	33397	31754	0,00	1643	95,08%

Battery	LOAD	P in	P out	P bat	Loss	Efficiency
	%	W	W	W	W	%
	100%		31688	33314	1625	95,12

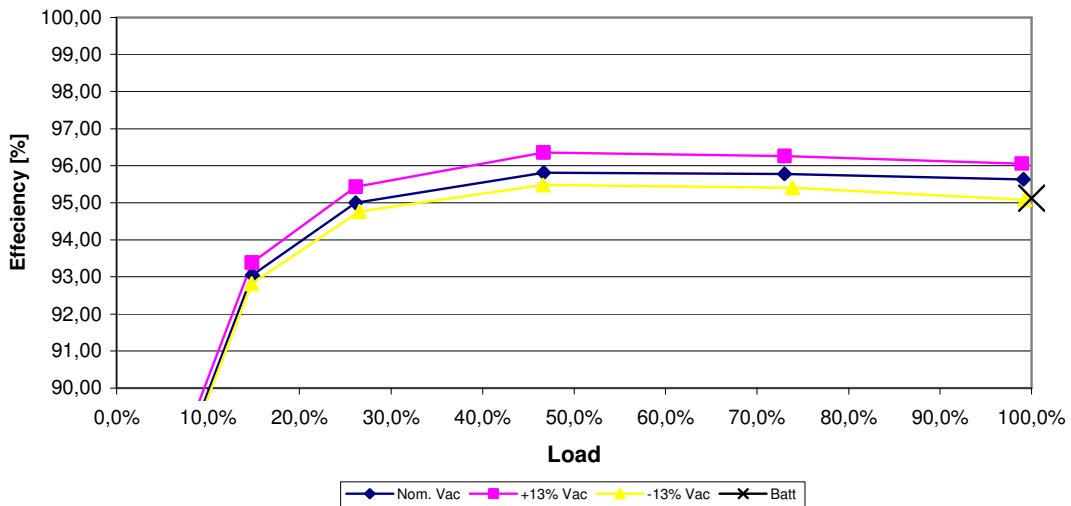
SL40KH

Loss vs. Load %. Resistive load



SL40KH

Efficiency vs. Load %. Resistive load.



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SUVT40KH
 Rated power 40kVA
 32kW

SMPS load

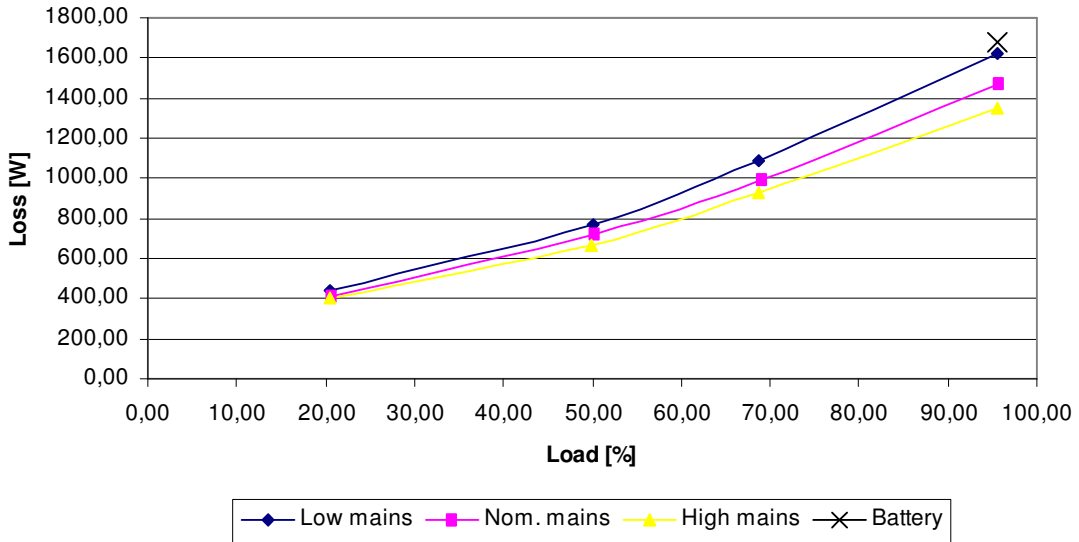
	LOAD	P in	P out	P bat	Loss	Efficiency
	%	W	W	W	W	%
Low mains	20,55	6072,99	5632,19	0,00	440,80	92,74
	50,01	14779,33	14008,11	0,00	771,22	94,78
	68,76	20597,67	19506,44	0,00	1091,22	94,70
	95,64	29168,56	27544,89	0,00	1623,67	94,43

	LOAD	P in	P out	P bat	Loss	Efficiency
	%	W	W	W	W	%
Nom. mains	20,65	6078,60	5661,68	0,00	416,92	93,14
	50,34	14797,67	14080,33	0,00	717,33	95,15
	69,10	20583,89	19586,89	0,00	997,00	95,16
	95,87	29066,78	27597,33	0,00	1469,44	94,94

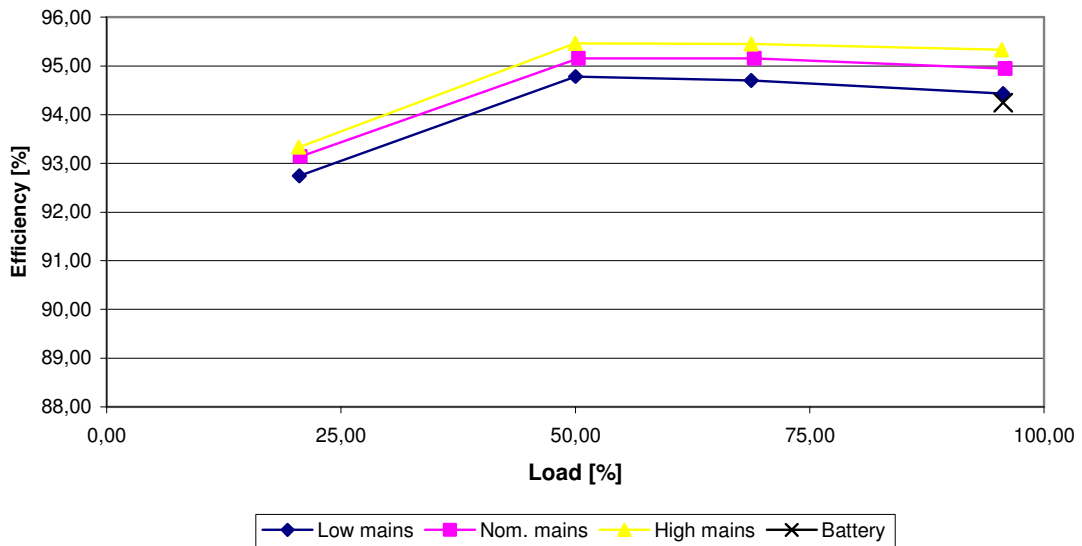
	LOAD	P in	P out	P bat	Loss	Efficiency
	%	W	W	W	W	%
High mains	20,51	6019,62	5618,33	0,00	401,29	93,33
	49,97	14660,00	13994,67	0,00	665,33	95,46
	68,74	20426,33	19497,56	0,00	928,78	95,45
	95,48	28847,44	27500,44	0,00	1347,00	95,33

	LOAD	P in	P out	P bat	Loss	Efficiency
	%	W	W	W	W	%
Battery	95,65		27539,11	29220,00	1680,89	94,25

SUVT40KH Loss vs. Load. SMPS load



SUVT40KH Efficiency vs. Load. SMPS load



Fotodokumentation

Photo documentation

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Auftraggeber <i>Client</i>	:	APC Denmark ApS	
Gegenstand der <i>Test item</i>		UPS System	
Bezeichnung <i>Identification</i>	:		Serien-Nr. <i>Serial No.</i>

Bild / Picture 1:



Bild / Picture 2:



Bild / Picture 3:

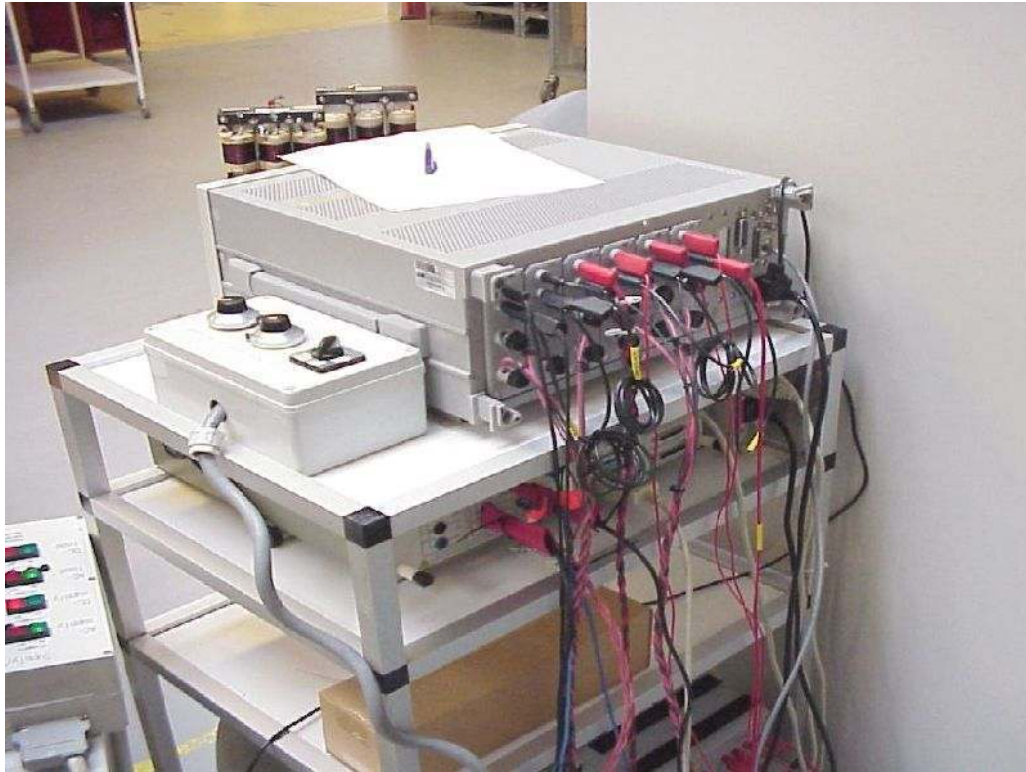


Bild / Picture 4:

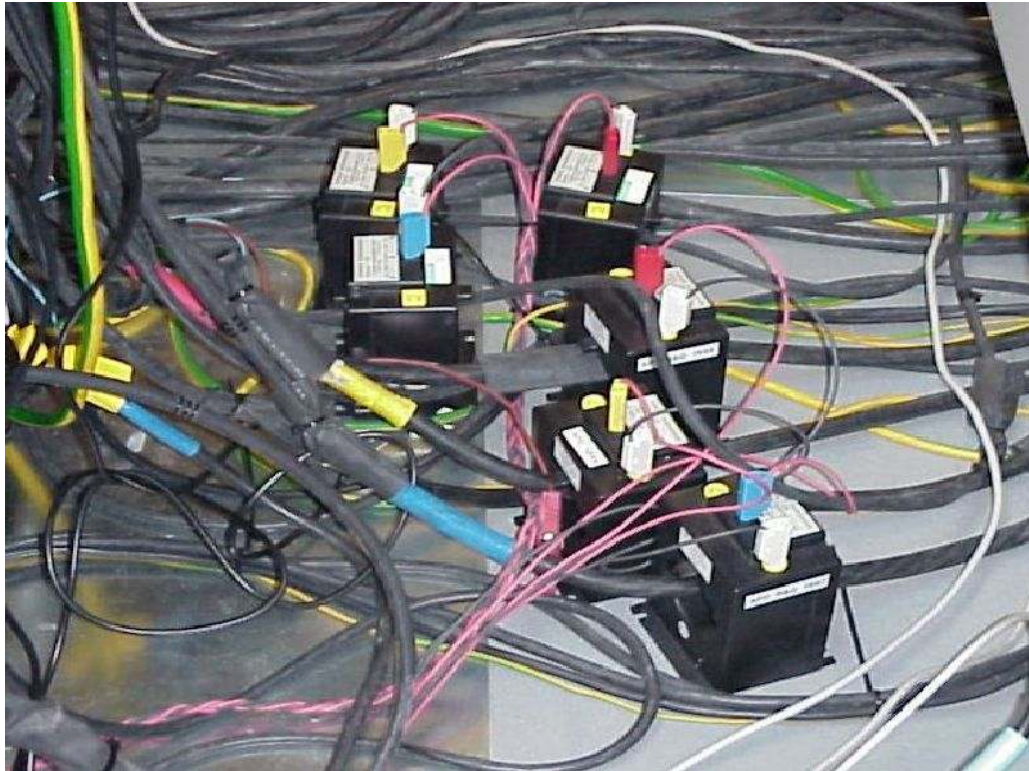


Bild / Picture 5:

