

Prüfbericht - Nr.: 17053767 001		Seite 1 von 15	
<i>Test Report No.:</i>		<i>Page 1 of 15</i>	
Auftraggeber: <i>Client:</i>		Sicon Chat Union Electric Co., Ltd. Bldg. 14&15, No. 319, Xiangjiang Street, Hi-Tech Zone, Shijiazhuang, Heibei, China	
Gegenstand der Prüfung: <i>Test item:</i>		Uninterruptible Power System	
Bezeichnung: <i>Identification:</i>	SCU Rack CMS 500 with 50kA modules (trademark: SCU)	Serien-Nr.: <i>Serial No.:</i>	N/A
Wareneingangs-Nr.: <i>Receipt No.:</i>	164049674	Eingangsdatum: <i>Date of receipt:</i>	Nov. 13, 2015
Prüfart: <i>Testing location:</i>		Sicon Chat Union Electric Co., Ltd. Bldg. 14&15, No. 319, Xiangjiang Street, Hi-Tech Zone, Shijiazhuang, Heibei, China	
Prüfgrundlage: <i>Test specification:</i>		Efficiency Test in accordance with IEC/ EN 62040-1 Uninterruptible Power Systems (UPS) Part 1: General and safety requirements for UPS Annex L Reference loads 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 Prüfgegenstand entspricht oben genannter Prüfgrundlage(n). <i>The test item passed the test specification(s).</i>	
Prüflaboratorium: <i>Testing Laboratory:</i>		TÜV Rheinland (Shenzhen) Co., Ltd. East of F/1, F/2~F/4, Building 1, Cybio Technology Building No. 6 Langshan No.2 Road, North Hi-tech Industry Park 518057 Shenzhen Nanshan District CHINA	
geprüft/ tested by:		kontrolliert/ reviewed by:	
 Jan. 28, 2016 Jammy Zhang/Engineer		 Jan. 28, 2016 Sommy Chen/Technical Certifier	
Datum <i>Date</i>	Name/Stellung <i>Name/Position</i>	Unterschrift <i>Signature</i>	Datum <i>Date</i>
Sonstiges/ Other Aspects:			
▪ For testing and issuing test report only.			
Abkürzungen:		Abbreviations:	
P(ass) =	entspricht Prüfgrundlage	P(ass) =	passed
F(ail) =	entspricht nicht Prüfgrundlage	F(ail) =	failed
N/A =	nicht anwendbar	N/A =	not applicable
N/T =	nicht getestet	N/T =	not tested
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. <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>			

1. Requirements and Agreements

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

The tested UPS systems got investigated in accordance with the following requirements and standards.

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

Part 1: General and safety requirements for UPS

Annex L Reference loads

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 SCU's personnel. Measuring equipment was calibrated and suitable for testing. Conducted single measurement was recorded and documented as result of the independent witness test.

2. Information about the devices under test (DUT)

SCU has provided for testing model as follow:

Model	Output Power	Output Power	Output Voltage and frequency
CMS-500	500kVA	450kW	~380/400/415V; 3W+N+PE; 50/60Hz;
Note: Rack CMS 500 filled with 10 pcs 50kVA UPS modules.			

The DUT configure information is listed in the below

Module	Firmware version	Qty.	Description	Remark
Power convert unit	V1.02, V1.01a	10	AC/DC and DC/AC convert	Model: Y1-CM50 Output power: 50kVA/45kW
CMS-STS640 II	CMS-STS640 II V1.06	1	--	--
CMS-CSU III A	CSU III A V1.07	1	--	--

DUT's provided for test are engineering sample.

3. Description of the Test Set-up

Mains input voltage has been adjusted to

- .-10% of the nominal voltage (Low mains)
- .nominal voltage (Nominal mains)
- .+10% of the nominal voltage (High mains)

The EUT was connected at all voltages to

- Resistive load
- non-linear(RCD) load

All tests are performed at Sicon Chat Union Electric Co., Ltd. facility.

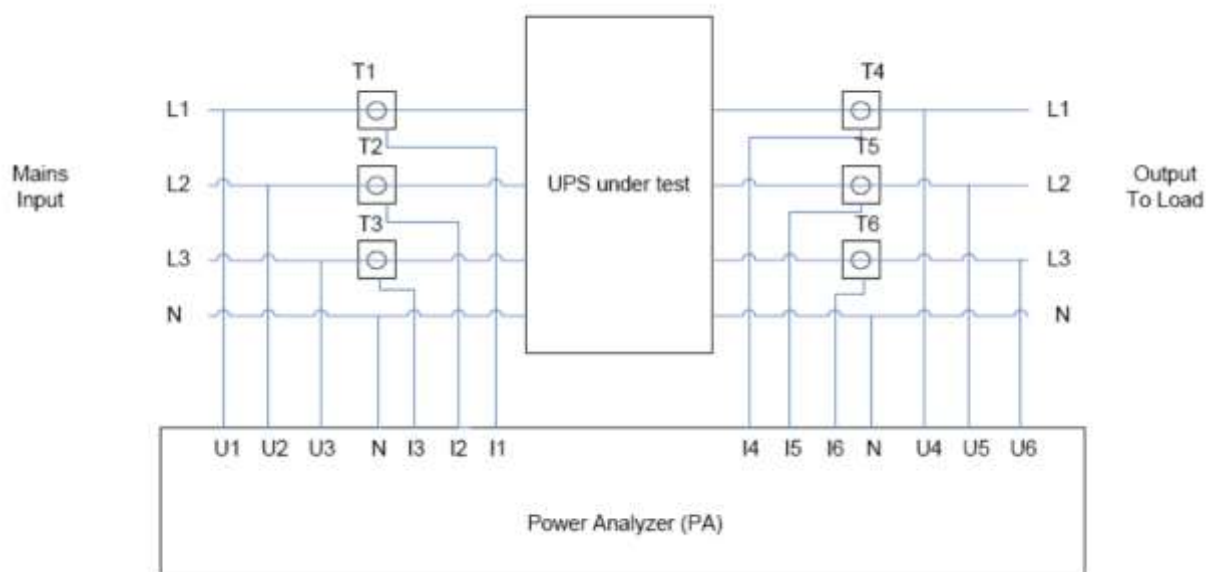
Each test result value is computed of an average of 10 single measurements.

Mains distortion and mains frequency have been observed during the tests.

Battery model didn't consider in this test report.

Refer for the test setup to the photo documentation also.

Test circuit for efficiency test

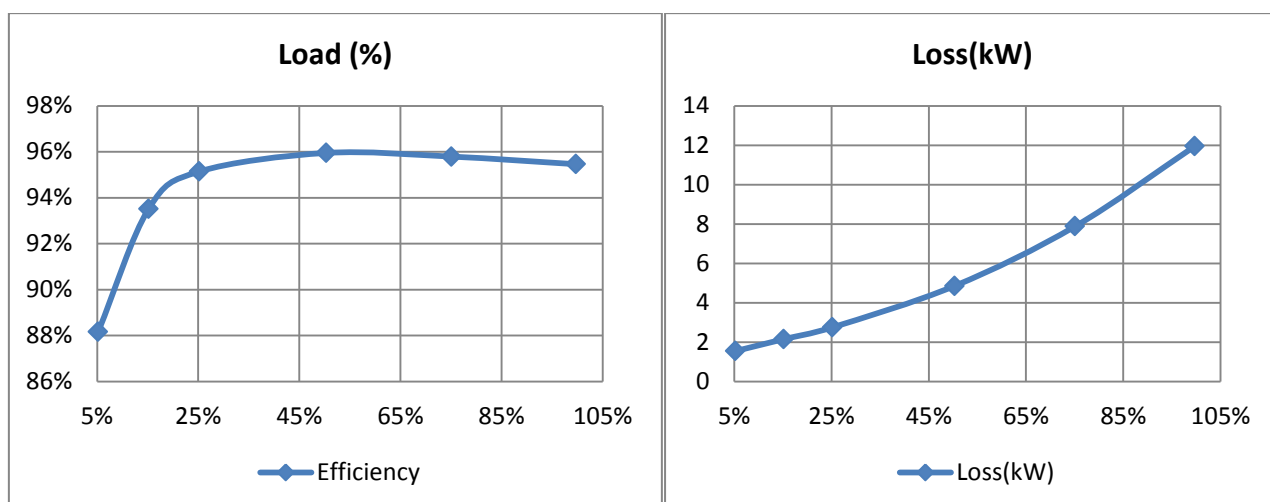


Measuring Test Instruments			
Measuring Test Instruments	Manufacturer	Equipment Model No.	Last Calibration
3 phase electrical analyzer	Fluke	SC-SC-576	2015/01/30
1#~6# Current Probe	Fluke	SC-DZ-820, SC-DZ-819, SC-DZ821	2015/01/30
Test system	CSU	SC-SC-599	2015/01/30
Digital Oscilloscope	Tek	SC-DZ-568	2015/01/30
Electrical load	CSU	SC-FZ-605, SC-FZ-606, SC-FZ-607, SC-FZ-608	2015/01/30

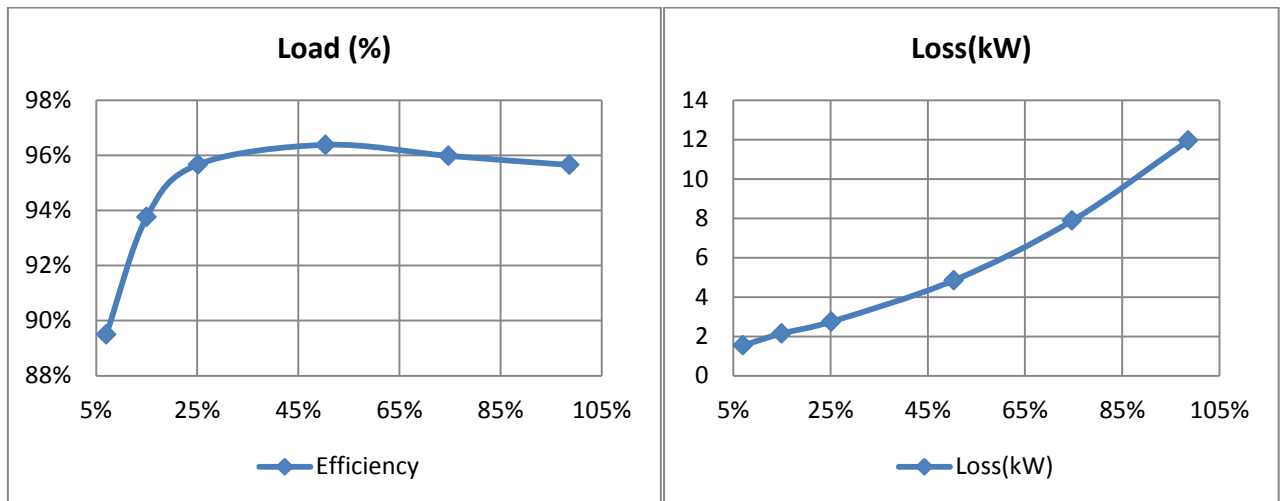
4. The efficiency of 220Vac model

Resistive load (R load) (On line mode)

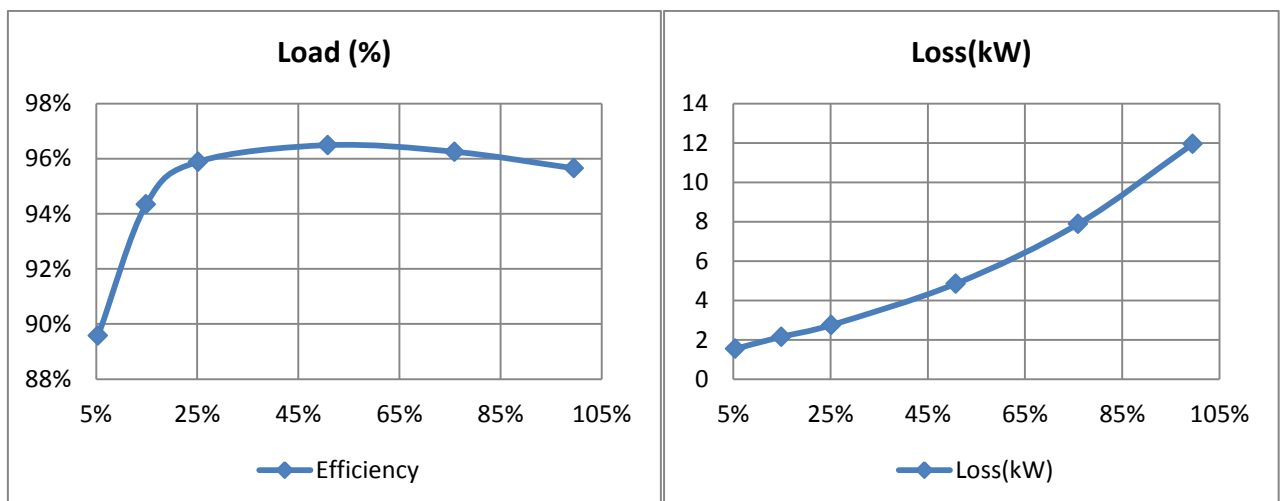
Low mains 198V/50Hz	P In	S In	P out	S out	Load	Loss	Efficiency
	KW	KVA	KW	KVA	%	KW	%
	26.6	27.7	23.45	23.45	5.2	3.15	88.16
	73.0	75.6	68.28	68.28	15.2	4.72	93.52
	119.0	122.0	113.25	113.25	25.2	5.75	95.14
	236.0	236.5	226.53	226.53	50.3	9.47	95.95
	352.7	353.0	337.86	337.86	75.1	14.84	95.79
	470.0	470.4	448.65	448.65	99.7	21.35	95.46



Normal Mains 220V/50Hz	P In	S In	P out	S out	Load	Loss	Efficiency
	KW	KVA	KW	KVA	%	KW	%
	35.2	36.8	31.52	31.52	7.0	3.68	89.50
	72.0	73.9	67.51	67.51	15.0	4.49	93.76
	118.6	121.5	113.46	113.46	25.2	5.14	95.67
	235	235.7	226.58	226.58	50.4	8.42	96.38
	350.5	351.2	336.5	336.5	74.7	14	95.98
	463.6	464.5	443.5	443.5	98.6	20.1	95.65

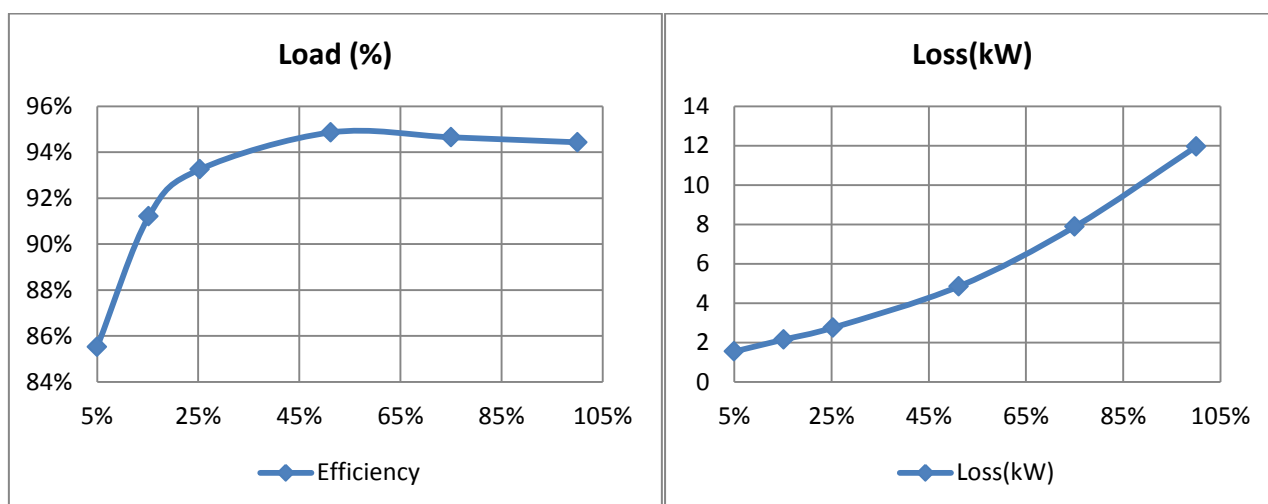


High mains 242V/50Hz	P In	S In	P out	S out	Load	Loss	Efficiency
	KW	KVA	KW	KVA	%	KW	%
	27.0	28.29	24.23	24.23	5.4	2.77	89.58
	70.9	73.5	66.89	66.89	14.9	4.01	94.34
	118.4	121.4	113.56	113.56	25.2	4.84	95.89
	237	237.5	228.74	228.74	50.8	8.26	96.49
	354.8	355.1	341.52	341.52	75.9	13.28	96.25
	468.2	469.1	447.89	447.89	99.5	20.31	95.65

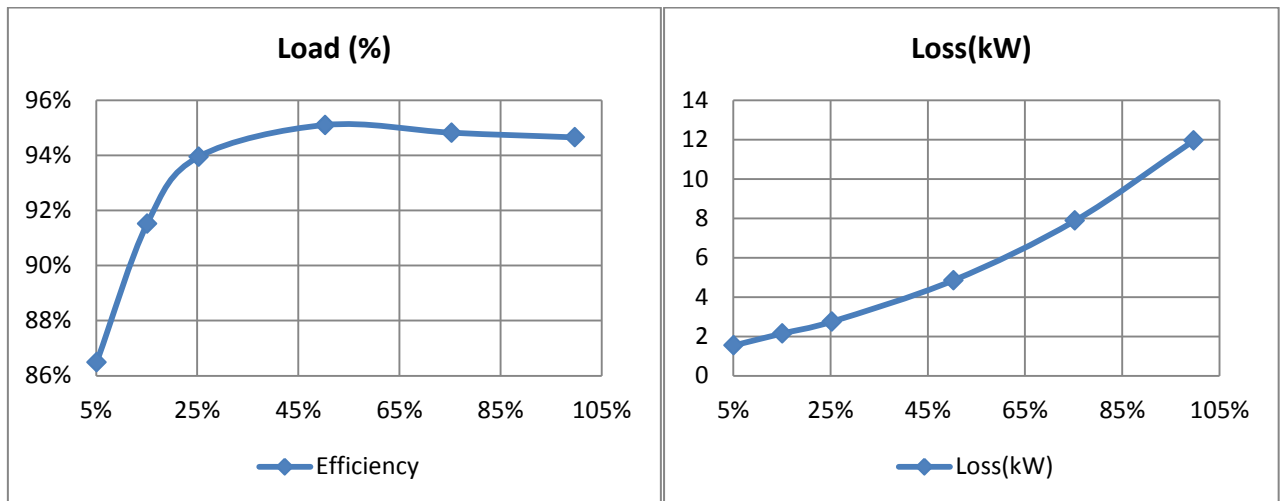


Non-linear load (RCD load) (On line mode)

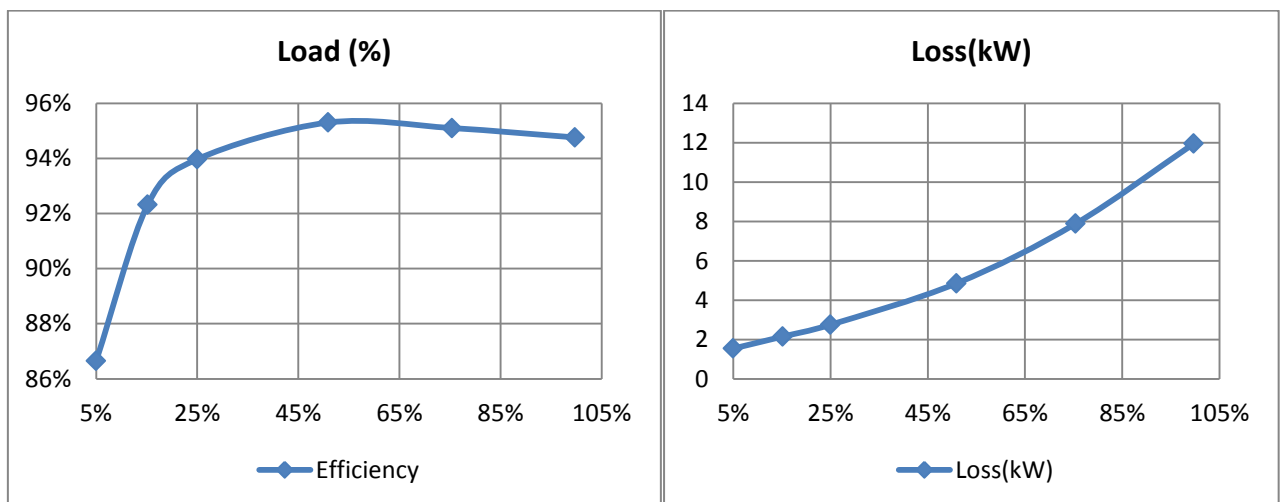
Low mains 198V/50Hz	P In	S In	P out	S out	Load	Loss	Efficiency
	KW	KVA	KW	KVA	%	KW	%
	17.4	18.2	14.88	24.88	5	2.52	85.52
	50.7	52.9	46.25	75.96	15.2	4.45	91.2
	82.6	85.7	77.10	126.39	25.3	5.5	93.25
	185	185.8	175.52	256.23	51.2	9.48	94.86
	274.1	275.2	259.49	374.98	75.0	14.61	94.65
	367.4	368.6	347.02	498.59	100.0	20.38	94.43



Normal mains 220V/50Hz	P In	S In	P out	S out	Load	Loss	Efficiency
	KW	KVA	KW	KVA	%	KW	%
	17.4	18.3	15.05	25.68	5.1	2.35	86.49
	49.5	52.1	45.32	75.66	15.1	4.18	91.52
	79.7	82.6	74.9	126.32	25.3	4.8	93.95
	183.7	184.3	174.76	251.46	50.3	8.94	95.1
	277.3	278.1	262.99	376.25	75.3	14.31	94.82
	368.0	368.8	348.33	498.32	99.7	19.67	94.65



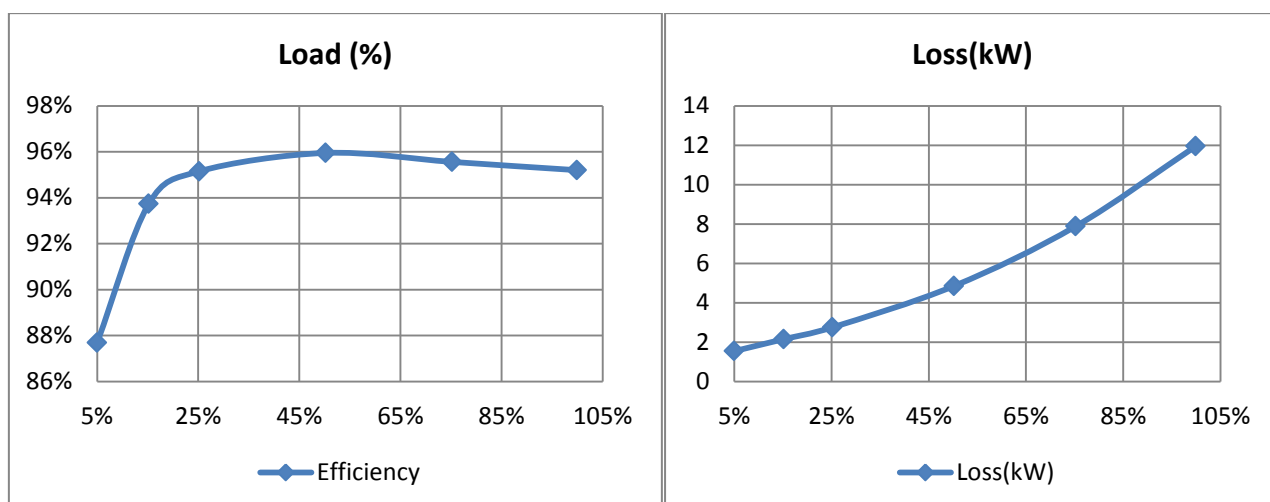
High mains 242V/50Hz	P In	S In	P out	S out	Load	Loss	Efficiency
	KW	KVA	KW	KVA	%	KW	%
	17.0	17.8	14.79	24.86	5	2.26	86.65
	51.1	52.9	47.19	76.23	15.2	3.91	92.32
	82.2	84.3	77.31	124.89	25.0	4.89	93.97
	180.1	180.5	171.69	254.36	50.9	8.41	95.3
	271.4	272.0	258.17	376.89	75.4	13.23	95.1
	367.3	368.0	348.09	498.69	99.7	19.21	94.76



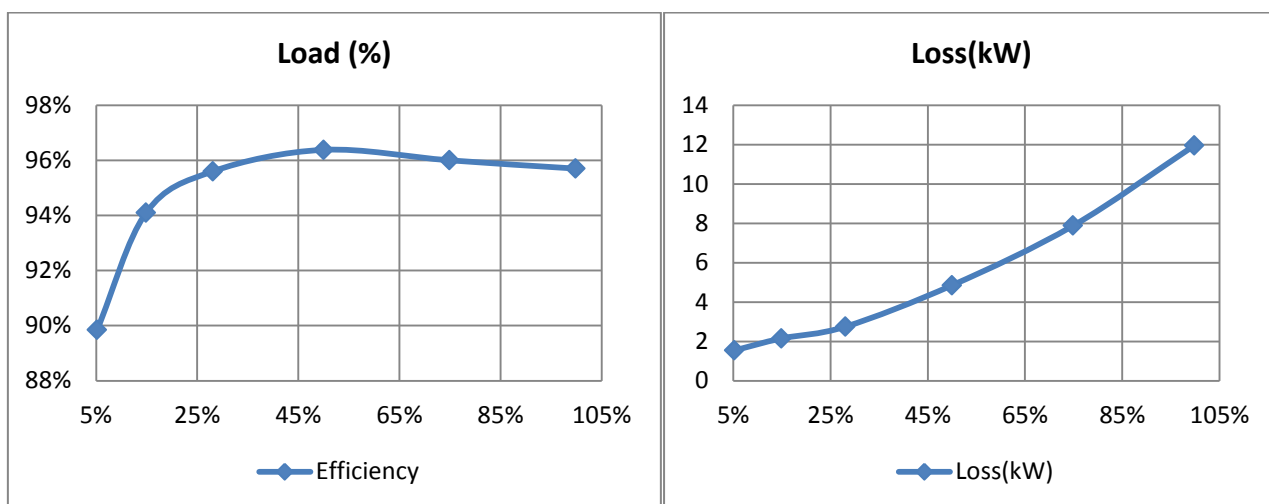
5. The efficiency of 230Vac model

Resistive load (R load) (On line mode)

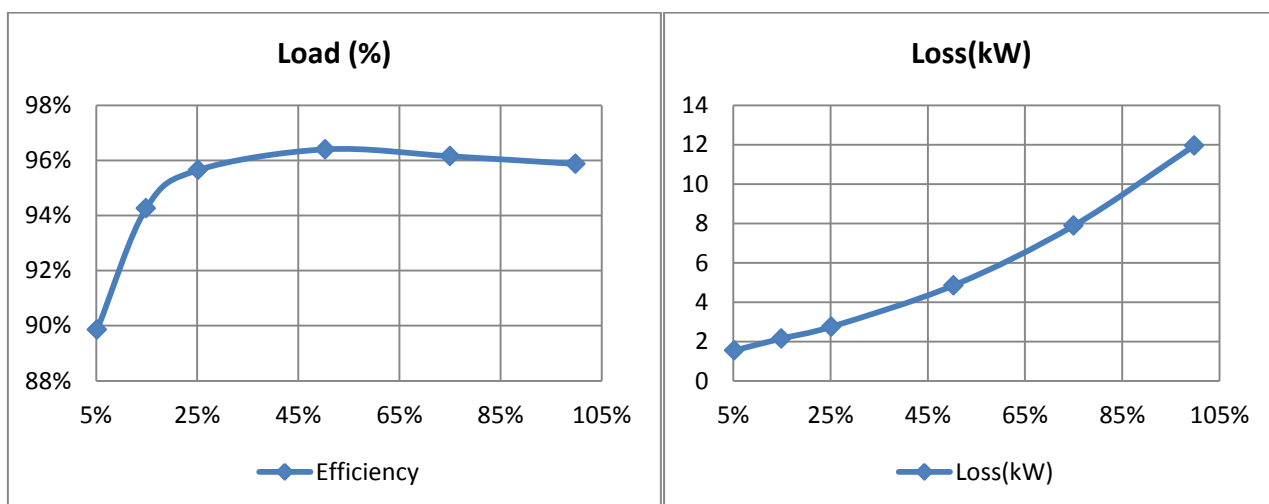
Low mains 207V/50Hz	P In	S In	P out	S out	Load	Loss	Efficiency
	KW	KVA	KW	KVA	%	KW	%
	25.8	26.9	22.65	22.65	5.0	3.15	87.69
	72.8	75.9	68.25	68.25	15.2	4.55	93.73
	119.3	123.6	113.56	113.56	25.2	5.74	95.15
	235.8	236.5	226.32	226.32	50.2	9.48	95.95
	354.2	355.3	338.56	338.56	75.2	15.64	95.56
	472.2	473.1	449.56	449.56	99.9	22.64	95.2



Normal mains 230V/50Hz	P In	S In	P out	S out	Load	Loss	Efficiency
	KW	KVA	KW	KVA	%	KW	%
	26.1	27.4	23.45	23.45	5.2	2.65	89.85
	71.1	73.7	66.98	66.98	14.9	4.12	94.1
	132.2	135.6	126.45	126.45	28.1	5.75	95.6
	233.4	234.1	224.98	224.98	50.0	8.42	96.38
	350.9	351.6	336.89	336.89	74.9	14.01	96.0
	469.1	470.0	448.98	448.98	99.8	20.12	95.7

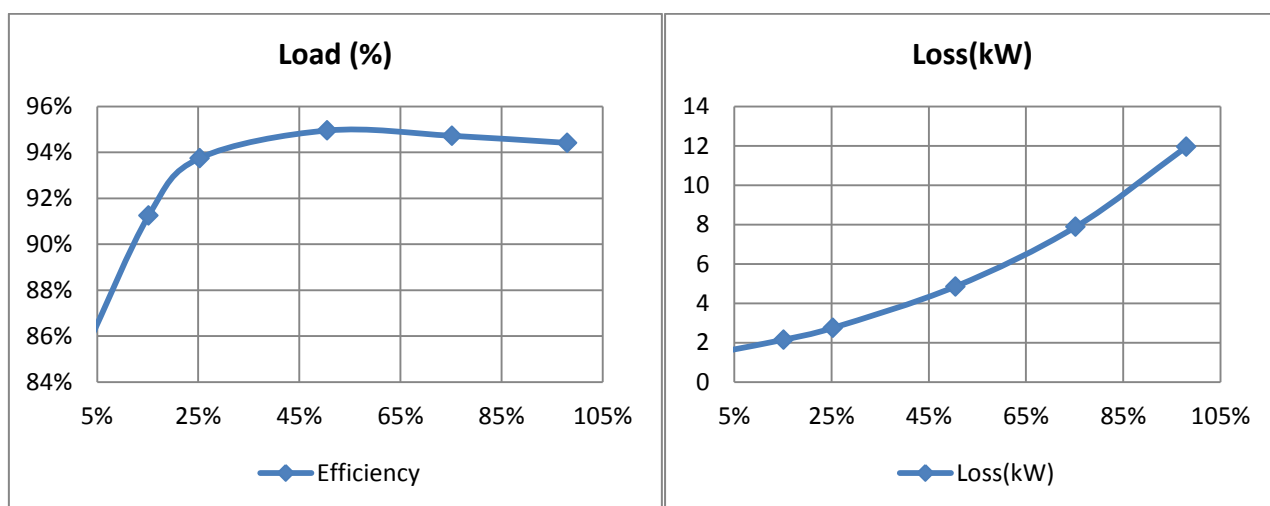


High mains 253V/50Hz	P In	S In	P out	S out	Load	Loss	Efficiency
	KW	KVA	KW	KVA	%	KW	%
	26.2	27.4	23.56	23.56	5.2	2.64	89.86
	70.9	73.2	66.89	66.89	14.9	4.01	94.26
	118.7	121.8	113.62	113.62	25.2	5.08	95.65
	234.9	235.6	226.45	226.45	50.32	8.45	96.4
	351.2	352.2	337.68	337.68	75.0	13.52	96.15
	468.5	469.5	449.23	449.23	99.8	19.27	95.87

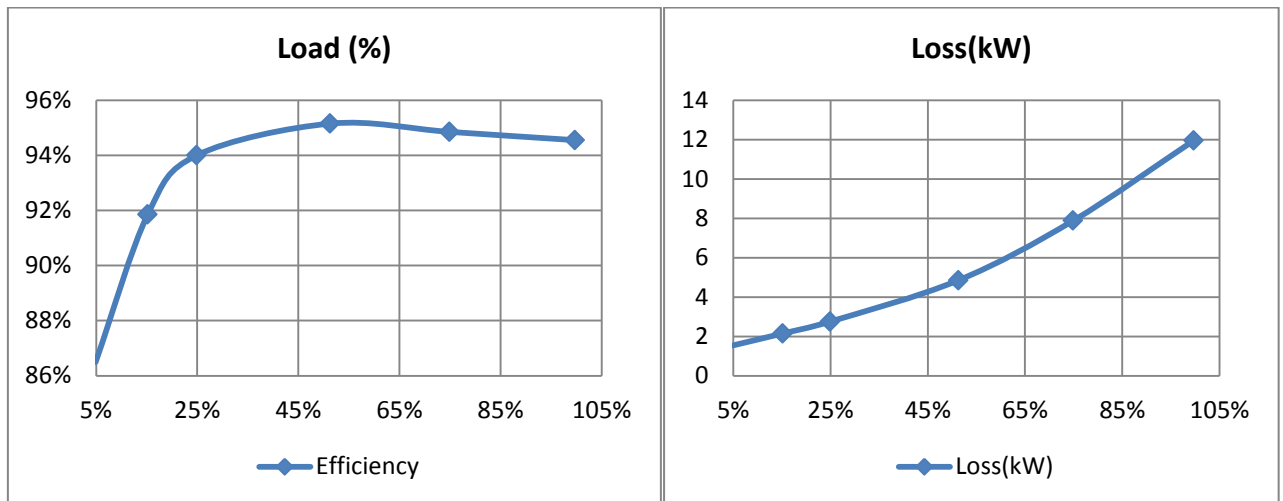


Non-linear load (RCD load) (On line mode)

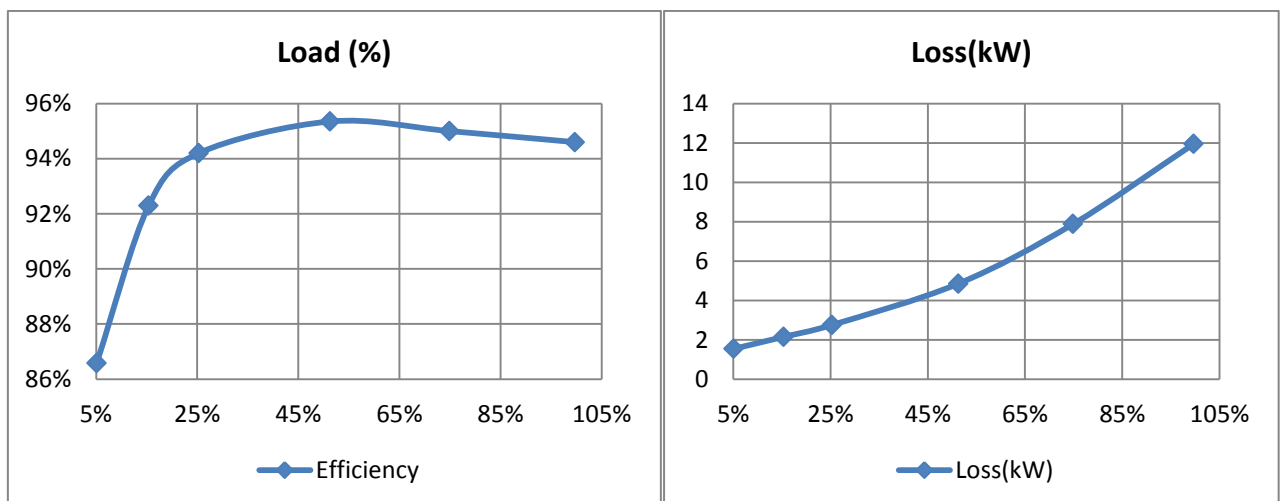
Low mains 207V/50Hz	P In	S In	P out	S out	Load	Loss	Efficiency
	KW	KVA	KW	KVA	%	KW	%
	17.5	18.4	14.97	24.96	2.53	3.13	85.32
	51.3	53.2	46.89	76.26	15.2	4.41	91.25
	86.7	88.9	81.32	126.67	25.3	5.38	93.75
	176.7	177.5	167.78	248.56	50.5	8.92	94.95
	272.0	273.1	257.64	376.12	75.2	14.36	94.72
	360.6	361.7	340.53	489.98	98.0	20.07	94.41



Normal mains 230V/50Hz	P In	S In	P out	S out	Load	Loss	Efficiency
	KW	KVA	KW	KVA	%	KW	%
	16.7	17.4	14.46	24.56	4.9	2.24	86.5
	50.0	51.8	45.96	76.23	15.2	4.04	91.85
	82.5	84.6	77.60	124.56	24.9	4.9	94.0
	185.6	186.3	176.61	256.33	51.3	8.99	95.15
	276.1	276.9	261.90	374.68	74.9	14.2	94.85
	368.5	369.3	348.49	498.56	99.7	20.01	94.55



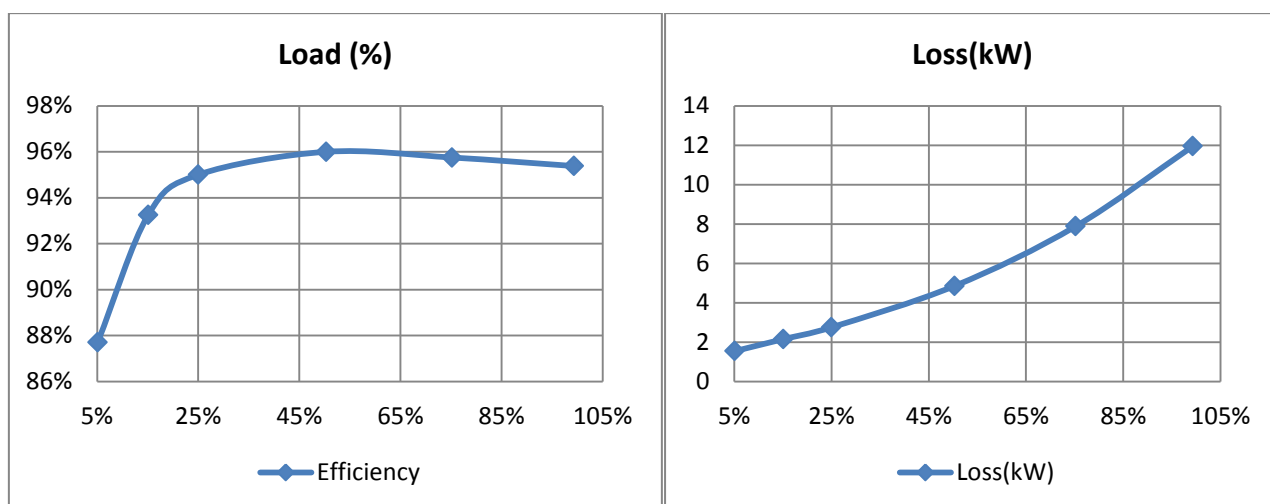
High mains 253V/50Hz	P In	S In	P out	S out	Load	Loss	Efficiency
	KW	KVA	KW	KVA	%	KW	%
	17.7	18.6	15.40	25.66	5.1	2.3	86.58
	52.1	53.8	48.11	76.98	15.4	3.99	92.3
	87.6	89.8	82.53	126.78	25.3	5.07	94.2
	181.5	182.4	173.09	256.43	51.3	8.41	95.35
	274.1	275.2	260.40	374.68	74.9	13.7	95.0
	368.4	369.5	348.58	498.69	99.7	19.82	94.6



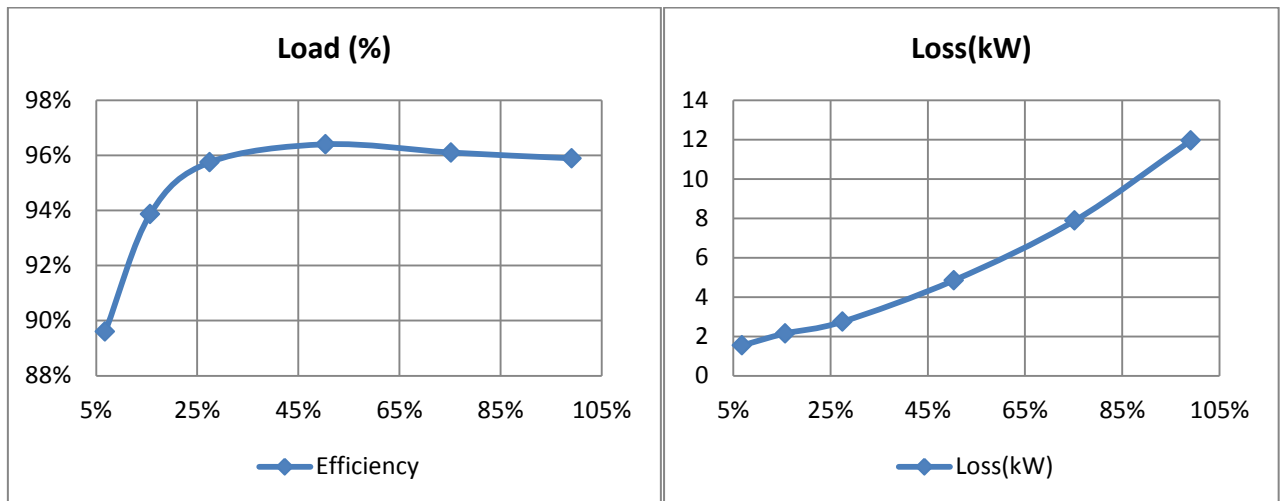
6. The efficiency of 240Vac model

Resistive load (R load) (On line mode)

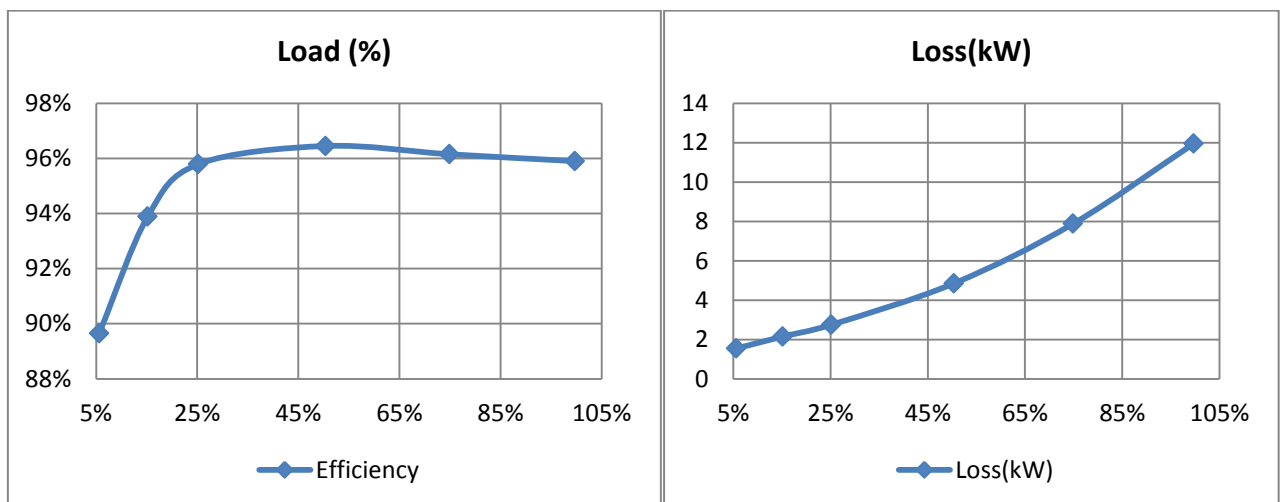
Low mains 216V/60Hz	P In	S In	P out	S out	Load	Loss	Efficiency
	KW	KVA	KW	KVA	%	KW	%
	26.3	27.7	23.12	23.12	5.1	3.18	87.7
	72.9	75.5	68.02	68.02	15.1	4.88	93.25
	118.5	121.6	112.65	112.65	25.0	5.85	95.0
	235.5	236.7	226.13	226.13	50.3	9.37	96.0
	353.5	355.0	338.56	338.56	75.2	14.94	95.75
	468.6	469.0	446.98	446.98	99.3	21.62	95.38



Normal mains 240V/60Hz	P In	S In	P out	S out	Load	Loss	Efficiency
	KW	KVA	KW	KVA	%	KW	%
	34.1	35.6	30.57	30.57	6.8	3.53	89.60
	75.4	78.1	70.83	70.83	15.7	4.57	93.87
	129.1	132.4	123.68	123.68	27.5	5.42	95.75
	235.6	236.7	227.17	227.17	50.4	8.43	96.4
	352.2	353.2	338.5	338.5	75.2	13.7	96.1
	464.9	465.3	445.8	445.8	99.1	19.1	95.89

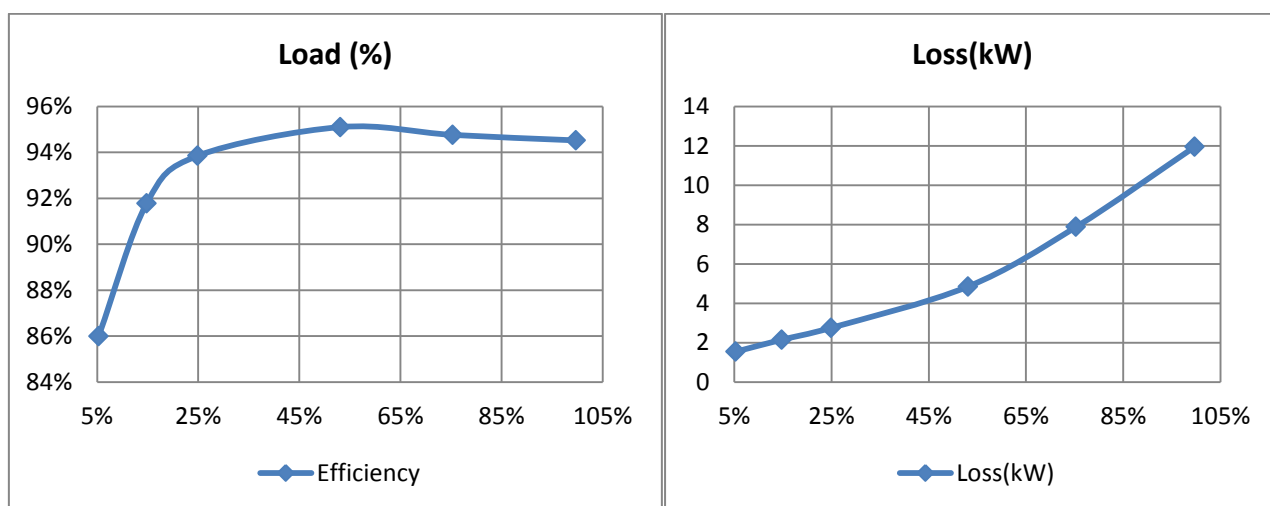


High mains 264V/60Hz	P In	S In	P out	S out	Load	Loss	Efficiency
	KW	KVA	KW	KVA	%	KW	%
	25.2	26.5	22.65	22.65	5.6	2.55	89.65
	72.6	75.0	68.25	68.25	15.2	4.35	93.89
	118.5	120.3	113.52	113.52	25.2	4.98	95.79
	235.2	236.1	226.89	226.89	50.4	8.31	96.45
	350.4	351.5	336.98	336.98	74.9	13.42	96.15
	467.7	468.6	448.56	448.56	99.7	19.14	95.90

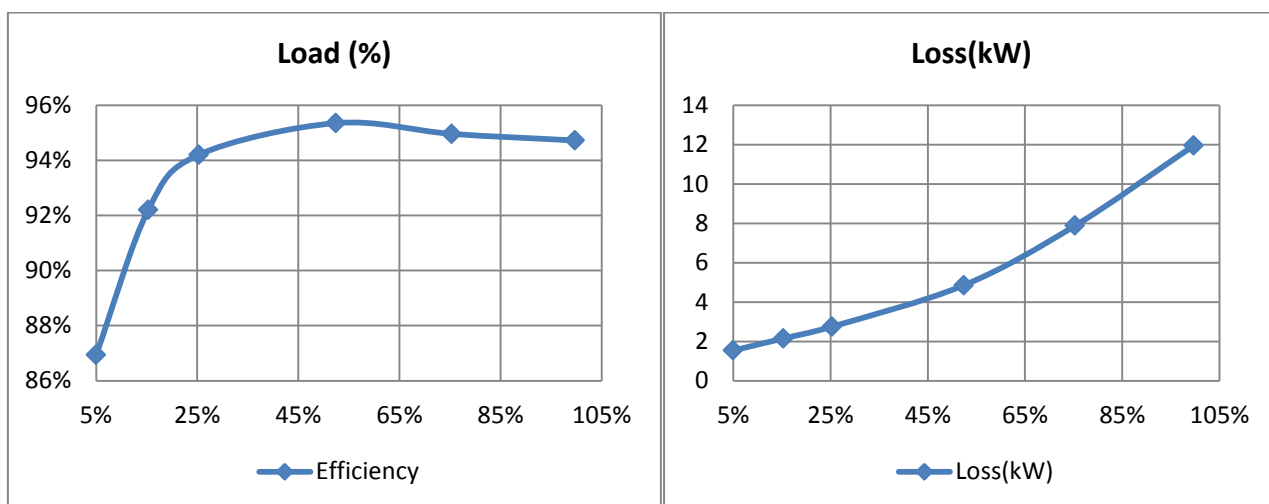


Non-linear load (RCD load) (On line mode)

Low mains 216V/60Hz	P In	S In	P out	S out	Load	Loss	Efficiency
	KW	KVA	KW	KVA	%	KW	%
	18.3	19.3	15.79	26.53	5.3	2.51	86.0
	50.0	51.7	45.94	76.58	14.8	4.06	91.78
	82.6	84.72	77.68	124.68	24.9	2.47	93.85
	188.2	189.1	179.0	265.34	53.1	9.20	95.10
	272.9	274.0	258.69	376.56	75.3	14.21	94.76
	368.7	369.8	348.54	498.63	99.7	20.16	94.52



Normal mains 240V/60Hz	P In	S In	P out	S out	Load	Loss	Efficiency
	KW	KVA	KW	KVA	%	KW	%
	17.1	17.89	14.87	24.86	5.0	2.23	86.94
	52.7	54.9	48.62	76.56	15.3	4.08	92.2
	87.6	88.9	82.52	126.54	25.3	5.08	94.20
	189.0	189.9	180.23	262.35	52.4	8.77	95.35
	275.6	276.7	261.72	376.58	75.3	13.88	94.96
	368.0	369.1	348.58	498.69	99.7	19.42	94.72



High mains 264V/60Hz	P In	S In	P out	S out	Load	Loss	Efficiency
	KW	KVA	KW	KVA	%	KW	%
	17.6	18.4	15.34	25.61	5.1	2.26	87.12
	52.0	53.7	48.26	76.85	15.4	3.74	92.75
	87.2	88.6	82.39	126.56	25.3	4.81	94.40
	179.1	180.0	171.15	249.86	49.9	7.95	95.56
	273.9	275.0	260.91	378.69	75.7	12.99	95.25
	367.0	368.2	348.58	498.69	99.7	18.42	94.96

