Date of issue: 2010-10-20
This report enfolded 8 pages.

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Staatliche Versuchsanstalt
Elektrotechnik und Elektronik
FEDERAL INSTITUTE OF TECHNOLOGY
ELECTRICAL AND
ELECTRONIC ENGINEERING

MEASURING - REPORT

TGM – VA EE 33407A

Power measurement on
energy saving systems
Manufacturer: Keseco
Type: Ultra

Commissioned by:	...hartner GmbH & CoKG
Address:	...erstrasse 6...
	...g., Industriestraße 19
Order reached:	2...
Sign of order:	Hr. S. Nestler
Receiving of test sample(s):	3317 / 2010-06-15
Test period:	KW 24-26/2010
TGM-number:	515/10

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MEASURING - REPORT

TGM – VA EE 33407A

Power measurement on
energy saving systems
Manufacturer: Keseco
Type: Ultra

Commissioned by:	Dodeka Ltd. / Elektro Schartner GmbH & CoKG
Address:	A-8045 Graz, Satteggerstrasse 60 / A-5600 St. Johann i. Pg., Industriestraße 19
Order reached:	2010-09-22
Sign of order:	Hr. S. Nestler
Receiving of test sample(s):	3317 / 2010-06-15
Test period:	KW 24-26/2010
TGM-number:	515/10

1 Test order

As ordered we carried out the power consumption and the performance of the energy saving system "Keseco Ultra" by measuring sample applications. The measurements were carried out on the same sample applications with- and without the energy saving system "Keseco Ultra".

2 Test item

Energy saving system: Keseco Ultra

Manufacturer: Keseco
8F, Namyoung Bldg., 284-49 Sung Su-Dong 2Ga, Sung Dong-Gu, Seoul, Korea

Type: U-803; U-804

Number of test samples: one per type

Ratings: U-803: nominal voltage: 100-600 V, 50/60 Hz
nominal power: 5 kVA
supply line length: 102 cm
serial number: H51004201K 107 N
dimensions: (140x90,3x40,6) mm
U-804: nominal voltage: 100-6000 V, 50/60 Hz
nominal power: 1 kVA
supply line length: 20 cm
serial number: M11006081K 049 N
dimensions: (111x80,5x32,5) mm

3 Test procedure

Every measurement was carried out under the same conditions with and without the energy saving system "Keseco Ultra" to compare the power consumption with and without the energy saving system. The energy saving system was activated with load cycles according to the manufacturers specifications (application time) before the measurement with the saving system was done.

Application 1: induction cooker – temperature controlled mode

Test assembly: the power supply (AC 230 V, 50 Hz) was connected to a voltage stabiliser and an isolating transformer. The measurement was carried out with a digital multimeter. During the measurement with the energy saving system, the energy saving system U-803 was installed parallel to the induction cooker. The test procedure and the switching cycles during the tests were specified by the manufacturer.

Load: induction cooker, manufacturer: CASO, type: Basic 2002, Art.Nr.: 2005

During every test the induction cooker was operated in the temperature control mode (reference value 120 °C).

Measurement 1: switching cycles: 4
On- / Off time: 10 min / 5 min

Measurement 2: switching cycles: 3
On- / Off time: 15 min / 5 min

Measurement 3: switching cycles: 3
On- / Off time: 30 min / 5 min

Measurement 1-3 was carried out without an interrupt. The water in the pot was changed after each switching cycle.

Ambient air temperature: 23±2 °C; amount of water: 2l

Application time: Ultra U-803: 7 h

Application 2.1: air conditioner– temperature controlled mode

Test assembly: the power supply (AC 230 V, 50 Hz) was connected to a voltage stabiliser and an isolating transformer. The measurement was carried out with a digital multimeter. During the measurement with the energy saving system, the energy saving system U-804 was installed parallel to the air conditioner. The test procedure and the switching cycles during the tests were specified by the manufacturer.

Load: air conditioner, manufacturer: ARTEL, type: HP09RL14R (module: indoor, outdoor)

During each test the air conditioner was operated in the temperature control mode (reference value 16 °C). The temperature in the test camber during the whole test was constant 35 °C.

Measurement 1: switching cycles: 3
On- / Off time: 5 min / 5 min

Measurement 2: switching cycles: 3
On- / Off time: 8 min / 8 min

Measurement 3: switching cycles: 4
On- / Off time: 10 min / 5 min

Application time: Ultra U-804: 5 h

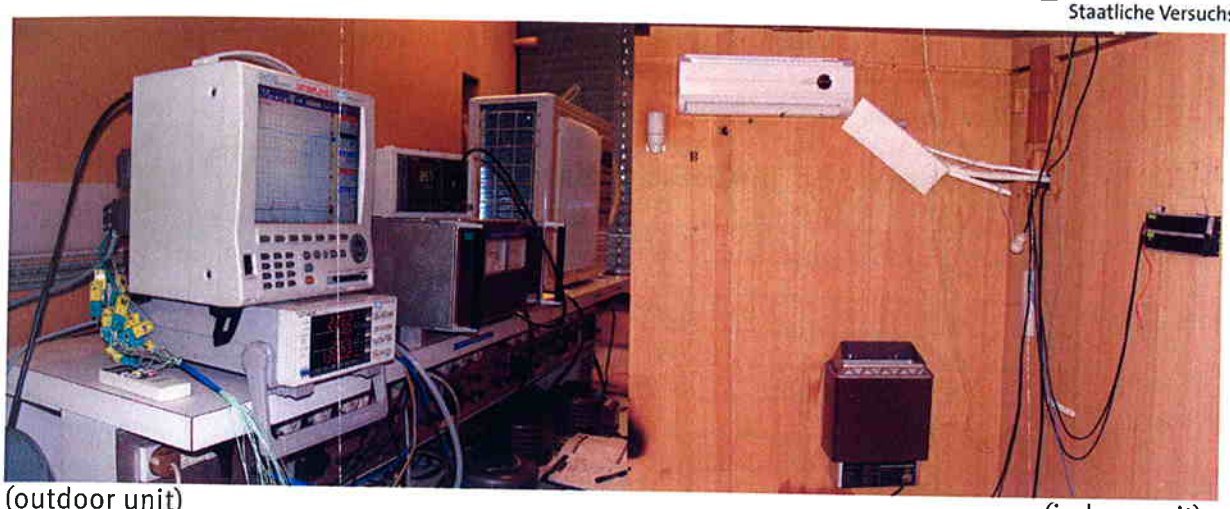
Application 2.2: air conditioner– cooling efficiency

Test assembly: the power supply (AC 230 V, 50 Hz) was connected to a voltage stabiliser and an isolating transformer. The measurement was carried out with a digital multimeter. During the measurement with the energy saving system, the energy saving system U-804 was installed parallel to the air conditioner. The test procedure and the switching cycles during the tests were specified by the manufacturer.

Load: air conditioner, manufacturer: ARTEL, type: HP09RL14R (module: indoor, outdoor)

During each test the air conditioner was operated in the temperature control mode (reference value 16 °C). The temperature in the test camber at the beginning of the test was 35 °C, the test room was not heated during the test.

Measurement : Operating time until the temperature of the test camber reached 16,8 °C.
Dimensions of the test room: (3850x2500x2100) mm



(outdoor unit) (indoor unit)

Test equipment:

designation	manufacturer	type	TGM-VA EE ID
stop watch	Quantum	440 9798	SW.00.633Ü
wattmeter	Yokogawa	WT 200	IL.11.024Ü IL.11.026Ü
recorder	Yokogawa	MV 210	IL.11.027Ü IL.11.025Ü
isolating transformer	Ben. & Jäger	W 32/13	HG.00.289H SW.00.606H
voltage stabiliser	Philips	PE 1611/00	IL.00.064H IL.11.023H
climate measuring instrument	Testo	635-2	SW.00.639Ü

4. Test result

Application 1: induction cooker – temperature controlled mode

Measurement without energy saving system:

measurement	cycle	energy consumption [Wh]	accumulated energy consumption [Wh]
1	1	225,8	225,8
	2	214,7	440,5
	3	223,4	663,9
	4	225,7	889,6
2	1	284,1	1173,7
	2	288,2	1461,9
	3	280,2	1742,1
3	1	493,0	2235,1
	2	471,7	2706,8
	3	487,2	3194,0

Measurement with energy saving system Ultra, U-803:

measurement	cycle	energy consumption [Wh]	accumulated energy consumption [Wh]
1	1	234,6	234,6
	2	224,3	458,9
	3	224,3	683,2
	4	219,7	902,9
2	1	289,5	1192,4
	2	281,6	1474,0
	3	276,2	1750,2
3	1	450,9	2201,1
	2	468,3	2669,4
	3	450,2	3119,6

Comparison:

measurement	energy consumption [Wh] without Ultra U-803	energy consumption [Wh] with Ultra U-803	comparison ΔE	
			[Wh]	[%]
1	889,6	902,9	13,3	1,50
2	852,5	847,1	-5,4	-0,63
3	1451,9	1369,4	-82,5	-5,68

Application 2.1: air conditioner– temperature controlled mode

Measurement without energy saving system:

measurement	cycle	energy consumption [Wh]	accumulated energy consumption [Wh]
1	1	26,73	26,73
	2	26,82	53,55
	3	27,02	80,57
2	1	66,87	147,44
	2	66,47	213,91
	3	66,10	280,00
3	1	91,60	371,60
	2	91,93	463,53
	3	91,53	555,06
	4	91,43	646,49

Measurement with energy saving system Ultra, U-804:

measurement	cycle	energy consumption [Wh]	accumulated energy consumption [Wh]
1	1	25,70	25,70
	2	25,64	51,34
	3	25,28	76,62
2	1	61,40	138,02
	2	61,35	199,37
	3	61,78	261,15
3	1	85,39	346,54
	2	86,02	432,56
	3	86,40	518,96
	4	88,35	607,31

Comparison:

measurement	energy consumption [Wh] without Ultra U-804	energy consumption [Wh] with Ultra U-804	comparison ΔE	
			[Wh]	[%]
1	80,57	76,62	-3,95	-4,90
2	199,43	184,53	-14,9	-7,47
3	366,49	346,16	-20,33	-5,55

Application 2.2: air conditioner– cooling efficiency

Measurement without energy saving system:

operating time [min]	ambient temperature indoor – modul [°C]	ambient temperature outdoor – modul [°C]	energy consumption	
			energy consumption time interval [Wh]	accumulated energy consumption [Wh]
0	35,1	26,7	0	0
30	26,7	26,7	361	361
60	21,7	27,1	387	748
75	19,8	27,4	190	938
90	18,6	27,7	199	1137
105	17,8	27,6	163	1300
120	17,2	27,8	158	1458
135	17,1	27,6	123	1581
150	16,8	27,5	132	1713

Measurement with energy saving system Ultra, U-804:

operating time [min]	ambient temperature indoor – modul [°C]	ambient temperature outdoor – modul [°C]	energy consumption	
			energy consumption time interval [Wh]	accumulated energy consumption [Wh]
0	35,2	25,6	0	0
30	27,0	26,4	348	348
60	21,8	27,1	389	737
75	19,8	26,8	192	929
90	18,7	27,0	192	1121
105	17,5	27,5	193	1314
120	16,8	27,2	154	1468
135	16,8	27,1	125	1593
150	16,4	27,2	129	1722

Comparison:
The target temperature (16,8 °C) was reached 30 min earlier with the energy saving system U-804. The ambient temperature of the test camber after the whole operating time (150 min) was 16,4 °C. During the whole operating time the accumulated energy consumption with the energy saving system U-804 was 9 Wh (= 0,53%) higher.

5 Summary

Assuming the conditions described in clause 3 of this report, the following peak values of saved energy were measured:

- Application 1: induction cooker – temperature controlled mode:
  Peak value of saved energy at measurement 3 with Ultra U-803: 5,68%
- Application 2.1: air conditioner– temperature controlled mode
  Peak value of saved energy at measurement 2 with Ultra U-804: 7,47%
- Application 2.2: air conditioner– cooling efficiency:
  Target temperature was reached 30 min (20%) earlier, with a slightly higher energy consumption of 9 Wh (+0,53%).

The measured values are not applicable for interpretation of other load situations.

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The present report

is including 8 Pages
0 Appendix(es) (with 0 pages)

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Vienna, 2010-10-20

Rund-
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Principal

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