PERFORMANCE TEST OF STREET LIGHT ENERGY SAVE SWITCH

Manufactured by

KAKATIYA ENERGY SYSTEMS LIMITED

REPORT NO.: CPRI/ERED/LC/02/2011

(Work order No.: Nil, DATED 10/09/2011)

NOVEMBER 2011

Test conducted by

CENTRAL POWER RESEARCH INSTITUTE
(A Govt. of India Society)
ENERGY EFFICIENCY AND RENEWABLE ENERGY DIVISION
P. B. No. : 8066, Prof. Sir.C.V. Raman Road
Sadashivanagar Sub. P.O. BANGALORE – 560 080.

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ENERGY EFFICIANCY AND RENEWABLE ENERGY DIVISION
CENTRAL POWER RESEARCH INSTITUTE,
P.B. No. 8066, Sadashivanagar Sub P.O.,
Prof. Sir. C.V. Raman Road, Bangalore – 560 080

Project Summary

01	Title:	Performance test on Street light Energy Save Switch
02	Manufactured by:	M/s. Kakatiya Energy Systems Limited 3-6-272, N.V.K. Towers, Himayat Nagar, Hyderabad – 500 029
03	Contact Person	P.R.L. Rao, Managing Director
04	Testing agency:	Central Power Research Institute, P.B. No. 8066, Sir C .V. Raman Road, Sadashivanagar Sub-P.O., Bangalore-560080 Tel:080-23604682 FAX: 080-23601213
05	Contact Person (Testing agency):	M. Siddhartha Bhatt, Additional Director (EC & DD) Central Power Research Institute, P.B. No. 8066, Sir C. V. Raman Road, Sadashivanagar Sub-P.O., Bangalore-560080 Tel: 080-23604682 FAX: 080-23604682 E-mail: msb@cpri.in
06	Test Engineer	K. Pradeep , Engineering Assistant
07	Objectives:	Performance test on Lighting Controller
08	Scope of work:	• Measurement of power supply parameters with Save switch for 12 hours and without save switch for 12 hours • Measurement of lighting level at a common point during by-pass mode and auto mode. • Computation of energy input.
09	Report No.:	CPRI/ERED/LC/02/2011
10	Date of issue of report:	30th November 2011
11	Signature of Head of Division	

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PERFORMANCE REPORT OF SAVE SWITCH FOR STREET LIGHT

SL No.	PARTICULARS	DETAILS
01	Title	Performance test on Street Light Energy Save Switch
02	Name and address of the client	M/s. Kakatiya Energy Systems Limited
03	Name of the person witnessing the test	P.R.L. Rao, Managing Director
04	Date and time of test	**i). with save switch:** 07/10/2011 – 15.00 Hrs to 08/10/2011 – 03.00 hrs **ii). Without save switch:** 08/10/2011 -11:00 Hrs to 08/10/2011 -23.00 Hrs
05	Street light controller details	i). Make: Kakatiya Energy Systems Limited ii). Rating :250 W AC 1 Phase,2 wire system iii). Sl. No. 11379
06	Particulars of study & test conducted	i). Power measurement without save switch ii). Power measurement with save switch. iii). Measurement of illumination at a common point iv). Computation of energy saving
07	Load connected to the controller	1 Number of sodium vapor lamp – 250W
08	Meters used	**Power analyzer:** Automatic recording type 3 phase, 4 wire power analyzer of Krykard make (Sl. No.296945) Current clamps and Voltage probes. Calibration validity up to 24-12-2011 **Lux meter:** Make – Yokogawa (Sl. No. 090093) Calibration Validity up to 03/11/2011
09	Total number of pages	30
10	Signature of the Divisional Head	**M. Siddhartha Bhatt** **(Additional Director, ERED)**

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PERFORMANCE TEST OF SAVE SWITCH FORSTREET LIGHT

Sl.No.	Particulars	Description
01	Supplier	M/s. Kakatiya Energy Systems Limited
02	Name of the Energy Saver	Save switch
05	capacity	250 W
05	Equipment Sl. No.	11379

DETAILS OF THE TEST

Sl.No.	Tests	Results
01	Energy and Power Test	Change in electrical energy input without save switch and with save switch Reduction by: 38.25 % Details are shown in Annexure-1
03	Illumination Test	Lux level measured at height of 2 meter at a common point Without save switch – 466 lux With save switch – 406 lux The reduction in lux level is – 12.88 %
04	Power Factor Test	The Average power factor is increased by using the save switch Power factor without save switch – 0.82 Power factor with save switch – 0.87
05	THD- Total Harmonic Distortion Test	The current THD without Energy save switch is 289.94 % (max.) and the voltage THD is 2.10 % (max.). The current THD with Energy save switch is 253.04 % (max.) and the voltage THD is 2.90 % (max.).The Current harmonics is decreasing due to energy saver. The details are given in Annexure – 2

a) This is not a certificate of compliance.

b) These test results relate only to the items tested, which are selected and submitted by the client mentioned above.

c) The data reported in this test report are valid at the time of testing and under the stipulated conditions of measurements.

d) Publications or reproduction of this report in any form other than by complete set of the whole report and in the language written is not permitted without consent of CPRI.

e) Correction/erasing invalidate the test report.

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PERFORMANCE TEST OF SAVE SWITCH FORSTREET LIGHT

Sl. No.	*Particulars*	*Manufacturer specification*	*Observation by CPRI*
01	Visual Examination	Device shall be examined for the finish	Complies
02	Operating voltage range test	150 V to 290 V AC	Complies
03	Device Power consumption in HW test	1.5 W MAX	1.263 W
04	Device power consumption in LW test	1.5 percent of NWR of the load +3.5 W (NWR – Nominal Wattage range)	4.896 W for a 250 W lamp
05	Insulation resistance (Dry test)	Not less than 5Mohms	312 MΩ
06	Wattage transition test	Smooth transition from HW to LW and flicker free operation after dimming	Complies
07	Pre-dimming duration test	Same as the accuracy of line frequency (tested for all switch positions)	Complies
08	Pre-warming duration test	5min ± 5 sec	Complies

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ANNEXURE – 1
ENERGY & POWER TEST

Test Description: The test is conducted to have a comparative study of energy consumption of the load with and without the above mentioned energy saver and thus evaluate the percentage of saving obtained with Street light controller (Make: GEMS) connected.

COMPARATIVE STATEMENT OF ENERGY CONSUMPTION NOMAL VS ENERGY SAVER

Sl. No.	*Particulars*	*Without Energy Saver*	*With Energy Saver*
1	Starting date	08/10/2011	07/10/2011
2	Finishing date	08/10/2011	08/10/2011
5	Starting time	11.00 Hrs	15.00 Hrs
7	Finishing time	23.00 Hrs	03.00 Hrs
8	Energy consumption (kWh)	3.174	1.963
9	Load on duration	12.00 hrs	12.00 hrs
10	Average consumption per hour (kWh)	0.264	0.163
11	Change in energy consumption in auto-mode	–	38.25 % (reduction)

Sl. No.	Particulars	Details
01	*Table -1*	*Measured electrical parameters with save switch*
02	*Table-2*	*Measured electrical parameters without save switch*
03	*Figure 1 & 2*	*Input voltage variation without and with save switch*
04	*Figure 3 & 4*	*Input Current variation without and with save switch*
	Figure 5 & 6	*Power factor variation with out and with save switch*
05	*Figure 7 & 8*	*Power variation with out and with save switch*

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ANNEXURE – 2
THD-TOTAL HARMONICS DISTORTION TEST

Date and time of : **i). with save switch:** 07/10/2011 – 15.00 Hrs to
08/10/2011 – 03.00 hrs
ii). Without save switch: 08/10/2011 -11:00 Hrs to
08/10/2011 -23.00 Hrs

Test Description : This test is conducted to asses if the introduction of the Save switch causes an increase/decrease in the Total Harmonic Distortion

Sl. No.	Description	Without Energy Saver (MAX)	With Energy Saver (MAX)	Remarks
01	THD Current	289.94 %	253.04 %	
02	THD Voltage	2.10 %	2.90 %	

Sl. No.	*Particulars*	*Details*
01	*Figure 9 and 10*	*Voltage harmonics without and with save switch*
02	*Figure 11 and, 12*	*Current harmonics without and with save switch*

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Figure 1:input Voltage variation wothout save switch to the lamp

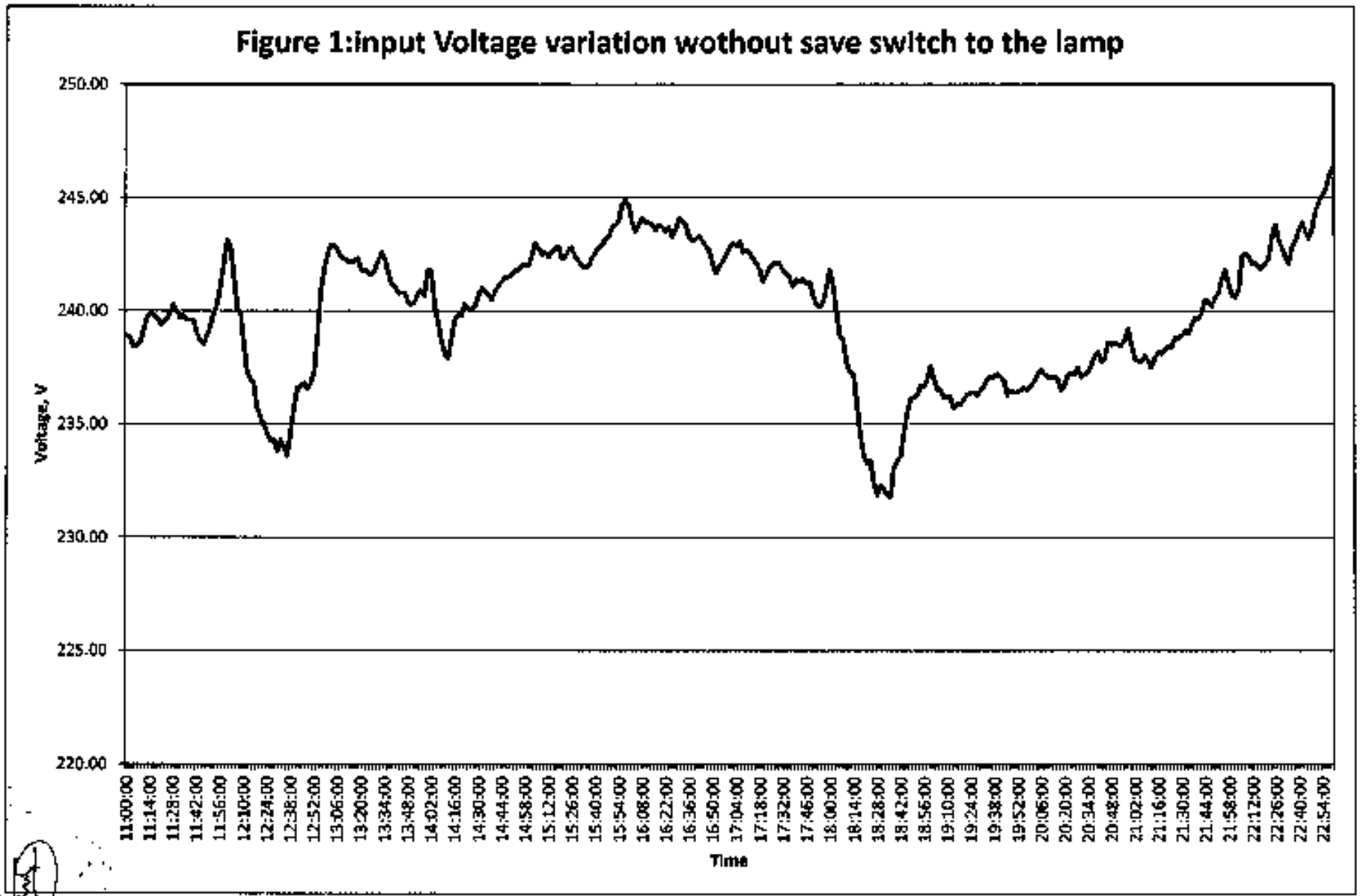


Figure 2: Input voltage veriation with save switch to the lamp

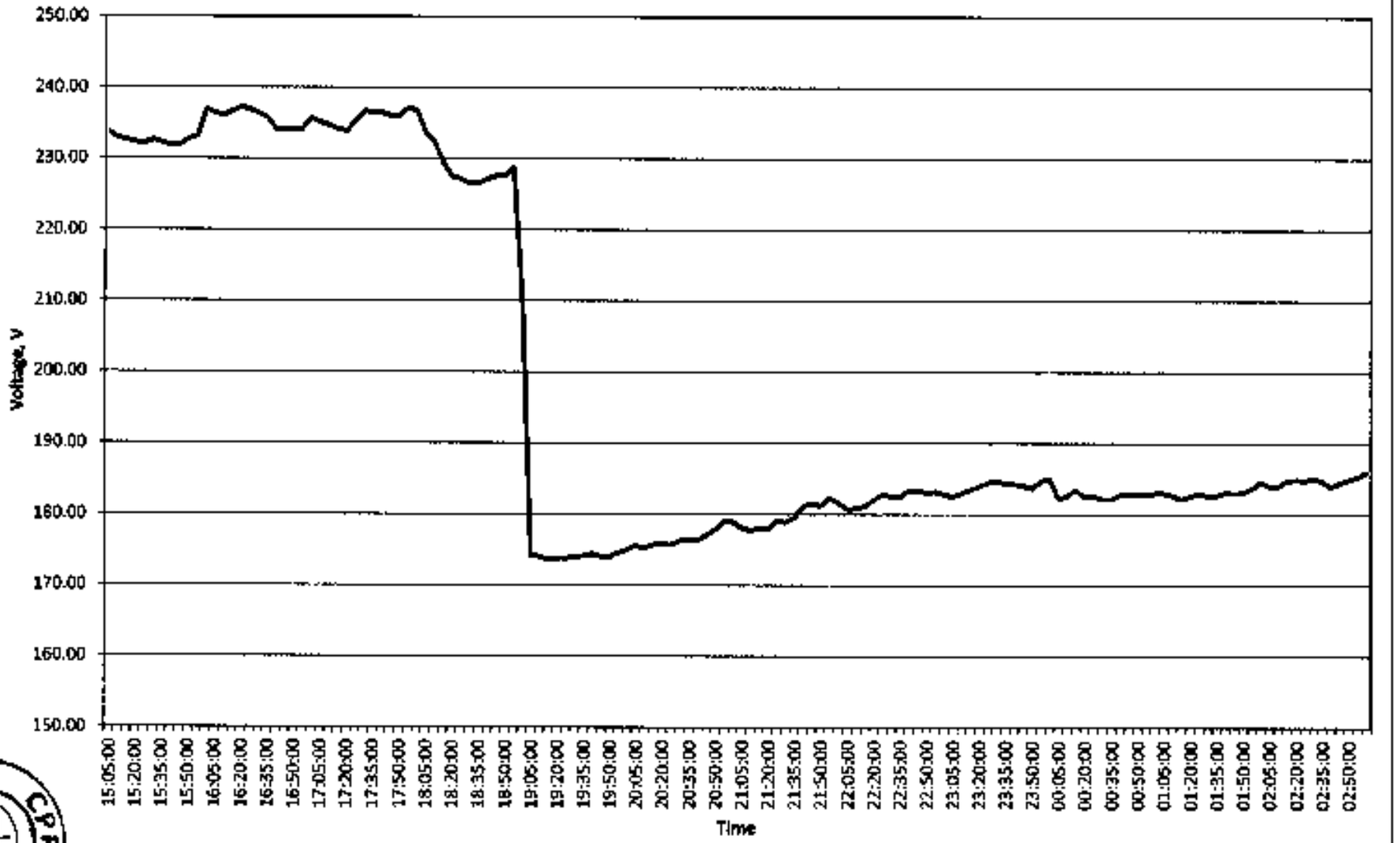


Figure 3: input current variation to the lamp without save switch

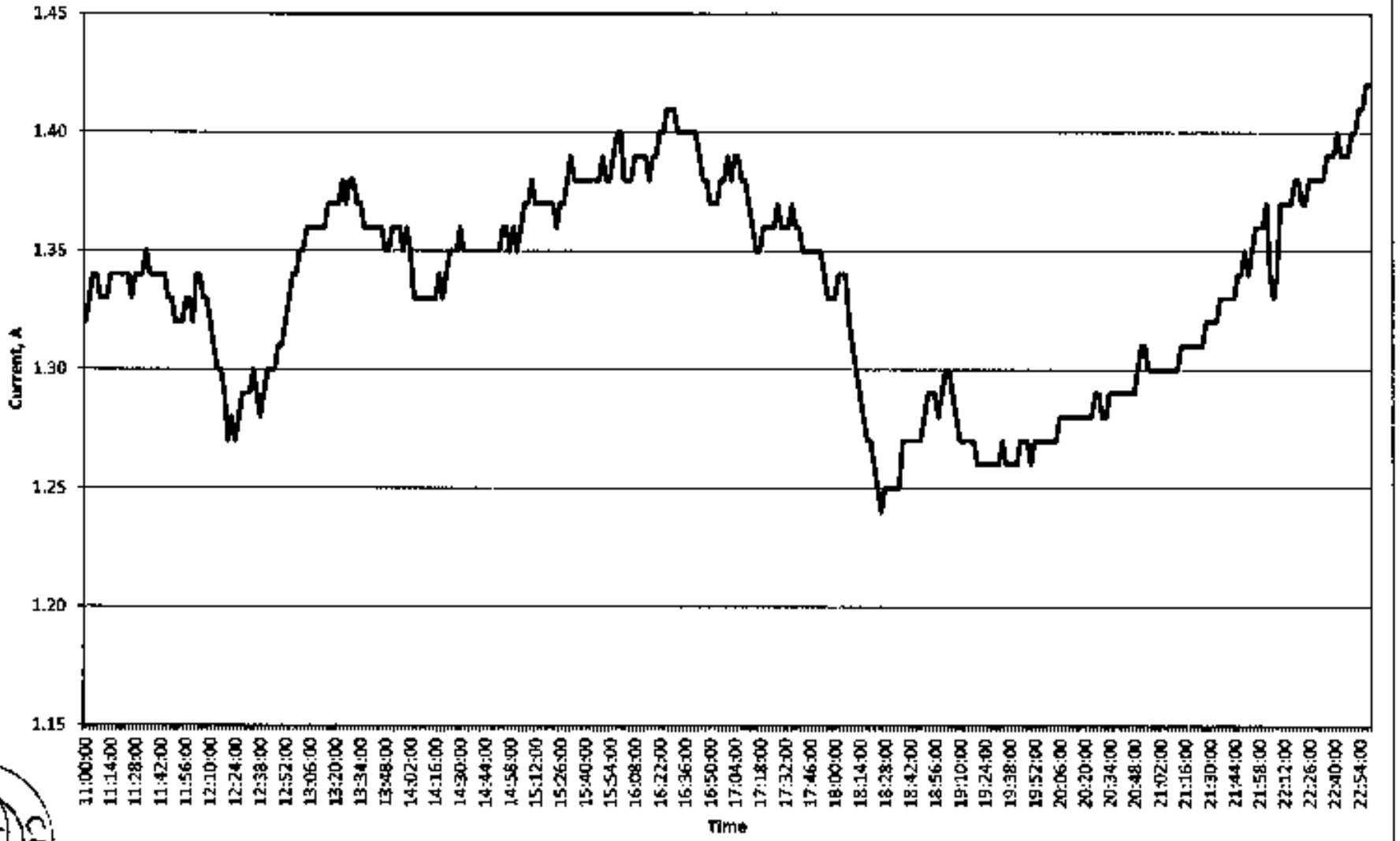


Figure 4: Input current variation to the lamp with save switch

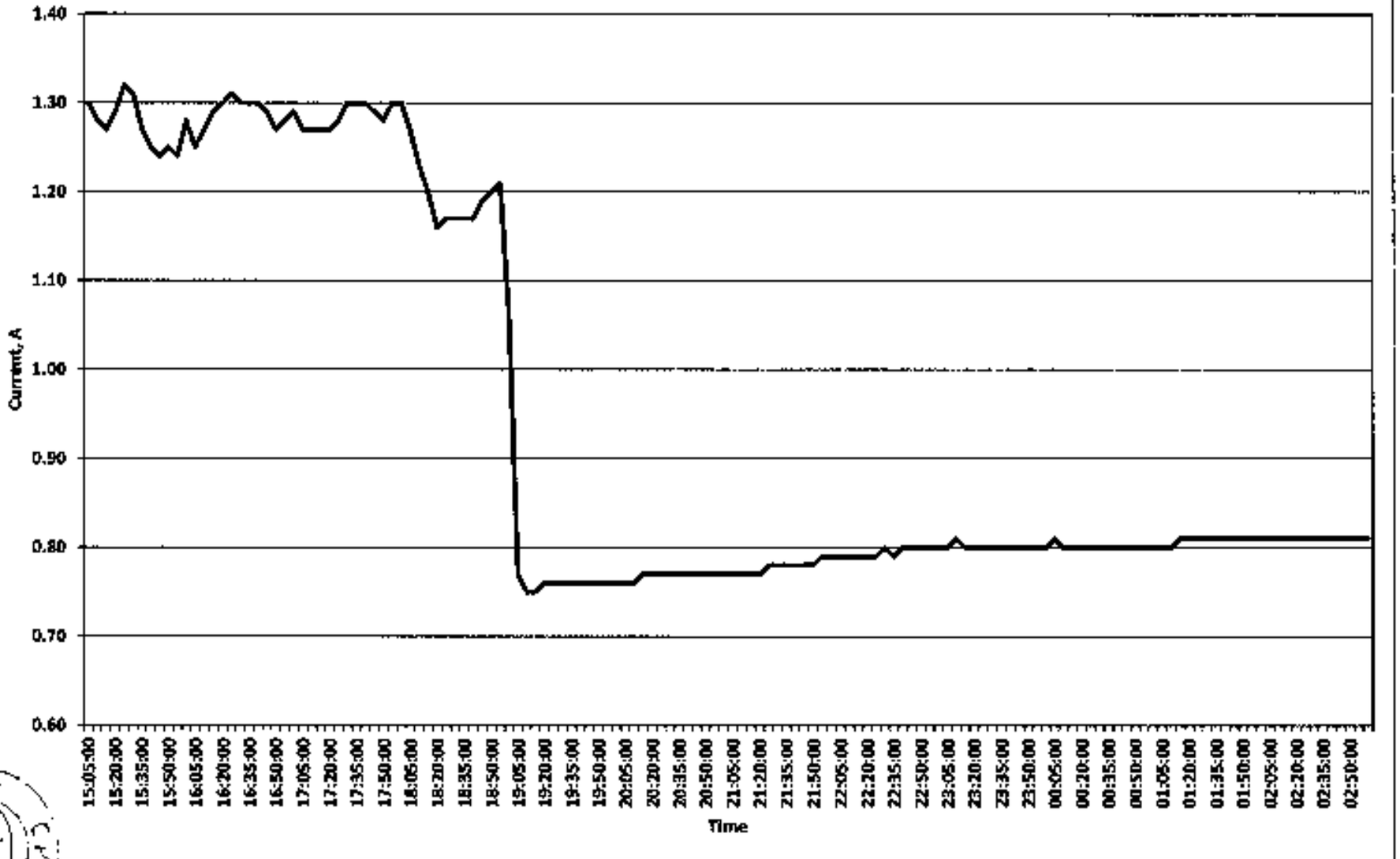
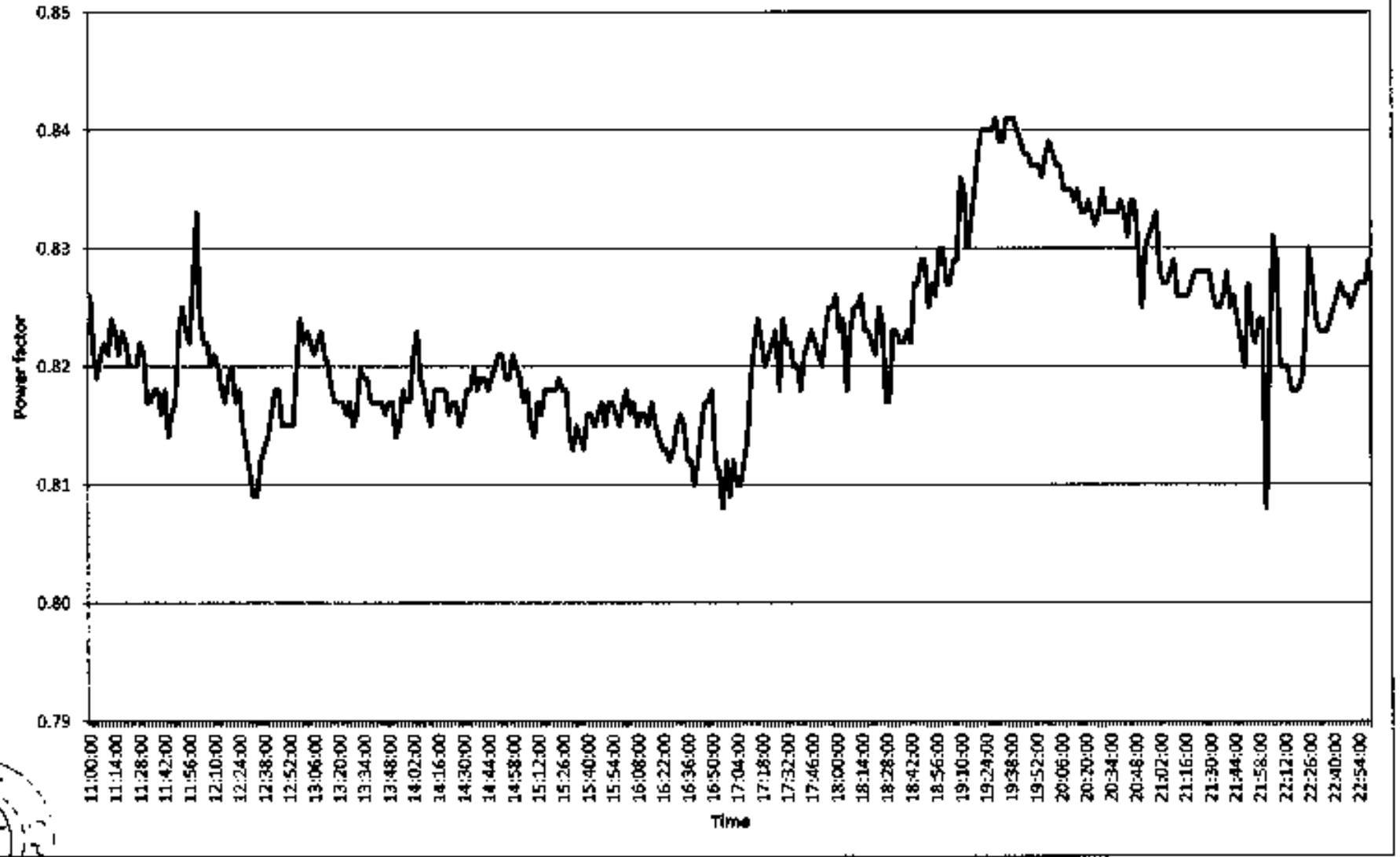


Figure 5: Input powerfactor variation without save switch



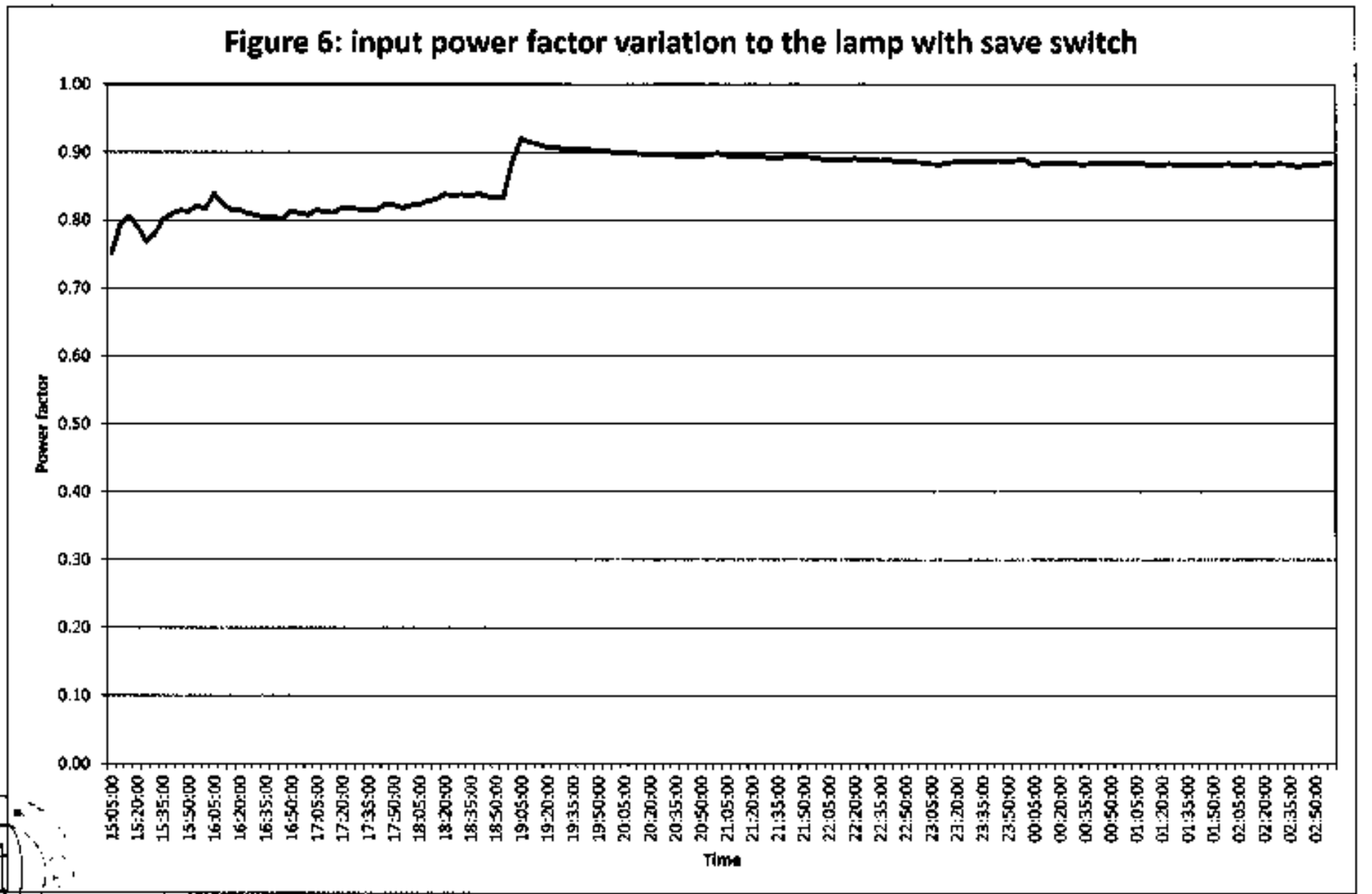


Figure 6: input power factor variation to the lamp with save switch
Power factor
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
Time
15:05:00
15:20:00
15:35:00
15:50:00
16:05:00
16:20:00
16:35:00
16:50:00
17:05:00
17:20:00
17:35:00
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02:20:00
02:35:00
02:50:00

Figure 8: Input power variation to the lamp with save switch

Figure 9: Input voltage harmonics without save switch
V THD, %
2.50
2.00
1.50
1.00
0.50
0.00
Time
11:00:00
11:14:00
11:28:00
11:42:00
11:56:00
12:10:00
12:24:00
12:38:00
12:52:00
13:06:00
13:20:00
13:34:00
13:48:00
14:02:00
14:16:00
14:30:00
14:44:00
14:58:00
15:12:00
15:26:00
15:40:00
15:54:00
16:08:00
16:22:00
16:36:00
16:50:00
17:04:00
17:18:00
17:32:00
17:46:00
18:00:00
18:14:00
18:28:00
18:42:00
18:56:00
19:10:00
19:24:00
19:38:00
19:52:00
20:06:00
20:20:00
20:34:00
20:48:00
21:02:00
21:16:00
21:30:00
21:44:00
21:58:00
22:12:00
22:26:00
22:40:00
22:54:00

Figure 10: Input voltage harmonics with save switch
V THD, %
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
Time
15:05:00
15:20:00
15:35:00
15:50:00
16:05:00
16:20:00
16:35:00
16:50:00
17:05:00
17:20:00
17:35:00
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