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ENERGY MEASUREMENT OF SINGLE-PHASE UPS DEVICES

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The authors of this report are solely responsible for its content and findings.

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1. Zusammenfassung

Im vorliegenden Messprojekt konnten 46 einphasige USV-Geräte im Leistungsbereich von 350VA bis 3000VA in Bezug auf den Wirkungsgrad und den Energieverbrauch ausgemessen werden.

Die Klassifizierung in VFD-, VI- und VFI-Geräte sowie die Durchführung der Messungen wurde nach IEC 62040-3 mit ohmscher und nichtlinearer Last vorgenommen.

Wie erwartet weisen die VFD-Geräte den besten Wirkungsgrad auf, gefolgt von den VI- und den VFI-Geräten.

Die Wirkungsgrade bei 50%, 75% und 100% der Nennbelastung unterscheiden sich nur wenig und liegen mehrheitlich über 90%. Dagegen fällt der Wirkungsgrad deutlich ab bei einer Belastung von 25% (zum Teil unter 80%).

Bei den Standby-Verlusten (eingeschaltet, ohne Last) gibt es grosse Unterschiede, die sich nur zum Teil durch die unterschiedliche Technologie der verschiedenen USV-Geräteklassen erklären lassen.

Im Vergleich zum Code of Conduct für USV-Geräte mit einer Leistung grösser 10kVA schneiden die leistungsmässig kleinen Geräte relativ gut ab, vor allem dank geringem Aufwand für die Kühlung.

2. Abstract

In this project, 46 single-phase UPS devices in the power range from 350 VA up to 3000 VA could be measured with regard to efficiency and energy consumption.

The classification into VFD, VI and VFI devices and the performance of the measurements were carried out in accordance with IEC 62040-3 with resistive and non-linear loads.

As expected, the VFD devices showed the best efficiency level, followed by VI and VFI devices.

The efficiency rate at 50%, 75% and 100% of the nominal power differs only slightly, and in most cases exceeds 90%. However, at a load of 25% the efficiency decreases considerably (in individual cases to below 80%).

There are large differences in the area of standby losses (switched on, without load) which can only partly be explained by the different technologies of the various types of UPS devices.

Compared to the Code of Conduct for UPS devices with a power of more than 10 kVA, the devices with lower power compare relatively well, especially because of the small power demands for cooling.

3. Résumé

L'objet du présent projet était de mesurer le rendement et la consommation énergétique de 46 onduleurs monophasiques ASI (système d'alimentation sans interruption), répartis dans une gamme de puissance allant de 350 VA à 3000 VA.

Le classement en appareils DVF (dépendants des voltages et fréquences), IV (indépendants des voltages) et IVF (indépendants des voltages et fréquences), ainsi que la réalisation des mesures ont été effectués d'après le standard IEC 62040-3 avec charges ohmiques et charges non linéaire.

Comme prévu, les appareils IVF présentent le meilleur rendement, suivi par les appareils IV et IVF.

Le degré d'efficacité à 50%, 75% et 100% de la charge nominale ne diffère que peu et se situe en majorité au dessus de 90%. En revanche, une charge de 25% provoque une nette diminution de l'efficacité (dans certains cas en-dessous de 80%).

Les mesures de déperditions en mode stand-by (branché, sans charge) laissent apparaître de grandes différences. La variété des technologies employées par les systèmes ASI n'expliquent que partiellement ce phénomène.

Comparés au Code of Conduct concernant les onduleurs ASI d'une puissance supérieure à 10 kVA, les appareils de moindre puissance affichent des résultats relativement bons, surtout grâce à leur moindre demande en refroidissement.

4. Abbreviations used in this document

| Abbreviation | In full | Comments |
|---------------------|---|--|
| UPS | U ninterruptible power supply | |
| VFI | V oltage frequency independent | |
| VI | V oltage independent | |
| VFD | V oltage frequency d ependent | |
| AVR | A utomatic voltage regulator | Regulates the output voltage of a UPS device |

5. Background and objectives

UPS (uninterruptible power supply) devices are used for increasing the availability of IT, communications, medical and other equipment. They are primarily used as a means of protecting equipment against problems relating to the power supply, including brown-outs and power cuts, and for reducing harmonic distortion. Detailed knowledge of the requirements and quality of the equipment and power supply forms the basis for the optimised and economical use of UPS devices (cf. Fact sheet on the optimised use of UPS devices, SFOE 2005).

The SFOE has been campaigning for a number of years now for the definition of principles for implementing a voluntary European agreement (Code of Conduct for UPS devices in the power range above 10 kVA).

For UPS devices in the power range below 10 kVA the idea is to develop a corresponding label in cooperation with the EU. For this purpose, an overview of the consumption levels of devices currently available on the market is an essential requirement.

The aim of this project was to carry out around 40 measurements on typical UPS devices. For this purpose the consumption characteristics of the most important devices (single-phase, up to 6 kVA) in terms of quantity were measured and evaluated in the most important operating modes. The objective here was to present as reliable and comprehensive a picture as possible of the energy consumption of single-phase UPS devices.

6. Principles

6.1 UPS devices

Due to the constant increase in the number of PCs and servers in networks, the ever increasing demands placed on availability on the one hand and the resulting higher risk of power cuts and disturbances in the liberalised electricity market on the other hand, ever more importance is being attached to protecting the power supply for such equipment.

UPS devices are a suitable solution for protecting the supply of electricity to critical equipment for a limited period of time.

In accordance with EN-50091-1, a UPS device is a power supply unit with energy storage that protects the supply of the required load without interruption in the event of a power failure.

A UPS device is switched between the power supply and the equipment to be protected. Its core component is its batteries, which maintain the supply of electricity to the connected equipment for a certain amount of time if the mains supply should be interrupted.

Different types of UPS devices are available to suit the many differing demands and protection requirements. UPS devices can basically be classified into three categories.

Classification of UPS devices:

The categories described below are based on IEC Standard 62040-3, which defines UPS devices on the basis of their characteristics. This standard is strongly oriented on the output voltage, since securing its constancy and quality is the most important criterion a UPS device has to meet.

There are three classification levels:

Level 1: Degree of dependence of the UPS output on the mains supply in normal operating mode

Level 2: The form of the voltage curve of the UPS output

Level 3: Dynamic tolerance curves of the UPS output

Level 1: Dependence of UPS output on mains supply

Table 1: Code level 1

| Previous designation | Designation according to IEC 62040-3 Code | Explanation |
|---|---|--|
| Offline Ready mode Stand-by mode Passive on-line mode | VFD "Voltage and frequency dependent" | Output voltage is dependent on fluctuations in supply voltage and supply frequency if no components such as transformers, EMV filters or varistors are installed for improvement purposes. |
| Mains interactive Line interactive Single conversion Active on-line mode | VI "Voltage independent" | Output voltage is dependent on supply frequency and is processed via active or passive regulators within certain thresholds. |
| Online Double conversion Uninterrupted conversion | VFI "Voltage and frequency independent" | Output voltage is independent of all fluctuations in supply and frequency, and in accordance with the relevant IEC Standard it is regulated electronically. |

Operating principles of offline (VFD) UPS devices

In normal operating mode, offline UPS devices transfer the current directly from the input to the output. They only provide protection in the event of a power failure. They are able to block certain (high-frequency) disturbances, depending on the input filter. The connected equipment must be able to tol-

erate a switching time of several milliseconds. As load, the most suitable devices are those equipped with power supply units with primary clock pulses (e.g. PCs).

If the supply voltage is within the permissible tolerance, it is transferred to the output via the change-over switch, and the batteries are thus charged. In the event of a disturbance in the power supply, the control unit switches to battery operation. The current inverter is activated and its output voltage is supplied to the UPS output with the aid of the change-over switch. At the same time the mains supply is cut off.

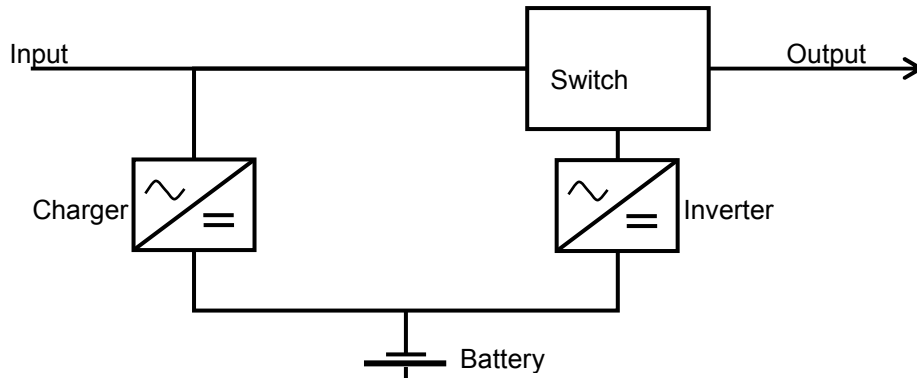


Fig. 1: Offline UPS device (VFD)

With offline UPS devices the output voltage is the same as the input voltage. All disturbances and fluctuations on the input side are passed on to the equipment. And the output frequency is the same as the input frequency. Frequency fluctuations are not adjusted. Switching times are relatively lengthy (several milliseconds). During battery operation the voltage curve is usually stepped. There are no switching times when changing from battery to mains operation.

Operating principles of mains interactive (VI) UPS devices

Mains interactive UPS devices function in a similar way to offline devices. Voltage fluctuations are adjusted on a step-by-step basis.

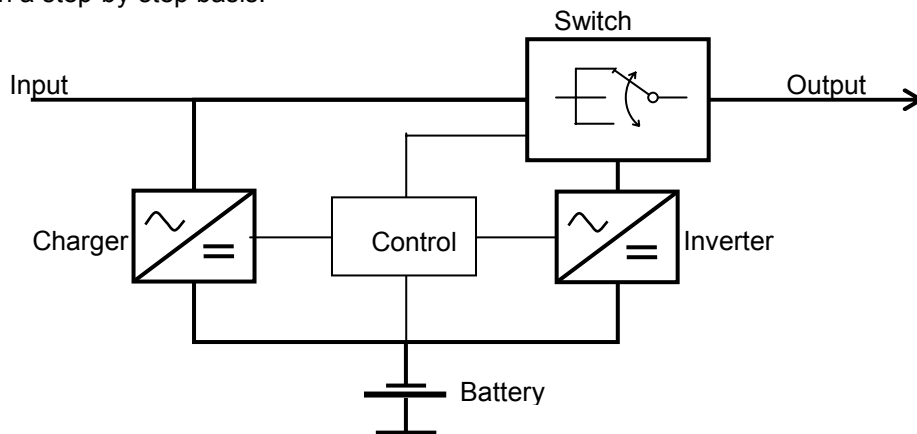


Fig. 2: Mains interactive UPS device (VI)

Trapezoid or sinusoid curves are available as forms of output curve. Voltage regulation is carried out step by step. The output frequency is the same as the input frequency and frequency fluctuations are not adjusted. In the same way as with offline UPS devices, switching times are approx. 2 to 4 milliseconds. There are no switching times when changing from battery to mains operation.

Operating principles of online UPS devices (VFI)

As genuine uninterruptible converters in accordance with EN 50091-1, online UPS devices are equipped with dual power converters. A rectifier at the input (AC/DC converter) converts alternating

current into direct current. With direct current, the battery is charged and the energy is provided that is subsequently required for the inverter. The inverter (DC/AC converter) converts the direct current into alternating current. Since the output voltage is obtained solely from the output of the inverter, this permits operation that is free of disturbances and is independent of the quality of the main supply (no switching in the event of a disturbance).

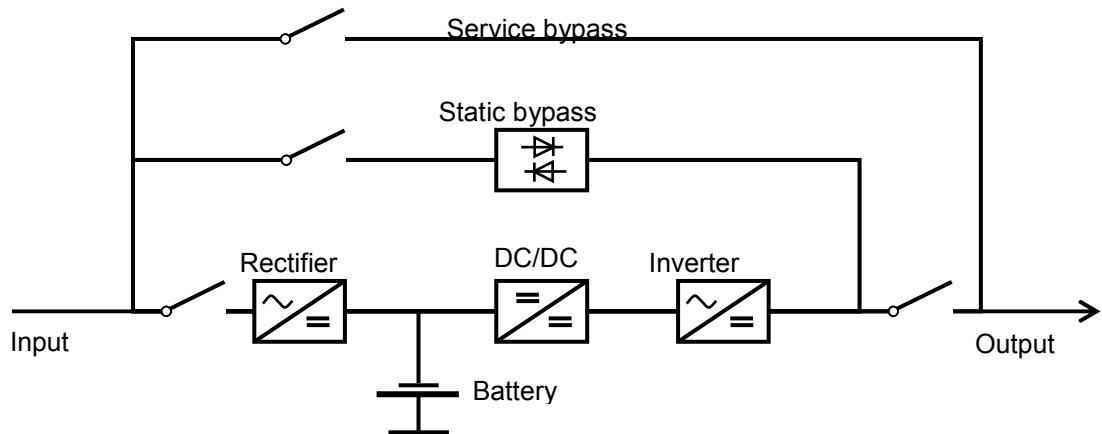


Fig. 3: Online UPS device (VFI)

Input and output are galvanically separated. In the event of an overload or defective inverter the static bypass automatically switches the connected equipment to the mains. Automatic return switching only takes place if the load has been reduced accordingly or the inrush current has dropped. All connected equipment can continue to be supplied with power, without interruption, via a service bypass while the UPS device is disconnected from the mains for maintenance purposes. Output voltage and output frequency are independent of disturbances on the input side. There are no switching times when changing from mains to battery operation.

Level 2: Voltage curve form of the UPS output

Level 2 classifies the curve form of the output voltage relatively roughly, in each case in both operating modes (mains and battery operation).

Table 2 Code level 2

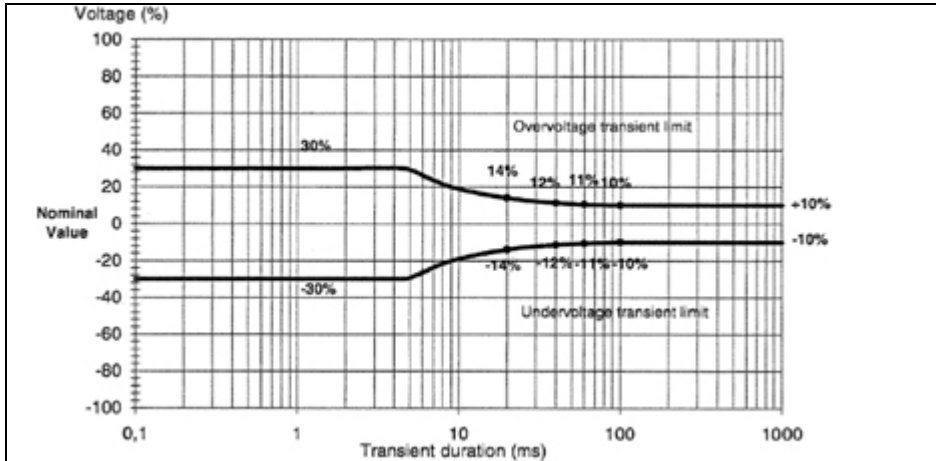
| Code | | Comments |
|-----------------|-------------------|--|
| Mains operation | Battery operation | |
| S | S | Sinusoid: distortion factor $D < 0.08$ (IEC 61000-2-2) at all linear and non-linear reference loads |
| X | X | Non-sinusoid: $D > 0.08$ at non-linear reference load (trapezoid form) |
| Y | Y | Non-sinusoid: also exceeds the thresholds of IEC 61000-2-2 (incremental) |

Especially with VFD or VI UPS devices in the low power range (< 1000 VA) the voltage curve form in battery operation can be rectangular or trapezoid, i.e. it deviates significantly from the sinusoid form. This is not suitable for all equipment.

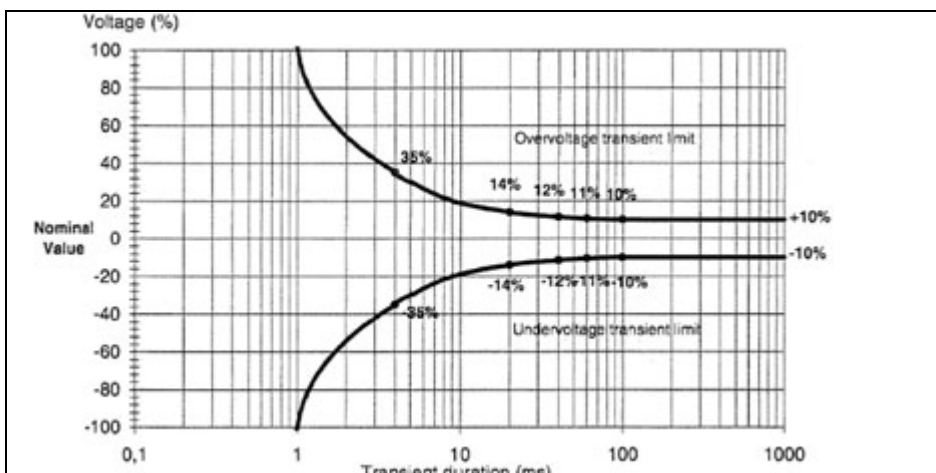
Level 3: Dynamic tolerance curves of the UPS output

Critical applications always require a strictly sinusoid voltage. The highest requirements in terms of quality of output voltage are specified through the definition of the maximum permissible dynamic deviations from sinusoid voltage.

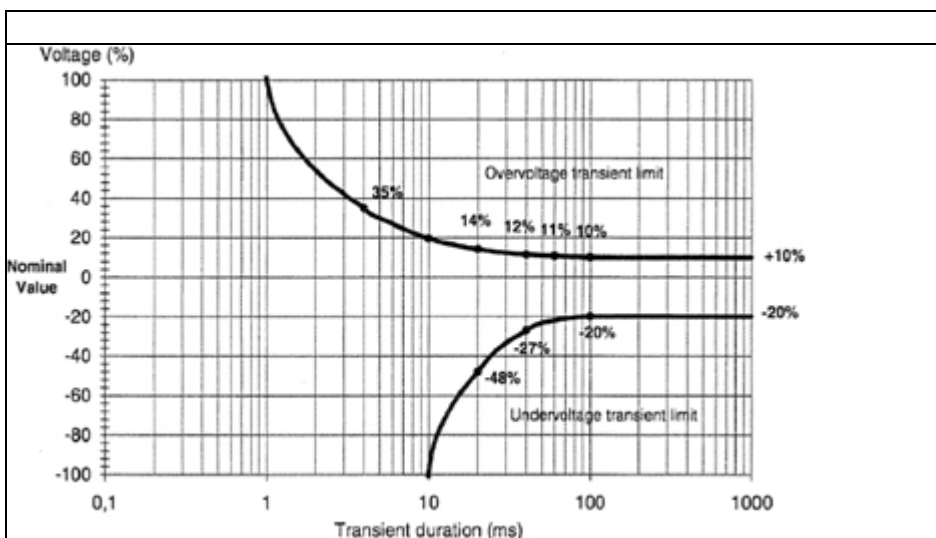
A distinction is made between 3 tolerance categories with the respective tolerance curves:



Class 1



Class 2



Class 3

The code for output tolerance curves comprises three digits that correspond to three different typical dynamic cases in operation:

1st digit: Tolerance with change of operating mode, e.g. mains, battery, bypass operation

2nd digit: Tolerance with load increases with linear load in mains and battery operation

3rd digit: Tolerance with load increases with non-linear load in mains and battery operation

Full classification code:

The full UPS device classification code is thus as follows:

| Dependence on output from mains | Distortion of output curve form | Tolerance of output voltage |
|---------------------------------|---------------------------------|-----------------------------|
| VFI | SS | 111 |
| VI | SX | 122 |
| VFD | XY | 333 |

Table 3: Classification code

This three-part code represents a useful and detailed description of the characteristics of a UPS device.

6.2 PROCUREMENT OF DEVICES

A variety of manufacturers and distributors of UPS devices in Switzerland were contacted for the purpose of obtaining models for carrying out measurements. In most cases this concerned representatives of the industry that were also contacted directly by the Swiss Federal Office of Energy (SFOE), and a number of other potential suppliers were also contacted.

| Company | Contact | Product |
|---|------------------------|----------------------------|
| ALMAT AG | B. Kessler | ALMAT |
| ATC Frech & Cie | V. Garapic | AROS |
| APC Switzerland / Gutor Electronic GmbH | J. Ruders | American Power Corporation |
| GE Consumer & Industrial SA | G. Andrighetti | General Electric |
| MGE UPS Systems | L. Racciatti | MGE |
| Rotronic AG | M. Werner | APC, |
| Service Net AG | P. Niggli / I. Gentsch | Ally, Megaline, NeWave, .. |
| Sicon Socomec AG | O. Saladin / Kaufmann | Modulys |
| NeWave SA | R. Molteni | NeWave |
| Online | P. Jaberg | Online-USV |

Most of the representatives who were contacted showed a great deal of interest in the project and were happy to supply us with UPS devices for measurement purposes. The project team wishes to express its sincerest thanks to the above companies and persons for their kind co-operation.

7. Measurements

7.1 METHODOLOGY

Registration of devices:

The devices on which tests were to be carried out were registered and classified by type (VFI, VI, VFD) in accordance with IEC 62040-3. In each case the standard battery set was used.

Preparations:

Each device was connected to the power supply (230 V / 50 Hz) in “power on” mode for a period of more than 12 hours. The aim here was to ensure that the batteries were fully charged, which is a prerequisite for accurate power measurement.

Performance of measurements:

The power measurements were carried out in stand-by and normal operation. In the case of 11 devices equipped with manual bypass mode, the consumption levels at 50% and 100% were recorded.

One measuring device was used for the power requirement and one for the power output. A level was obtained from the mathematical average of three consecutive measurements. Then the measuring devices were exchanged and the process was repeated. The result is then the mathematical average of the two previously obtained readings.

An electronically stabilised 4 kVA alternating current source was used in order to provide a constant input voltage.

In accordance with IEC Standard 62040-3, Appendix E, the load was initially prepared for measurement of the non-linear load with a separate measuring device. After checking the 230 V / 50 Hz mains supply, the load was then switched to the output of the device to be tested.

The load in normal operating mode was raised in four stages from 25 percent to 100 percent of the nominal apparent power (SN). For control purposes the maximum load of each device was also determined. As a rule, this is slightly higher than the maximum load (SN) indicated in the specifications.

In the active power range with the same four stages (25% to 100%), the load was adjusted directly.

The following arrangement was used for carrying out the measurements (depicted in diagram form):

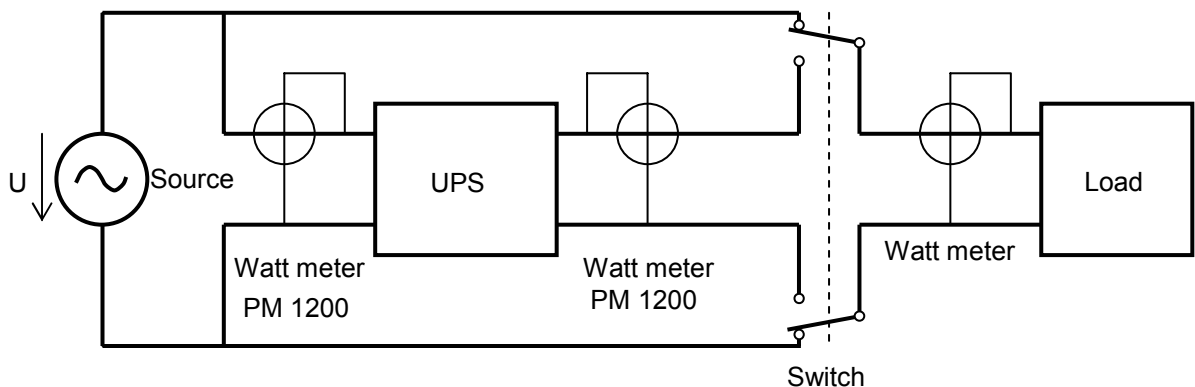


Fig. 4 Measurement structure

Source: Stabilised 230 V / 50 Hz mains supply, Pacific Smart Source 140-ASX

Watt meter: PM 1200 manufactured by Voltech

UPS: Tested UPS device

Switch: For adjusting load (25%, 50%, 75%, 100%)

Load: Resistive or non-linear load as per IEC 62040-3

7.2 OPERATING MODES

Standby

Standby refers to the operating mode without load. Most UPS devices also consume power in “power-off” mode (= UPS device is switched off). In this mode only the accumulator is supported, while all LEDs, interfaces and displays are switched off.

If the UPS device is switched on, the power requirement increases for regulation and the various displays and LEDs.

Normal mode

In normal mode the UPS device operates with a load. Losses from the device arise in the power electronics, regulation, ventilation and displays.

Bypass mode

In bypass mode the UPS device is bypassed, i.e. input and output are directly connected to one another. This status occurs if, for example, there is a fault in the UPS device or if it needs to be serviced (e.g. change of batteries, switching to another UPS device).

Measurement of power requirement

The power requirements were measured at the input and output of each UPS device using two PM1200 devices manufactured by Voltech. These devices permit the measurement of active, idle and apparent power ratings and the power factor from a current and voltage measurement up to a maximum frequency of 100 kHz. The error factor for the readings is less than 1 percent.

The measured levels (current, voltage, active power) can be recorded simultaneously with the aid of a hold function. The data can then be read and entered into the corresponding table.

7.3 CALCULATION OF EFFICIENCY

EN 62040-3, paragraph 3.3.19 stipulates that the performance of a UPS device is calculated as follows:

Ratio of active output to active input power under specified operating conditions, without an exchange of energy with the accumulator.

Equation:
$$\eta = \frac{P_{Ausgang}}{P_{Eingang}}$$

7.4 MEASUREMENT RESULTS

The following diagrams depict the evaluations of the measurement results in the form of graphs.

The corresponding tables and measurement data, together with all additional evaluations, are presented in the appendix.

a) VI UPS devices

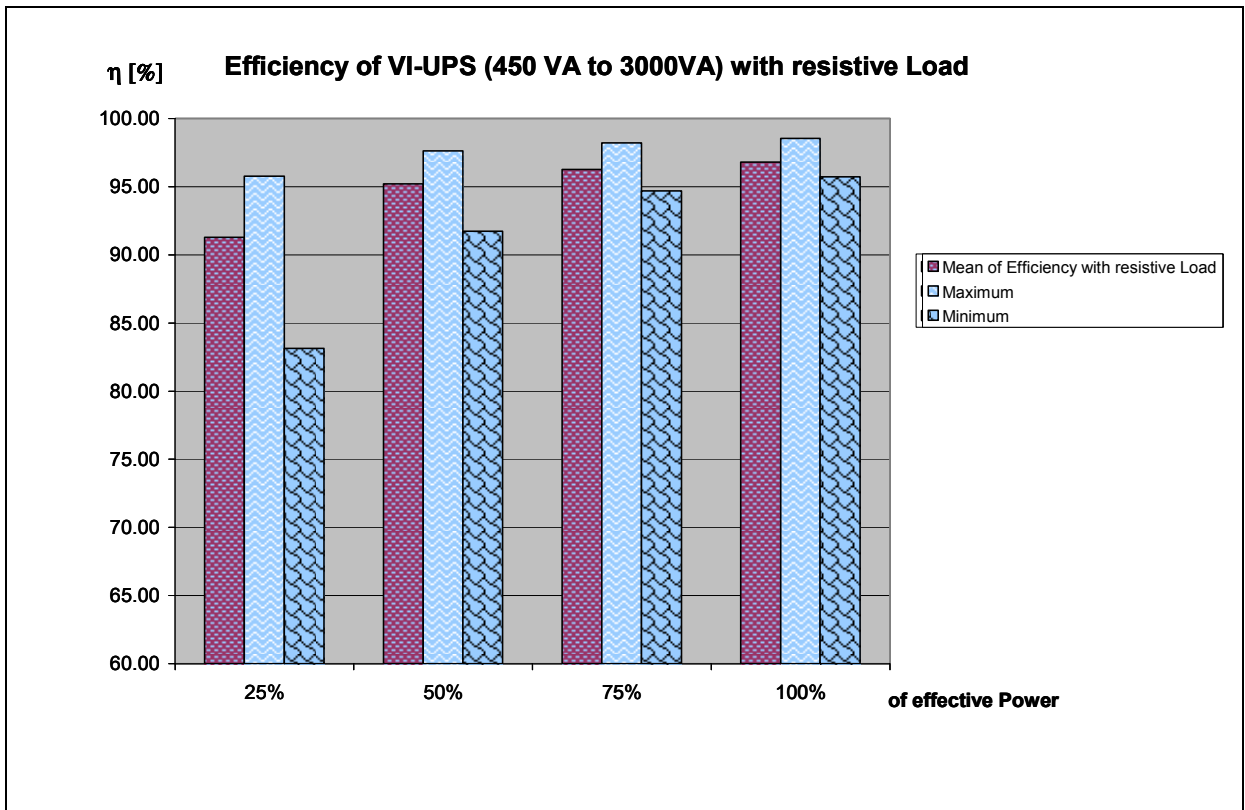


Fig. 5 Efficiency of VI UPS devices with resistive load in the 450 VA to 3000 VA range

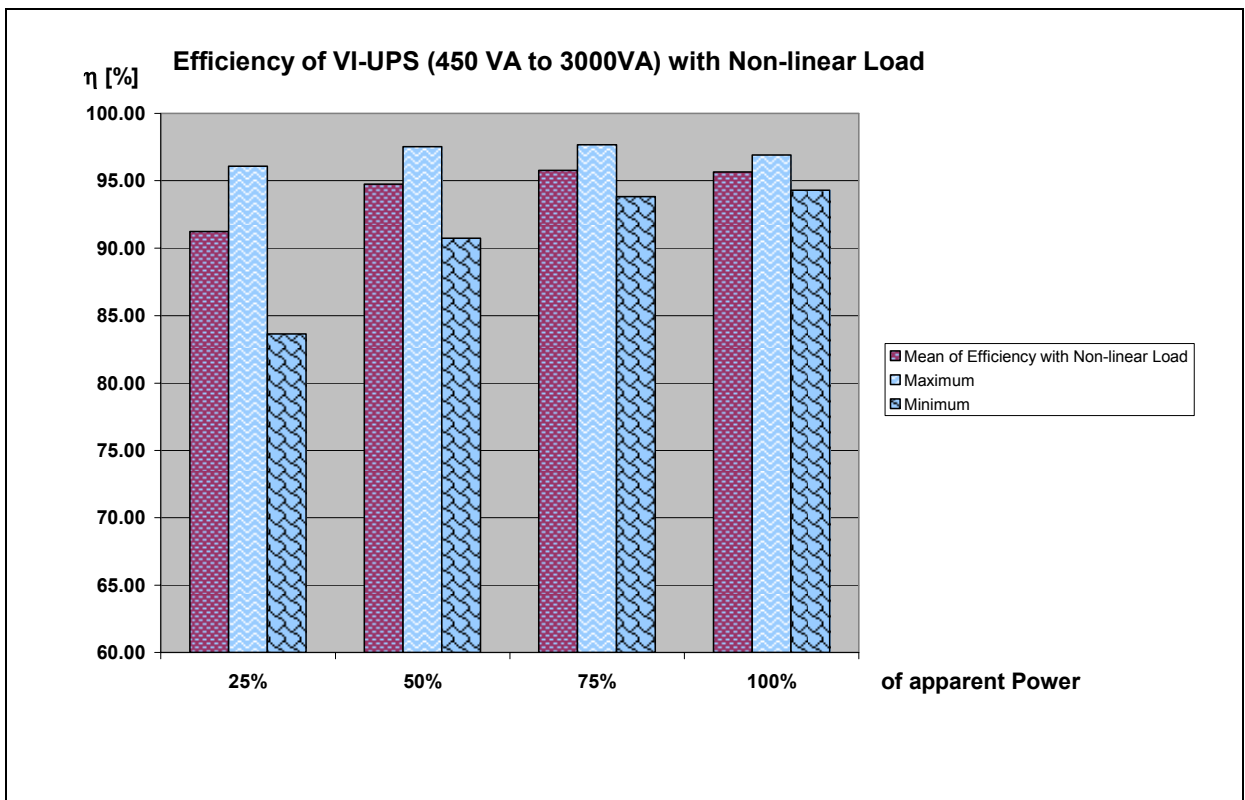


Fig. 6 Efficiency of VI UPS devices with non-linear load in the 450 VS to 3000 VA range

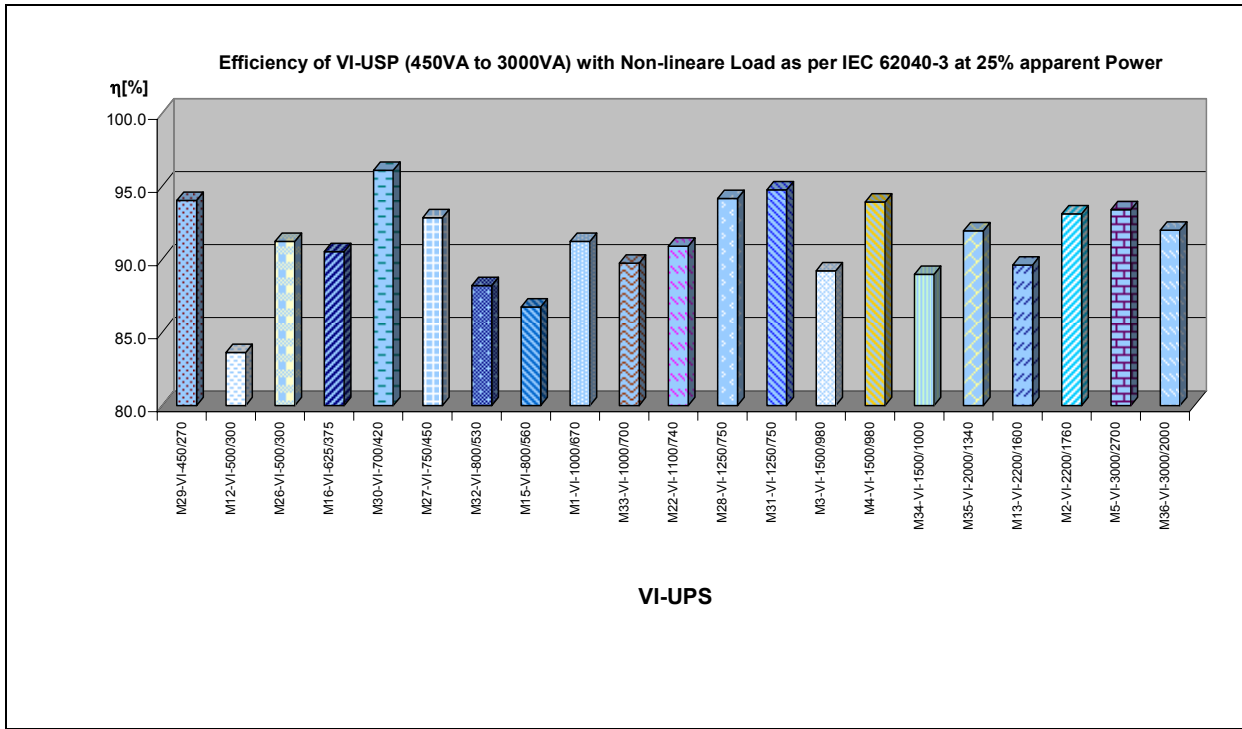


Fig. 7 Efficiency of VI UPS devices at 25% non-linear load

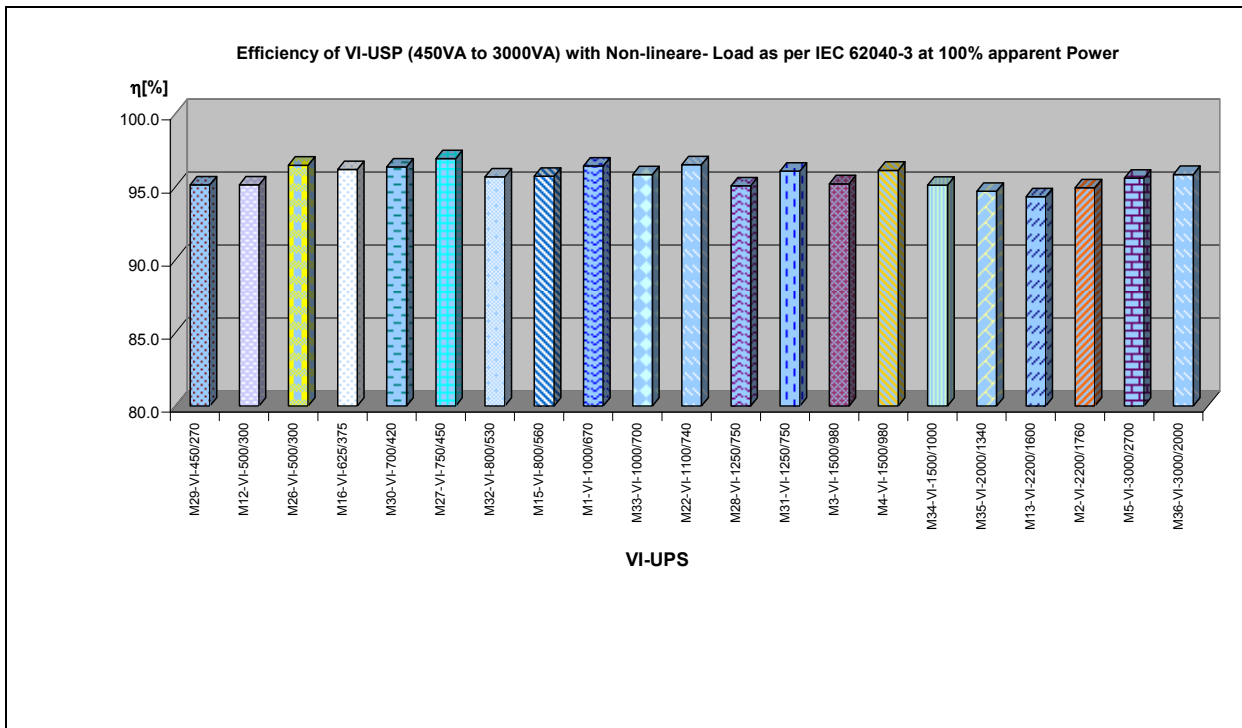


Fig. 8 Efficiency of VI UPS devices at 100% non-linear load

b) VFI devices

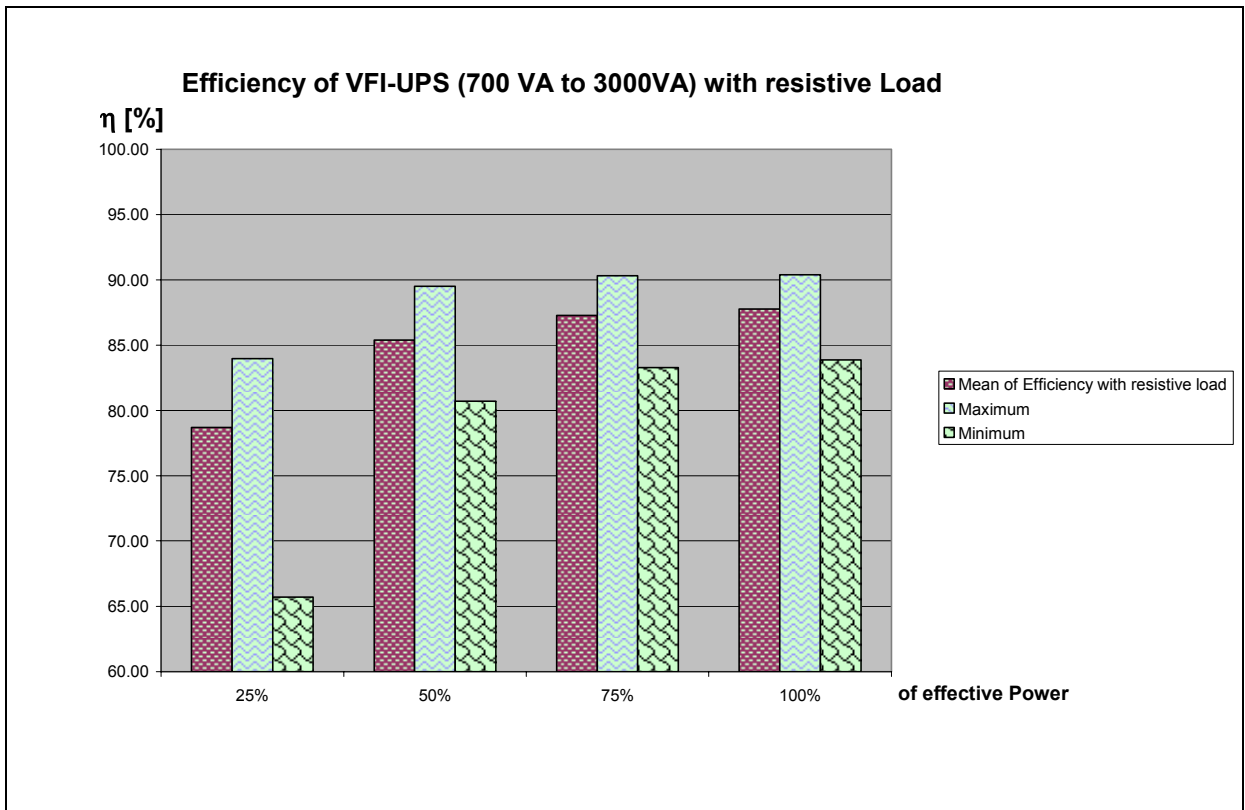


Fig. 9 Efficiency of VFI UPS devices with resistive load in the 480 W to 2400 W range

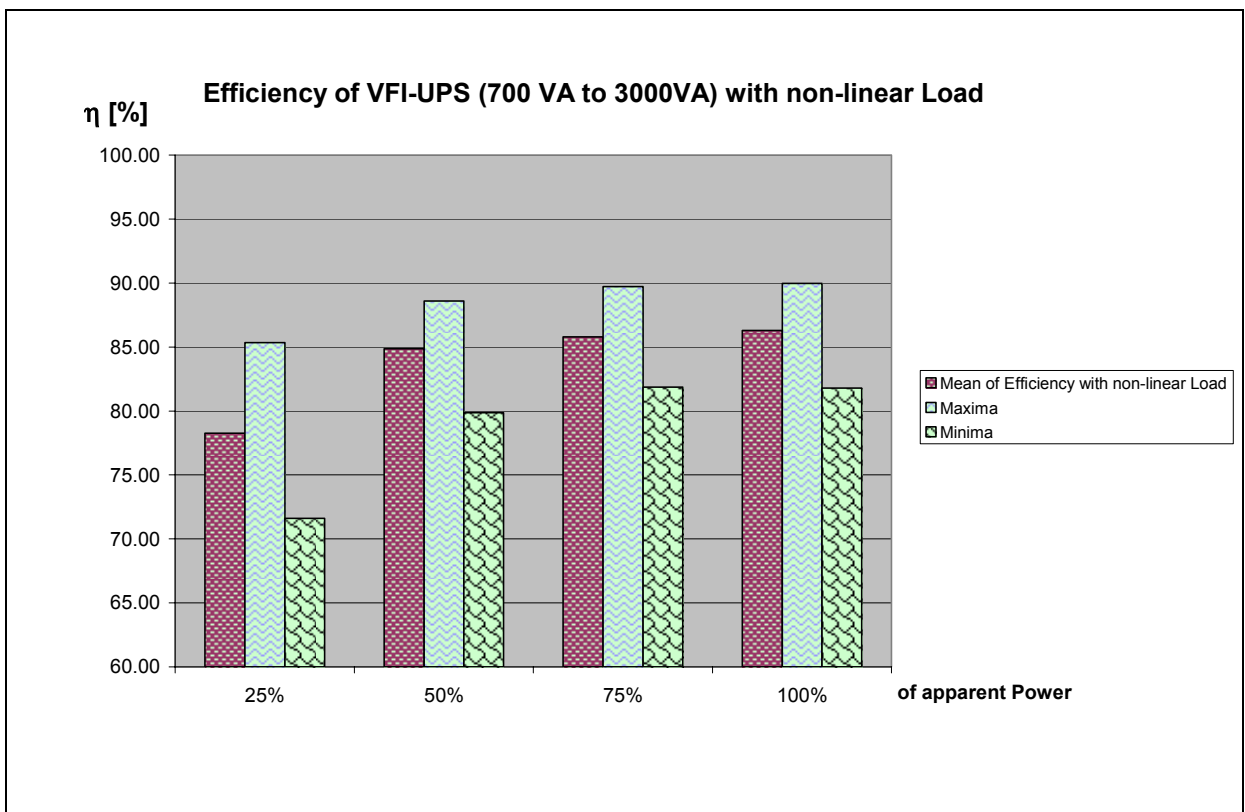


Fig. 10 Efficiency of VFI UPS devices with non-linear load in the 700 VA to 3 kVA range

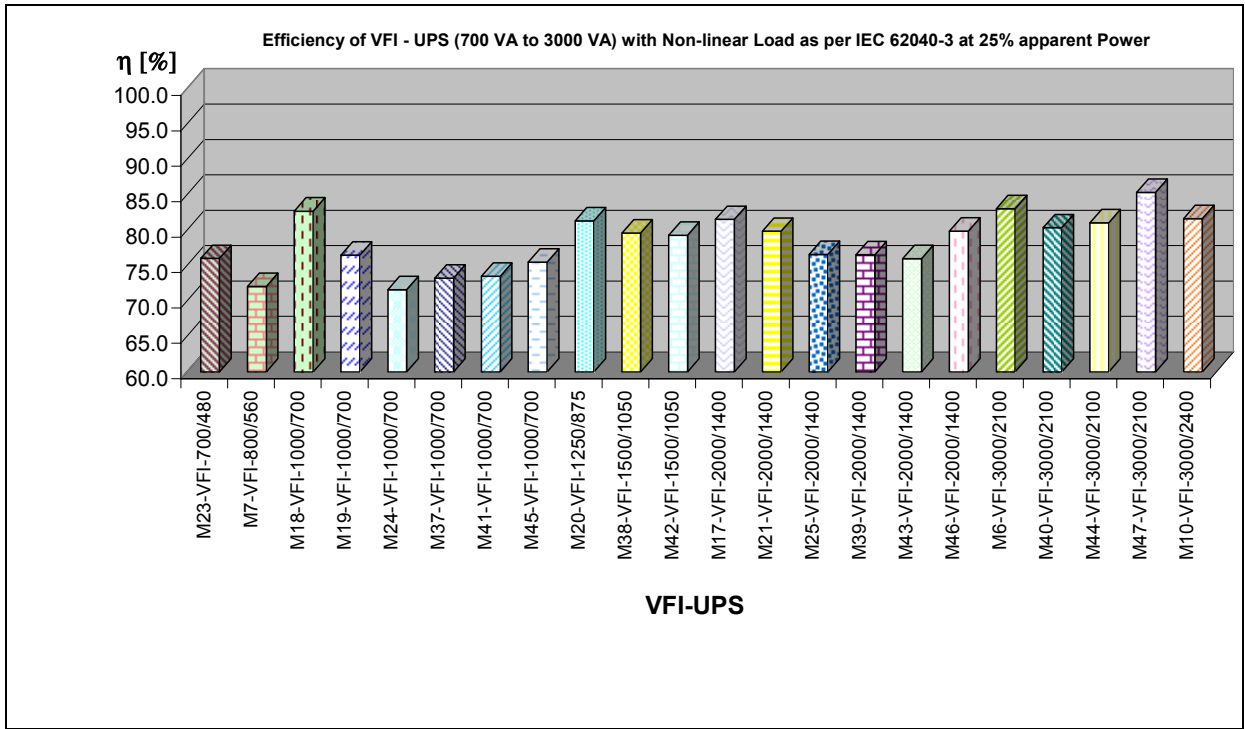


Fig. 11 Efficiency of VFI USV devices at 25% non-linear load

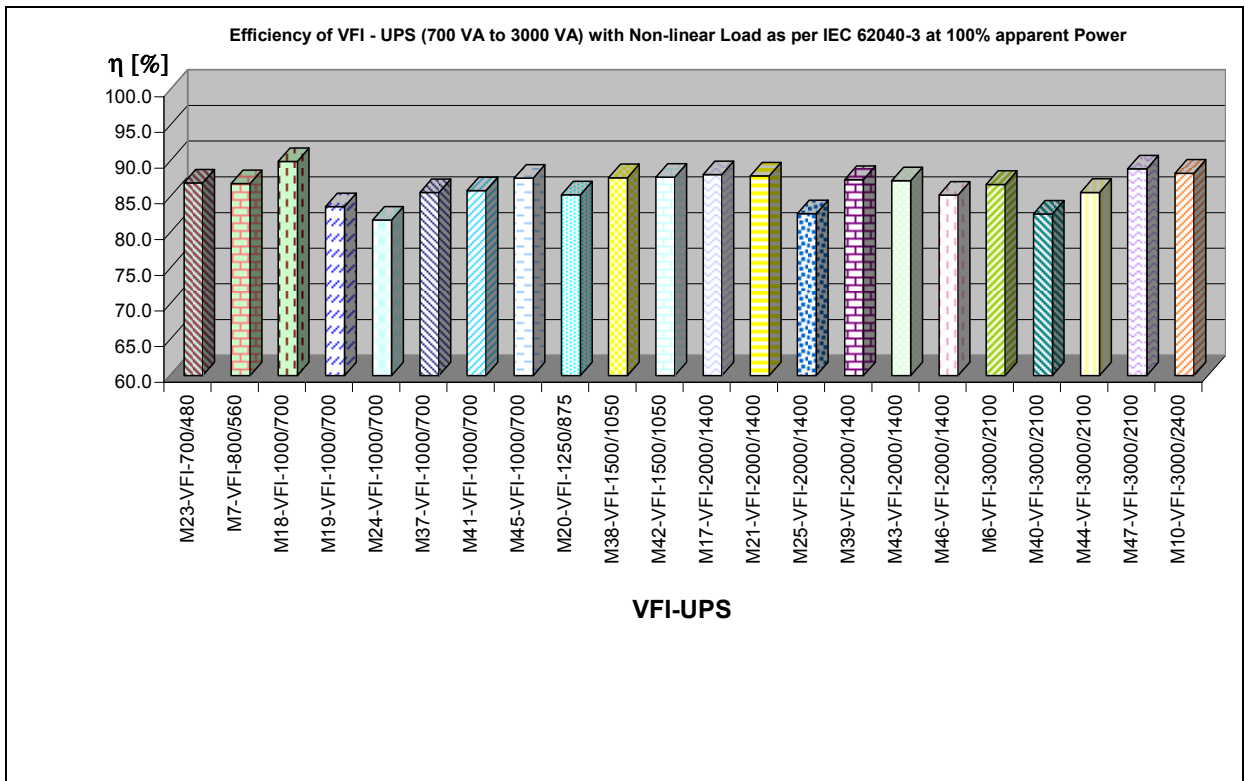


Fig. 12 Efficiency of VFI UPS devices at 100% non-linear load

c) VFD devices

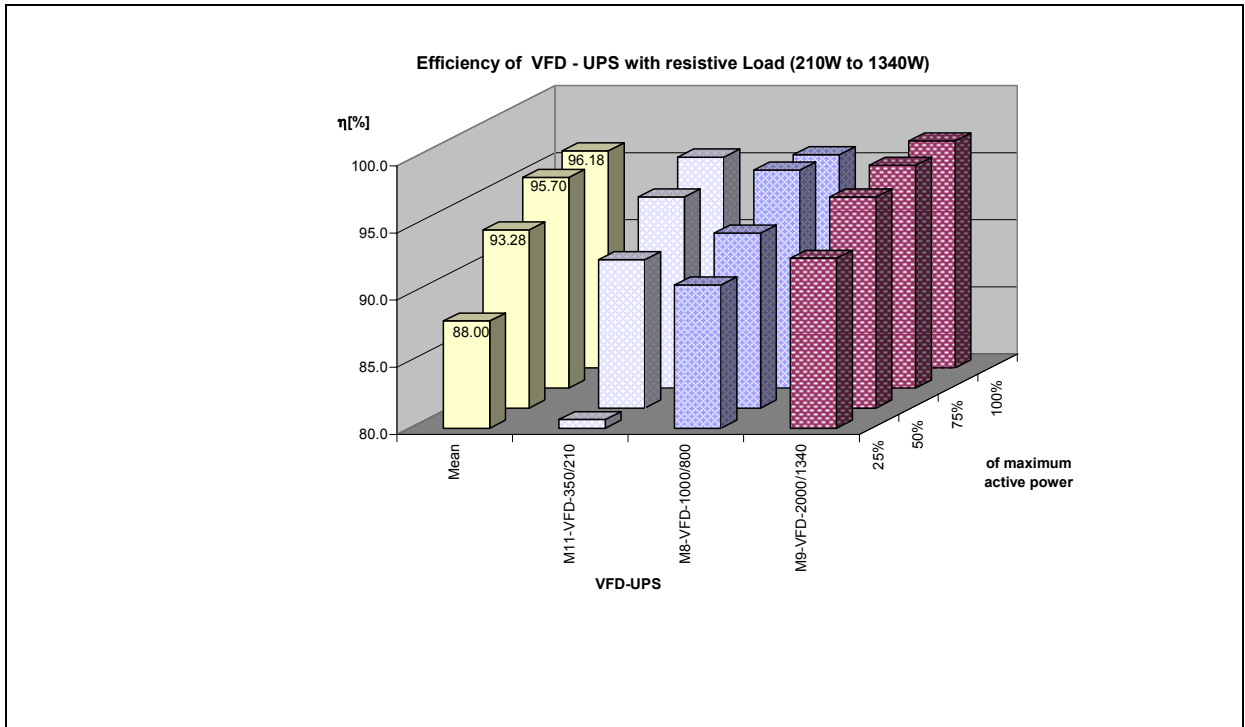


Fig. 13 Efficiency of VFD UPS devices with resistive load in the 210 W to 1340 W range

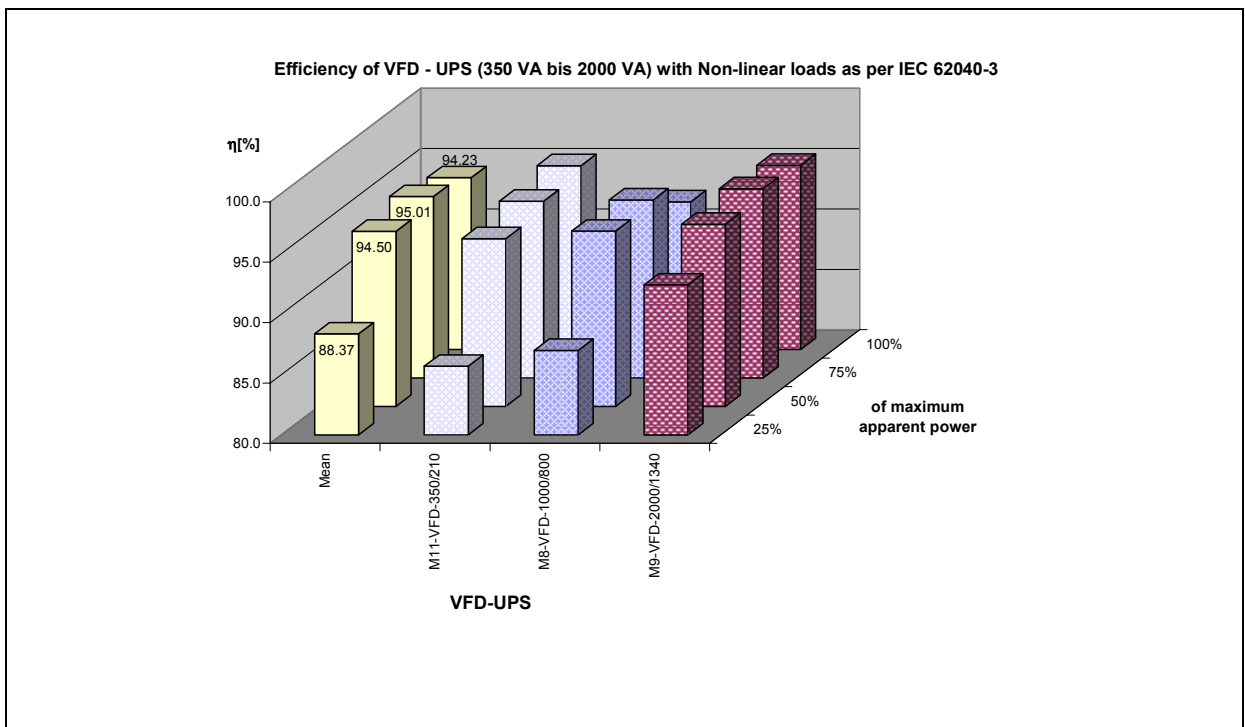


Fig. 14 Efficiency of VFD UPS devices with non-linear load in the 350 VA to 2 kVA range

d) Standby losses in bypass and normal operating mode

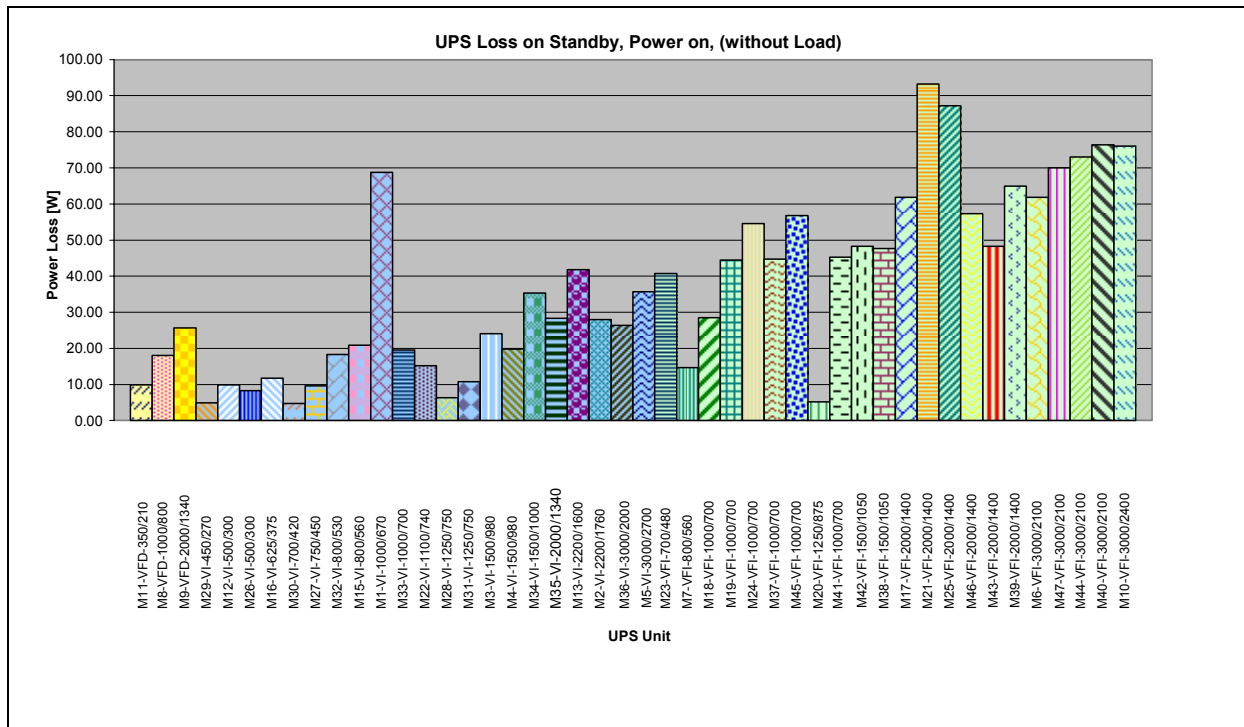


Fig. 15 Standby losses in normal mode

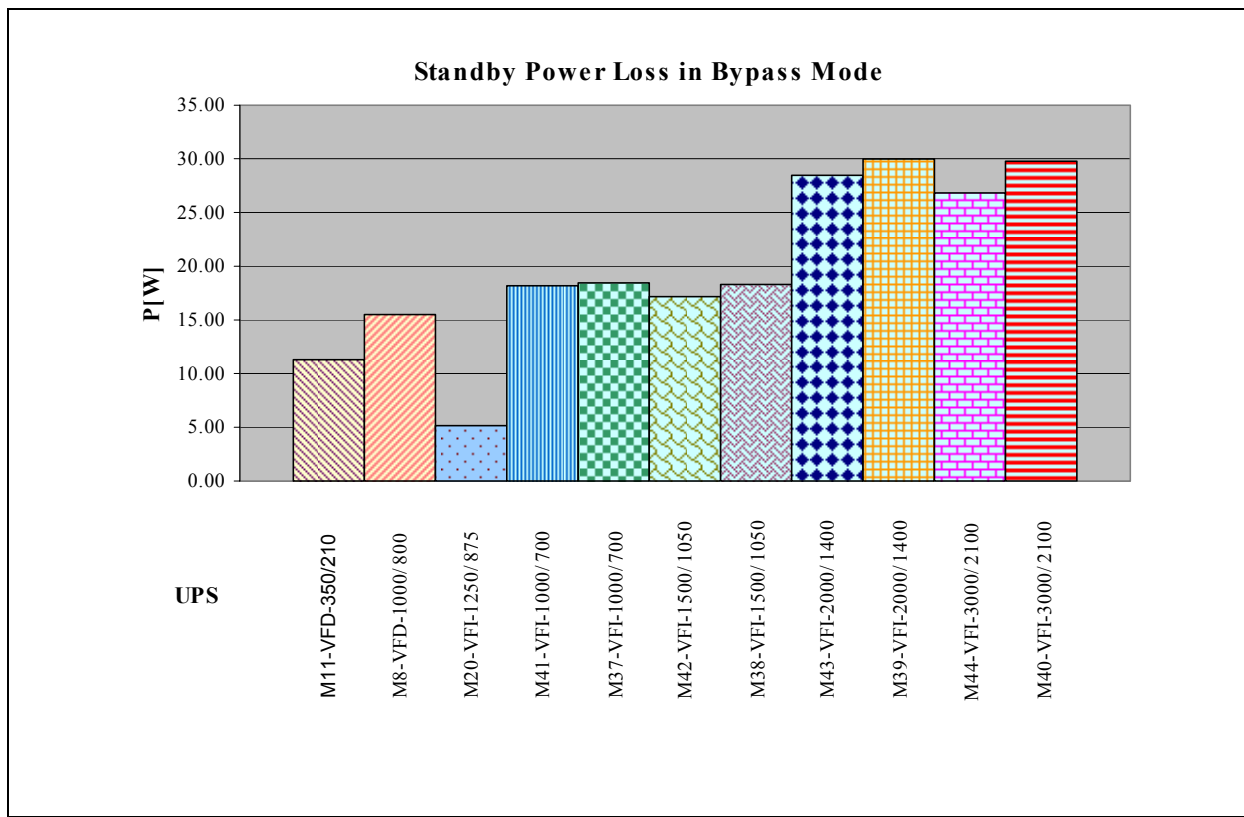


Fig. 16 Standby losses in bypass mode

e) Losses, all UPS devices

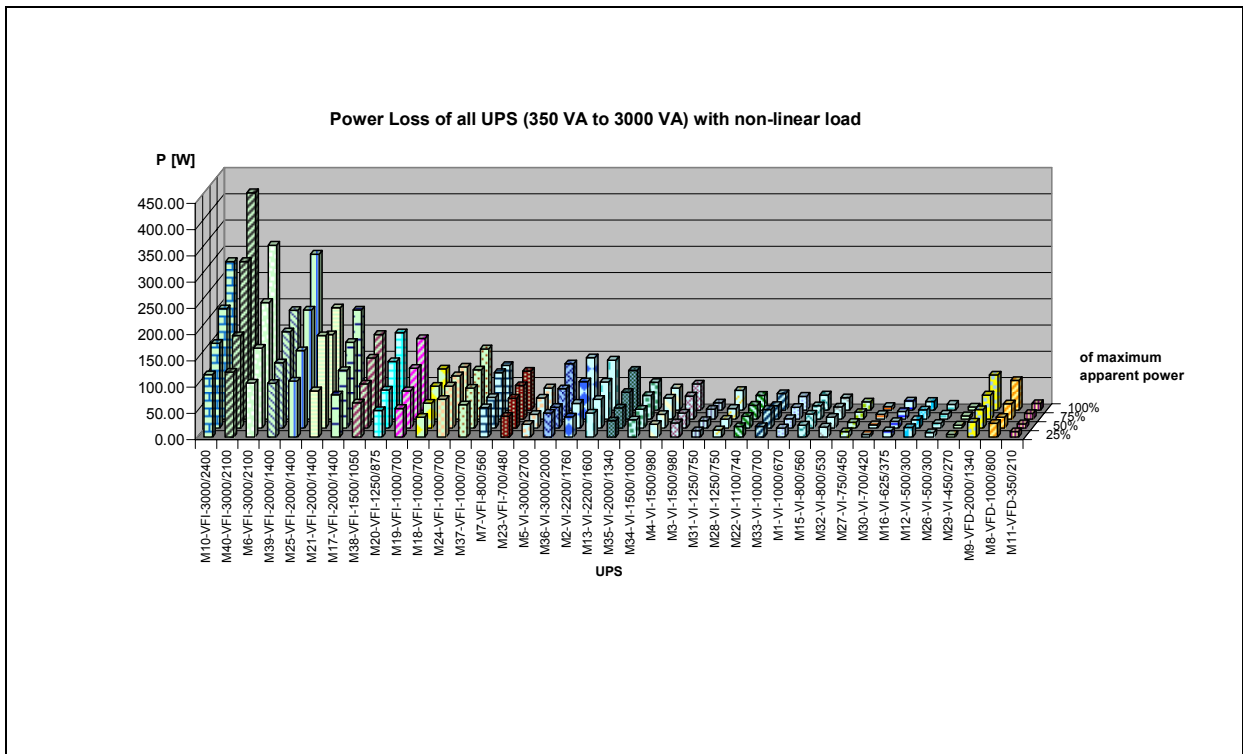


Fig. 17 Power losses, all UPS devices with non-linear load in the 350 VA to 3000 VA range

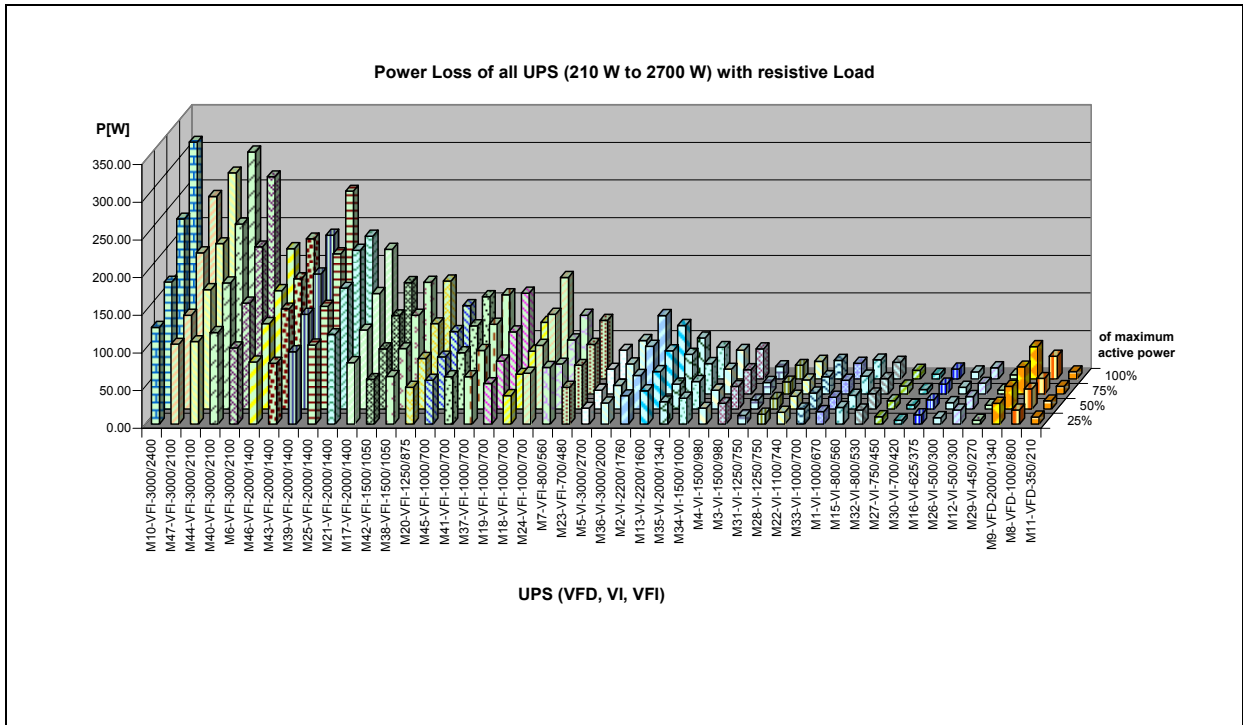


Fig. 18 Power losses, all UPS devices with resistive load in the 210 W to 2700 W range

Power loss = difference between active input and active output power.

This increases with larger systems as well as with higher loads.

8. Discussion of results

8.1 GENERAL FINDINGS

47 UPS devices were measured. One of these had a defect, and although it was also measured the results were not taken into account.

Quality of output voltage and degree of protection against interruptions to the power supply come at a price: efficiency declines with higher quality and greater protection. Thus the efficiency of VFD and VI devices is higher than that of VFI devices, and this is mainly attributable to the higher adjustment, control and monitoring requirements.

Measurements revealed that there is still scope for improvement with some devices.

As expected, losses in VFI devices were greater than in the other two types, resulting in an approximately 10 percent lower level of efficiency.

Since only 3 VFD devices were available for measurement, the corresponding findings are less relevant than those obtained with the other categories (21 VI and 22 VFI devices).

It should be noted that the power levels tend to be lower for VI devices, whereas VFI devices tend to operate in the range above 1 kVA.

8.2 EFFICIENCY

Efficiency can be expected to increase with larger systems, and this proved to be the case with VFI devices, but not with VI devices, for which the efficiency was found to remain at a constantly high level at full load throughout the entire 0.5 kVA to 3 kVA range.

In terms of efficiency, VFD devices indicated a similar behaviour to that of VI devices. In both cases, the degree of efficiency was around 95 percent at full load, and this changed very little with the size of the system.

At partial load it was observed that the variation of readings was greater than at full load. This indicates that, for certain devices, there is still room for improvement with respect to efficiency.

Devices from the same manufacturer tended to display very similar efficiency levels. From this it may be deduced that the switches and/or the strategy deployed for activating the power semiconductors (regulators, rectifiers and converters), together with the used components, have a decisive influence on efficiency and power losses.

From an energy efficiency point of view it is best to choose a VI device, and to only opt for a VFI device if a completely uninterrupted power supply is essential. With VFD devices the interruption time is often too long, and for this reason these models are seldom put into use.

8.3 CODE OF CONDUCT

The existing Code of Conduct¹ is applicable to devices in the range above 10 kVA, and therefore cannot be used as a reference for UPS devices in the range up to 3 kVA. We would nonetheless like to refer to this document here in order to be able to apply it to smaller systems for comparison purposes.

The Code of Conduct¹ specifies efficiency criteria for four load levels (25%, 50%, 75%, 100%) with linear and non-linear load.

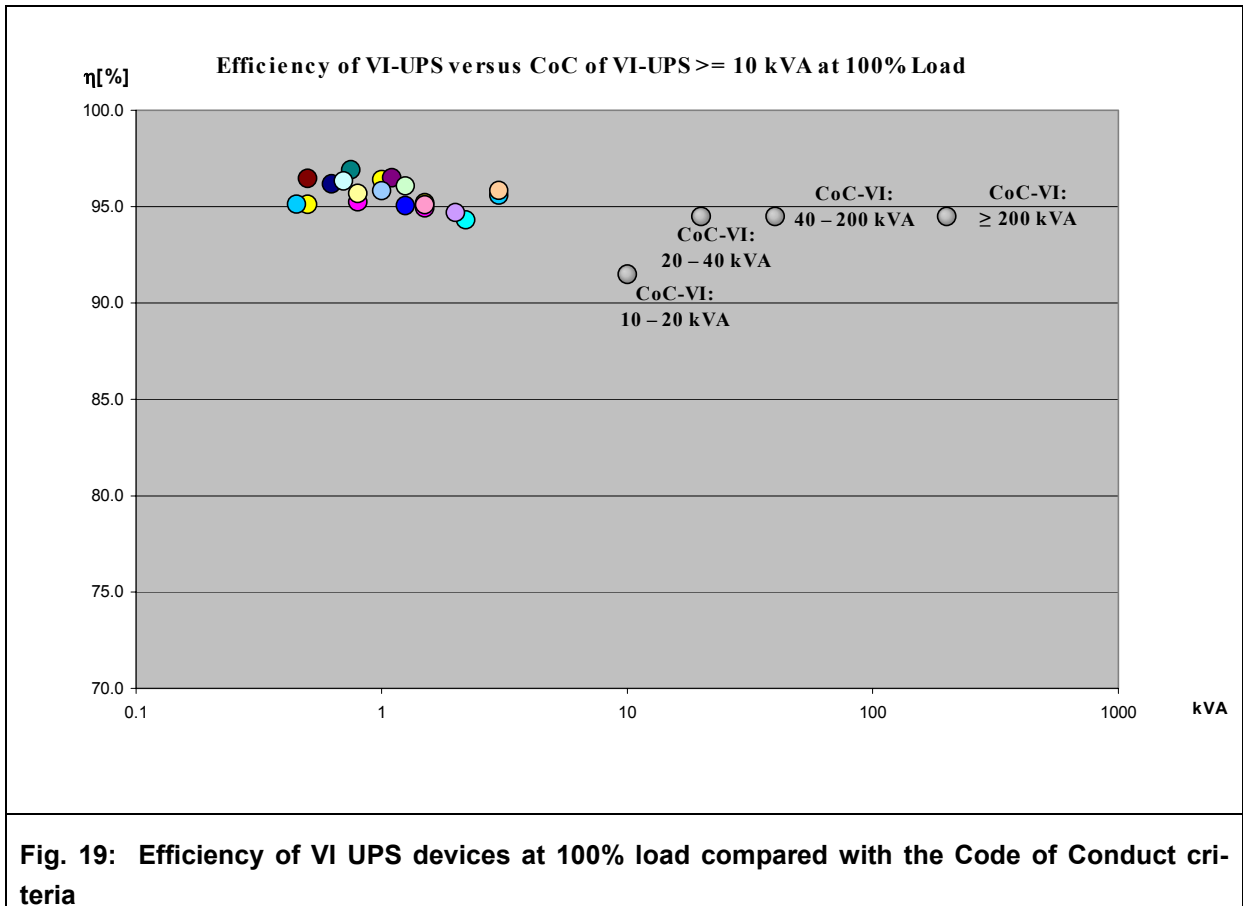
All VI UPS devices meet the criteria of the Code of Conduct at 100% load, and at partial loads only a handful of devices fail to meet the respective criteria. In this category the question therefore arises

¹ Code of Conduct on energy efficiency and quality of AC uninterruptible power supply (UPS) devices. Version 1.0a, Annex B, pp. 7 ff, Ispra, 22 December 2006

whether the Code of Conduct needs to be adjusted (or tightened up) for larger-scale systems, since in line with expectations the level of efficiency should be higher with larger systems.

With respect to VFD devices, it is questionable whether useful conclusions can be drawn from the results, since only three devices were measured.

VFI UPS devices behaved as expected, though some of them met the Code of Conduct criteria for the 10 kVA range.



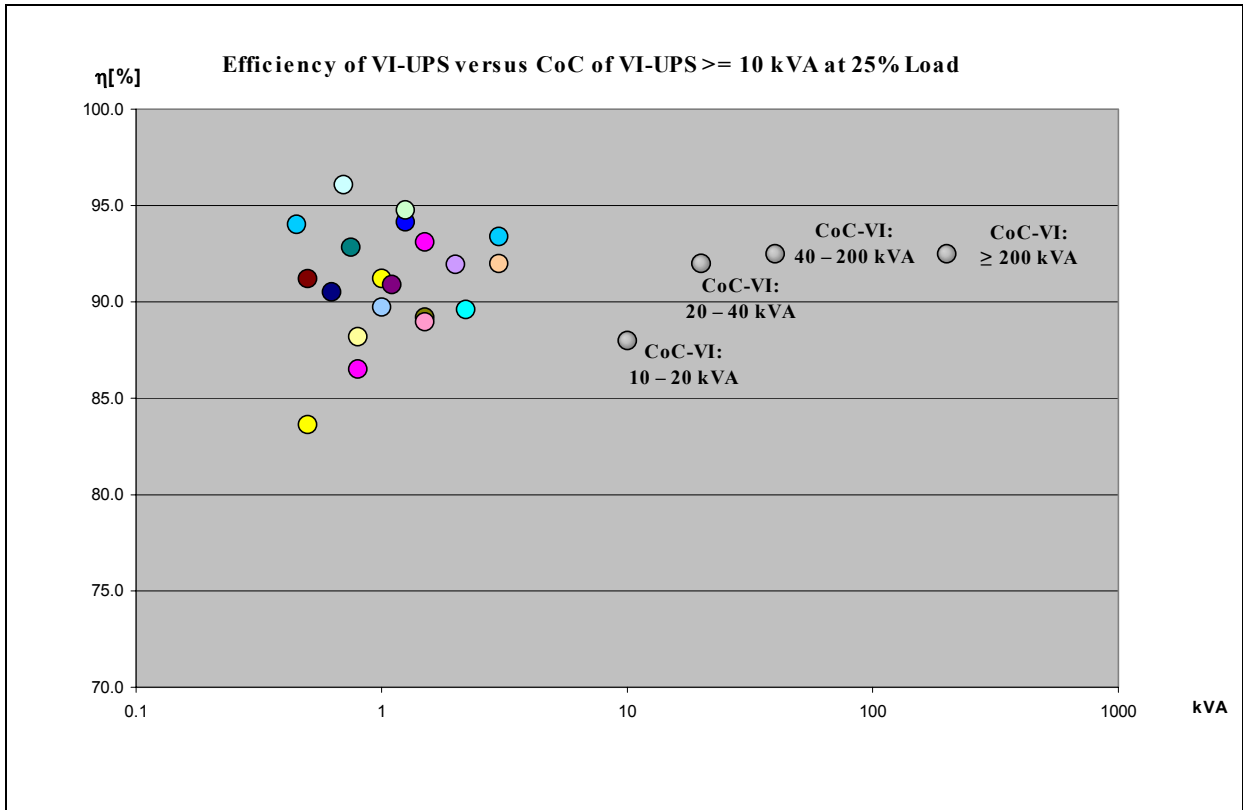


Fig. 20: Efficiency of VI UPS devices at 25% load compared with the Code of Conduct criteria

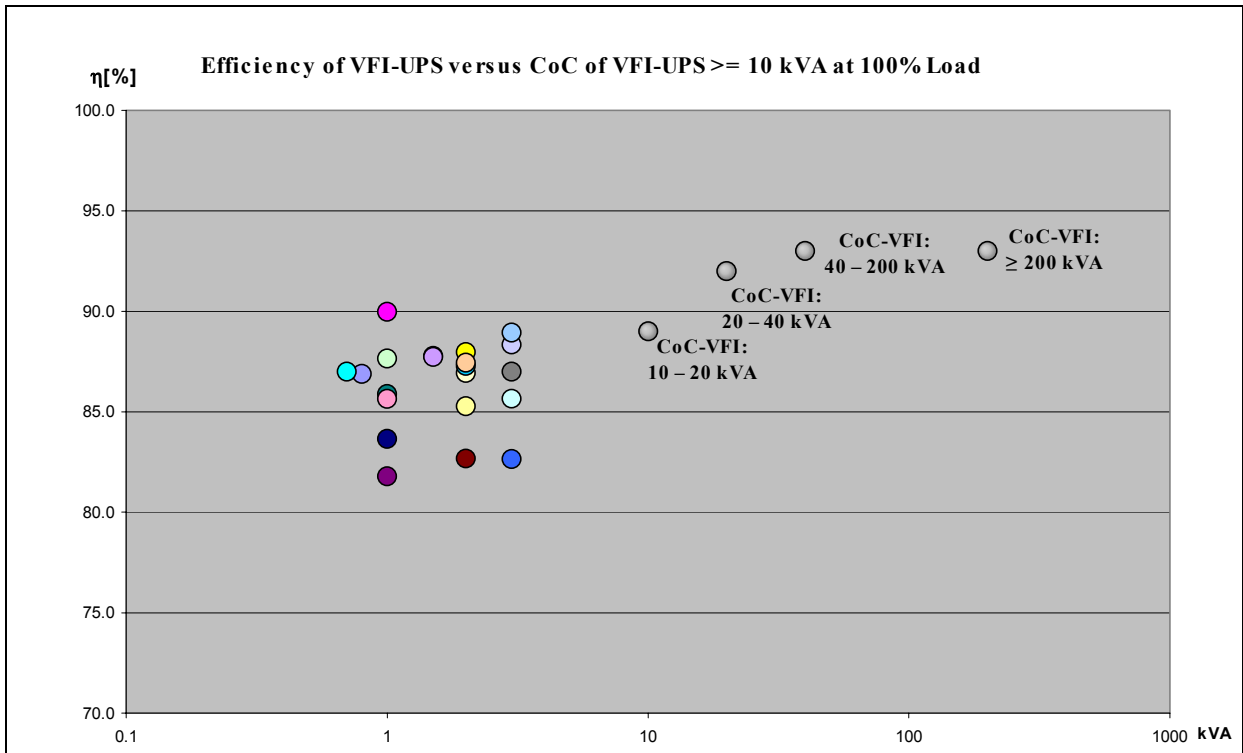


Fig. 21: Efficiency of VFI UPS devices at 100% load compared with the Code of Conduct criteria

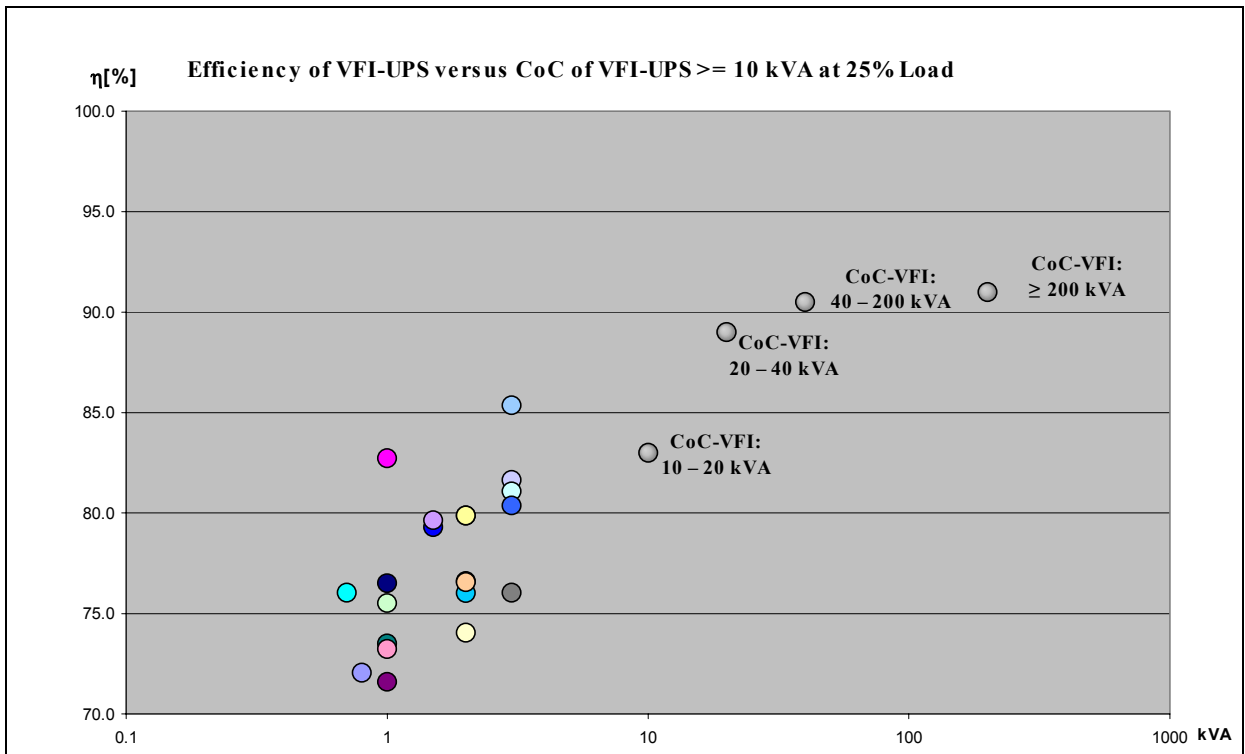


Fig. 22: Efficiency of VFI UPS devices at 25% load compared with the Code of Conduct criteria

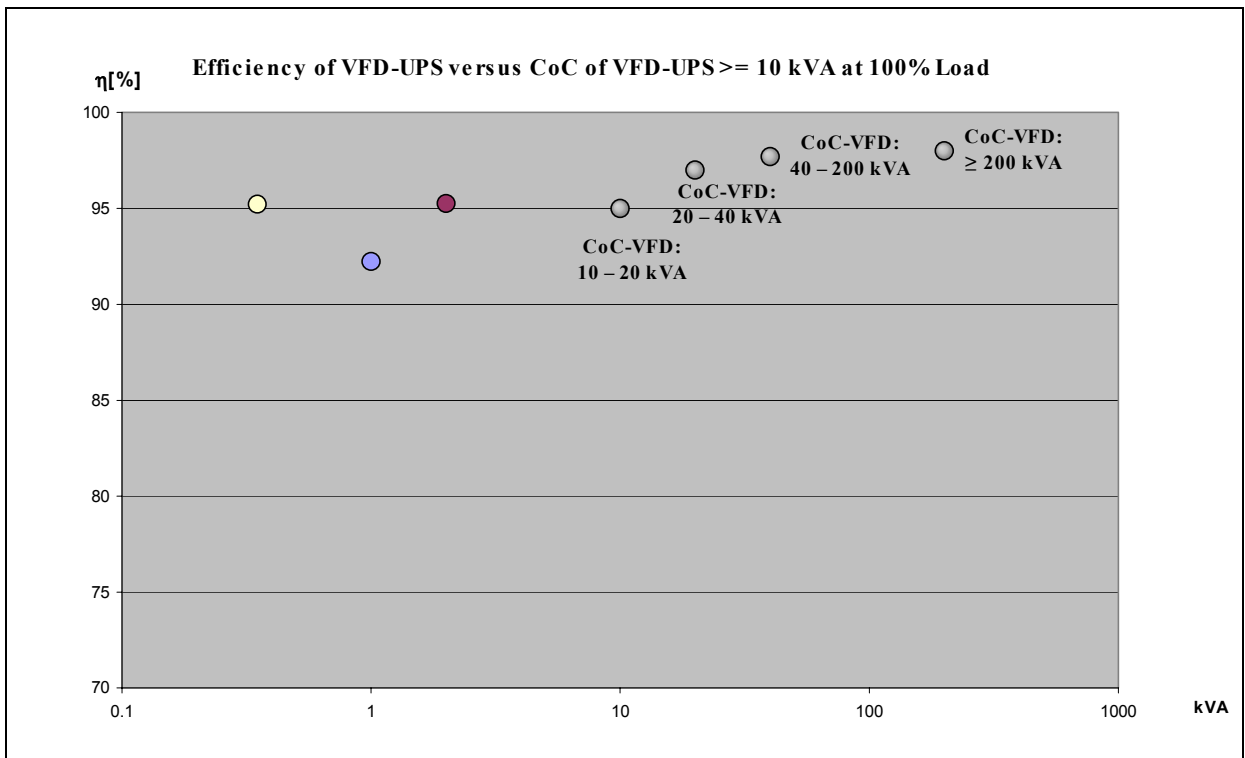


Fig. 23: Efficiency of VFD devices at 100% load compared with the Code of Conduct criteria

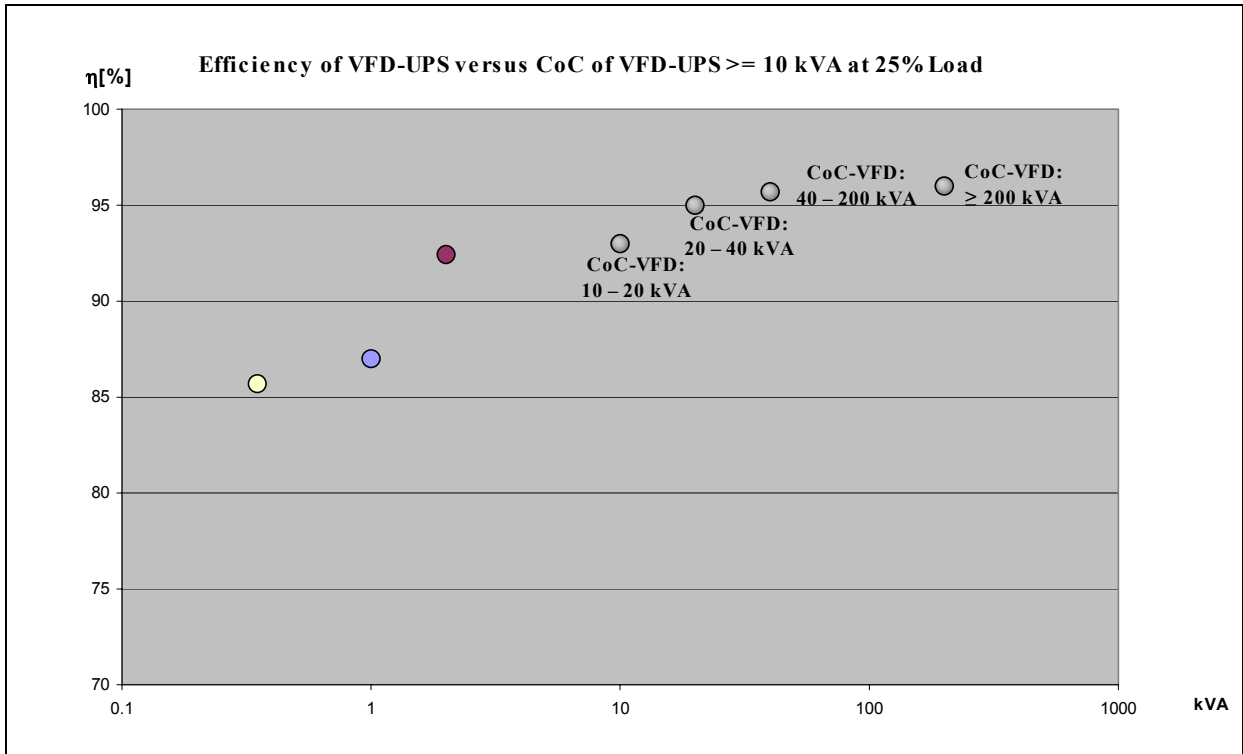


Fig. 24: Efficiency of VFD UPS devices at 25% load compared with the Code of Conduct criteria

9. Appendix

9.1. Links to Internet addresses

http://www.ruoss-kistler.ch/frameload.htm?http://www.ruoss-kistler.ch/Handel/Hilfe/usv_Lexikon.htm

UPS glossary (FAQs) prepared by Rouss-Kistler

<http://www.errepi.de/de/prinzip.htm>

ERREPI unterbrechungsfreie Stromversorgungen GmbH – principles of UPS technology

<http://www.aegpss.de/vorschau/USV/PDF/VDE2002.pdf>

Classification of UPS devices by operating behaviour in accordance with the new standard governing UPS products (IEC 62040-3)

http://www.adpos-ups.de/deutsch/pdf/adpos_produk-news_dez04.pdf

Peter Michael Kohn, independent energy measurement expert

New classification of UPS devices in accordance with IEC 62040-3

http://www.bfe.admin.ch/php/modules/enet/streamfile.php?file=000000008997.pdf&name=000000250069_lang.pdf

Schnyder Ingenieure AG, Bösch 23, 6331 Hünenberg

Formulation of a code of conduct for UPS devices

Final report, November 2005

9.2. REFERENCES

- [1] Siegbert Hopf, USV-Klassen, Funkschau, 2004, Heft 15, Seiten 53 und 54 (*article on categories of UPS devices, published in "Funkschau", no. 15, pages 53 and 54*)
- [2] Swiss standard EN 62040-3, Uninterruptible Power Supply Systems,
Part 3: Methods for specifying efficiency and testing requirements
(German version, EN 62040-3:2001)
- [3] Code of Conduct on energy efficiency and quality of AC uninterruptible power supply devices,
Ispra, 22 December 2006

9.3. ADDITIONAL EVALUATIONS

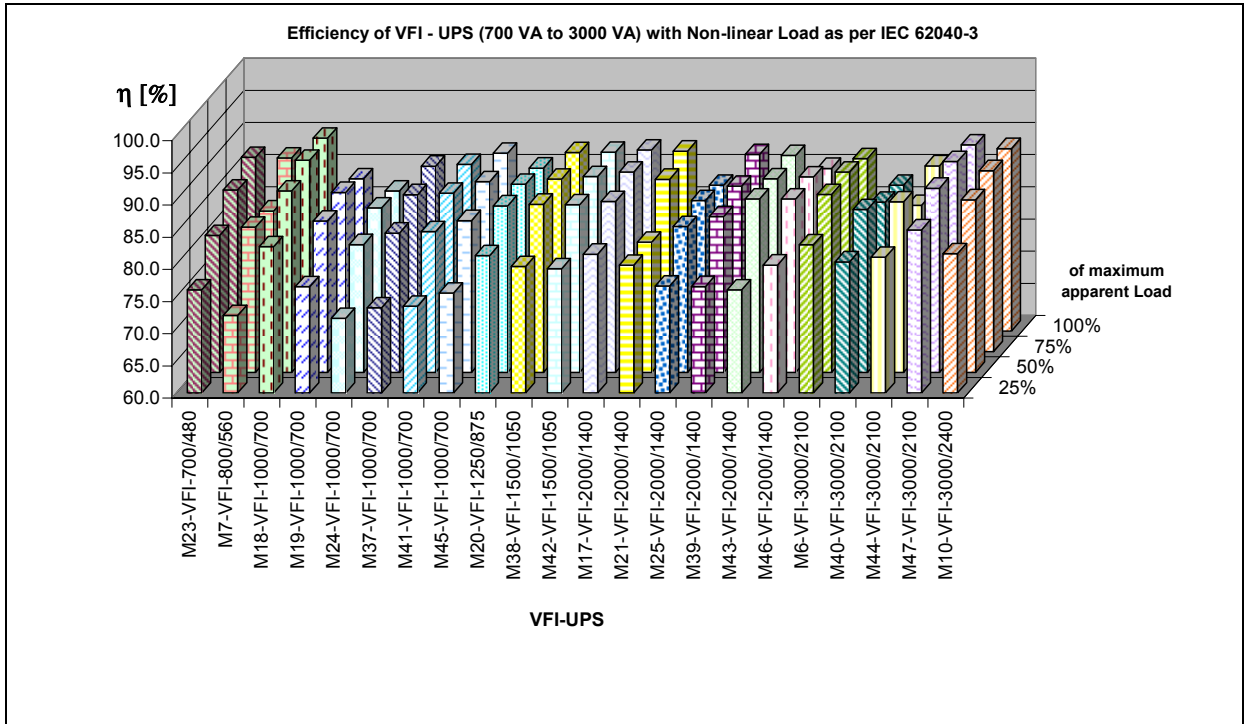


Fig. 25 Overview of efficiency of VFI UPS devices with non-linear load (excluding M14, which was faulty)

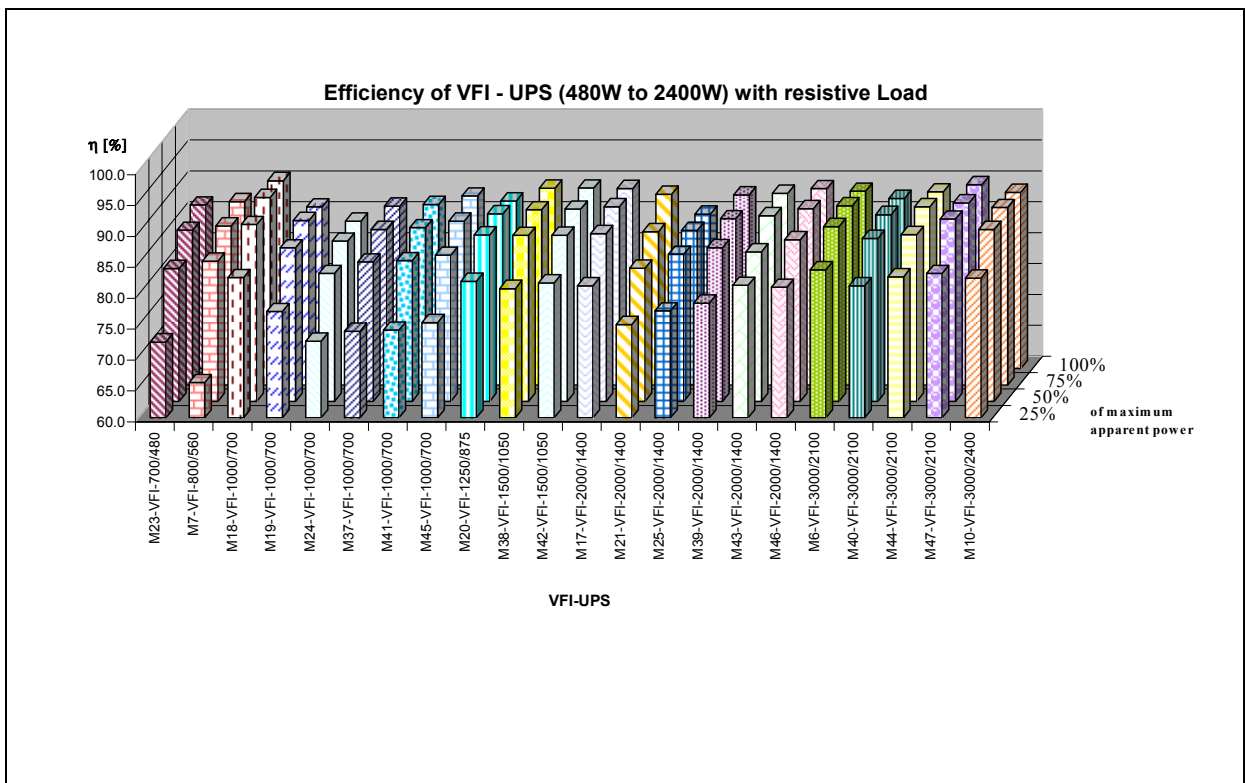


Fig. 26 Overview of efficiency of VFI UPS devices with resistive load

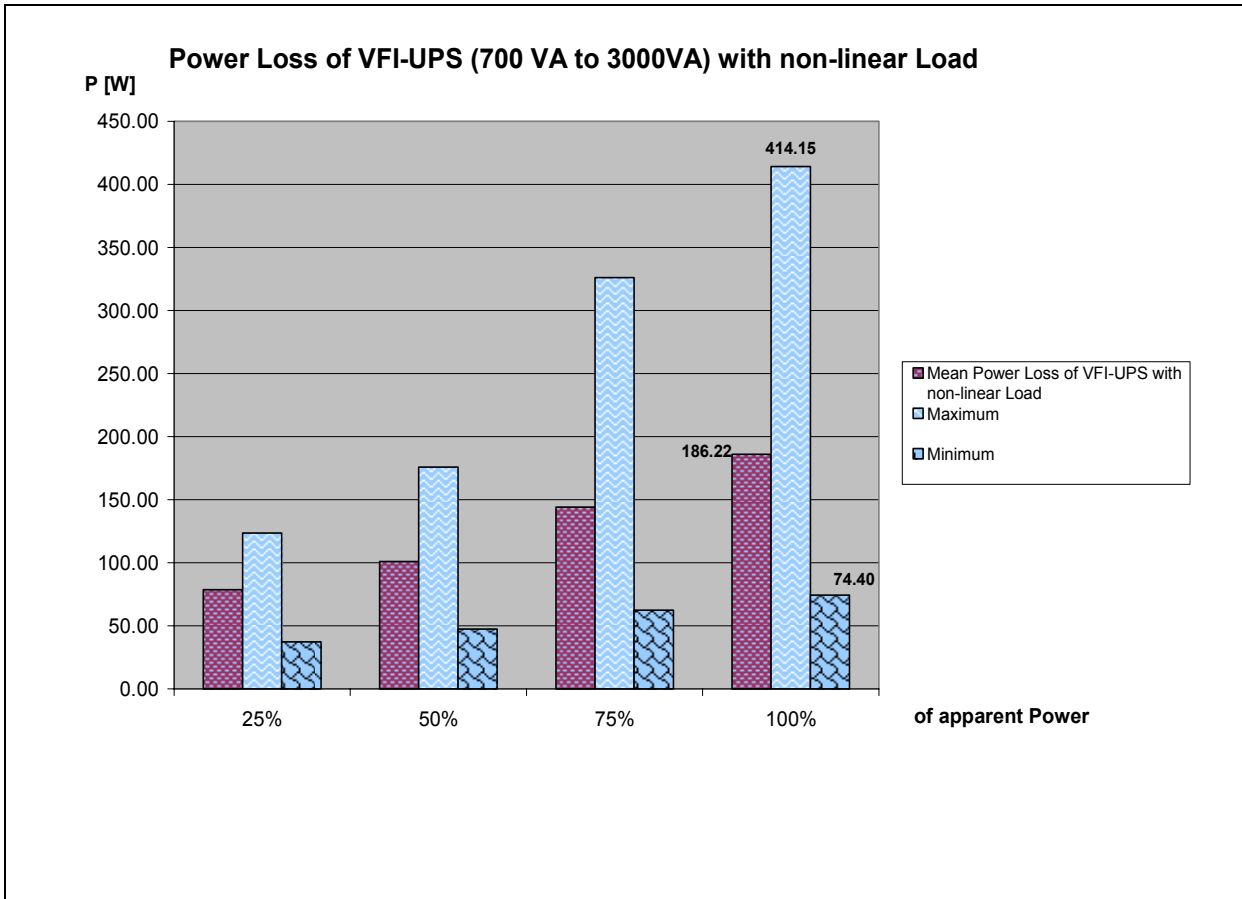


Fig. 27 Evaluation of absolute power loss of VFI devices

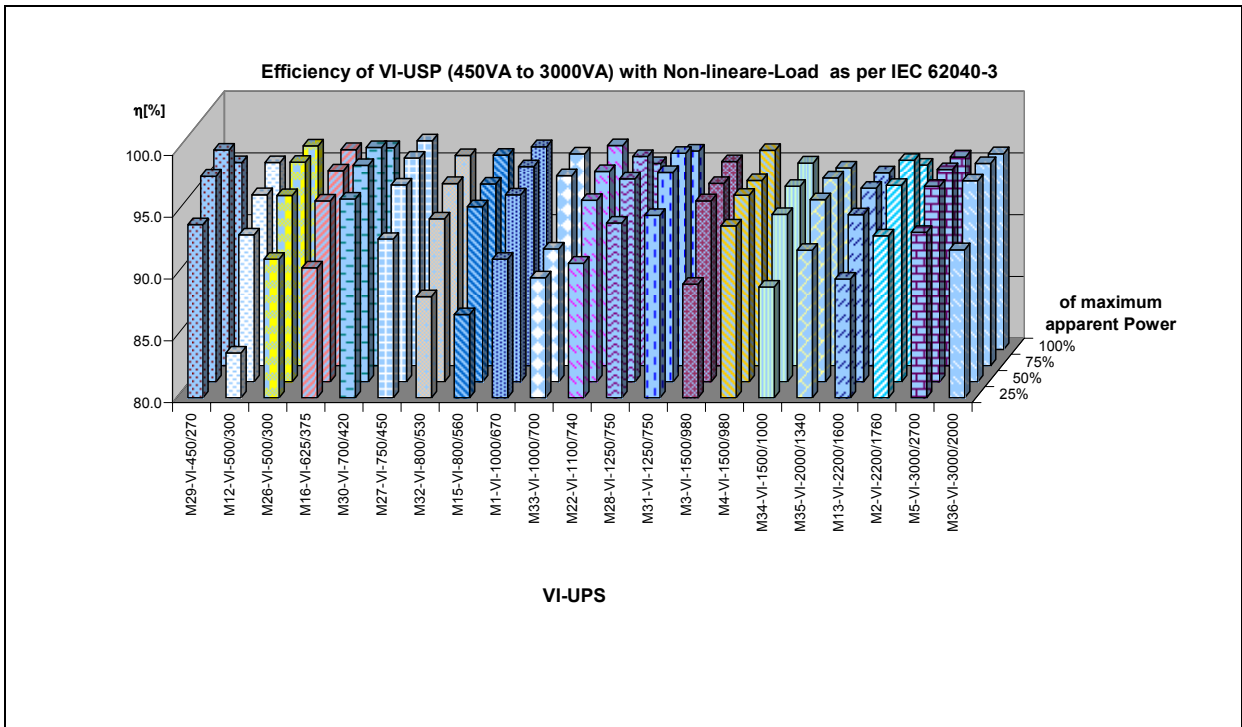


Fig. 28 Overview of efficiency of VI UPS devices with non-linear load

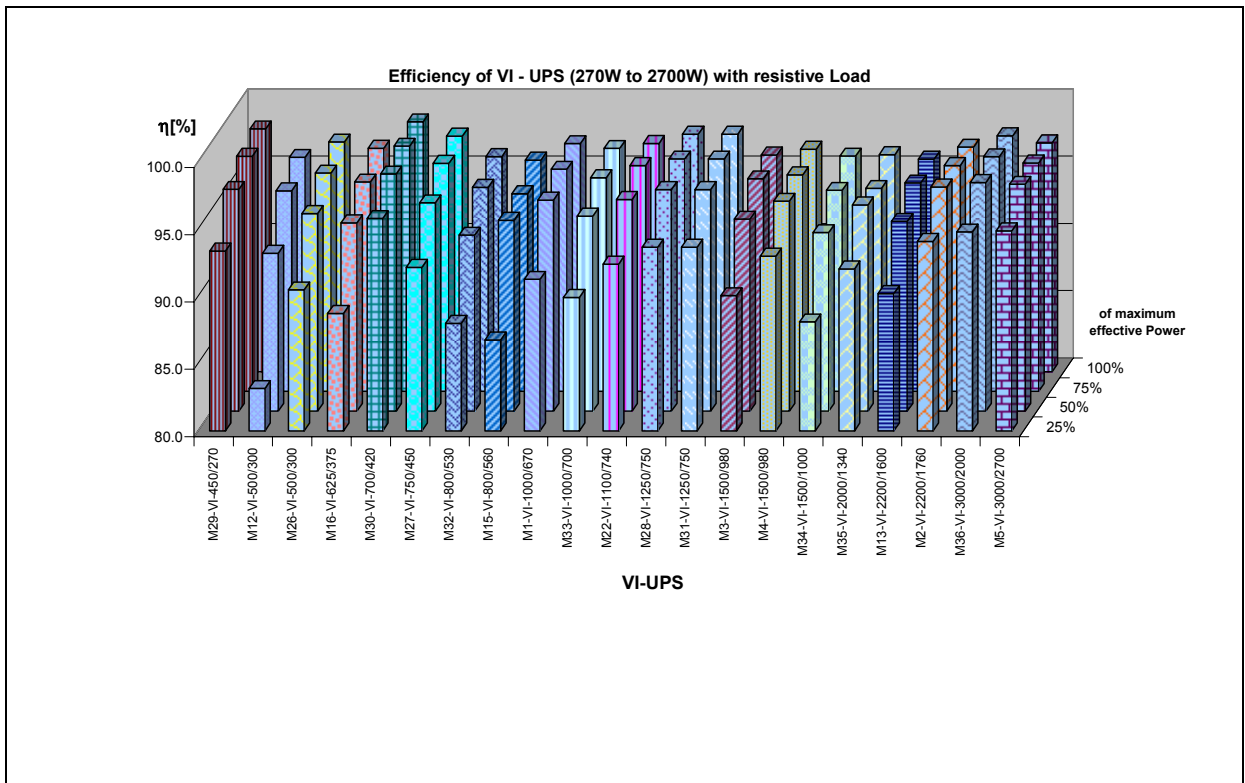


Fig. 29 Overview of efficiency of VI UPS devices with resistive load

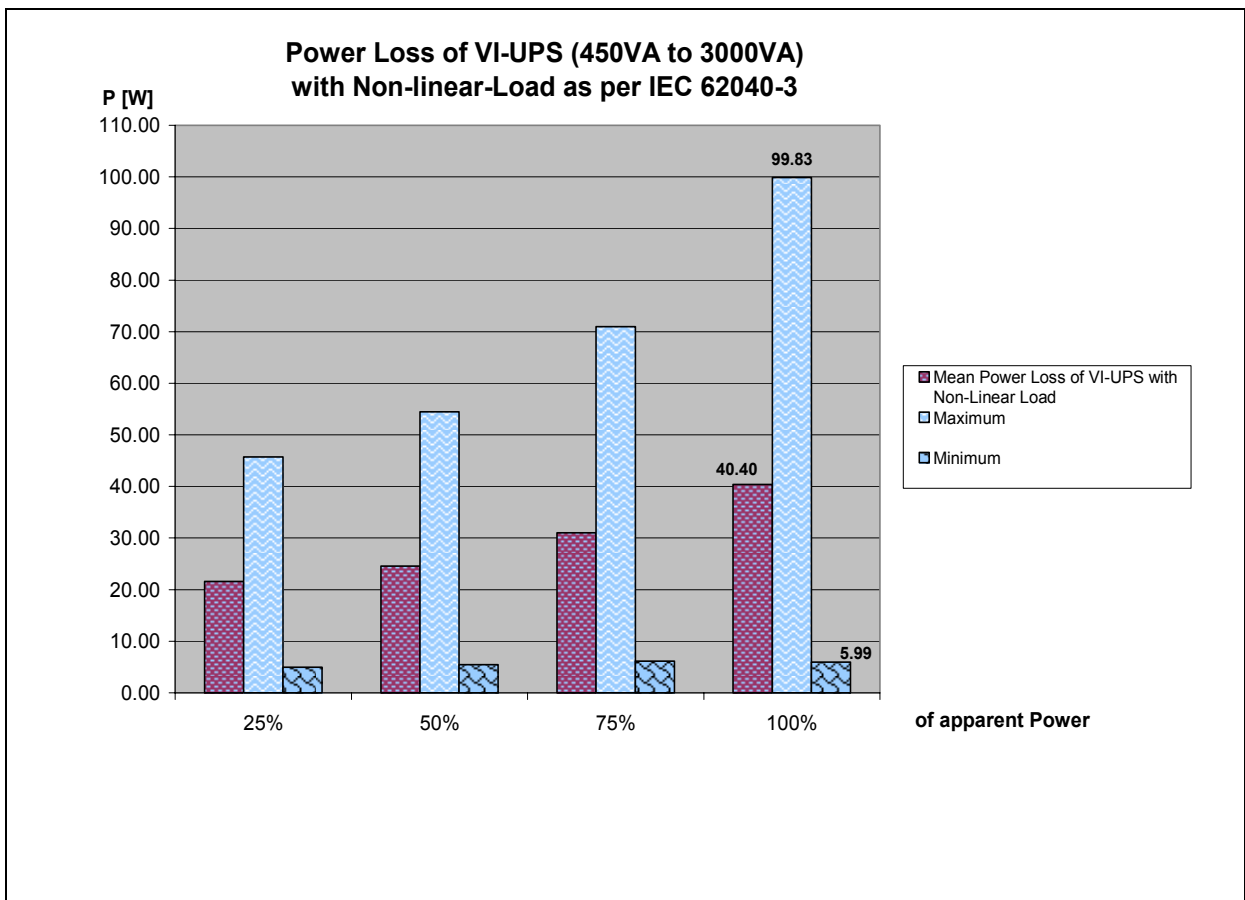


Fig. 30 Evaluation of absolute power loss of VI devices

9.4. TABLE OF MEASUREMENTS 21 VI-UPS

Table 3 Models M1 and M3

| 19.05.2007 | | | | | | | | | | 07.05.2007 | | | | | | | | | | | | | |
|------------------------------|---|----------------|---------------------|----------------------|------------------------|----------------------|---------------------|----------------------|--------------------|------------------------------|-------------|---|----------------|---------------------|----------------------|---------------------|----------------------|---------------------|----------------------|--------------------|--------|-------|-----|
| Hersteller: | | | | | Prüfdatum: | | | | | Hersteller: | | | | | Prüfdatum: | | | | | | | | |
| Typ: | | | | | Temperatur [°C]: | | | | | Typ: | | | | | Temperatur [°C]: | | | | | | | | |
| Spannung: 220-240 V 50/60 Hz | | | | | Imax 4.5A | | | | | Spannung: 220-240 V 50/60 Hz | | | | | 24 | | | | | | | | |
| Leistung: 1000 VA | | | | | 670 W Klasse VI-SS-111 | | | | | Line Interactive | | | | | Rel. Feuchte [rH] | | | | | | | | |
| Modell-Nr: M1-VI-1000/670 | | | | | 33 | | | | | Modell-Nr: M3-VI-1500/980 | | | | | 32 | | | | | | | | |
| Parameters | | Measurements | | | | | | | | | | Parameters | | Measurements | | | | | | | | | |
| Normal mode | Load | 25% | U _{in} [V] | U _{out} [V] | I _{in} [A] | I _{out} [A] | P _{in} [W] | P _{out} [W] | P _V [W] | η [%] | Normal mode | Load | 25% | U _{in} [V] | U _{out} [V] | I _{in} [A] | I _{out} [A] | P _{in} [W] | P _{out} [W] | P _V [W] | η [%] | | |
| | | Resistive load | 50% | P _N | 231.7 | 231.2 | 0.840 | 0.740 | 187.6 | 171.2 | | | 16.42 | 91.2 | Resistive load | 50% | P _N | 226.6 | 225.4 | 1.2122 | 1.0914 | 273.2 | 246 |
| | 75% | P _N | 231.5 | 230.7 | 1.594 | 1.507 | 363.3 | 347.5 | 15.75 | 95.7 | | 75% | P _N | 225.3 | 223.7 | 2.207 | 2.189 | 519.3 | 489.5 | 29.6 | 94.3 | | |
| | 100% | P _N | 231.3 | 230.0 | 2.262 | 2.206 | 525.7 | 507.3 | 18.36 | 95.5 | | 100% | P _N | 225.2 | 223.3 | 3.414 | 3.298 | 768.7 | 736.3 | 32.4 | 95.8 | | |
| | | S _N | 231.1 | 229.4 | 2.973 | 2.898 | 685.5 | 654.5 | 20.95 | 95.9 | | | S _N | 223.6 | 221.2 | 4.569 | 4.438 | 1021.2 | 981.3 | 39.9 | 95.1 | | |
| | | S _N | 231.7 | 231.2 | 1.175 | 1.099 | 194.9 | 177.8 | 17.11 | 91.2 | | | S _N | 223.5 | 222.4 | 1.7842 | 1.7011 | 250.2 | 223.2 | 27 | 89.2 | | |
| | | S _N | 231.4 | 230.6 | 2.206 | 2.146 | 368.0 | 350.0 | 17.95 | 95.1 | | | S _N | 221.3 | 220.7 | 3.508 | 3.433 | 534.4 | 505.8 | 28.6 | 94.6 | | |
| | | S _N | 231.2 | 230.1 | 3.421 | 3.360 | 659.5 | 547.3 | 22.20 | 96.1 | | | S _N | 222.5 | 220.4 | 5.255 | 5.137 | 841.7 | 797.6 | 44.1 | 94.8 | | |
| | | S _N | 231.0 | 229.4 | 4.551 | 4.411 | 730.8 | 704.6 | 26.23 | 96.4 | | | S _N | 221 | 218.5 | 6.29 | 6.16 | 1033.6 | 984 | 49.6 | 95.2 | | |
| | Maximum output current λ= | 0.73 | 231.0 | 229.2 | 4.980 | 4.403 | 774.9 | 740.5 | 34.42 | 95.6 | | Maximum output current λ= | 0.73 | 220.8 | 218.2 | 6.86 | 6.745 | 1135 | 1080.8 | 54.2 | 95.2 | | |
| | Asymmetrical non-linear load as per IEC 62040-3 | | | | | | | | | | | Asymmetrical non-linear load as per IEC 62040-3 | | | | | | | | | | | |
| | Standby | | 221.7 | Unom | 0.472 | | 35.66 | 0 | 68.78 | | | Standby | 222.1 | Unom | 0.18 | 0 | 24.11 | 0 | 24.11 | | | | |

Table 4 Models M2 and M4

| 17.04.2007 | | | | | | | | | | 21.05.2007 | | | | | | | | | | | | | |
|------------------------------|---|----------------|---------------------|----------------------|------------------------|----------------------|---------------------|----------------------|--------------------|------------------------------|-------------|---|----------------|---------------------|----------------------|---------------------|----------------------|---------------------|----------------------|--------------------|-------|-------|-------|
| Hersteller: | | | | | Prüfdatum: | | | | | Hersteller: | | | | | Prüfdatum: | | | | | | | | |
| Typ: | | | | | Temperatur [°C]: | | | | | Typ: | | | | | Temperatur [°C]: | | | | | | | | |
| Spannung: 220-240 V 50/60 Hz | | | | | Imax 16A | | | | | Spannung: 220-240 V 50/60 Hz | | | | | 26.5 | | | | | | | | |
| Leistung: 1500 VA | | | | | 980 W Klasse VI-SS-111 | | | | | Line Interactive | | | | | Rel. Feuchte [rH] | | | | | | | | |
| Modell-Nr: M1-VI-1500/980 | | | | | 33 | | | | | Modell-Nr: M2-VI-2000/1760 | | | | | 33 | | | | | | | | |
| Parameters | | Measurements | | | | | | | | | | Parameters | | Measurements | | | | | | | | | |
| Normal mode | Load | 25% | U _{in} [V] | U _{out} [V] | I _{in} [A] | I _{out} [A] | P _{in} [W] | P _{out} [W] | P _V [W] | η [%] | Normal mode | Load | 25% | U _{in} [V] | U _{out} [V] | I _{in} [A] | I _{out} [A] | P _{in} [W] | P _{out} [W] | P _V [W] | η [%] | | |
| | | Resistive load | 50% | P _N | 233 | 232.1 | 1.3 | 1.2 | 289 | 279 | | | 21 | 93.0 | Resistive load | 50% | P _N | 231.4 | 230.9 | 2.091 | 1.934 | 474.7 | 446.6 |
| | 75% | P _N | 230.1 | 228.6 | 2.46 | 2.37 | 566 | 541 | 25 | 95.6 | | 75% | P _N | 230.9 | 229.9 | 4.010 | 3.875 | 921.4 | 890.5 | 30.83 | 95.7 | | |
| | 100% | P _N | 230 | 227.1 | 4.74 | 4.64 | 1090 | 1052 | 38 | 95.5 | | 100% | P _N | 230.4 | 228.9 | 5.987 | 5.819 | 1376.1 | 1321.6 | 44.50 | 95.8 | | |
| | | S _N | 232.5 | 230.9 | 2.48 | 2.4 | 395 | 371 | 24 | 93.9 | | | S _N | 229.8 | 227.8 | 7.997 | 7.794 | 1835.7 | 1774.7 | 61.00 | 95.7 | | |
| | | S _N | 232.5 | 230.7 | 3.25 | 3.19 | 531 | 505 | 26 | 95.1 | | | S _N | 231.5 | 231.0 | 2.542 | 2.420 | 416.7 | 387.9 | 26.72 | 93.1 | | |
| | | S _N | 230.8 | 228.5 | 4.74 | 4.65 | 797 | 757 | 40 | 95.0 | | | S _N | 231.0 | 230.1 | 4.932 | 4.823 | 817.2 | 783.7 | 33.52 | 95.9 | | |
| | | S _N | 230.4 | 227.4 | 6.32 | 6.15 | 1085 | 1043 | 42 | 96.1 | | | S _N | 230.4 | 229.1 | 7.463 | 7.340 | 1222.4 | 1181.1 | 41.28 | 95.6 | | |
| | Maximum output current λ= | 0.73 | 220.8 | 218.2 | 6.86 | 6.745 | 1135 | 1080.8 | 54.2 | 95.2 | | Maximum output current λ= | 0.71 | 229.4 | 227.2 | 11.986 | 11.808 | 1982.0 | 1914.9 | 67.13 | 96.6 | | |
| | Asymmetrical non-linear load as per IEC 62040-3 | | | | | | | | | | | Asymmetrical non-linear load as per IEC 62040-3 | | | | | | | | | | | |
| | Standby | | 230.6 | Unom | 0.208 | 0 | 19.81 | 0 | 19.81 | | | Standby | 231.6 | Unom | 0.443 | | 27.99 | 0 | 27.99 | | | | |

Table 5 Models 15 und 16

| 03.07.2007 | | | | | | | | | | 04.07.2007 | | | | | | | | | | | | | |
|------------------------------|---|--------------------------------|---------------------|----------------------|------------------------|----------------------|---------------------|----------------------|--------------------|---------------------------|-------------|---|----------------|---------------------|----------------------|---------------------|----------------------|---------------------|----------------------|--------------------|-------|-------|-------|
| Hersteller: | | | | | Prüfdatum: | | | | | Hersteller: | | | | | Prüfdatum: | | | | | | | | |
| Typ: | | | | | Normalmode | | | | | Typ: | | | | | Temperatur [°C]: | | | | | | | | |
| Spannung: 220-240 V 50/60 Hz | | | | | Sinus | | | | | Spannung: 230V | | | | | 24 | | | | | | | | |
| Leistung: 625 VA | | | | | 375 W Klasse VI-SY-311 | | | | | Line Interactive | | | | | Rel. Feuchte [rH] | | | | | | | | |
| Modell-Nr: M16-VI-625/375 | | | | | 39 | | | | | Modell-Nr: M15-VI-800/560 | | | | | 32 | | | | | | | | |
| Parameters | | Measurements | | | | | | | | | | Parameters | | Measurements | | | | | | | | | |
| Normal mode | Load | 25% | U _{in} [V] | U _{out} [V] | I _{in} [A] | I _{out} [A] | P _{in} [W] | P _{out} [W] | P _V [W] | η [%] | Normal mode | Load | 25% | U _{in} [V] | U _{out} [V] | I _{in} [A] | I _{out} [A] | P _{in} [W] | P _{out} [W] | P _V [W] | η [%] | | |
| | | Resistive load | 50% | P _N | 222.8 | 222.4 | 0.492 | 0.437 | 109.5 | 97.1 | | | 12.36 | 88.7 | Resistive load | 50% | P _N | 222.4 | 222.1 | 0.868 | 0.650 | 166.2 | 144.2 |
| | 75% | P _N | 222.7 | 222.0 | 0.916 | 0.863 | 204.0 | 191.7 | 12.30 | 94.0 | | 75% | P _N | 222.2 | 221.8 | 1.454 | 1.288 | 308.6 | 290.6 | 18.00 | 94.2 | | |
| | 100% | P _N | 222.2 | 221.2 | 1.335 | 1.260 | 296.4 | 283.2 | 13.20 | 95.5 | | 100% | P _N | 221.8 | 221.0 | 2.072 | 1.932 | 450.8 | 426.9 | 23.90 | 94.7 | | |
| | | S _N | 221.4 | 220.2 | 1.770 | 1.719 | 391.5 | 378.2 | 13.30 | 96.6 | | | S _N | 221.0 | 220.6 | 2.696 | 2.566 | 591.3 | 566.0 | 25.30 | 95.7 | | |
| | | S _N | 221.8 | 221.6 | 0.765 | 0.726 | 124.6 | 112.7 | 11.81 | 90.5 | | | S _N | 223.4 | 223.2 | 1.093 | 0.922 | 166.7 | 144.2 | 22.48 | 86.5 | | |
| | | S _N | 221.8 | 221.1 | 1.479 | 1.440 | 234.4 | 221.8 | 12.60 | 94.6 | | | S _N | 223.4 | 222.9 | 1.966 | 1.834 | 309.4 | 282.6 | 26.80 | 91.3 | | |
| | | S _N | 220.2 | 220.2 | 2.188 | 2.147 | 345.4 | 330.8 | 14.60 | 96.8 | | | S _N | 223.6 | 222.8 | 2.852 | 2.737 | 459.0 | 432.7 | 25.30 | 94.5 | | |
| | | S _N | 221.5 | 220.2 | 2.918 | 2.876 | 458.4 | 440.9 | 17.50 | 96.2 | | | S _N | 223.8 | 222.4 | 3.757 | 3.652 | 605.4 | 576.6 | 28.80 | 95.2 | | |
| | Maximum output current λ= | 0.71 | 221.3 | 220.2 | 3.338 | 3.301 | 531.6 | 515.8 | 15.80 | 97.0 | | Maximum output current λ= | 0.70 | 221.6 | 220.1 | 4.220 | 4.120 | 688.4 | 638.0 | 30.40 | 95.5 | | |
| | Asymmetrical non-linear load as per IEC 62040-3 | | | | | | | | | | | Asymmetrical non-linear load as per IEC 62040-3 | | | | | | | | | | | |
| | Standby | | 222.4 | Unom | 0.059 | | 11.76 | 0 | 11.76 | | | Standby | 222.5 | Unom | 0.450 | | 20.87 | 0 | 20.87 | | | | |
| Surge Protected Output | 50% | P _N | 222.8 | 222.3 | 0.917 | 0.864 | 204.0 | 192.0 | 12.01 | 94.1 | | | | | | | | | | | | | |
| | 100% | P _N | 221.6 | 220.8 | 1.775 | 1.722 | 393.3 | 380.2 | 13.10 | 96.7 | | | | | | | | | | | | | |
| | 50% | S _N | 221.8 | 221.4 | 1.489 | 1.449 | 235.4 | 222.8 | 12.60 | 94.6 | | | | | | | | | | | | | |
| | 100% | S _N | 221.4 | 220.6 | 2.950 | 2.906 | 480.5 | 444.4 | 16.10 | 96.5 | | | | | | | | | | | | | |
| | Maximum output current λ= | 0.73 | 220.4 | 219.0 | 4.692 | 4.622 | 760.0 | 739.6 | 20.40 | 97.3 | | | | | | | | | | | | | |
| | Asymmetrical non-linear load as per IEC 62040-3 | Keine Begrenzung bei 130% Last | | | | | | | | | | | | | | | | | | | | | |
| | Standby | | 222.7 | Unom | 0.057 | | 11.30 | | 11.30 | | | | | | | | | | | | | | |

Table 9 Models 29 and 30

| Hersteller: | | Profidatum: | | | | | | | | | | 23.08.2007 | | Hersteller: | | Profidatum: | | | | | | | | | | 22.08.2007 | | | | | |
|-------------|---|--|----------------|----------------|---------------------|----------------------|--------------------|----------------------|---------------------|----------------------|--------------------|--------------------|---------------------|----------------------|--------------------|------------------------|---------------------|--|--------------------|-------|-------|-------|-------|-------|-------|------------|-----|--------------------|--|------|--|
| Typ: | | | | | | | | | | | | Temperatur [°C] | | 26 | | Typ: | | | | | | | | | | | | Temperatur [°C] | | 23.4 | |
| Spannung: | | 230/220-240 V 50/60 Hz | | | | | | | | | | | | Spannung: | | 230/220-240 V 50/60 Hz | | | | | | | | | | | | | | | |
| Leistung: | | 450VA 270 W Klasse VI Line Interactive | | | | | | | | | | Rel. Feuchte [%RH] | | 32 | | Leistung: | | 700VA 270 W Klasse VI Line Interactive | | | | | | | | | | Rel. Feuchte [%RH] | | 35 | |
| Modell-Nr: | | M29-VI-150/270 | | | | | | | | | | | | Modell-Nr: | | M30-VI-700/420 | | | | | | | | | | | | | | | |
| Parameters | | | | Measurements | | | | | | | | | | Parameters | | | | Measurements | | | | | | | | | | | | | |
| Normal mode | Resistive load | Load | 25% | P _N | U _{in} [V] | U _{out} [V] | I _n [A] | I _{out} [A] | P _{in} [W] | P _{out} [W] | P _v [W] | η [%] | U _{in} [V] | U _{out} [V] | I _n [A] | I _{out} [A] | P _{in} [W] | P _{out} [W] | P _v [W] | η [%] | | | | | | | | | | | |
| | | | | | 231.7 | 231.5 | 0.336 | 0.298 | 73.8 | 68.9 | 4.9 | 93.4 | | | | | | | | | 231.6 | 231.4 | 0.490 | 0.459 | 111.0 | 106.3 | 4.7 | 95.8 | | | |
| | | Non-linear-Load as per IEC 62040-3 | S _N | 25% | 231.6 | 231.4 | 0.515 | 0.491 | 83.3 | 78.4 | 5.0 | 94.0 | 231.5 | 231.2 | 0.785 | 0.768 | 127.3 | 122.4 | 5.0 | 96.1 | | | | | | | | | | | |
| | | | | 50% | 231.4 | 231.0 | 0.995 | 0.975 | 162.0 | 156.6 | 5.5 | 96.6 | 231.4 | 230.9 | 1.522 | 1.505 | 248.2 | 242.1 | 6.1 | 97.5 | | | | | | | | | | | |
| | | | | 75% | 231.4 | 230.9 | 1.470 | 1.451 | 241.7 | 235.5 | 6.2 | 97.5 | 231.2 | 230.5 | 2.311 | 2.290 | 383.0 | 374.1 | 8.9 | 97.7 | | | | | | | | | | | |
| | 100% | 231.9 | 230.8 | 0.756 | 0.732 | 123.1 | 117.1 | 6.0 | 95.1 | 231.8 | 230.6 | 1.156 | 1.135 | 188.5 | 181.6 | 6.9 | 96.3 | | | | | | | | | | | | | | |
| | Maximum output current | λ = | 0.69 | 231.3 | 230.6 | 2.339 | 2.333 | 326.1 | 320.0 | 6.1 | 97.5 | 0.70 | 231.1 | 230.0 | 3.340 | 3.328 | 543.7 | 533.6 | 10.1 | 98.2 | | | | | | | | | | | |
| | Asymmetrical non-linear load as per IEC 62040-3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Standby | | | 231.8 | Unom | 0.110 | 0.000 | 4.9 | 0.0 | 4.9 | | | 231.7 | Unom | 0.107 | 0.000 | 4.7 | 0.0 | 4.7 | | | | | | | | | | | | |

Table 10 Models 31 and 28

| Hersteller: | | Profidatum: | | | | | | | | | | 23.08.2007 | | Hersteller: | | Profidatum: | | | | | | | | | | 23.08.2007 | | | | | |
|-------------|---|---|----------------|----------------|---------------------|----------------------|--------------------|----------------------|---------------------|----------------------|--------------------|--------------------|---------------------|----------------------|--------------------|------------------------|---------------------|---|--------------------|-------|-------|-------|-------|-------|-------|------------|------|--------------------|--|------|--|
| Typ: | | | | | | | | | | | | Temperatur [°C] | | 27.7 | | Typ: | | | | | | | | | | | | Temperatur [°C] | | 23.1 | |
| Spannung: | | 230/220-240 V 50/60 Hz | | | | | | | | | | | | Spannung: | | 230/220-240 V 50/60 Hz | | | | | | | | | | | | | | | |
| Leistung: | | 1250VA 750 W Klasse VI Line Interactive | | | | | | | | | | Rel. Feuchte [%RH] | | 30 | | Leistung: | | 1250VA 750 W Klasse VI Line Interactive | | | | | | | | | | Rel. Feuchte [%RH] | | 40 | |
| Modell-Nr: | | M31-VI-1250/750 | | | | | | | | | | | | Modell-Nr: | | M28-VI-1250/750 | | | | | | | | | | | | | | | |
| Parameters | | | | Measurements | | | | | | | | | | Parameters | | | | Measurements | | | | | | | | | | | | | |
| Normal mode | Resistive load | Load | 25% | P _N | U _{in} [V] | U _{out} [V] | I _n [A] | I _{out} [A] | P _{in} [W] | P _{out} [W] | P _v [W] | η [%] | U _{in} [V] | U _{out} [V] | I _n [A] | I _{out} [A] | P _{in} [W] | P _{out} [W] | P _v [W] | η [%] | | | | | | | | | | | |
| | | | | | 231.7 | 231.3 | 0.869 | 0.817 | 200.1 | 189.0 | 11.1 | 94.4 | | | | | | | | | 231.7 | 231.2 | 0.879 | 0.821 | 202.5 | 189.6 | 12.9 | 93.6 | | | |
| | | Non-linear-Load as per IEC 62040-3 | S _N | 25% | 231.6 | 231.2 | 1.378 | 1.349 | 229.3 | 217.3 | 12.0 | 94.8 | 231.6 | 231.2 | 1.402 | 1.348 | 230.9 | 217.4 | 13.5 | 94.2 | | | | | | | | | | | |
| | | | | 50% | 231.3 | 230.4 | 2.774 | 2.748 | 463.4 | 449.3 | 14.1 | 97.0 | 231.4 | 230.5 | 2.784 | 2.730 | 462.4 | 445.9 | 16.6 | 96.4 | | | | | | | | | | | |
| | | | | 75% | 231.1 | 229.8 | 3.976 | 3.948 | 662.1 | 643.5 | 18.7 | 97.2 | 231.1 | 229.7 | 3.998 | 3.946 | 663.5 | 643.2 | 20.4 | 96.9 | | | | | | | | | | | |
| | 100% | 231.6 | 230.6 | 2.075 | 2.050 | 346.7 | 333.1 | 13.6 | 96.1 | 231.0 | 229.4 | 5.164 | 5.056 | 761.5 | 723.9 | 37.6 | 95.1 | | | | | | | | | | | | | | |
| | Maximum output current | λ = | 0.67 | 230.8 | 228.8 | 6.165 | 6.144 | 966.7 | 937.4 | 29.3 | 97.0 | 0.62 | 230.9 | 229.3 | 5.519 | 5.469 | 799.3 | 771.3 | 28.1 | 96.5 | | | | | | | | | | | |
| | Asymmetrical non-linear load as per IEC 62040-3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Standby | | | 231.9 | Unom | 0.105 | 0.000 | 10.8 | 0.0 | 10.8 | | | 231.9 | Unom | 0.049 | 0.000 | 6.317 | 0.000 | 6.3 | | | | | | | | | | | | |

Table 11 Models 32 and 33

| Hersteller: | | Profidatum: | | | | | | | | | | 23.08.2007 | | Hersteller: | | Profidatum: | | | | | | | | | | 24.08.2007 | | | | | |
|-------------|---|--|----------------|----------------|---------------------|----------------------|--------------------|----------------------|---------------------|----------------------|--------------------|--------------------|---------------------|----------------------|--------------------|------------------------|---------------------|---|--------------------|-------|-------|-------|-------|-------|-------|------------|------|--------------------|--|------|--|
| Typ: | | | | | | | | | | | | Temperatur [°C] | | 27.5 | | Typ: | | | | | | | | | | | | Temperatur [°C] | | 23.3 | |
| Spannung: | | 230/220-240 V 50/60 Hz | | | | | | | | | | | | Spannung: | | 230/220-240 V 50/60 Hz | | | | | | | | | | | | | | | |
| Leistung: | | 800VA 530 W Klasse VI Line Interactive | | | | | | | | | | Rel. Feuchte [%RH] | | 31 | | Leistung: | | 1000VA 700 W Klasse VI Line Interactive | | | | | | | | | | Rel. Feuchte [%RH] | | 31 | |
| Modell-Nr: | | M32-VI-800/530 | | | | | | | | | | | | Modell-Nr: | | M33-VI-1000/700 | | | | | | | | | | | | | | | |
| Parameters | | | | Measurements | | | | | | | | | | Parameters | | | | Measurements | | | | | | | | | | | | | |
| Normal mode | Resistive load | Load | 25% | P _N | U _{in} [V] | U _{out} [V] | I _n [A] | I _{out} [A] | P _{in} [W] | P _{out} [W] | P _v [W] | η [%] | U _{in} [V] | U _{out} [V] | I _n [A] | I _{out} [A] | P _{in} [W] | P _{out} [W] | P _v [W] | η [%] | | | | | | | | | | | |
| | | | | | 231.8 | 231.4 | 0.663 | 0.582 | 152.8 | 134.6 | 18.4 | 88.0 | | | | | | | | | 231.7 | 231.3 | 0.857 | 0.768 | 197.4 | 177.5 | 19.9 | 89.9 | | | |
| | | Non-linear-Load as per IEC 62040-3 | S _N | 25% | 231.5 | 231.0 | 1.241 | 1.156 | 286.6 | 266.9 | 19.9 | 93.1 | 231.6 | 230.6 | 1.655 | 1.567 | 382.5 | 361.4 | 21.1 | 94.5 | | | | | | | | | | | |
| | | | | 50% | 231.5 | 230.4 | 1.822 | 1.741 | 421.3 | 400.9 | 20.4 | 95.2 | 231.4 | 230.0 | 2.390 | 2.303 | 562.5 | 529.7 | 22.8 | 95.9 | | | | | | | | | | | |
| | | | | 75% | 231.4 | 229.9 | 2.407 | 2.323 | 566.2 | 533.8 | 22.4 | 96.0 | 231.0 | 229.2 | 3.164 | 3.077 | 730.5 | 705.6 | 24.9 | 96.6 | | | | | | | | | | | |
| | 100% | 231.8 | 231.4 | 0.922 | 0.874 | 160.9 | 141.9 | 19.0 | 88.2 | 231.7 | 231.2 | 1.130 | 1.083 | 195.9 | 175.7 | 20.1 | 89.7 | | | | | | | | | | | | | | |
| | Maximum output current | λ = | 0.70 | 231.2 | 229.8 | 3.979 | 3.935 | 660.2 | 633.2 | 27.0 | 95.9 | 0.69 | 231.0 | 229.2 | 5.017 | 4.973 | 818.7 | 786.0 | 32.7 | 96.0 | | | | | | | | | | | |
| | Asymmetrical non-linear load as per IEC 62040-3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Standby | | | 232.0 | Unom | 0.102 | 0.000 | 18.3 | 0.0 | 18.3 | | | 231.9 | Unom | 0.112 | 0.000 | 19.5 | 0.0 | 19.5 | | | | | | | | | | | | |

Table 12 Models 34 and 35

| Hersteller: | | Prüfdatum: | | | | | | | | | | 28.08.2007 | | Hersteller: | | Prüfdatum: | | | | | | | | | | 30.08.2007 | | | | | | | | | |
|---|------------------------------------|-------------------------|----------------|---------------------|----------------------|---------------------|----------------------|---------------------|----------------------|--------------------|------|---|------------------------------------|---------------------|-------|------------------------|----------------------|---------------------|----------------------|-------------------------|----------------------|--------------------|------|------|--|------------|--|--|--|------------------|--|---------------------|--|----|--|
| Typ: | | Temperatur [°C]: | | | | | | | | | | 25.7 | | Typ: | | Temperatur [°C]: | | | | | | | | | | 25.6 | | | | | | | | | |
| Spannung: | | 230/220-240 V 50/60 Hz | | | | | | | | | | | | Spannung: | | 230/220-240 V 50/60 Hz | | | | | | | | | | | | | | | | | | | |
| Leistung: | | 1500VA 1000 W Klasse VI | | | | | | | | | | Line Interactive | | Rel. Feuchte [%rH]: | | 50 | | Leistung: | | 2000VA 1340 W Klasse VI | | | | | | | | | | Line Interactive | | Rel. Feuchte [%rH]: | | 42 | |
| Modell-Nr.: | | M34-VI-1500-1000 | | | | | | | | | | | | Modell-Nr.: | | M35-VI-2000-1340 | | | | | | | | | | | | | | | | | | | |
| Parameters | | | | Measurements | | | | | | | | Parameters | | | | Measurements | | | | | | | | | | | | | | | | | | | |
| Normal mode | Resistive load | Load | | U _{in} [V] | U _{out} [V] | I _{in} [A] | I _{out} [A] | P _{in} [W] | P _{out} [W] | P _v [W] | η[%] | Normal mode | Resistive load | Load | | U _{in} [V] | U _{out} [V] | I _{in} [A] | I _{out} [A] | P _{in} [W] | P _{out} [W] | P _v [W] | η[%] | | | | | | | | | | | | |
| | | 25% | P _N | 231.5 | 230.9 | 1.276 | 1.096 | 287.1 | 252.9 | 34.2 | 88.1 | | | 231.5 | 230.7 | 1.597 | 1.464 | 366.9 | 337.6 | 29.3 | 92.0 | | | | | | | | | | | | | | |
| | | 50% | P _N | 231.2 | 230.2 | 2.368 | 2.192 | 540.8 | 504.3 | 36.5 | 93.3 | | | 231.2 | 229.6 | 3.066 | 2.939 | 707.6 | 674.4 | 33.2 | 95.3 | | | | | | | | | | | | | | |
| | | 75% | P _N | 230.9 | 229.3 | 3.458 | 3.294 | 795.4 | 755.1 | 40.4 | 94.9 | | | 230.6 | 228.3 | 4.634 | 4.446 | 1066.9 | 1014.3 | 52.6 | 95.1 | | | | | | | | | | | | | | |
| | | 100% | P _N | 230.6 | 228.5 | 4.563 | 4.414 | 1049.6 | 1007.8 | 41.8 | 96.0 | | | 230.3 | 227.1 | 6.110 | 5.953 | 1405.9 | 1351.4 | 54.5 | 96.1 | | | | | | | | | | | | | | |
| | Non-linear-Load as per IEC 62040-3 | Load | | S _N | 231.5 | 231.0 | 1.695 | 1.617 | 296.4 | 263.7 | 32.7 | 89.0 | Non-linear-Load as per IEC 62040-3 | Load | | S _N | 231.4 | 230.7 | 2.233 | 2.173 | 381.9 | 351.2 | 30.8 | 91.9 | | | | | | | | | | | |
| | | 50% | S _N | 231.2 | 230.1 | 3.248 | 3.185 | 553.3 | 517.5 | 35.8 | 93.5 | 231.2 | | 229.6 | 4.258 | 4.200 | 720.4 | 682.5 | 38.0 | 94.7 | | | | | | | | | | | | | | | |
| | | 75% | S _N | 230.8 | 229.3 | 4.785 | 4.720 | 815.5 | 770.9 | 44.6 | 94.5 | 230.7 | | 228.4 | 6.240 | 6.182 | 1057.0 | 1006.2 | 50.8 | 95.2 | | | | | | | | | | | | | | | |
| | | 100% | S _N | 230.6 | 228.5 | 6.278 | 6.215 | 1070.3 | 1017.9 | 52.5 | 95.1 | 230.3 | | 227.1 | 8.900 | 8.840 | 1430.6 | 1354.7 | 75.9 | 94.7 | | | | | | | | | | | | | | | |
| | Maximum output current | | λ:= | 0.69 | 230.4 | 228.0 | 7.383 | 7.316 | 1204.9 | 1144.7 | 60.1 | 95.0 | Maximum output current | | λ:= | 0.69 | 230.0 | 226.5 | 9.861 | 9.807 | 1601.6 | 1522.3 | 79.3 | 95.0 | | | | | | | | | | | |
| Asymmetrical non-linear load as per IEC 62040-3 | | | | | | | | | | | | Asymmetrical non-linear load as per IEC 62040-3 | | | | | | | | | | | | | | | | | | | | | | | |
| Standby | | | | 231.8 | Unom | 0.346 | 0.000 | 35.3 | 0.0 | 35.3 | | Standby | | | | 231.9 | Unom | 0.231 | 0.000 | 28.340 | 0.000 | 28.3 | | | | | | | | | | | | | |

Table 13 Model 36

| Hersteller: | | Prüfdatum: | | | | | | | | | | 31.08.2007 | | | | | | | | | | | | |
|---|------------------------------------|-------------------------|----------------|---------------------|----------------------|---------------------|----------------------|---------------------|----------------------|--------------------|------|---|------------------------------------|---------------------|--------|---------------------|----------------------|---------------------|----------------------|---------------------|----------------------|--------------------|------|------|
| Typ: | | Temperatur [°C]: | | | | | | | | | | 26.4 | | | | | | | | | | | | |
| Spannung: | | 230/220-240 V 50/60 Hz | | | | | | | | | | | | | | | | | | | | | | |
| Leistung: | | 3000VA 2000 W Klasse VI | | | | | | | | | | Line Interactive | | Rel. Feuchte [%rH]: | | 30 | | | | | | | | |
| Modell-Nr.: | | M36-VI-3000/2000 | | | | | | | | | | Voltage Independent | | | | | | | | | | | | |
| Parameters | | | | Measurements | | | | | | | | | | | | | | | | | | | | |
| Normal mode | Resistive load | Load | | U _{in} [V] | U _{out} [V] | I _{in} [A] | I _{out} [A] | P _{in} [W] | P _{out} [W] | P _v [W] | η[%] | Normal mode | Resistive load | Load | | U _{in} [V] | U _{out} [V] | I _{in} [A] | I _{out} [A] | P _{in} [W] | P _{out} [W] | P _v [W] | η[%] | |
| | | 25% | P _N | 231.3 | 230.6 | 2.436 | 2.190 | 532.4 | 504.6 | 27.9 | 94.8 | | | 231.3 | 230.6 | 2.436 | 2.190 | 532.4 | 504.6 | 27.9 | 94.8 | | | |
| | | 50% | P _N | 230.7 | 229.4 | 4.573 | 4.399 | 1039.9 | 1008.6 | 31.3 | 97.0 | | | 230.7 | 229.4 | 4.573 | 4.399 | 1039.9 | 1008.6 | 31.3 | 97.0 | | | |
| | | 75% | P _N | 230.1 | 228.0 | 6.777 | 6.625 | 1550.1 | 1510.2 | 39.9 | 97.4 | | | 230.1 | 228.0 | 6.777 | 6.625 | 1550.1 | 1510.2 | 39.9 | 97.4 | | | |
| | | 100% | P _N | 229.6 | 226.7 | 9.027 | 8.889 | 2065.5 | 2014.5 | 51.0 | 97.5 | | | 229.6 | 226.7 | 9.027 | 8.889 | 2065.5 | 2014.5 | 51.0 | 97.5 | | | |
| | Non-linear-Load as per IEC 62040-3 | Load | | S _N | 231.2 | 230.5 | 3.542 | 3.191 | 566.2 | 520.8 | 45.4 | 92.0 | Non-linear-Load as per IEC 62040-3 | Load | | S _N | 231.2 | 230.5 | 3.542 | 3.191 | 566.2 | 520.8 | 45.4 | 92.0 |
| | | 50% | S _N | 230.7 | 229.3 | 6.503 | 6.280 | 1058.9 | 1019.4 | 39.5 | 96.3 | 230.7 | | 229.3 | 6.503 | 6.280 | 1058.9 | 1019.4 | 39.5 | 96.3 | | | | |
| | | 75% | S _N | 230.1 | 227.9 | 9.558 | 9.337 | 1594.5 | 1536.6 | 57.9 | 96.4 | 230.1 | | 227.9 | 9.558 | 9.337 | 1594.5 | 1536.6 | 57.9 | 96.4 | | | | |
| | | 100% | S _N | 229.3 | 226.7 | 13.291 | 13.046 | 2116.0 | 2028.0 | 88.0 | 95.8 | 229.3 | | 226.7 | 13.291 | 13.046 | 2116.0 | 2028.0 | 88.0 | 95.8 | | | | |
| | Maximum output current | | λ:= | 0.69 | 229.1 | 226.1 | 14.475 | 14.271 | 2325.0 | 2233.5 | 91.5 | 96.1 | Maximum output current | | λ:= | 0.69 | 229.1 | 226.1 | 14.475 | 14.271 | 2325.0 | 2233.5 | 91.5 | 96.1 |
| Asymmetrical non-linear load as per IEC 62040-3 | | | | | | | | | | | | Asymmetrical non-linear load as per IEC 62040-3 | | | | | | | | | | | | |
| Standby | | | | 231.7 | Unom | 0.846 | 0.000 | 26.340 | 0.000 | 26.3 | | Standby | | | | 231.7 | Unom | 0.846 | 0.000 | 26.340 | 0.000 | 26.3 | | |

9.5. TABLE OF MEASUREMENTS 23 VFI-UPS

| Table 14 Models 6 and 10 | | | | | | | | | | | | | | | | | | | | | | | |
|---|------|----------------|--------------------|---------------------|--------------------|-------------------------------|--------------------|---------------------|--------------------|-------|---------|---|--------------------|---------------------|--------------------|---------------------|--------------------|---------------------------|--------------------|-------|------|--|--|
| Hersteller: | | | | | | Prüfdatum: | | | | | | 17.05.2007 | | | | | | | | | | | |
| Typ: | | | | | | Temperatur [°C]: | | | | | | 25 | | | | | | | | | | | |
| Spannung: 200-240 V 50/60 Hz | | | | | | Imax: 13A@230 V (12.5 A@240V) | | | | | | Spannung: 200-240 V 50/60 Hz | | | | | | Imax: 13A@230 12.5 A@240V | | | | | |
| Leistung: 3000 VA | | | | | | 2100 W Klasse VFI-SS-111 | | | | | | Leistung: 3000 VA | | | | | | 2400 W Klasse VFI-SS-111 | | | | | |
| Modell-Nr. M6-VFI-3000/2100 | | | | | | Online, Double conversion | | | | | | Modell-Nr. M10-VFI-3000/2400 | | | | | | Online, Double conversion | | | | | |
| Rel. Feuchte [%r.H]: | | | | | | 31 | | | | | | Rel. Feuchte [%r.H]: | | | | | | 42 | | | | | |
| Parameters | | | Measurements | | | | | | | | | Parameters | | | Measurements | | | | | | | | |
| Load | 25% | P _N | U _N [V] | U _{oN} [V] | I _N [A] | I _{oN} [A] | P _N [W] | P _{oN} [W] | P _V [W] | η [%] | 25% | P _N | U _N [V] | U _{oN} [V] | I _N [A] | I _{oN} [A] | P _N [W] | P _{oN} [W] | P _V [W] | η [%] | | | |
| | | | Resistive load | 221.7 | 228.6 | 2.913 | 2.304 | 627.2 | 526.5 | 100.7 | | | 83.9 | 231.1 | 231.8 | 3.264 | 2.632 | 734.7 | 606.8 | 127.9 | 82.6 | | |
| | 50% | P _N | 221.9 | 226.9 | 5.424 | 4.657 | 1196.4 | 1056.1 | 140.3 | 86.3 | 50% | P _N | 229.9 | 231.2 | 6.030 | 5.238 | 1380.4 | 1212.2 | 168.25 | 87.8 | | | |
| | 75% | P _N | 220.6 | 225.9 | 8.039 | 6.975 | 1770.1 | 1575.3 | 194.8 | 89.0 | 75% | P _N | 229.4 | 231.0 | 8.974 | 7.890 | 2054.0 | 1822.2 | 231.8 | 88.7 | | | |
| | 100% | P _N | 220.3 | 225.1 | 10.8 | 9.346 | 2372 | 2104 | 268 | 88.7 | 100% | P _N | 228.5 | 230.8 | 11.987 | 10.468 | 2730.0 | 2416.0 | 314.0 | 88.5 | | | |
| Non-linear Load as per IEC 62040-3 | 25% | S _N | 222.1 | 232.7 | 2.806 | 3.211 | 605.3 | 502.7 | 102.6 | 83.0 | 25% | S _N | 231.2 | 231.7 | 2.891 | 3.295 | 646.7 | 527.9 | 118.75 | 81.6 | | | |
| | 50% | S _N | 220.8 | 231.4 | 5.601 | 6.517 | 1231.1 | 1079 | 152.1 | 87.6 | 50% | S _N | 230.4 | 231.2 | 5.350 | 6.551 | 1233.9 | 1062.3 | 161.6 | 86.8 | | | |
| | 75% | S _N | 220.1 | 230.9 | 8.364 | 9.805 | 1835.2 | 1613 | 222.2 | 87.9 | 75% | S _N | 229.8 | 230.2 | 7.738 | 9.815 | 1770.1 | 1560.0 | 210.1 | 88.1 | | | |
| | 100% | S _N | 218.7 | 230.7 | 10.975 | 13.042 | 2373 | 2059 | 314 | 86.8 | 100% | S _N | 228.9 | 231.0 | 10.664 | 13.102 | 2426.0 | 2145.0 | 283.0 | 88.3 | | | |
| Maximum output current | λ= | 0.70 | 220.2 | 230.5 | 11.076 | 13.042 | 2426 | 2100 | 326 | 86.6 | λ= | 0.71 | 228.9 | 230.8 | 10.886 | 13.328 | 2479.0 | 2178.0 | 301.0 | 87.9 | | | |
| Asymmetrical non-linear load as per IEC 62040-3 | | | | | | | | | | | | Asymmetrical non-linear load as per IEC 62040-3 | | | | | | | | | | | |
| Standby | | | 223.1 | Unom | 0.493 | 0 | 68.78 | 0 | 68.78 | | Standby | | 231.7 | Unom | 0.839 | | 76.060 | | 76.060 | | | | |
| | | | | | | | | | | | Standby | Power-ON Mode | 231.7 | Unom | 0.839 | | 76.060 | | 76.060 | | | | |
| | | | | | | | | | | | Standby | Power-OFF Mode | 231.8 | Unom | 0.468 | | 34.270 | | 34.270 | | | | |

| Table 15 Models 17 and 7 | | | | | | | | | | | | | | | | | | | | | | | |
|---|------|----------------|--------------------|---------------------|--------------------|------------------------------|--------------------|---------------------|--------------------|-------|---------|---|--------------------|---------------------|--------------------|---------------------|--------------------|---------------------------|--------------------|-------|------|--|--|
| Hersteller: | | | | | | Prüfdatum: | | | | | | 04.07.2007 | | | | | | | | | | | |
| Typ: | | | | | | Temperatur [°C]: | | | | | | 24.4 | | | | | | | | | | | |
| Spannung: 208 - 264V 50/ 60 Hz | | | | | | Leistung: 2000 VA | | | | | | Spannung: 220-240 V 50/60 Hz | | | | | | Leistung: 800VA | | | | | |
| 1400 W Klasse VFI-SS-111 | | | | | | Modell-Nr. M17-VFI-2000/1400 | | | | | | 560 W Klasse VFI-SS-111 | | | | | | Modell-Nr. M7-VFI-800/560 | | | | | |
| Rel. Feuchte [%r.H]: | | | | | | 31 | | | | | | double Conversion/ Online | | | | | | 27%r.H | | | | | |
| Parameters | | | Measurements | | | | | | | | | Parameters | | | Measurements | | | | | | | | |
| Load | 25% | P _N | U _N [V] | U _{oN} [V] | I _N [A] | I _{oN} [A] | P _N [W] | P _{oN} [W] | P _V [W] | η [%] | 25% | P _N | U _N [V] | U _{oN} [V] | I _N [A] | I _{oN} [A] | P _N [W] | P _{oN} [W] | P _V [W] | η [%] | | | |
| | | | Resistive load | 222.0 | 232.2 | 2.060 | 1.529 | 436.2 | 354.9 | 81.30 | | | 81.4 | 231.6 | 229.8 | 1.116 | 0.624 | 218.1 | 143.2 | 74.81 | 65.7 | | |
| | 50% | P _N | 221.0 | 232.2 | 3.761 | 3.044 | 812.0 | 707.5 | 104.50 | 87.1 | 50% | P _N | 231.5 | 230.0 | 1.601 | 1.239 | 344.4 | 284.8 | 59.60 | 82.7 | | | |
| | 75% | P _N | 220.8 | 231.8 | 5.491 | 4.580 | 1194.6 | 1061.2 | 133.40 | 88.8 | 75% | P _N | 231.2 | 229.0 | 2.255 | 1.870 | 501.6 | 430.0 | 71.60 | 85.7 | | | |
| | 100% | P _N | 220.4 | 231.4 | 7.270 | 6.102 | 1583.8 | 1411.7 | 172.10 | 89.1 | 100% | P _N | 231.1 | 230.0 | 2.885 | 2.468 | 649.2 | 564.8 | 84.40 | 87.0 | | | |
| Non-linear Load as per IEC 62040-3 | 25% | S _N | 222.0 | 232.6 | 2.056 | 2.182 | 436.4 | 355.9 | 80.50 | 81.6 | 25% | S _N | 231.6 | 230.2 | 1.007 | 0.902 | 199.4 | 143.7 | 55.74 | 72.1 | | | |
| | 50% | S _N | 221.6 | 232.3 | 3.746 | 4.349 | 814.2 | 704.6 | 109.60 | 86.5 | 50% | S _N | 231.8 | 229.2 | 1.849 | 1.706 | 333.3 | 275.2 | 58.10 | 82.6 | | | |
| | 75% | S _N | 220.6 | 231.9 | 5.546 | 6.540 | 1208.4 | 1062.1 | 146.30 | 87.9 | 75% | S _N | 231.4 | 229.6 | 2.201 | 2.534 | 488.2 | 399.6 | 86.60 | 81.9 | | | |
| | 100% | S _N | 220.4 | 231.6 | 7.362 | 8.734 | 1606.6 | 1416.0 | 190.60 | 88.1 | 100% | S _N | 231.2 | 229.4 | 2.874 | 3.542 | 648.0 | 563.0 | 85.00 | 86.9 | | | |
| Maximum output current | λ= | 0.70 | 223.1 | 229.2 | 8.358 | 9.984 | 1823.6 | 1697.8 | 226.80 | 87.6 | λ= | 0.68 | 230.9 | 229.2 | 3.080 | 3.832 | 700.4 | 599.8 | 100.60 | 85.6 | | | |
| Asymmetrical non-linear load as per IEC 62040-3 | | | | | | | | | | | | Asymmetrical non-linear load as per IEC 62040-3 | | | | | | | | | | | |
| Standby | | | 222.8 | Unom | 0.523 | 0 | 61.80 | 0 | 61.80 | | Standby | | 231.7 | Unom | 0.236 | 0 | 34.39 | 0 | 34.39 | | | | |
| Surge Protected Output | 50% | P _N | 221.4 | 220.0 | 3.368 | 3.204 | 736.0 | 704.6 | 31.40 | 95.7 | 50% | P _N | 231.6 | 229.4 | 1.329 | 1.240 | 302.0 | 284.3 | 17.70 | 94.1 | | | |
| | 100% | P _N | 220.4 | 217.4 | 6.662 | 6.510 | 1463.8 | 1414.8 | 49.00 | 96.7 | 100% | P _N | 231.6 | 228.6 | 2.538 | 2.460 | 584.3 | 561.8 | 22.50 | 96.1 | | | |
| | 50% | S _N | 221.4 | 219.9 | 4.698 | 4.595 | 754.1 | 717.8 | 36.30 | 95.2 | 50% | S _N | 231.6 | 230.2 | 1.792 | 1.692 | 295.2 | 259.4 | 35.05 | 87.9 | | | |
| | 100% | S _N | 220.0 | 216.7 | 9.408 | 9.311 | 1506.0 | 1434.4 | 71.60 | 95.2 | 100% | S _N | 231.2 | 229.0 | 3.643 | 3.555 | 595.6 | 568.8 | 27.00 | 95.5 | | | |
| Maximum output current | λ= | 0.71 | 219.8 | 216.4 | 10.120 | 10.016 | 1625.2 | 1546.4 | 78.80 | 95.2 | λ= | 0.70 | 231.2 | 228.9 | 3.910 | 3.820 | 637.4 | 609.0 | 26.40 | 95.5 | | | |
| Asymmetrical non-linear load as per IEC 62040-3 | | | | | | | | | | | | Asymmetrical non-linear load as per IEC 62040-3 | | | | | | | | | | | |
| Standby | | | 222.2 | Unom | 0.606 | 26.74 | | 26.74 | | | Standby | | 231.7 | Unom | 0.277 | 14.65 | | 14.65 | | | | | |

| Table 16 Models 18 and 19 | | | | | | | | | | | | | | | | | | | | | | | |
|---|-----------|----------------|--------------------|---------------------|--------------------|-----------------------------|--------------------|---------------------|--------------------|-------|---------|---|--------------------|---------------------|--------------------|---------------------|--------------------|-----------------------------|--------------------|-------|------|--|--|
| Hersteller: | | | | | | Prüfdatum: | | | | | | 06.07.2007 | | | | | | | | | | | |
| Typ: | | | | | | Temperatur [°C]: | | | | | | 24.1 | | | | | | | | | | | |
| Spannung: 230 VAC | | | | | | Leistung: 1000 VA | | | | | | Spannung: 230 VAC | | | | | | Leistung: 1000 VA | | | | | |
| 700 W Klasse VFI-SS-111 | | | | | | Modell-Nr. M19-VFI-1000/700 | | | | | | Flachstecker/ Crmpanschluss | | | | | | Modell-Nr. M18-VFI-1000/700 | | | | | |
| Bei 100% Last schaltet das Gerät auf Bypass um! | | | | | | 31 | | | | | | schwingt mit nichtlinearer Last | | | | | | 33 | | | | | |
| Parameters | | | Measurements | | | | | | | | | Parameters | | | Measurements | | | | | | | | |
| Load | 25% | P _N | U _N [V] | U _{oN} [V] | I _N [A] | I _{oN} [A] | P _N [W] | P _{oN} [W] | P _V [W] | η [%] | 25% | P _N | U _N [V] | U _{oN} [V] | I _N [A] | I _{oN} [A] | P _N [W] | P _{oN} [W] | P _V [W] | η [%] | | | |
| | | | Resistive load | 222.8 | 229.8 | 1.143 | 0.786 | 234.0 | 180.8 | 53.36 | | | 77.2 | 221.7 | 230.2 | 1.136 | 0.780 | 216.9 | 179.4 | 37.55 | 82.7 | | |
| | 50% | P _N | 223.4 | 229.2 | 1.953 | 1.554 | 419.2 | 355.6 | 63.60 | 84.8 | 50% | P _N | 221.4 | 229.8 | 1.948 | 1.552 | 402.4 | 356.6 | 45.80 | 88.6 | | | |
| | 75% | P _N | 222.6 | 228.8 | 2.864 | 2.327 | 615.0 | 532.6 | 82.40 | 86.6 | 75% | P _N | 221.6 | 229.1 | 2.758 | 2.318 | 589.0 | 532.0 | 57.00 | 90.3 | | | |
| | 100% | P _N | 221.8 | 228.2 | 3.770 | 3.100 | 821.2 | 707.4 | 113.80 | 86.1 | 100% | P _N | 220.8 | 229.2 | 3.590 | 3.084 | 782.0 | 706.9 | 75.10 | 90.4 | | | |
| Non-linear Load as per IEC 62040-3 | 25% | S _N | 223.4 | 229.4 | 1.122 | 1.118 | 231.2 | 176.9 | 54.32 | 76.5 | 25% | S _N | 222.2 | 230.4 | 1.130 | 1.111 | 216.4 | 179.0 | 37.40 | 82.7 | | | |
| | 50% | S _N | 222.8 | 228.8 | 1.993 | 2.228 | 430.0 | 369.0 | 71.00 | 83.5 | 50% | S _N | 222.8 | 230.0 | 1.934 | 2.206 | 401.2 | 353.8 | 47.40 | 88.2 | | | |
| | 75% | S _N | 222.7 | 228.7 | 2.931 | 3.322 | 634.4 | 537.6 | 96.80 | 84.7 | 75% | S _N | 222.6 | 229.8 | 2.824 | 3.317 | 608.5 | 546.0 | 62.50 | 89.7 | | | |
| | 100% | S _N | 222.8 | 226.5 | 3.804 | 4.306 | 834.0 | 697.6 | 136.4 | 83.6 | 100% | S _N | 223.2 | 229.5 | 3.548 | 4.394 | 779.6 | 701.4 | 78.20 | 90.0 | | | |
| Maximum output current | λ= | 0.72 | 222.8 | 226.5 | 3.804 | 4.306 | 834.0 | 697.6 | 136.40 | 83.6 | λ= | 0.70 | 223.1 | 229.6 | 3.774 | 4.678 | 832.4 | 748.6 | 83.80 | 89.9 | | | |
| Asymmetrical non-linear load as per IEC 62040-3 | | | | | | | | | | | | Asymmetrical non-linear load as per IEC 62040-3 | | | | | | | | | | | |
| Standby | Power-On | | 223.5 | Unom | 0.299 | 44.42 | 0 | 44.42 | | | Standby | | 222.2 | Unom | 0.283 | 28.47 | 0 | 28.47 | | | | | |
| Standby | Power-Off | | 223.2 | Unom | 0.146 | 4.42 | | 4.42 | | | | | | | | | | | | | | | |

Table 17 Models 20 and 21

| Hersteller: | | | | | | | | | | Prüfdatum: | | | | | | | | | | 09.07.2007 | | | | | | | | | | Hersteller: | | | | | | | | | | Prüfdatum: | | | | | | | | | | 08.08.2007 | | | | | | | | | | | | | | | | | | | |
|---|---|--|------------------------------------|----------------|---------------------|----------------------|---------------------|----------------------|---------------------|----------------------|--------------------|---|---|-------|--------------|------------------------------------|---------------------|----------------------|---------------------|----------------------|---------------------|----------------------|--------------------|-------|-------|------|--|--|--|--------------------------------|--|--|--|--|--|--|--|--|--|---------------------------|--|--|--|--|--|--|--|--|--|---------------------|--|--|--|--|--|--|--|--|--|----|--|--|--|--|--|--|--|--|--|
| Typ: | | | | | | | | | | Temperatur [°C]: | | | | | | | | | | 24.1 | | | | | | | | | | Typ: | | | | | | | | | | Temperatur [°C]: | | | | | | | | | | 25 | | | | | | | | | | | | | | | | | | | |
| Spannung: | | | | | | | | | | 220-240 V 50/60 Hz | | | | | | | | | | Leistung: | | | | | | | | | | 1250VA 875 W Klasse VFI-SS-111 | | | | | | | | | | double Conversion/ Online | | | | | | | | | | Rel. Feuchte [%rH]: | | | | | | | | | | 40 | | | | | | | | | |
| Modell-Nr.: | | | | | | | | | | M20-VFI-1250/875 | | | | | | | | | | Modell-Nr.: | | | | | | | | | | M21-VFI-2000/1400 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Parameters | | | | | Measurements | | | | | Parameters | | | | | Measurements | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Normal mode | Resistive load | Load | 25% | P _N | U _{in} [V] | U _{out} [V] | I _{in} [A] | I _{out} [A] | P _{in} [W] | P _{out} [W] | P _v [W] | η [%] | Resistive load | Load | 25% | P _N | U _{in} [V] | U _{out} [V] | I _{in} [A] | I _{out} [A] | P _{in} [W] | P _{out} [W] | P _v [W] | η [%] | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 50% | P _N | 224.1 | 229.3 | 1.257 | 0.972 | 371.8 | 233.1 | 49.70 | 82.1 | | | 50% | P _N | 223.9 | 230.6 | 2.301 | 3.064 | 867.8 | 707.6 | 160.20 | 81.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 75% | P _N | 222.9 | 228.7 | 3.401 | 2.902 | 756.7 | 663.6 | 93.10 | 87.7 | | | 75% | P _N | 223.3 | 230.2 | 3.401 | 4.618 | 1253.0 | 1062.4 | 190.60 | 84.8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 100% | P _N | 222.4 | 228.6 | 4.536 | 3.639 | 1006.8 | 877.0 | 129.80 | 87.1 | | | 100% | P _N | 223.4 | 230.0 | 4.536 | 6.156 | 1604.6 | 1415.2 | 189.40 | 88.2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Non-linear Load as per IEC 62040-3 | 25% | S _N | 224.3 | 229.2 | 1.254 | 1.394 | 270.9 | 220.4 | 50.50 | 81.4 | 25% | S _N | 224.3 | 231.1 | 1.254 | 2.193 | 437.6 | 349.5 | 88.10 | 79.9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 50% <td>S_N</td> <td>223.4</td> <td>228.8</td> <td>2.302</td> <td>2.765</td> <td>510.6</td> <td>438.4</td> <td>72.20</td> <td>86.9</td> <td>50% <td>S_N</td> <td>222.9</td> <td>230.6</td> <td>2.302</td> <td>4.392</td> <td>888.7</td> <td>712.9</td> <td>175.80</td> <td>80.2</td> </td> | S _N | 223.4 | 228.8 | 2.302 | 2.765 | 510.6 | 438.4 | 72.20 | 86.9 | 50% <td>S_N</td> <td>222.9</td> <td>230.6</td> <td>2.302</td> <td>4.392</td> <td>888.7</td> <td>712.9</td> <td>175.80</td> <td>80.2</td> | S _N | 222.9 | 230.6 | 2.302 | 4.392 | 888.7 | 712.9 | 175.80 | 80.2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 75% <td>S_N</td> <td>222.6</td> <td>228.6</td> <td>3.522</td> <td>4.172</td> <td>782.6</td> <td>673.2</td> <td>109.40</td> <td>86.0</td> <td>75% <td>S_N</td> <td>223.3</td> <td>230.3</td> <td>3.522</td> <td>6.568</td> <td>1215.5</td> <td>1054.7</td> <td>160.80</td> <td>86.8</td> </td> | S _N | 222.6 | 228.6 | 3.522 | 4.172 | 782.6 | 673.2 | 109.40 | 86.0 | 75% <td>S_N</td> <td>223.3</td> <td>230.3</td> <td>3.522</td> <td>6.568</td> <td>1215.5</td> <td>1054.7</td> <td>160.80</td> <td>86.8</td> | S _N | 223.3 | 230.3 | 3.522 | 6.568 | 1215.5 | 1054.7 | 160.80 | 86.8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 100% <td>S_N</td> <td>225.2</td> <td>227.5</td> <td>4.478</td> <td>4.878</td> <td>1002.5</td> <td>855.2</td> <td>147.30</td> <td>85.3</td> <td>100% <td>S_N</td> <td>222.6</td> <td>229.9</td> <td>4.478</td> <td>8.756</td> <td>1617.3</td> <td>1422.6</td> <td>194.70</td> <td>88.0</td> </td> | S _N | 225.2 | 227.5 | 4.478 | 4.878 | 1002.5 | 855.2 | 147.30 | 85.3 | 100% <td>S_N</td> <td>222.6</td> <td>229.9</td> <td>4.478</td> <td>8.756</td> <td>1617.3</td> <td>1422.6</td> <td>194.70</td> <td>88.0</td> | S _N | 222.6 | 229.9 | 4.478 | 8.756 | 1617.3 | 1422.6 | 194.70 | 88.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Maximum output current | | λ= | 0.77 | 225.2 | 227.5 | 4.478 | 4.878 | 1002.5 | 855.2 | 147.30 | 85.3 | Maximum output current | | λ= | 0.70 | 222.7 | 229.9 | 4.478 | 8.985 | 1690.6 | 1455.0 | 235.60 | 86.1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Asymmetrical non-linear load as per IEC 62040-3 | | | | | | | | | | | | Asymmetrical non-linear load as per IEC 62040-3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Standby | | | | | | | | | | | | Standby | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bypass Mode | | | | | Parameters | | | | | Measurements | | | | | Parameters | | | | | Measurements | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bypass Mode | Resistive load | Load | 50% | P _N | 227.1 | 226.1 | 2.096 | 1.911 | 474.6 | 432.1 | 42.50 | 91.0 | Resistive load | Load | 50% | P _N | 224.6 | Unom | 0.986 | 0 | 93.24 | 0 | 93.24 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 100% | P _N | 226.4 | 224.4 | 4.058 | 3.834 | 919.6 | 860.6 | 59.00 | 93.6 | | | 100% | P _N | 226.4 | 224.4 | 4.058 | 3.834 | 919.6 | 860.6 | 59.00 | 93.6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | Non-linear Load as per IEC 62040-3 | 50% | S _N | 227.4 | 226.0 | 2.913 | 2.826 | 498.7 | 444.3 | 54.40 | | | 89.1 | Non-linear Load as per IEC 62040-3 | 50% | S _N | 227.4 | 226.0 | 2.913 | 2.826 | 498.7 | 444.3 | 54.40 | 89.1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | 100% | S _N | 226.0 | 223.6 | 5.504 | 5.426 | 948.5 | 857.4 | 91.10 | | | 90.4 | | 100% | S _N | 226.0 | 223.6 | 5.504 | 5.426 | 948.5 | 857.4 | 91.10 | 90.4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum output current | | λ= | 0.71 | 226.0 | 223.6 | 5.504 | 5.426 | 948.5 | 857.4 | 91.10 | 90.4 | Maximum output current | | λ= | 0.70 | 222.7 | 229.9 | 4.478 | 8.985 | 1690.6 | 1455.0 | 235.60 | 86.1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Asymmetrical non-linear load as per IEC 62040-3 | | keine Begrenzung bei 130% Last | | | | | | | | | | Asymmetrical non-linear load as per IEC 62040-3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Standby | | | | | | | | | | | | Standby | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Table 18 Models 23 and 14

| Hersteller: | | | | | | | | | | Prüfdatum: | | | | | | | | | | 10.07.2007 | | | | | | | | | | Hersteller: | | | | | | | | | | Prüfdatum: | | | | | | | | | | 05.07.2007 | | | | | | | | | | | | | | | | | | | |
|-------------|---|--|----------------|----------------|--------------|-------|-------|-------|-------|--------------------|-------|------------------------------------|--|----------------|--|----------------|-------|-------|-------|-------------|--------|-------|--------|------|--|--|--|--|--|-------------------------------|--|--|--|--|--|--|--|--|--|---------------------------|--|--|--|--|--|--|--|--|--|---------------------|--|--|--|--|--|--|--|--|--|----|--|--|--|--|--|--|--|--|--|
| Typ: | | | | | | | | | | Temperatur [°C]: | | | | | | | | | | 24.6 | | | | | | | | | | Typ: | | | | | | | | | | Temperatur [°C]: | | | | | | | | | | 24.1 | | | | | | | | | | | | | | | | | | | |
| Spannung: | | | | | | | | | | 220-240 V 50/60 Hz | | | | | | | | | | Leistung: | | | | | | | | | | 700 VA 490W Klasse VFI-SS-111 | | | | | | | | | | double Conversion/ Online | | | | | | | | | | Rel. Feuchte [%rH]: | | | | | | | | | | 32 | | | | | | | | | |
| Modell-Nr.: | | | | | | | | | | M23-VFI-700/490 | | | | | | | | | | Modell-Nr.: | | | | | | | | | | M14-VFI-1000/750 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Parameters | | | | | Measurements | | | | | Parameters | | | | | Measurements | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Normal mode | Resistive load | Load | 25% | P _N | 225.4 | 232.8 | 0.837 | 0.544 | 175.0 | 126.4 | 48.51 | 72.3 | Resistive load | Load | 25% | P _N | 223.6 | 230.4 | 1.305 | 0.780 | 281.0 | 179.7 | 101.29 | 64.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 50% | P _N | 225.2 | 232.0 | 1.435 | 1.098 | 312.6 | 254.7 | 57.90 | 81.5 | | | 50% | P _N | 224.0 | 230.2 | 2.170 | 1.555 | 477.4 | 357.8 | 119.60 | 74.9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 75% | P _N | 225.1 | 232.6 | 1.980 | 1.606 | 439.4 | 373.6 | 65.80 | 86.0 | | | 75% | P _N | 224.9 | 230.8 | 3.016 | 2.314 | 670.6 | 532.2 | 138.40 | 79.4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 100% | P _N | 225.6 | 231.8 | 2.574 | 2.143 | 574.4 | 496.6 | 77.80 | 86.5 | | | 100% | P _N | 224.4 | 229.0 | 3.915 | 3.077 | 870.2 | 707.0 | 163.20 | 81.2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Non-linear Load as per IEC 62040-3 | 25% | S _N | 225.8 | 232.8 | 0.836 | 0.774 | 164.9 | 125.4 | 39.51 | 76.0 | Non-linear Load as per IEC 62040-3 | 25% | S _N | 225.6 | 230.1 | 1.324 | 1.112 | 283.5 | 178.4 | 105.11 | 62.9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 50% <td>S_N</td> <td>227.0</td> <td>230.7</td> <td>1.395</td> <td>1.531</td> <td>303.2</td> <td>246.4</td> <td>56.80</td> <td>81.3</td> <td>50% <td>S_N</td> <td>225.3</td> <td>230.0</td> <td>2.258</td> <td>2.215</td> <td>478.8</td> <td>354.2</td> <td>124.60</td> <td>74.0</td> </td> | S _N | 227.0 | 230.7 | 1.395 | 1.531 | 303.2 | 246.4 | 56.80 | 81.3 | | 50% <td>S_N</td> <td>225.3</td> <td>230.0</td> <td>2.258</td> <td>2.215</td> <td>478.8</td> <td>354.2</td> <td>124.60</td> <td>74.0</td> | S _N | 225.3 | 230.0 | 2.258 | 2.215 | 478.8 | 354.2 | 124.60 | 74.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 75% <td>S_N</td> <td>225.2</td> <td>232.3</td> <td>1.937</td> <td>2.294</td> <td>429.8</td> <td>365.8</td> <td>64.00</td> <td>85.1</td> <td>75% <td>S_N</td> <td>224.1</td> <td>229.6</td> <td>3.222</td> <td>3.310</td> <td>685.2</td> <td>531.7</td> <td>153.50</td> <td>77.6</td> </td> | S _N | 225.2 | 232.3 | 1.937 | 2.294 | 429.8 | 365.8 | 64.00 | 85.1 | | 75% <td>S_N</td> <td>224.1</td> <td>229.6</td> <td>3.222</td> <td>3.310</td> <td>685.2</td> <td>531.7</td> <td>153.50</td> <td>77.6</td> | S _N | 224.1 | 229.6 | 3.222 | 3.310 | 685.2 | 531.7 | 153.50 | 77.6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 100% <td>S_N</td> <td>224.0</td> <td>232.0</td> <td>2.596</td> <td>3.058</td> <td>571.8</td> <td>497.4</td> <td>74.40</td> <td>87.0</td> <td>100% <td>S_N</td> <td>--</td> <td>--</td> <td>--</td> <td>--</td> <td>--</td> <td>--</td> <td>--</td> <td>--</td> </td> | S _N | 224.0 | 232.0 | 2.596 | 3.058 | 571.8 | 497.4 | 74.40 | 87.0 | | 100% <td>S_N</td> <td>--</td> <td>--</td> <td>--</td> <td>--</td> <td>--</td> <td>--</td> <td>--</td> <td>--</td> | S _N | -- | -- | -- | -- | -- | -- | -- | -- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Maximum output current | | λ= | 0.70 | 224.4 | 231.8 | 2.456 | 3.200 | 595.0 | 517.9 | 77.10 | 87.0 | Maximum output current | | λ= | -- | -- | -- | -- | -- | -- | -- | -- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Asymmetrical non-linear load as per IEC 62040-3 | | | | | | | | | | | | Asymmetrical non-linear load as per IEC 62040-3 | | Elektronik ab 100% nichtlineare Last defekt! | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Standby | | | | | | | | | | | | Standby | | Power-On | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Table 19 Models 24 and 25

| Hersteller: | | | | | | | | | | Prüfdatum: | | | | | | | | | | 21.08.2007 | | | | | | | | | | Hersteller: | | | | | | | | | | Prüfdatum: | | | | | | | | | | 21.08.2007 | | | | | | | | | | | | | | | | | | | |
|-------------|---|---|----------------|----------------|--------------|-------|-------|-------|-------|--------------------|--------|------------------------------------|---|----------------|--------------|----------------|-------|-------|--------|-------------|--------|--------|--------|------|--|--|--|--|--|--------------------------------|--|--|--|--|--|--|--|--|--|---------------------------|--|--|--|--|--|--|--|--|--|---------------------|--|--|--|--|--|--|--|--|--|----|--|--|--|--|--|--|--|--|--|
| Typ: | | | | | | | | | | Temperatur [°C]: | | | | | | | | | | 23 | | | | | | | | | | Typ: | | | | | | | | | | Temperatur [°C]: | | | | | | | | | | 23.1 | | | | | | | | | | | | | | | | | | | |
| Spannung: | | | | | | | | | | 220-240 V 50/60 Hz | | | | | | | | | | Leistung: | | | | | | | | | | 1000 VA 700W Klasse VFI-SS-111 | | | | | | | | | | double Conversion/ Online | | | | | | | | | | Rel. Feuchte [%rH]: | | | | | | | | | | 40 | | | | | | | | | |
| Modell-Nr.: | | | | | | | | | | M24-VFI-1000/700 | | | | | | | | | | Modell-Nr.: | | | | | | | | | | M25-VFI-2000/1400 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Parameters | | | | | Measurements | | | | | Parameters | | | | | Measurements | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Normal mode | Resistive load | Load | 25% | P _N | 221.4 | 230.2 | 1.116 | 0.768 | 244.0 | 176.6 | 67.31 | 72.4 | Resistive load | Load | 25% | P _N | 222.2 | 228.5 | 2.091 | 1.549 | 459.7 | 355.3 | 104.45 | 77.3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 50% | P _N | 221.7 | 229.7 | 1.979 | 1.533 | 436.0 | 351.8 | 84.20 | 80.7 | | | 50% | P _N | 222.2 | 228.8 | 3.800 | 3.070 | 838.5 | 702.5 | 135.95 | 83.8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 75% | P _N | 221.2 | 229.1 | 2.869 | 2.289 | 631.3 | 525.7 | 105.65 | 83.3 | | | 75% | P _N | 221.4 | 228.4 | 5.620 | 4.613 | 1238.8 | 1053.1 | 185.70 | 85.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 100% | P _N | 219.9 | 228.9 | 3.812 | 3.058 | 834.2 | 699.5 | 134.70 | 83.9 | | | 100% | P _N | 220.5 | 227.6 | 7.548 | 6.186 | 1657.2 | 1408.3 | 248.85 | 85.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Non-linear Load as per IEC 62040-3 | 25% | S _N | 221.3 | 229.9 | 1.120 | 1.097 | 244.5 | 175.1 | 69.44 | 71.6 | Non-linear Load as per IEC 62040-3 | 25% | S _N | 224.0 | 229.5 | 2.063 | 2.200 | 455.0 | 348.6 | 106.45 | 76.6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 50% | S _N | 220.5 | 229.6 | 1.993 | 2.187 | 435.7 | 347.9 | 87.80 | 79.8 | | 50% | S _N | 222.6 | 228.9 | 3.844 | 4.445 | 849.2 | 701.7 | 147.50 | 82.8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 75% <td>S_N</td> <td>220.0</td> <td>229.4</td> <td>2.911</td> <td>3.293</td> <td>636.0</td> <td>523.7</td> <td>112.35</td> <td>82.3</td> <td>75% <td>S_N</td> <td>221.5</td> <td>228.2</td> <td>5.712</td> <td>6.598</td> <td>1257.3</td> <td>1049.7</td> <td>207.65</td> <td>83.5</td> </td> | S _N | 220.0 | 229.4 | 2.911 | 3.293 | 636.0 | 523.7 | 112.35 | 82.3 | | 75% <td>S_N</td> <td>221.5</td> <td>228.2</td> <td>5.712</td> <td>6.598</td> <td>1257.3</td> <td>1049.7</td> <td>207.65</td> <td>83.5</td> | S _N | 221.5 | 228.2 | 5.712 | 6.598 | 1257.3 | 1049.7 | 207.65 | 83.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 100% <td>S_N</td> <td>218.8</td> <td>228.6</td> <td>3.943</td> <td>4.385</td> <td>857.1</td> <td>701.0</td> <td>156.10</td> <td>81.8</td> <td>100% <td>S_N</td> <td>221.1</td> <td>227.1</td> <td>7.803</td> <td>8.851</td> <td>1715.1</td> <td>1418.0</td> <td>297.15</td> <td>82.7</td> </td> | S _N | 218.8 | 228.6 | 3.943 | 4.385 | 857.1 | 701.0 | 156.10 | 81.8 | | 100% <td>S_N</td> <td>221.1</td> <td>227.1</td> <td>7.803</td> <td>8.851</td> <td>1715.1</td> <td>1418.0</td> <td>297.15</td> <td>82.7</td> | S _N | 221.1 | 227.1 | 7.803 | 8.851 | 1715.1 | 1418.0 | 297.15 | 82.7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Maximum output current | | λ= | 0.70 | 220.7 | 228.7 | 4.008 | 4.425 | 872.0 | 709.6 | 162.40 | 81.4 | Maximum output current | | λ= | 0.70 | 220.7 | 227.1 | 7.994 | 8.938 | 1731.9 | 1423.0 | 308.90 | 82.2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Asymmetrical non-linear load as per IEC 62040-3 | | | | | | | | | | | | Asymmetrical non-linear load as per IEC 62040-3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Standby | | | | | | | | | | | | Standby | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Table 20 Models 37 and 38

| Model: M37-VFI-1000/700 | | | | | | | | | | Model: M38-VFI-1500/1050 | | | | | | | | | | | | | | | |
|---|------------------------------------|----------------|---------------------------------------|----------------------|---------------------|----------------------|---------------------|----------------------|--------------------|--------------------------|---------------------|----------------------|---|----------------------|---------------------|---------------------------------------|--------------------|--------|-------|-------|-------|-------|-------|-------|-------|
| Hersteller: | | | | | Prüfdatum: | | | | | Hersteller: | | | | | Prüfdatum: | | | | | | | | | | |
| Typ: | | | | | Temperatur [°C]: | | | | | Typ: | | | | | Temperatur [°C]: | | | | | | | | | | |
| Spannung: | | | | | 27.5 | | | | | Spannung: | | | | | 22.6 | | | | | | | | | | |
| Leistung: | | | | | Rel. Feuchte [%rH]: | | | | | Leistung: | | | | | Rel. Feuchte [%rH]: | | | | | | | | | | |
| Modell-Nr.: | | | | | 31 | | | | | Modell-Nr.: | | | | | 53 | | | | | | | | | | |
| Parameters | | Measurements | | | | | | | | | | Parameters | | Measurements | | | | | | | | | | | |
| Load | 25% | P _N | U _{in} [V] | U _{oax} [V] | I _{in} [A] | I _{oax} [A] | P _{in} [W] | P _{oax} [W] | P _V [W] | η [%] | U _{in} [V] | U _{oax} [V] | I _{in} [A] | I _{oax} [A] | P _{in} [W] | P _{oax} [W] | P _V [W] | η [%] | | | | | | | |
| | | | 231.7 | 232.0 | 1.150 | 0.770 | 241.4 | 178.6 | 62.79 | 74.0 | | | | | | | | | 231.5 | 232.3 | 1.551 | 1.150 | 330.1 | 267.1 | 63.00 |
| Resistive load | 50% | P _N | 231.5 | 232.4 | 2.006 | 1.580 | 444.5 | 367.0 | 77.45 | 82.6 | 231.2 | 230.6 | 2.754 | 2.294 | 609.0 | 529.0 | 80.00 | 86.9 | | | | | | | |
| | 75% | P _N | 231.2 | 231.7 | 2.776 | 2.297 | 624.5 | 531.8 | 92.70 | 85.2 | 230.9 | 231.2 | 4.013 | 3.427 | 896.5 | 792.1 | 104.45 | 88.3 | | | | | | | |
| | 100% | P _N | 231.0 | 232.3 | 3.590 | 3.026 | 814.0 | 702.3 | 111.70 | 86.3 | 230.6 | 230.5 | 5.296 | 4.595 | 1187.3 | 1058.9 | 128.35 | 89.2 | | | | | | | |
| Non-linear Load as per IEC 62040-3 | 25% | S _N | 231.6 | 231.2 | 1.095 | 1.004 | 229.3 | 167.9 | 61.37 | 73.2 | 231.5 | 231.3 | 1.430 | 1.562 | 319.1 | 254.1 | 64.95 | 79.6 | | | | | | | |
| | 50% | S _N | 231.4 | 232.4 | 1.876 | 1.994 | 414.7 | 338.6 | 76.10 | 81.6 | 231.1 | 232.1 | 2.665 | 3.131 | 604.3 | 520.5 | 83.88 | 86.1 | | | | | | | |
| | 75% | S _N | 231.2 | 231.9 | 2.680 | 3.013 | 601.0 | 507.2 | 93.80 | 84.4 | 230.8 | 231.8 | 3.963 | 4.667 | 881.3 | 765.1 | 116.20 | 86.8 | | | | | | | |
| 100% | S _N | 231.0 | 232.3 | 3.610 | 4.157 | 812.1 | 695.4 | 116.65 | 86.6 | 230.6 | 231.9 | 5.261 | 6.207 | 1171.7 | 1027.9 | 143.80 | 87.7 | | | | | | | | |
| Maximum output current | λ = | 0.68 | 230.9 | 231.9 | 3.886 | 4.734 | 876.1 | 749.3 | 126.75 | 85.5 | 0.69 | 230.2 | 230.9 | 5.705 | 6.982 | 1268.4 | 1108.0 | 160.45 | 87.4 | | | | | | |
| Asymmetrical non-linear load as per IEC 62040-3 | | | | | | | | | | | | | Asymmetrical non-linear load as per IEC 62040-3 | | | | | | | | | | | | |
| Standby | | | 231.9 Unom 0.324 0.000 44.7 0.0 44.69 | | | | | | | | | | Standby | | | 231.8 Unom 0.415 0.000 47.6 0.0 47.65 | | | | | | | | | |
| Resistive load | 50% | P _N | 231.5 | 229.4 | 1.658 | 1.560 | 379.1 | 357.6 | 21.50 | 94.3 | 231.3 | 228.6 | 2.382 | 2.674 | 543.7 | 519.7 | 24.05 | 95.6 | | | | | | | |
| | 100% | P _N | 231.1 | 228.3 | 3.176 | 3.088 | 731.6 | 704.7 | 26.95 | 96.3 | 230.7 | 227.0 | 4.766 | 4.670 | 1095.9 | 1059.3 | 36.60 | 96.7 | | | | | | | |
| | Non-linear Load as per IEC 62040-3 | 50% | S _N | 231.5 | 229.8 | 2.245 | 2.117 | 370.4 | 347.3 | 23.10 | 93.8 | 230.3 | 228.4 | 3.200 | 3.059 | 535.9 | 505.2 | 30.75 | 94.3 | | | | | | |
| 100% | S _N | 231.1 | 228.6 | 4.508 | 4.380 | 740.2 | 707.2 | 33.05 | 95.5 | 230.6 | 227.1 | 6.175 | 6.090 | 1044.5 | 997.2 | 47.30 | 95.5 | | | | | | | | |
| Maximum output current | λ = | 0.70 | 231.0 | 228.6 | 4.768 | 4.696 | 787.2 | 740.3 | 46.95 | 94.0 | 0.70 | 230.5 | 227.2 | 7.221 | 7.087 | 1173.1 | 1121.5 | 51.60 | 95.6 | | | | | | |
| Asymmetrical non-linear load as per IEC 62040-3 | | | | | | | | | | | | | Asymmetrical non-linear load as per IEC 62040-3 | | | | | | | | | | | | |
| Standby | | | 232.0 Unom 0.259 0.000 18.4 0.0 18.44 | | | | | | | | | | Standby | | | 231.8 Unom 0.389 0.000 18.3 0.0 18.31 | | | | | | | | | |

Table 21 Models 39 and 40

| Model: M39-VFI-2000/1400 | | | | | | | | | | Model: M40-VFI-3000/2100 | | | | | | | | | | | | | | | |
|---|------------------------------------|----------------|---------------------------------------|----------------------|---------------------|----------------------|---------------------|----------------------|--------------------|--------------------------|---------------------|----------------------|---|----------------------|---------------------|---------------------------------------|--------------------|--------|-------|-------|-------|-------|-------|-------|--------|
| Hersteller: | | | | | Prüfdatum: | | | | | Hersteller: | | | | | Prüfdatum: | | | | | | | | | | |
| Typ: | | | | | Temperatur [°C]: | | | | | Typ: | | | | | Temperatur [°C]: | | | | | | | | | | |
| Spannung: | | | | | 26.6 | | | | | Spannung: | | | | | 26.9 | | | | | | | | | | |
| Leistung: | | | | | Rel. Feuchte [%rH]: | | | | | Leistung: | | | | | Rel. Feuchte [%rH]: | | | | | | | | | | |
| Modell-Nr.: | | | | | 42 | | | | | Modell-Nr.: | | | | | 47 | | | | | | | | | | |
| Parameters | | Measurements | | | | | | | | | | Parameters | | Measurements | | | | | | | | | | | |
| Load | 25% | P _N | U _{in} [V] | U _{oax} [V] | I _{in} [A] | I _{oax} [A] | P _{in} [W] | P _{oax} [W] | P _V [W] | η [%] | U _{in} [V] | U _{oax} [V] | I _{in} [A] | I _{oax} [A] | P _{in} [W] | P _{oax} [W] | P _V [W] | η [%] | | | | | | | |
| | | | 231.4 | 229.6 | 2.059 | 1.530 | 446.9 | 351.2 | 95.75 | 78.6 | | | | | | | | | 231.1 | 229.6 | 3.037 | 2.306 | 690.3 | 529.0 | 121.30 |
| Resistive load | 50% | P _N | 231.1 | 228.2 | 3.690 | 3.089 | 830.4 | 704.8 | 125.60 | 84.9 | 230.5 | 227.0 | 5.498 | 4.664 | 1224.8 | 1057.7 | 167.15 | 86.4 | | | | | | | |
| | 75% | P _N | 230.5 | 228.9 | 5.356 | 4.624 | 1217.0 | 1057.7 | 159.30 | 86.9 | 229.8 | 227.6 | 7.947 | 6.966 | 1809.8 | 1584.7 | 225.05 | 87.6 | | | | | | | |
| | 100% | P _N | 230.0 | 227.1 | 7.022 | 6.209 | 1599.9 | 1409.5 | 190.40 | 88.1 | 229.1 | 226.1 | 10.630 | 9.361 | 2417.5 | 2116.5 | 301.00 | 87.5 | | | | | | | |
| Non-linear Load as per IEC 62040-3 | 25% | S _N | 231.4 | 228.5 | 1.985 | 2.106 | 437.4 | 334.9 | 102.55 | 76.6 | 231.2 | 229.6 | 2.820 | 3.100 | 629.6 | 506.1 | 123.55 | 80.4 | | | | | | | |
| | 50% | S _N | 231.0 | 228.4 | 3.492 | 4.143 | 784.6 | 660.6 | 124.05 | 84.2 | 230.6 | 229.8 | 5.269 | 6.266 | 1194.4 | 1018.6 | 175.80 | 85.3 | | | | | | | |
| | 75% | S _N | 230.6 | 229.3 | 5.167 | 6.237 | 1164.0 | 997.8 | 166.20 | 85.7 | 229.9 | 227.8 | 7.881 | 9.227 | 1789.3 | 1489.3 | 300.05 | 83.2 | | | | | | | |
| 100% | S _N | 230.2 | 228.1 | 6.720 | 8.263 | 1512.4 | 1322.5 | 189.95 | 87.4 | 229.2 | 226.1 | 10.527 | 12.233 | 2386.0 | 1971.9 | 414.15 | 82.6 | | | | | | | | |
| Maximum output current | λ = | 0.67 | 230.1 | 228.2 | 7.278 | 9.196 | 1635.5 | 1413.2 | 222.30 | 86.4 | 0.70 | 228.2 | 225.9 | 11.620 | 13.980 | 2628.5 | 2197.5 | 431.00 | 83.6 | | | | | | |
| Asymmetrical non-linear load as per IEC 62040-3 | | | | | | | | | | | | | Asymmetrical non-linear load as per IEC 62040-3 | | | | | | | | | | | | |
| Standby | | | 231.8 Unom 0.459 0.000 65.0 0.0 64.96 | | | | | | | | | | Standby | | | 231.8 Unom 0.599 0.000 76.4 0.0 76.43 | | | | | | | | | |
| Resistive load | 50% | P _N | 231.1 | 228.7 | 3.227 | 3.081 | 741.5 | 704.4 | 37.15 | 95.0 | 230.7 | 227.3 | 4.799 | 4.661 | 1103.4 | 1058.9 | 44.00 | 96.0 | | | | | | | |
| | 100% | P _N | 228.2 | 226.4 | 6.373 | 6.238 | 1465.3 | 1411.6 | 53.65 | 96.3 | 230.5 | 227.0 | 9.669 | 9.485 | 2217.0 | 2115.0 | 102.00 | 95.4 | | | | | | | |
| | Non-linear Load as per IEC 62040-3 | 50% | S _N | 231.2 | 228.9 | 4.223 | 4.131 | 716.0 | 672.3 | 42.65 | 94.0 | 230.6 | 227.4 | 6.265 | 6.181 | 1071.5 | 1014.8 | 56.70 | 94.7 | | | | | | |
| 100% | S _N | 230.4 | 226.8 | 8.105 | 8.022 | 1387.0 | 1318.5 | 68.50 | 95.1 | 230.5 | 226.3 | 11.683 | 11.744 | 2066.5 | 1938.1 | 147.45 | 92.9 | | | | | | | | |
| Maximum output current | λ = | 0.69 | 230.2 | 226.4 | 9.372 | 9.277 | 1524.2 | 1441.1 | 83.15 | 94.5 | 0.71 | 229.1 | 223.7 | 14.053 | 13.959 | 2956.5 | 2197.0 | 169.50 | 93.2 | | | | | | |
| Asymmetrical non-linear load as per IEC 62040-3 | | | | | | | | | | | | | Asymmetrical non-linear load as per IEC 62040-3 | | | | | | | | | | | | |
| Standby | | | 232.0 Unom 0.405 0.000 30.0 0.0 29.99 | | | | | | | | | | Standby | | | 231.9 Unom 0.417 0.000 29.8 0.0 29.78 | | | | | | | | | |

Table 22 Models 41 and 42

| Model: M41-VFI-1000/700 | | | | | | | | | | Model: M42-VFI-1500/1050 | | | | | | | | | | | | | | | |
|---|------------------------------------|----------------|---------------------------------------|----------------------|---------------------|----------------------|---------------------|----------------------|--------------------|--------------------------|---------------------|----------------------|---|----------------------|---------------------|---------------------------------------|--------------------|--------|-------|-------|-------|-------|-------|-------|-------|
| Hersteller: | | | | | Prüfdatum: | | | | | Hersteller: | | | | | Prüfdatum: | | | | | | | | | | |
| Typ: | | | | | Temperatur [°C]: | | | | | Typ: | | | | | Temperatur [°C]: | | | | | | | | | | |
| Spannung: | | | | | 27.5 | | | | | Spannung: | | | | | 27.5 | | | | | | | | | | |
| Leistung: | | | | | Rel. Feuchte [%rH]: | | | | | Leistung: | | | | | Rel. Feuchte [%rH]: | | | | | | | | | | |
| Modell-Nr.: | | | | | 31 | | | | | Modell-Nr.: | | | | | 31 | | | | | | | | | | |
| Parameters | | Measurements | | | | | | | | | | Parameters | | Measurements | | | | | | | | | | | |
| Load | 25% | P _N | U _{in} [V] | U _{oax} [V] | I _{in} [A] | I _{oax} [A] | P _{in} [W] | P _{oax} [W] | P _V [W] | η [%] | U _{in} [V] | U _{oax} [V] | I _{in} [A] | I _{oax} [A] | P _{in} [W] | P _{oax} [W] | P _V [W] | η [%] | | | | | | | |
| | | | 231.7 | 233.0 | 1.137 | 0.773 | 242.7 | 180.1 | 62.63 | 74.2 | | | | | | | | | 231.5 | 231.1 | 1.551 | 1.151 | 325.0 | 265.9 | 59.10 |
| Resistive load | 50% | P _N | 231.4 | 232.5 | 1.952 | 1.542 | 433.0 | 368.4 | 74.65 | 82.8 | 231.2 | 230.8 | 2.764 | 2.296 | 661.4 | 529.5 | 79.90 | 86.9 | | | | | | | |
| | 75% | P _N | 230.6 | 232.2 | 2.754 | 2.288 | 620.1 | 529.8 | 90.30 | 85.4 | 230.9 | 230.9 | 4.021 | 3.437 | 897.0 | 793.3 | 103.75 | 88.4 | | | | | | | |
| | 100% | P _N | 231.0 | 232.1 | 3.585 | 3.030 | 812.1 | 702.9 | 109.25 | 86.5 | 230.5 | 229.9 | 5.315 | 4.607 | 1186.7 | 1058.8 | 127.85 | 89.2 | | | | | | | |
| Non-linear Load as per IEC 62040-3 | 25% | S _N | 231.6 | 231.9 | 1.081 | 1.005 | 229.5 | 168.7 | 60.82 | 73.5 | 231.5 | 230.8 | 1.421 | 1.557 | 318.3 | 252.4 | 65.85 | 79.3 | | | | | | | |
| | 50% | S _N | 231.5 | 232.8 | 1.882 | 2.006 | 417.2 | 341.5 | 75.70 | 81.9 | 231.2 | 231.5 | 2.663 | 3.151 | 605.2 | 520.6 | 84.60 | 86.0 | | | | | | | |
| | 75% | S _N | 231.2 | 232.6 | 2.684 | 3.012 | 600.0 | 507.8 | 92.20 | 84.6 | 230.8 | 230.5 | 3.911 | 4.642 | 865.8 | 755.1 | 110.75 | 87.2 | | | | | | | |
| 100% | S _N | 230.9 | 232.8 | 3.636 | 4.197 | 816.5 | 701.2 | 115.30 | 85.9 | 230.5 | 230.9 | 5.244 | 6.196 | 1162.3 | 1020.2 | 142.15 | 87.8 | | | | | | | | |
| Maximum output current | λ = | 0.72 | 230.8 | 231.4 | 4.030 | 4.693 | 905.3 | 776.5 | 128.85 | 86.8 | 0.68 | 230.4 | 230.6 | 5.723 | 7.047 | 1286.3 | 1108.5 | 157.75 | 87.5 | | | | | | |
| Asymmetrical non-linear load as per IEC 62040-3 | | | | | | | | | | | | | Asymmetrical non-linear load as per IEC 62040-3 | | | | | | | | | | | | |
| Standby | | | 231.9 Unom 0.324 0.000 45.3 0.0 45.25 | | | | | | | | | | Standby | | | 231.8 Unom 0.416 0.000 48.3 0.0 48.35 | | | | | | | | | |
| Resistive load | 50% | P _N | 231.5 | 229.2 | 1.617 | 1.520 | 369.9 | 340.3 | 21.60 | 94.2 | 231.3 | 228.3 | 2.426 | 2.323 | 555.0 | 529.9 | 25.05 | 95.5 | | | | | | | |
| | 100% | P _N | 231.1 | 228.3 | 3.170 | 3.062 | 730.2 | 703.3 | 26.85 | 96.3 | 230.6 | 227.0 | 4.746 | 4.662 | 861.4 | 842.4 | 29.00 | 97.1 | | | | | | | |
| | Non-linear Load as per IEC 62040-3 | 50% | S _N | 231.5 | 229.2 | 2.205 | 2.083 | 365.8 | 341.5 | 24.30 | 93.4 | 231.2 | 229.0 | 3.275 | 3.143 | 544.2 | 517.6 | 26.60 | 95.1 | | | | | | |
| 100% | S _N | 231.0 | 228.7 | 4.512 | 4.382 | 739.9 | 707.2 | 32.65 | 96.6 | 230.6 | 227.3 | 6.199 | 6.077 | 1047.0 | 1001.6 | 45.45 | 95.7 | | | | | | | | |
| Maximum output current | λ = | 0.71 | 231.0 | 228.7 | 4.737 | 4.632 | 781.1 | 753.7 | 27.45 | 96.6 | 0.68 | 230.6 | 227.3 | 7.262 | 7.125 | 1180.9 | 1107.8 | 53.05 | 95.4 | | | | | | |
| Asymmetrical non-linear load as per IEC 62040-3 | | | | | | | | | | | | | Asymmetrical non-linear load as per IEC 62040-3 | | | | | | | | | | | | |
| Standby | | | 232.0 Unom 0.254 0.000 18.2 0.0 18.16 | | | | | | | | | | Standby | | | 231.9 Unom 0.364 0.000 17.2 0.0 17.15 | | | | | | | | | |

Table 23 Models 43 and 44

| Hersteller: | | Prüfdatum: | | | | | | | | | | Hersteller: | | Prüfdatum: | | | | | | | | | | | |
|---|-------------------------------------|-----------------|--|---------------------|----------------------|---------------------|----------------------|---------------------|----------------------|--------------------|---|-------------------------------------|---------------------------|-------------------------------------|----------------|--|----------------------|---------------------|----------------------|---------------------|----------------------|--------------------|-------|--------|------|
| Typ: | | Temperatur [°C] | | | | | | | | | | Typ: | | Temperatur [°C] | | | | | | | | | | | |
| Spannung: | | 22.6 | | | | | | | | | | Spannung: | | 25.6 | | | | | | | | | | | |
| Leistung: | | 22.6 | | | | | | | | | | Leistung: | | 25.6 | | | | | | | | | | | |
| Modell-Nr.: | | 53 | | | | | | | | | | Modell-Nr.: | | 42 | | | | | | | | | | | |
| Parameters | | | | | | | | | | | | Measurements | | | | | | | | | | | | | |
| Normal mode | Resistive load | Load | | U _{in} [V] | U _{out} [V] | I _{in} [A] | I _{out} [A] | P _{in} [W] | P _{out} [W] | P _v [W] | η [%] | Normal mode | Resistive load | Load | | U _{in} [V] | U _{out} [V] | I _{in} [A] | I _{out} [A] | P _{in} [W] | P _{out} [W] | P _v [W] | η [%] | | |
| | | 25% | P _N | 231.4 | 230.2 | 2.013 | 1.534 | 433.7 | 353.1 | 80.60 | 81.4 | | | 25% | P _N | 231.1 | 231.1 | 2.900 | 2.274 | 634.4 | 525.3 | 109.15 | 82.9 | | |
| | | 50% | P _N | 230.8 | 231.2 | 3.732 | 3.050 | 837.5 | 705.0 | 132.50 | 84.2 | | | 50% | P _N | 230.4 | 230.1 | 5.397 | 4.601 | 1216.1 | 1056.0 | 158.10 | 87.0 | | |
| | | 75% | P _N | 230.5 | 230.1 | 5.337 | 4.603 | 1211.5 | 1058.7 | 152.80 | 87.4 | | | 75% | P _N | 229.9 | 230.3 | 7.672 | 6.896 | 1786.4 | 1567.3 | 199.10 | 88.9 | | |
| | 100% | P _N | 229.9 | 228.8 | 7.013 | 6.170 | 1586.8 | 1411.0 | 185.75 | 88.4 | 100% | | P _N | 229.2 | 229.2 | 10.490 | 9.226 | 2387.0 | 2114.0 | 273.00 | 88.6 | | | | |
| | Non-lineare-Load as per IEC 62040-3 | | 25% <td>S_N</td> <td>231.3</td> <td>229.7</td> <td>2.007</td> <td>2.114</td> <td>444.1</td> <td>337.6</td> <td>106.50</td> <td>76.0</td> <th colspan="2">Non-lineare-Load as per IEC 62040-3</th> <th>25% <td>S_N</td> <td>231.1</td> <td>231.5</td> <td>2.867</td> <td>3.174</td> <td>633.6</td> <td>513.7</td> <td>119.90</td> <td>81.1</td> </th> | S _N | 231.3 | 229.7 | 2.007 | 2.114 | 444.1 | 337.6 | 106.50 | | 76.0 | Non-lineare-Load as per IEC 62040-3 | | 25% <td>S_N</td> <td>231.1</td> <td>231.5</td> <td>2.867</td> <td>3.174</td> <td>633.6</td> <td>513.7</td> <td>119.90</td> <td>81.1</td> | S _N | 231.1 | 231.5 | 2.867 | 3.174 | 633.6 | 513.7 | 119.90 | 81.1 |
| | 50% | S _N | 231.0 | 230.0 | 3.447 | 4.181 | 771.8 | 671.0 | 100.80 | 86.9 | 50% | | S _N | 230.5 | 231.5 | 5.226 | 6.374 | 1181.5 | 1021.9 | 159.60 | 86.5 | | | | |
| | 75% | S _N | 230.6 | 230.6 | 5.135 | 6.236 | 1157.8 | 1005.6 | 152.15 | 86.9 | 75% | | S _N | 229.7 | 230.7 | 8.335 | 9.668 | 1890.6 | 1564.4 | 326.25 | 82.7 | | | | |
| | 100% | S _N | 230.1 | 231.2 | 6.938 | 8.398 | 1562.5 | 1363.8 | 198.70 | 87.3 | 100% | | S _N | 229.1 | 230.3 | 10.614 | 12.957 | 2404.5 | 2059.5 | 345.00 | 85.7 | | | | |
| | Maximum output current λ= | | 0.68 | 230.7 | 229.0 | 7.409 | 9.227 | 1674.2 | 1440.1 | 234.10 | 86.0 | | Maximum output current λ= | | 0.69 | 228.8 | 228.9 | 11.609 | 14.205 | 2524.5 | 2252.0 | 372.50 | 85.8 | | |
| Asymmetrical non-linear load as per IEC 62040-3 | | | | | | | | | | | Asymmetrical non-linear load as per IEC 62040-3 | | | | | | | | | | | | | | |
| Standby | | | 231.8 | Unom | 0.454 | 0.000 | 64.4 | 0.0 | 64.45 | | Standby | | | 231.9 | Unom | 0.509 | 0.000 | 73.1 | 0.0 | 73.06 | | | | | |
| Bypass Mode | | 50% | P _N | 231.1 | 228.9 | 3.215 | 3.077 | 739.1 | 704.1 | 36.05 | 95.3 | Bypass Mode | | 50% | P _N | 230.6 | 228.0 | 4.770 | 4.641 | 1097.5 | 1057.8 | 39.65 | 96.4 | | |
| 100% | P _N | 230.2 | 226.7 | 6.445 | 6.224 | 1479.9 | 1411.9 | 67.95 | 95.4 | 100% | P _N | 229.4 | 225.3 | 9.524 | 9.401 | 2184.0 | 2117.5 | 66.50 | 97.0 | | | | | | |
| Resistive load | | 50% | S _N | 231.2 | 229.0 | 4.230 | 4.151 | 714.0 | 675.1 | 38.85 | 94.6 | Resistive load | | 50% | S _N | 230.7 | 228.5 | 6.270 | 6.187 | 1052.2 | 1006.5 | 45.75 | 95.7 | | |
| Non-lineare-Load as per IEC 62040-3 | | 100% | S _N | 230.4 | 226.9 | 8.129 | 8.053 | 1386.9 | 1321.9 | 64.95 | 95.3 | Non-lineare-Load as per IEC 62040-3 | | 100% | S _N | 229.5 | 226.0 | 12.203 | 12.121 | 2067.5 | 1980.2 | 87.35 | 95.8 | | |
| Maximum output current λ= | | 0.69 | 230.2 | 226.8 | 9.218 | 9.134 | 1503.3 | 1428.9 | 74.40 | 95.1 | Maximum output current λ= | | 0.70 | 228.5 | 225.6 | 14.473 | 14.402 | 2350.5 | 2263.6 | 87.00 | 96.3 | | | | |
| Asymmetrical non-linear load as per IEC 62040-3 | | | | | | | | | | | Asymmetrical non-linear load as per IEC 62040-3 | | | | | | | | | | | | | | |
| Standby | | | 231.9 | Unom | 0.382 | 0.000 | 28.5 | 0.0 | 28.45 | | Standby | | | 231.8 | Unom | 0.401 | 0.000 | 26.8 | 0.0 | 26.82 | | | | | |

Table 24 Models 45 and 46

| Hersteller: | | Prüfdatum: | | | | | | | | | | Hersteller: | | Prüfdatum: | | | | | | | | | | | |
|---|-------------------------------------|----------------|--|---------------------|----------------------|---------------------|----------------------|---------------------|----------------------|--------------------|---|--------------|---------------------------|-------------------------------------|----------------|---|----------------------|---------------------|----------------------|---------------------|----------------------|--------------------|-------|-------|------|
| Typ: | | 24.08.2007 | | | | | | | | | | Typ: | | 30.08.2007 | | | | | | | | | | | |
| Spannung: | | 27.5 | | | | | | | | | | Spannung: | | 25.6 | | | | | | | | | | | |
| Leistung: | | 27.5 | | | | | | | | | | Leistung: | | 25.6 | | | | | | | | | | | |
| Modell-Nr.: | | 31 | | | | | | | | | | Modell-Nr.: | | 42 | | | | | | | | | | | |
| Parameters | | | | | | | | | | | | Measurements | | | | | | | | | | | | | |
| Normal mode | Resistive load | Load | | U _{in} [V] | U _{out} [V] | I _{in} [A] | I _{out} [A] | P _{in} [W] | P _{out} [W] | P _v [W] | η [%] | Normal mode | Resistive load | Load | | U _{in} [V] | U _{out} [V] | I _{in} [A] | I _{out} [A] | P _{in} [W] | P _{out} [W] | P _v [W] | η [%] | | |
| | | 25% | P _N | 231.1 | 231.0 | 1.133 | 0.767 | 234.9 | 177.1 | 57.80 | 75.4 | | | 25% | P _N | 229.8 | 229.7 | 2.034 | 1.538 | 435.2 | 353.1 | 82.15 | 81.1 | | |
| | | 50% | P _N | 231.9 | 230.8 | 1.885 | 1.530 | 421.9 | 352.9 | 89.00 | 83.6 | | | 50% | P _N | 230.9 | 229.4 | 3.615 | 3.073 | 817.6 | 704.5 | 113.05 | 86.2 | | |
| | | 75% | P _N | 230.1 | 230.6 | 2.721 | 2.297 | 612.2 | 529.5 | 82.70 | 86.5 | | | 75% | P _N | 233.0 | 228.9 | 5.175 | 4.623 | 1194.6 | 1057.7 | 136.90 | 88.5 | | |
| | 100% | P _N | 233.2 | 230.5 | 3.505 | 3.068 | 804.2 | 706.9 | 97.25 | 87.9 | 100% | | P _N | 227.5 | 228.4 | 7.010 | 6.179 | 1583.5 | 1410.8 | 172.70 | 89.1 | | | | |
| | Non-lineare-Load as per IEC 62040-3 | | 25% <td>S_N</td> <td>232.0</td> <td>231.0</td> <td>1.092</td> <td>1.056</td> <td>226.3</td> <td>170.9</td> <td>55.38</td> <td>75.5</td> <th colspan="2">Non-lineare-Load as per IEC 62040-3</th> <th>25% <td>S_N</td> <td>230.8</td> <td>229.8</td> <td>1.991</td> <td>2.099</td> <td>423.9</td> <td>338.6</td> <td>85.30</td> <td>79.9</td> </th> | S _N | 232.0 | 231.0 | 1.092 | 1.056 | 226.3 | 170.9 | 55.38 | | 75.5 | Non-lineare-Load as per IEC 62040-3 | | 25% <td>S_N</td> <td>230.8</td> <td>229.8</td> <td>1.991</td> <td>2.099</td> <td>423.9</td> <td>338.6</td> <td>85.30</td> <td>79.9</td> | S _N | 230.8 | 229.8 | 1.991 | 2.099 | 423.9 | 338.6 | 85.30 | 79.9 |
| | 50% | S _N | 231.9 | 230.8 | 1.944 | 2.100 | 410.8 | 343.4 | 67.40 | 83.6 | 50% | | S _N | 230.3 | 229.4 | 3.389 | 4.101 | 763.6 | 653.9 | 99.80 | 86.9 | | | | |
| | 75% | S _N | 231.7 | 230.6 | 2.622 | 3.165 | 593.2 | 512.7 | 80.45 | 86.4 | 75% | | S _N | 229.8 | 229.0 | 5.020 | 6.140 | 1140.0 | 993.4 | 146.60 | 87.1 | | | | |
| | 100% | S _N | 232.0 | 230.5 | 3.504 | 4.362 | 798.8 | 700.2 | 98.65 | 87.7 | 100% | | S _N | 227.9 | 228.6 | 6.894 | 8.119 | 1546.7 | 1318.9 | 227.80 | 85.3 | | | | |
| | Maximum output current λ= | | 0.70 | 231.6 | 230.4 | 3.738 | 4.637 | 851.6 | 745.6 | 105.20 | 87.6 | | Maximum output current λ= | | 0.69 | 227.7 | 226.4 | 7.439 | 9.153 | 1681.9 | 1452.8 | 229.05 | 86.4 | | |
| Asymmetrical non-linear load as per IEC 62040-3 | | | | | | | | | | | Asymmetrical non-linear load as per IEC 62040-3 | | | | | | | | | | | | | | |
| Standby | | | 231.9 | Unom | 0.474 | 0.000 | 56.9 | 0.0 | 56.85 | | Standby | | | 231.5 | Unom | 0.716 | 0.000 | 57.3 | 0.0 | 57.34 | | | | | |

Table 25 Model 47

| Hersteller: | | Prüfdatum: | | | | | | | | | | Hersteller: | | Prüfdatum: | | | | | | | | | | | |
|---|-------------------------------------|----------------|--|---------------------|----------------------|---------------------|----------------------|---------------------|----------------------|--------------------|---|--------------|---------------------------|-------------------------------------|----------------|---|----------------------|---------------------|----------------------|---------------------|----------------------|--------------------|-------|-------|------|
| Typ: | | 31.08.2007 | | | | | | | | | | Typ: | | Temperatur [°C] | | | | | | | | | | | |
| Spannung: | | 26.4 | | | | | | | | | | Spannung: | | 26.4 | | | | | | | | | | | |
| Leistung: | | 26.4 | | | | | | | | | | Leistung: | | 26.4 | | | | | | | | | | | |
| Modell-Nr.: | | 30 | | | | | | | | | | Modell-Nr.: | | 30 | | | | | | | | | | | |
| Parameters | | | | | | | | | | | | Measurements | | | | | | | | | | | | | |
| Normal mode | Resistive load | Load | | U _{in} [V] | U _{out} [V] | I _{in} [A] | I _{out} [A] | P _{in} [W] | P _{out} [W] | P _v [W] | η [%] | Normal mode | Resistive load | Load | | U _{in} [V] | U _{out} [V] | I _{in} [A] | I _{out} [A] | P _{in} [W] | P _{out} [W] | P _v [W] | η [%] | | |
| | | 25% | P _N | 231.7 | 231.9 | 2.944 | 2.282 | 634.6 | 529.0 | 105.65 | 83.4 | | | 25% | P _N | 231.7 | 231.9 | 2.944 | 2.282 | 634.6 | 529.0 | 105.65 | 83.4 | | |
| | | 50% | P _N | 228.9 | 231.3 | 5.275 | 4.576 | 1182.9 | 1058.7 | 124.20 | 89.5 | | | 50% | P _N | 228.9 | 231.3 | 5.275 | 4.576 | 1182.9 | 1058.7 | 124.20 | 89.5 | | |
| | | 75% | P _N | 232.5 | 230.9 | 7.717 | 6.880 | 1775.3 | 1588.0 | 187.25 | 89.5 | | | 75% | P _N | 232.5 | 230.9 | 7.717 | 6.880 | 1775.3 | 1588.0 | 187.25 | 89.5 | | |
| | 100% | P _N | 225.7 | 230.5 | 10.538 | 9.188 | 2359.5 | 2117.5 | 242.00 | 89.7 | 100% | | P _N | 225.7 | 230.5 | 10.538 | 9.188 | 2359.5 | 2117.5 | 242.00 | 89.7 | | | | |
| | Non-lineare-Load as per IEC 62040-3 | | 25% <td>S_N</td> <td>232.9</td> <td>232.0</td> <td>2.809</td> <td>3.192</td> <td>605.6</td> <td>516.9</td> <td>88.65</td> <td>85.4</td> <th colspan="2">Non-lineare-Load as per IEC 62040-3</th> <th>25% <td>S_N</td> <td>232.9</td> <td>232.0</td> <td>2.809</td> <td>3.192</td> <td>605.6</td> <td>516.9</td> <td>88.65</td> <td>85.4</td> </th> | S _N | 232.9 | 232.0 | 2.809 | 3.192 | 605.6 | 516.9 | 88.65 | | 85.4 | Non-lineare-Load as per IEC 62040-3 | | 25% <td>S_N</td> <td>232.9</td> <td>232.0</td> <td>2.809</td> <td>3.192</td> <td>605.6</td> <td>516.9</td> <td>88.65</td> <td>85.4</td> | S _N | 232.9 | 232.0 | 2.809 | 3.192 | 605.6 | 516.9 | 88.65 | 85.4 |
| | 50% | S _N | 231.8 | 231.5 | 5.080 | 6.374 | 1153.0 | 1021.5 | 131.45 | 88.6 | 50% | | S _N | 231.8 | 231.5 | 5.080 | 6.374 | 1153.0 | 1021.5 | 131.45 | 88.6 | | | | |
| | 75% | S _N | 231.2 | 231.0 | 7.613 | 9.595 | 1741.9 | 1560.0 | 181.95 | 89.6 | 75% | | S _N | 231.2 | 231.0 | 7.613 | 9.595 | 1741.9 | 1560.0 | 181.95 | 89.6 | | | | |
| | 100% | S _N | 231.3 | 230.6 | 10.032 | 12.785 | 2301.0 | 2046.5 | 254.50 | 88.9 | 100% | | S _N | 231.3 | 230.6 | 10.032 | 12.785 | 2301.0 | 2046.5 | 254.50 | 88.9 | | | | |
| | Maximum output current λ= | | 0.67 | 230.8 | 230.5 | 10.997 | 14.044 | 2516.5 | 2182.0 | 334.50 | 86.7 | | Maximum output current λ= | | 0.67 | 230.8 | 230.5 | 10.997 | 14.044 | 2516.5 | 2182.0 | 334.50 | 86.7 | | |
| Asymmetrical non-linear load as per IEC 62040-3 | | | | | | | | | | | Asymmetrical non-linear load as per IEC 62040-3 | | | | | | | | | | | | | | |
| Standby | | | 231.3 | Unom | 0.873 | 0.000 | 70.0 | 0.0 | 70.00 | | Standby | | | 231.3 | Unom | 0.873 | 0.000 | 70.0 | 0.0 | 70.00 | | | | | |

9.6. TABLE OF MEASUREMENTS 3 VFD-UPS

Table 26 Models 8 and 9

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|------|----------------|-------|-------------------|---------------------|----------------------|---------------------|----------------------|---|---|------------------------------------|-------|----------------|-------------------------------------|--------|----------------|--------|----------------|---------------------|----------------------|---------------------|----------------------|---------------------|--------------------------|--------------------|-------|------|--|
| Hersteller: | | | | | | | | | | Prüfdatum: 28.06.2007 | | | | | | | | | | | | | | | | | | | |
| Typ: | | | | | | | | | | Temperatur [°C]: 22.8 | | | | | | | | | | | | | | | | | | | |
| Spannung: 220-240 V 50/60 Hz | | | | | Leistung: 1000 VA | | | | | Klasse: 700 W | | | | | VFD Voltage and Frequency Dependent | | | | | Line Interactive | | | | | Rel. Feuchte [%r.H.]: 31 | | | | |
| Modell-Nr: M8-VFD-1000/800 | | | | | | | | | | Modell-Nr: M9-VFD-2000/1340 | | | | | | | | | | | | | | | | | | | |
| Parameters | | | | | | | | | | Parameters | | | | | | | | | | | | | | | | | | | |
| Normal mode | Resistive load | Load | | 25% | P _N | U _{In} [V] | U _{Out} [V] | I _{In} [A] | I _{Out} [A] | P _{In} [W] | P _{Out} [W] | P _V [W] | η [%] | Normal mode | Resistive load | Load | | 25% | P _N | U _{In} [V] | U _{Out} [V] | I _{In} [A] | I _{Out} [A] | P _{In} [W] | P _{Out} [W] | P _V [W] | η [%] | | |
| | | 50% | P _N | 231.9 | 231.4 | 0.848 | 0.768 | 196.0 | 177.7 | 18.27 | 90.7 | 231.8 | 230.6 | | | 1.6216 | 1.6021 | 373.8 | 346.4 | 27.4 | 92.7 | | | | | | | | |
| | | 75% | P _N | 231.4 | 230.2 | 2.384 | 2.206 | 590.9 | 530.2 | 20.70 | 96.2 | 230.7 | 228.4 | | | 4.562 | 4.448 | 1051.8 | 1016 | 35.8 | 96.6 | | | | | | | | |
| | | 100% | P _N | 231.2 | 229.6 | 3.174 | 2.898 | 736.0 | 705.8 | 30.20 | 95.9 | 230.2 | 227.3 | | | 6.069 | 5.968 | 1396.6 | 1353.6 | 43 | 96.9 | | | | | | | | |
| | Non-linear-Load as per IEC 62040-3 | 25% | S _N | 231.7 | 231.2 | 1.213 | 1.099 | 201.2 | 175.1 | 26.17 | 87.0 | 231.6 | 230.8 | 2.21 | 2.156 | 374.8 | 346.4 | 28.4 | 92.4 | | | | | | | | | | |
| | | 50% | S _N | 231.6 | 230.8 | 2.227 | 2.146 | 370.2 | 349.9 | 20.30 | 94.5 | 231 | 229.5 | 4.266 | 4.216 | 718.8 | 683.5 | 35.3 | 95.1 | | | | | | | | | | |
| | | 75% | S _N | 231.3 | 230.2 | 3.199 | 3.360 | 549.6 | 520.7 | 28.90 | 94.7 | 230.6 | 228.6 | 6.266 | 6.221 | 1056.4 | 1010.6 | 45.8 | 95.7 | | | | | | | | | | |
| | | 100% | S _N | 231.1 | 229.6 | 4.209 | 4.411 | 725.9 | 699.5 | 36.40 | 92.2 | 230.1 | 227.2 | 8.26 | 8.196 | 1412.2 | 1345.2 | 67 | 95.3 | | | | | | | | | | |
| | Maximum output current λ:= | | | | 0.72 | | 231.0 | 229.4 | 4.625 | 4.403 | 765.5 | 724.3 | 41.20 | 94.6 | λ:= | | | | 0.71 | | 230 | 226.6 | 9.614 | 9.566 | 1611.2 | 1539 | 73.2 | 95.5 | |
| | Asymmetrical non-linear load as per IEC 62040-3 | | | | | | | | | | Asymmetrical non-linear load as per IEC 62040-3 | | | | | | | | | | | | | | | | | | |
| Standby | | | | | | | | | | Standby | | | | | | | | | | | | | | | | | | | |
| Bypass Mode | Resistive load | 50% | P _N | 231.8 | Unom | 0.097 | 0 | 18.01 | 0 | 18.01 | | | | Bypass Mode | Resistive load | 50% | P _N | 231.6 | 230.8 | 1.615 | 1.535 | 373.8 | 354.2 | 19.60 | 94.8 | | | | |
| | | 100% | P _N | 231.6 | 229.7 | 3.156 | 3.075 | 729.2 | 705.4 | 23.80 | 96.7 | 231.7 | Unom | | | 0.21 | 0 | 25.66 | 0 | 25.66 | | | | | | | | | |
| | Non-linear-Load as per IEC 62040-3 | 50% | S _N | 231.6 | 230.8 | 2.234 | 2.156 | 372.8 | 352.6 | 20.20 | 94.6 | Non-linear-Load as per IEC 62040-3 | 50% | S _N | 231.6 | 230.8 | 2.234 | 2.156 | 372.8 | 352.6 | 20.20 | 94.6 | | | | | | | |
| | | 100% | S _N | 230.2 | 230.2 | 4.294 | 4.234 | 708.4 | 683.2 | 25.20 | 96.4 | | 100% | S _N | 230.2 | 230.2 | 4.294 | 4.234 | 708.4 | 683.2 | 25.20 | 96.4 | | | | | | | |
| | Maximum output current λ:= | | | | 0.64 | | 230.8 | 229.6 | 5.804 | 5.714 | 932.8 | 839.8 | 93.00 | 90.0 | λ:= | | | | 0.64 | | 230.8 | 229.6 | 5.804 | 5.714 | 932.8 | 839.8 | 93.00 | 90.0 | |
| Asymmetrical non-linear load as per IEC 62040-3 | | | | | | | | | | Asymmetrical non-linear load as per IEC 62040-3 | | | | | | | | | | | | | | | | | | | |
| Standby | | | | | | | | | | Standby | | | | | | | | | | | | | | | | | | | |

Table 27 Model 11

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|------|----------------|-------|---------------------|---------------------|----------------------|---------------------|----------------------|---|---|------------------------------------|----------------|----------------|----------------|-------|-------|-------|----------------|---------------------|----------------------|---------------------|----------------------|---------------------|--------------------------|--------------------|-------|------|--|
| Hersteller: | | | | | | | | | | Prüfdatum: 03.07.2007 | | | | | | | | | | | | | | | | | | | |
| Typ: | | | | | | | | | | Temperatur [°C]: 24.4 | | | | | | | | | | | | | | | | | | | |
| Spannung: 220-240 V 50/60 Hz | | | | | I _{max} 5A | | | | | Leistung: 350VA | | | | | Klasse: 210 W | | | | | VFD SY 333 | | | | | Rel. Feuchte [%r.H.]: 41 | | | | |
| Modell-Nr: M11-VFD-350/210 | | | | | | | | | | Modell-Nr: M11-VFD-350/210 | | | | | | | | | | | | | | | | | | | |
| Parameters | | | | | | | | | | Parameters | | | | | | | | | | | | | | | | | | | |
| Normal mode | Resistive load | Load | | 25% | P _N | U _{In} [V] | U _{Out} [V] | I _{In} [A] | I _{Out} [A] | P _{In} [W] | P _{Out} [W] | P _V [W] | η [%] | Normal mode | Resistive load | Load | | 25% | P _N | U _{In} [V] | U _{Out} [V] | I _{In} [A] | I _{Out} [A] | P _{In} [W] | P _{Out} [W] | P _V [W] | η [%] | | |
| | | 50% | P _N | 223.2 | 223.4 | 0.250 | 0.250 | 47.5 | 38.3 | 9.20 | 80.6 | 223.5 | Unom | | | 0.082 | | 9.87 | 0 | 9.87 | | | | | | | | | |
| | | 75% | P _N | 222.8 | 222.5 | 0.490 | 0.490 | 119.6 | 108.9 | 10.69 | 91.1 | 222.2 | 222.8 | | | 0.730 | 0.730 | 172.3 | 162.4 | 9.91 | 94.2 | | | | | | | | |
| | | 100% | P _N | 222.2 | 222.3 | 0.966 | 0.966 | 224.2 | 214.6 | 9.60 | 95.7 | 222.4 | 222.3 | | | 0.966 | 0.966 | 224.2 | 214.6 | 9.60 | 95.7 | | | | | | | | |
| | Non-linear-Load as per IEC 62040-3 | 25% | S _N | 222.9 | 222.8 | 0.433 | 0.404 | 70.9 | 60.8 | 10.15 | 85.7 | 222.9 | 222.8 | 0.433 | 0.404 | 70.9 | 60.8 | 10.15 | 85.7 | | | | | | | | | | |
| | | 50% | S _N | 226.0 | 225.8 | 0.814 | 0.790 | 132.6 | 124.5 | 8.10 | 93.9 | 226.0 | 225.8 | 0.814 | 0.790 | 132.6 | 124.5 | 8.10 | 93.9 | | | | | | | | | | |
| | | 75% | S _N | 226.6 | 226.0 | 1.196 | 1.175 | 198.4 | 187.7 | 10.64 | 94.6 | 226.6 | 226.0 | 1.196 | 1.175 | 198.4 | 187.7 | 10.64 | 94.6 | | | | | | | | | | |
| | | 100% | S _N | 226.9 | 226.2 | 1.564 | 1.542 | 259.2 | 246.8 | 12.40 | 95.2 | 226.9 | 226.2 | 1.564 | 1.542 | 259.2 | 246.8 | 12.40 | 95.2 | | | | | | | | | | |
| | Maximum output current λ:= | | | | 0.69 | | 222.2 | 222.4 | 1.648 | 1.625 | 261.3 | 249.6 | 11.70 | 95.5 | λ:= | | | | 0.69 | | 222.2 | 222.4 | 1.648 | 1.625 | 261.3 | 249.6 | 11.70 | 95.5 | |
| | Asymmetrical non-linear load as per IEC 62040-3 | | | | | | | | | | Asymmetrical non-linear load as per IEC 62040-3 | | | | | | | | | | | | | | | | | | |
| Standby | | | | | | | | | | Standby | | | | | | | | | | | | | | | | | | | |
| Surge Protected Output | Resistive load | 50% | P _N | 222.2 | 224.2 | 0.546 | 0.490 | 120.5 | 108.8 | 11.73 | 90.3 | Surge Protected Output | Resistive load | 50% | P _N | 222.2 | 224.2 | 0.546 | 0.490 | 120.5 | 108.8 | 11.73 | 90.3 | | | | | | |
| | | 100% | P _N | 221.6 | 222.4 | 1.015 | 0.966 | 225.5 | 215.2 | 10.30 | 95.4 | | | 100% | P _N | 221.6 | 222.4 | 1.015 | 0.966 | 225.5 | 215.2 | 10.30 | 95.4 | | | | | | |
| | Non-linear-Load as per IEC 62040-3 | 50% | S _N | 226.2 | 226.0 | 0.816 | 0.793 | 134.8 | 125.1 | 9.69 | 92.8 | Non-linear-Load as per IEC 62040-3 | 50% | S _N | 226.2 | 226.0 | 0.816 | 0.793 | 134.8 | 125.1 | 9.69 | 92.8 | | | | | | | |
| | | 100% | S _N | 222.0 | 222.5 | 1.570 | 1.544 | 250.6 | 240.0 | 10.60 | 95.8 | | 100% | S _N | 222.0 | 222.5 | 1.570 | 1.544 | 250.6 | 240.0 | 10.60 | 95.8 | | | | | | | |
| | Maximum output current λ:= | | | | 0.70 | | 222.7 | 222.0 | 2.088 | 2.066 | 332.6 | 320.4 | 12.20 | 96.3 | λ:= | | | | 0.70 | | 222.7 | 222.0 | 2.088 | 2.066 | 332.6 | 320.4 | 12.20 | 96.3 | |
| Asymmetrical non-linear load as per IEC 62040-3 | | | | | | | | | | Asymmetrical non-linear load as per IEC 62040-3 | | | | | | | | | | | | | | | | | | | |
| Standby | | | | | | | | | | Standby | | | | | | | | | | | | | | | | | | | |