

# SYMBIOSIS

Data Centre Energy Management Software



Professional energy analysis and control solution for the smart rack.

Cost-efficient, simple, distributed and modular.

## Symbiosis: Professional energy management is now available for all data centres!

With **Symbiosis**, professional energy management becomes available to small and medium-sized data centres for the first time – cost-efficient, simple, flexible, distributed and modular.

Alert	Name	Category	Remote Lab Location	Vendor	Value
Alert	9 ports	PDU	Remote Lab Location	Vendor	0 A
Alert	my PX	PDU	My Location Location	Vendor	2 A
Alert	Sensor Rack 1	SENSORBOX	CeBIT Location	Vendor	26.59 c
Alert	Single Port	PDU	Remote Lab Location	Vendor	0.08 A
	dpm27	PANELMETER	Remote Lab Location	Vendor	0.03 A
	my PX3	PDU	My Location Location	Vendor	0.09 A
	PDUeXPRT	PDU	Haag Germany Location	Vendor	0 W

## Savings, energy efficiency, sustainability: Green IT in your data centre with Symbiosis

Measuring and analysing energy usage in computer centres offers the biggest opportunity for savings and has hence become a central focus of managers and analysts. Legal changes and rising energy costs now force small and medium-sized computer centres and industrial IT installations to reconsider their energy strategies.

## Symbiosis Overview

### Intuitively optimize the energy consumption in your data centre with Symbiosis

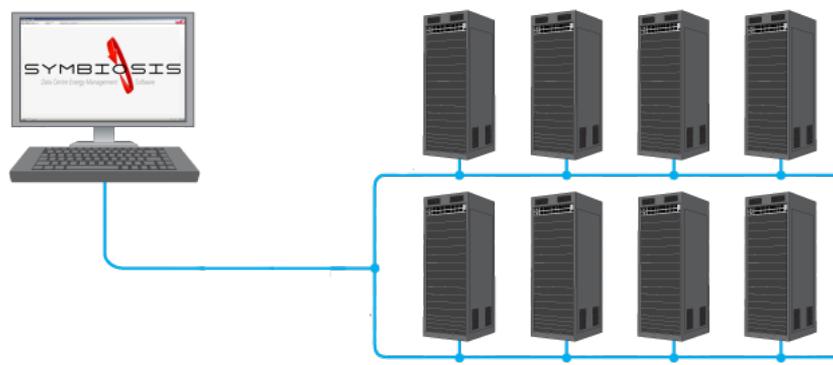
**Symbiosis** supports you in optimizing the energy consumption of your data centre in a very comprehensive way. As an innovative energy monitoring and management system, **Symbiosis** provides simple, reliable and cost-efficient collection, management and control of vital energy and environmental data of data centres. You can see all connected PDUs, cooling systems and sensors clearly structured and at a glance at any time.

### Increase the competitiveness of your data centre with Symbiosis

For the first time, **Symbiosis** enables small and medium-sized data centres to measure, and thus reduce, their energy consumption effectively and comprehensively and increase their competitiveness.

### The Symbiosis installation runs (almost) automatically and identifies all your PDUs, sensors, cooling systems and other DC equipment

**Symbiosis** provides energy monitoring and control for PDUs and sensors from many different manufacturers in one place and registers everything connected to it automatically – an essential feature in the heterogenous technology landscape of data centres and no additional installation hassle for you (currently we support PDUs and sensors from Raritan, **PDU eXpert**, Schleifenbauer and Gude). **Symbiosis** also adapts optimally to different sensors of a data centre.



### We offer two solutions of Symbiosis for professional use:

- An industrial-quality hardware solution
- Software solution (virtual machine) – more cost-effective and can be easily integrated in every IT landscape

**Symbiosis is based on Internet of Things (IoT) technologies and can therefore be used in a completely geographically flexible and modular way.**

## Symbiosis Advantages

### Smart Rack: Profit from this game changing architecture with Symbiosis

- **Symbiosis** is an innovative and distributed monitoring and control system. As such it offers you a better, more intelligent and more flexible way to collect and manage the large amounts of data provided from current energy and sensor sources, compared to older, monolithic concepts (e.g. DCIM).
- A Smart Rack is a single intelligent rack, and groups its contained servers with their PDUs, and sensors into one logical unit of management.
- This Smart Rack will provide detailed analysis data to a specific customer group, and will be connected in a standard hierarchical manner to concentrators which then provide a wider group of management and administrators with the type of data they need (e.g. history and trending over the complete data center or specific events).
- The auto-detect feature of **Symbiosis** will automatically provide IP-devices with an address on the private network, and will add the device to your management overview. (Note: only possible for supported devices with DHCP and using factory settings).
- This means that there is no need for costly in-cabinet IP or other configuration or additional Ethernet switches, turning your cabinet into a Smart Rack.
- In contrast to many DCIM platforms **Symbiosis** offers full device support: instead of only very simple SNMP GET-functions of many DCIM platforms, **Symbiosis** supports all measurement and control functions of a connected device through our specially designed device software.

Overview  
Overview of all devices

Details  
Single Port

Alarms  
9

Reports  
Generate energy reports

Fast-Switch to ▼

Information

Configuration

## Single Port

**Input Measurements**

parameter	L1	history
energy total	497.00 kWh	
energy subtotal	272.00 kWh	
power	19.11 W	<div style="width: 100%; height: 10px; background-color: #ffc0cb;"></div>
apparent power	19.12 VA	<div style="width: 100%; height: 10px; background-color: #ffc0cb;"></div>
power factor	100.0 %	<div style="width: 100%; height: 10px; background-color: #ffc0cb;"></div>
actual current	0.08 A	<div style="width: 100%; height: 10px; background-color: #ffc0cb;"></div>
peak current	4.25 A	<div style="width: 100%; height: 10px; background-color: #ffc0cb;"></div>
actual voltage	238.89 V	<div style="width: 100%; height: 10px; background-color: #ffc0cb;"></div>
min. voltage	V	

**PDU Measurements**

parameter	value	history
int. temperature	28.93 °C	<div style="width: 100%; height: 10px; background-color: #ffc0cb;"></div>
int. peak temperature	34.50 °C	<div style="width: 100%; height: 10px; background-color: #ffc0cb;"></div>
ext. temperature	0 °C	<div style="width: 100%; height: 10px; background-color: #ffc0cb;"></div>
ext. peak temperature	0 °C	<div style="width: 100%; height: 10px; background-color: #ffc0cb;"></div>

**Actions**

parameter	value
reboot	<span style="background-color: #6c757d; color: white; padding: 2px 5px; border-radius: 4px;">execute</span>
reset alarms	<span style="background-color: #6c757d; color: white; padding: 2px 5px; border-radius: 4px;">execute</span>
reset peak values	<span style="background-color: #6c757d; color: white; padding: 2px 5px; border-radius: 4px;">execute</span>
reset input subtotals	<span style="background-color: #6c757d; color: white; padding: 2px 5px; border-radius: 4px;">execute</span>
reset output subtotals	<span style="background-color: #6c757d; color: white; padding: 2px 5px; border-radius: 4px;">execute</span>

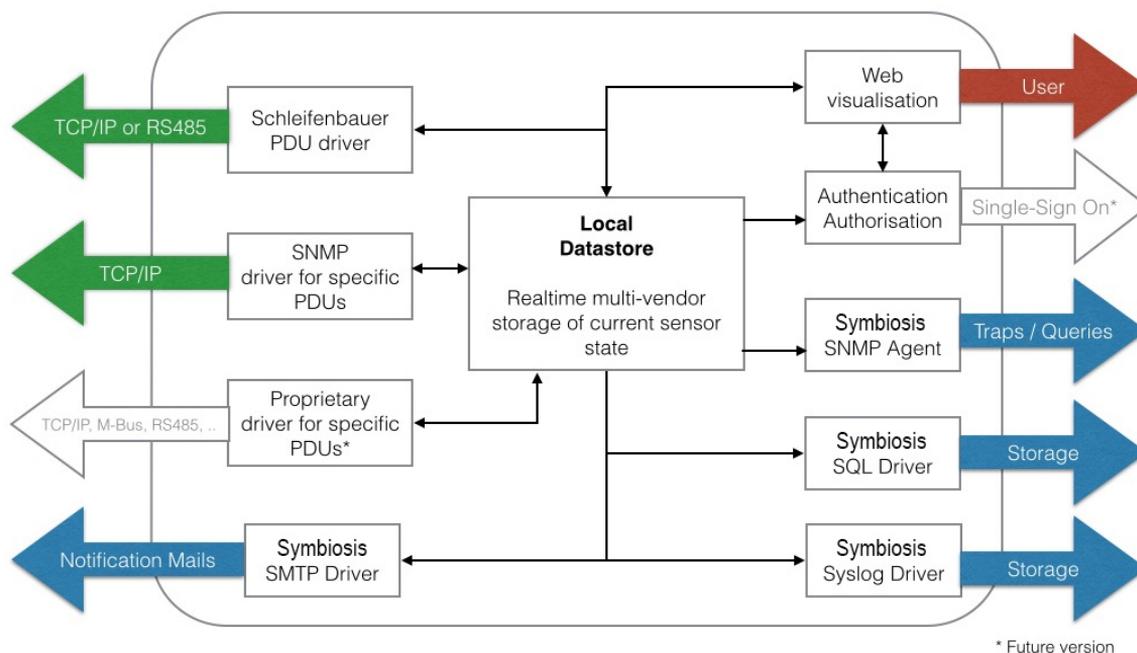


## Symbiosis offers you many more advantages

- **Symbiosis** presents you and your users with their energy and sensors data in a way that they can easily and quickly understand. A dashboard front page gives the user an overview of all connected devices, and with a single click, the detail page of a selected device.
- The collected data is visualized using state-of-the-art charting technology. You can easily see weighted averages and historical high values, both of which are important for determining the remaining power budget or for seeing trends over time.
- Reports based on the collected data can be created for further offline analysis of specific devices. These reports can be used as the basis for billing documents.
- Data or device changes are displayed immediately in **Symbiosis** - no need to refresh to see any changes.
- Many different PDU types and environmental sensors are fully supported by **Symbiosis**. The list growing all the time - please ask if your devices are supported.
- The **Symbiosis** user interface is displayed in the web browser on desktop and tablets, no plugins needed. Most modern browsers are supported (JavaScript must be enabled).
- Devices from different manufacturers which are being monitored and controlled within **Symbiosis** appear in a common form. This is a major advantage for users as they do not need to understand the remote device features. Should the user wish to access the on-device administration interface directly, this can be done with a single click.
- The embedded **Symbiosis** alarm architecture enhances the individual device alert systems with a unified concept of multiple thresholds. Alarms can be simply sent to multiple destinations (E-Mail, SYSLOG, Apps).
- The auto-detect **Symbiosis** architecture will automatically provide IP-devices with an address on the private network, and will after interviewing the device automatically register it. (Note: only possible for supported devices with DHCP and using factory settings). This means that there is no need for in-cabinet IP configuration or additional Ethernet switches, turning your cabinet into a Smart Rack.
- Direct access to non-ethernet remote devices via RS-485, RS-232C, USB, CAN-bus using Modbus and other protocols.
- The data from all the connected devices can be exported into a remote MySQL database. The user can then analyse the data from all the connected devices in any way he wishes.

## Symbiosis offers you many more advantages

- The **Symbiosis** notification data is available at various priority levels. Selected priority levels can be exported into the enterprise SYSLOG, sent as E-Mails.
- **Symbiosis** also includes a SNMP agent to allow its data to be collected by a SNMP manager. This SNMP manager then collects the data from all the different devices in a common form using the Symbiosis MIB.
- **Symbiosis** is a complete solution pre-installed on an industry quality device for immediate installation. It is also available as a virtual machine or Docker container.
- The **Symbiosis** architecture is based on a price winning industry standard "KURA". KURA, which in its turn is built on the OSGi standard, provides a secure and stable environment well placed in the IoT market place.
- The **Symbiosis** distributed architecture can be extended by linking the gateways to a **Symbiosis** concentrator. The industry standard secure protocol MQTT ensures that no data is lost in these transfers.
- Remote software support can be offered to users of **Symbiosis**. The support is based on the secure OSGi protocols, which only allow remote access when specifically enabled from the individual gateway. To maintain the customers network security strategy, the **Symbiosis** gateway (when enabled) makes an outgoing call to the support services, and does not need any incoming firewall rules.





## Symbiosis Specifications

### Supported remote devices

- All Schleifenbauer PDUs connected via the data-bus or Ethernet. Auto-detection only supported for hPDUs connected via Ethernet.
- Raritan PDUs connected via Ethernet.
- **PDUeXpert** PDUs connected via Ethernet. Auto-detection only supported when the DHCP client function is enabled.
- Gude PDUs connected via Ethernet.
- BM Green Cooling Sidecooler connected via RS-485.

### Installation

The installation of **Symbiosis** depends on the form factor:

- Preinstalled in an industrial quality fan-less device, with an external power supply. Depending on the customer interface requirements (multiple LANs, RS-485, RS-232, etc), different form factors are available. The devices can be mounted on the DIN-rail or in a 19 inch rack.
- Preinstalled in a virtual machine or Docker container to be installed on a server. This only offers single Ethernet support without auto-detection.

### Exporting data and events from Symbiosis

Symbiosis can easily be bound into an existing management structure using any of the following standard features:

- The data from all the connected devices can be exported to an external MySQL server. The schema that is necessary to set this up is available from our web-site.
- **Symbiosis** includes an SNMP agent (the MIB is available via the web-site). SNMP managers can query the **Symbiosis** gateway for data collected from the connected devices, and receive the important data in a concise form without the necessity of loading all the individual device MIBs.
- Notifications can be automatically passed on to SYSLOG server. **Symbiosis** offers a simple way to select which notifications are exported (e.g. only errors).
- Notifications can be automatically sent as E-mails to a specific user. The decision which notification level will be sent, is also a simple **Symbiosis** setup parameter. **Symbiosis** will try reduce the number of E-mails sent by packing multiple notifications into one message.
- Notifications can be sent via push to specific smartphone users.