

# Power Management designed for ICT Networking



# Networking architectures

**Networking** is the term used to describe a set of interconnecting systems that allows the processing, management and storage of information. Nowadays, networking is the infrastructure used by all types and sizes of enterprises and organisations to implement their business objectives.

With networking at the operational centre of any business, integrated power supply services **capable of guaranteeing** critical loads (**mission critical**), network devices (**switches**) and high-quality energy must be available continuously.

Due to this, an uninterruptible electricity supply is crucial, as a break in the electricity could lead to a serious risk of a break in the service (**downtime**) which is both inconvenient and costly.

	Black-out	Electrical disturbance
Cause	Atmospheric phenomena	Current and voltage peaks
	Short circuits	Frequency and voltage changes
	Overloads	Voltage distortion and flicker
	Human error	Current harmonics
Risks	Irretrievable data loss	Interference and micro-breaks
	Disk crash	Operating faults
	Hardware damage	Premature wear of electronic components
		Irreparable hardware damage
		Excessive consumption

The primary task of networking operators, ICT dealers, value-added retailers, system integrators and WISPs is to provide networking solutions with a high enough level of electrical protection to prevent risks deriving from blackouts or electrical disturbance, guaranteeing maximum continuity of service to the customer (**business continuity**).

Concrete benefits of reliable electrical protection	
Guaranteed business continuity in the event of blackouts	→ no breaks in operation and business services at any time
Loads protected at all times against network disturbances	→ longer load life
Efficient centralised management	→ reduced maintenance costs

## The system approach

The power supply system for a networking infrastructure must be approached taking the following 5 points into consideration: **distribution**, **protection**, **resilience**, **communication** and **monitoring**.



### Distribution (PDU)

The choice of cables, protection devices, **distribution** diagrams and automatic transfer systems (when there is a generator), is of crucial importance with regard to both the safety of personnel and the dispatching of electrical power in the system. Choosing cables or protection devices without taking the harmonics generated by the system's loads into account could result in the untimely tripping of protection devices or cable overheating, which can lead to breaks in the power supply or cause premature aging of system components, hazard situations for people or energy wastage.



### Protection (UPS)

**Electrical protection** nowadays has a much broader meaning than just blackouts. It also means protecting units from poor quality energy phenomena such as micro-breaks in the power supply or cause overvoltages, harmonics and flicker. There are different types of UPS designed specifically for different power supply conditions and load requirements.



### Resilience (STS)

Networking users require different levels of services. Credit card transaction services are compatible with rare downtime lasting a few minutes, if not seconds, whereas SOHO environment work stations can withstand prolonged breaks but not sudden ones, and the time needed for saving data and switching off correctly must always be guaranteed.

A single distribution line or UPS is not enough for heavier demands: these must be met by providing **redundancy**, to ensure that the protected service will not be affected in the unlikely event of an operation anomaly.



### Communication

The UPS must be connected to the network and controlled from a workstation, just like any other peripheral. ICT managers need to **monitor** the state of the systems equipment power supply at all times; if the autonomy limits are reached, the loads must switch off automatically. For more demanding or unmanned applications, maintenance personnel must be kept informed 24 hours a day, either locally or remotely, in order to respond quickly if faults occur.



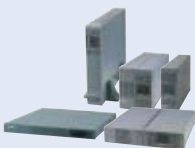




The UPS, therefore, must be supported by evolved and user-friendly communications software, compatible with the widest possible range of communication systems, i.e. those based on LAN/WAN networks, GSM and HTTP, SMTP, SNMP and JBUS protocols.



### Monitoring (EMD)

The **environmental monitoring** device, which is only compatible with Netys RT, can be installed inside the rack cabinet. It is designed to control two parameters, humidity and temperature, and four clean contacts enable physical or mechanical control (safety, water, fire and smoke). The status of all parameters can be remotely monitored via a specific web page and by configuring trip thresholds if necessary, with alert notification sent by email.

# Selection guide

	SOHO	<b>NetYS PL/NetYS PE</b>		<b>NetYS PR</b>	
		Good/High protection		High protection	
		Tower		Tower and Rack	
		-		Long back up time	
		-		-	
					
		SNMP/Network interface			
	SME	<b>NetYS RT</b>			
		Total protection			
		Tower/Rack (convertible)			
		Long back up time			
		Parallelable			
					
		SNMP/Network interface			
	CORPORATE	<b>Green Power</b>			
		Total protection			
		Cabinet (19" compatible)			
		Long back up time			
		Parallelable			
					
		SNMP/Network interface			

## The various levels of protection

	Good protection	High protection	Total protection
Black-out			
Current and voltage peaks			
Interference			
Voltage variations			
Microinterruptions			
Frequency variations			
Current harmonics			
Voltage distortion			

## Typologie

Model	NeTYS PL	NeTYS PE	NeTYS PR	NeTYS RT	GREEN POWER
Technology	Off-line	Line interactive	Line interactive with Automatic Voltage Regulation (AVR)	Online double conversion	
Level of protection	Good	High	High	Total	
Output waveform	Pseudo-sinusoidal	Pseudo-sinusoidal	Sinusoidal	Sinusoidal	
Normal supply	From mains	From mains via AVR	From mains via AVR	From UPS	
Emergency supply	With switching < 10 ms	With switching < 10 ms	With switching < 10 ms	Without switching	
Voltage regulation	No	Yes (step regulation)	Yes (step regulation)	Yes (continuous regulation)	
Frequency regulation	No	No	No	Yes	
Automatic bypass in case of failure	No	No	No	Yes	

## High availability

The exclusive use of a dual conversion on-line UPS (the best technology which provides the highest level of protection), is not always sufficient to guarantee the availability required by the application and correct business continuity.

The concept of High Availability is determined by the statistic quantifying the probability of downtime, and assumes the existence of one or more redundant solutions within the system, each capable of performing the same function within the system.

The solutions for achieving the highest level of availability depend on, among other factors, on the configuration of the electrical installation and the type of UPS systems used.

Socomec UPS offers 3 solutions:

- Automatic Transfer Systems (ATS): the system is integrated with an ASYS or **STATYS**,
- parallel redundant configuration (1+1): the system incorporates one more UPS module than is needed to protect the load,
- remote monitoring systems operating 24/7/365: the system is integrated with **T.SERVICE** for remote surveillance.

High Availability solutions are strongly recommended for mission critical loads, whose availability is essential to the assurance of business continuity.





# SOHO (Small Office Home Office)

The term **SOHO** (Small Office Home Office) refers to networking architecture which is relatively simple such as: small offices, home offices, shops and businesses.

These architectures are designed to allow users to share all the applications needed for the work activity in a network.

## Typical applications

- Floor distribution switch
- PC/workstations, monitors and printers
- CAD/graphics stations
- Fiscal recorders, POS readers, electronic scales

## Protection needs

It is important for the loads to either have distributed or centralised protection against blackouts and voltage changes. These can cause **downtime** lasting many minutes, seriously damaging any activities taking place.

## Solutions

The typical loads in these environments are usually not very complex and can withstand power cuts for a few fractions of a second. Simple and economical no-break power solutions can therefore be used, guaranteeing adequate protection with **minimum investment**.



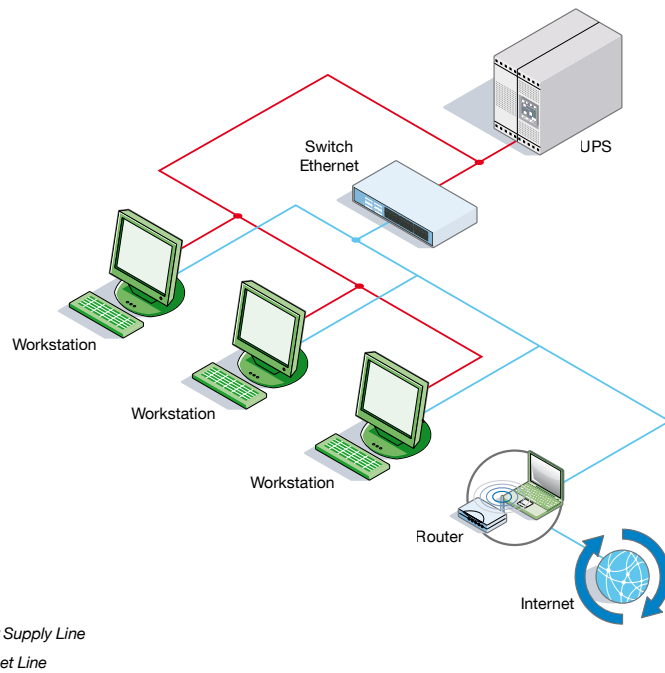
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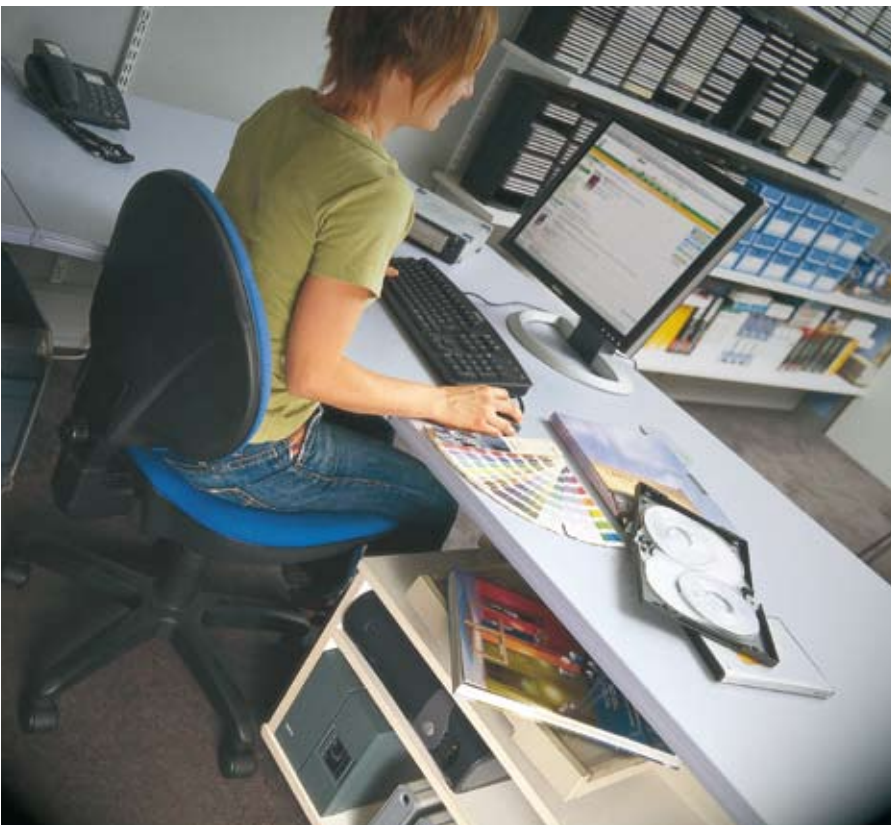
## UPS Solutions

Models	<b>NETYS PL</b>	<b>NETYS PE</b>	<b>NETYS PR</b>	<b>NETYS PR rack 1U</b>
Power (VA)	550 - 750	600 - 2000	1000 - 3000	1000 - 1500
Power (W)	330 - 450	360 - 1200	700 - 2100	670 - 1000
Input / output phases	1ph+n / 1ph+n	1ph+n / 1ph+n	1ph+n / 1ph+n	1ph+n / 1ph+n
Technology	Offline	Interactive line	Interactive line	Interactive line
Output waveform	Pseudo-sinusoidal	Pseudo-sinusoidal	Sinusoidal	Sinusoidal
Type of installation	Tower	Tower	Tower and Rack	Rack
Equipment supplied	Telephone/modem/xDSL line protection	Telephone/modem/xDSL line protection	Data line protection against atmospheric overvoltages	Data line protection against atmospheric overvoltages
	USB port for Microsoft HID protection	USB port for Microsoft HID protection (excludes 400 VA)	Complete software	Complete software

## SOHO architecture



ICT 001 B GB



APPL 103 A

## NeTYS PL



550-750 VA

NETYS 048\_B

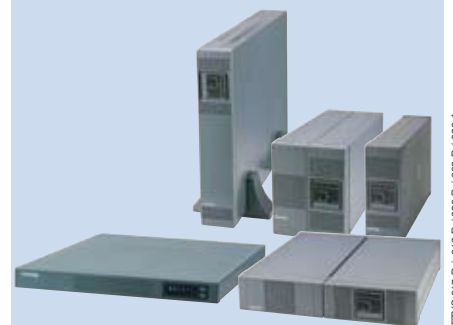
## NeTYS PE



600-2000 VA

GAIME 142\_A

## NeTYS PR



1000-3000 VA

NETYS 017\_B / 018\_B / 020\_B / 032\_B / 090\_A

# SME (Small and Medium Enterprises)

SME is the term used to describe small and medium-sized enterprises, where the main aim of the networking architecture is to **maximise** power supply and communication line costs. The system hinges on a

distribution network switch using PoE (Power over Ethernet) technology, by which both electricity and transmitted audio/video data pass through a single Ethernet cable.

Another feature is the server room, where the server, connected to a central switch (the building switch), manages the floor switches and other applications.

## Typical applications

- Floor distribution switch (PoE)
- Building distribution switch
- SIP server telephone switchboards
- VCR/Server recorder
- SAN (Storage Area Network)
- Firewall router
- Wireless access points (WLAN)
- VoIP telephone systems
- IP video surveillance systems

## Protection needs

The electrical power supplies of the PoE and building switches require protection, as the quality and continuity of the power supply to the remotely powered devices in the video surveillance, VoIP telephone and wireless network systems must be guaranteed.

It is also very important to provide a minimum level of **resilience** for the Mission Critical loads in the server rooms.

## Solutions

The typical loads in these environments require a **high level of protection** because they are more sensitive to electrical disturbances, overvoltages and all the possible interference from a mains network. The UPS must respond to the increasing demands of the loads whilst avoiding the propagation of electrical disturbances from (and to) the network. **Compact** UPS, designed to fit into 19" cabinet racks, provide functional and centralised protection to all the peripheral devices.

Greater levels of **reliability** can be attained by using **basic ATS switches** which, when there are two power supply sources, guarantee no-break electricity to a load by switching to a second source when a source fails or goes out of the load's tolerance range.



SITE 419 A



## UPS Solutions

Models	NETYS PR	NETYS PR RACK 1U	NETYS RT
Power (VA)	1000 - 3000	1000 - 1500	1100 - 11000
Power (W)	700 - 2100	670 - 1000	800 - 8000
Input / output phases	1ph+n / 1ph+n	1ph+n / 1ph+n	1ph+n / 1ph+n
Technology	Interactive line	Interactive line	Online double conversion
Output 'waveform'	Sinusoidal	Sinusoidal	Sinusoidal
Type of installation	Tower and Rack	Rack	Tower/Rack (convertible)
Equipment supplied	Data line protection against atmospheric overvoltages	Data line protection against atmospheric overvoltages	Kit Tower/Rack complete with cables
	Complete software	Complete software	Ethernet card and complete software included*
			Parallel redundant and manual bypass kit (optional)

\* according to model.



## Resilient solutions

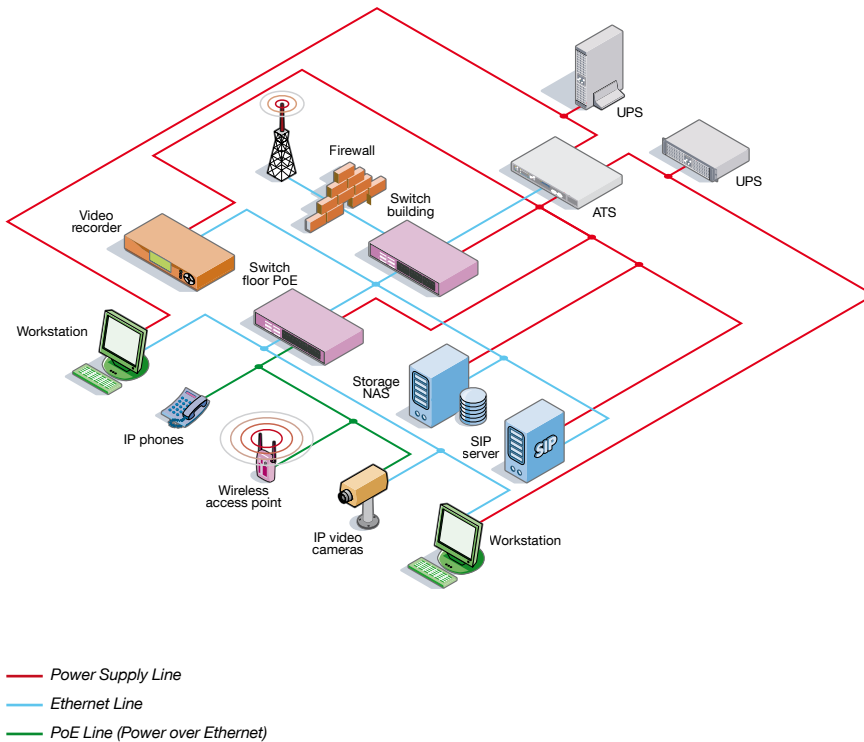
Models	ASYS
Nominal current (A)	16
Power (kVA)	3.6
Phases	1ph+n
Type of installation	Rack
Equipment supplied	Rack kit complete with cables
	IEC 320 input and output sockets



## Power Distribution Unit

Models	1-phase	3-phase
Input rated current (A)	32	16
Nominal input voltage (VAC)	200 - 240	346 - 415
Input/output phases	1ph+n / 1ph+n	3ph+n (Y) / 1ph+n
Type of installation	Vertical Zero-U	Vertical Zero-U
Input connector	IEC309-32 A-3 W	IEC309-16 A-5 W
Output connectors	(24) IEC320-C13	(36) IEC320-C13
	(4) IEC320-C19	(3) IEC320-C19

## SME architecture



ICT 002 B GB



SITE 458 A

## NeTYS PR



NeTYS 017 B / 018 B / 032 B / 050 A

1000 - 3000 VA

## NeTYS RT



GAIME 110 A

1100 - 11000 VA

## ASYS



ASYS 006 A

16 A

## PDU



ASYS 005 A



# Corporate

**CORPORATE** refers to large scale business environments with an extensive presence both nationally and internationally. The networking architectures are highly complex, as they are designed to increase the **optimisation** of the entire data transmission process and

the **productivity** of the resources, both in the central offices and the peripheral branches. The enormous quantity of information to be handled means that the company requires a data centre in which the servers connected to the central switch (the campus switch)

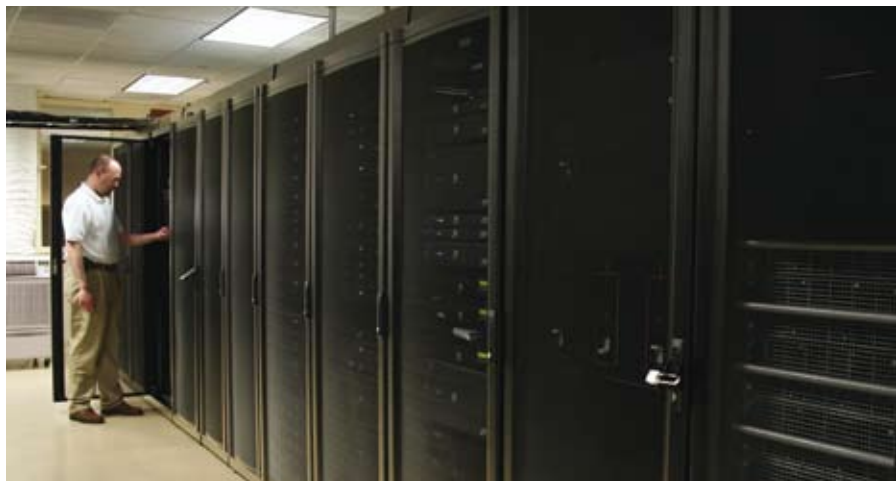
communicate with the server rooms in the peripheral branches via building switches.

## Typical applications

- Campus distribution switch
- Blade server
- SAN (Storage Area Network)
- PBX telephone switchboards
- Access Control System

## Protection needs

The main cause of power cuts in data centres is human error, related to mistaken actions or bad maintenance. Every minute of downtime can result in huge economic losses. Reliable, efficient and safe electrical protection must be provided for each level of the architecture, with a **smart system** for managing redundant power supply sources.



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## Solutions

The protection technology of the **UPS** must be of the **highest level**, generating a new power supply output at all times with a perfect sinusoidal waveform, independently of the input power supply with regard to both voltage and frequency.

Blade server and virtualization processes require ever greater levels of energy density. The **UPS**, must therefore, be highly efficient with an output power factor suitable for latest-generation equipment.

In the event of emergencies, the immediate switching between the two power sources is guaranteed by **STS** systems with double processors, designed for maximum reliability and full integration with BMS (Building Management Systems).



### UPS Solutions

Models	<b>NETYS RT</b>	<b>Green Power</b>
Power (kVA)	1.1 - 11	10 - 20
Power (kW)	0.8 - 8	9 - 18
Input / output phases	1ph+n / 1ph+n	3ph+n / 1ph+n
Technology	Online double conversion	Online double conversion
Output 'waveform'	Sinusoidal	Sinusoidal
Type of installation	Tower/Rack (convertible)	Cabinet (19" compatible)
Equipment supplied	Kit Tower/Rack complete with cables Ethernet card and complete software included* Parallel redundant and manual bypass kit (optional)	Ethernet card and complete software included Integrated maintenance bypass Interface for <b>T.Service</b> 24/7 remote maintenance

\* according to model.



### Power Distribution Unit

Models	<b>1-phase</b>	<b>3-phase</b>
Input rated current (A)	32	16
Nominal input voltage (VAC)	200 - 240	346 - 415
Input/output phases	1ph+n / 1ph+n	3ph+n (Y) / 1ph+n
Type of installation	Vertical Zero-U	Vertical Zero-U
Input connector	IEC309-32 A-3 W	IEC309-16 A-5 W
Output connectors	(24) IEC320-C13 (4) IEC320-C19	(36) IEC320-C13 (3) IEC320-C19



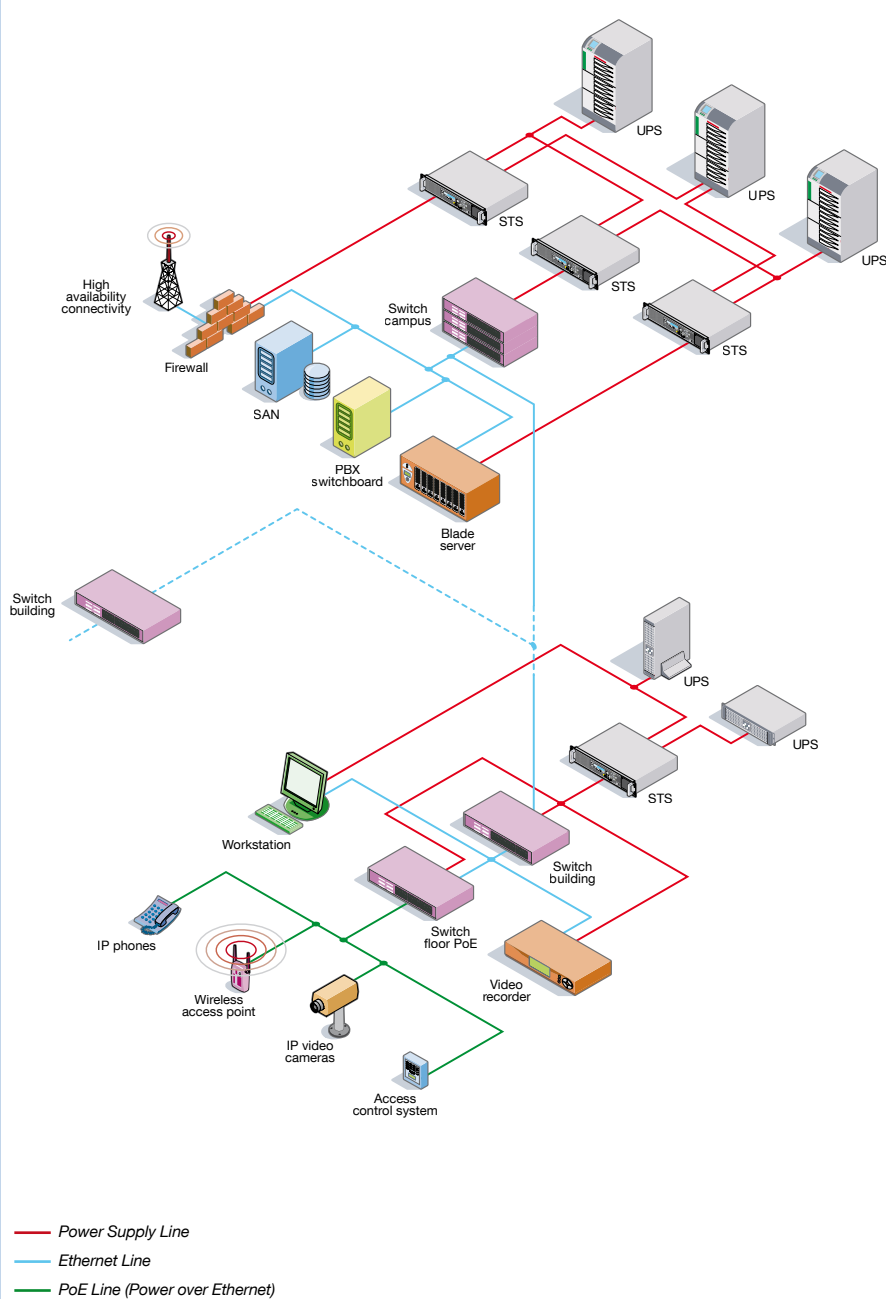
### Resilient solutions

Models	<b>STATYS</b>
Nominal current (A)	32 - 63
Power (kVA)	7.3 -14.5
Input/output phases	ph+n or ph-ph (+PE)
Type of installation	Rack
Equipment supplied	Rack kit complete with cables Ethernet card and complete software included Internal redundancy package (microprocessor, power supply, ventilation, SCR controls)* Hot Swap integrated maintenance bypass*

\* according to model.



## Corporate architecture



ICT 003 B GB

## NeTYS RT



1100 - 11000 VA

## Green Power



10 - 20 kVA

## STATYS



from 32 to 63 A

## PDU



GAMME 110 A

GREEN 016 B - GREEN 017 B

STATYS 044 A

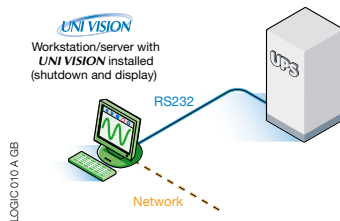
ASY/S 008 A

# Communication software and remote monitoring systems

## Monitoring and shutdown

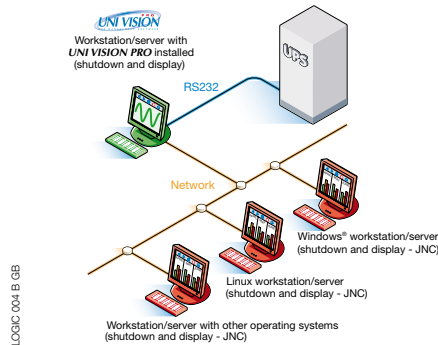
### • UNI VISION

The software allows the UPS to be managed from a workstation or server. The UPS can also be monitored from the other stations connected to the local network when exists.



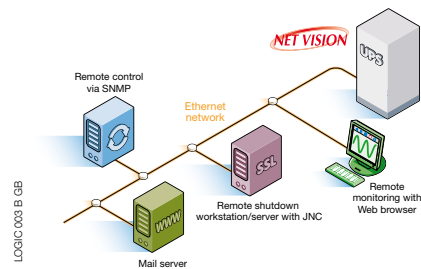
### • UNI VISION PRO

Similar features of **UNI VISION**, with several additional function, such as to program and carry out the automatic shutdown of remote server-based workstations connected to the network. The UPS can also be programmed by networked server-based workstations.



### • NET VISION

It is a communication and management interface designed for business networks. The UPS can be managed remotely and allows the shutdown of serverbased workstations. **NET VISION** allows a direct interface between the UPS and LAN network (via SNMP, HTTP...) avoiding dependence on the server. It is therefore compatible with all networks and multi-OS since it interacts via the Web browser.

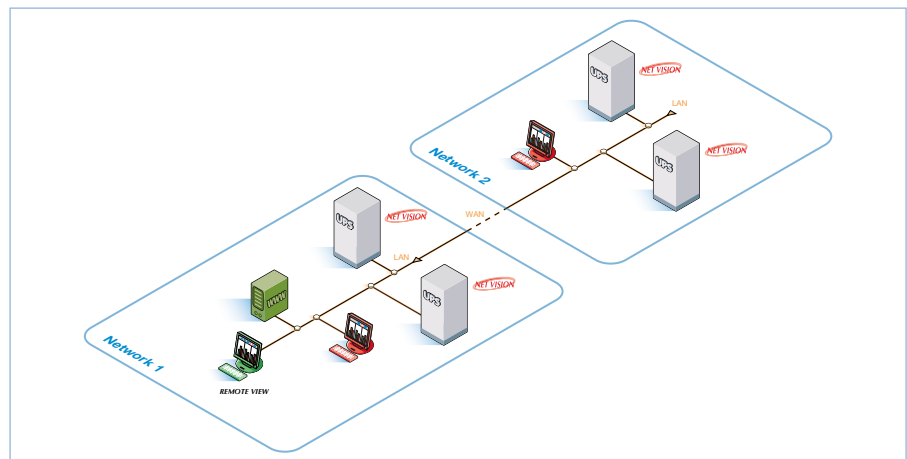


## Remote view

### • Centralized Monitoring System

Remote view is an application used for monitoring simultaneously up to 1024 devices equipped with **NET VISION** card or box through the LAN or the Internet. When an alarm happens in some monitored UPS, the icon that represent UPS will change to different colours according to the severity level, sending email to several addressees which has been set in program configuration dialog window.

Input and output voltages, battery capacity and load percentage are continuously monitored by Remote view program. Plant supervisors technician can have all the UPS under control in the same program window.

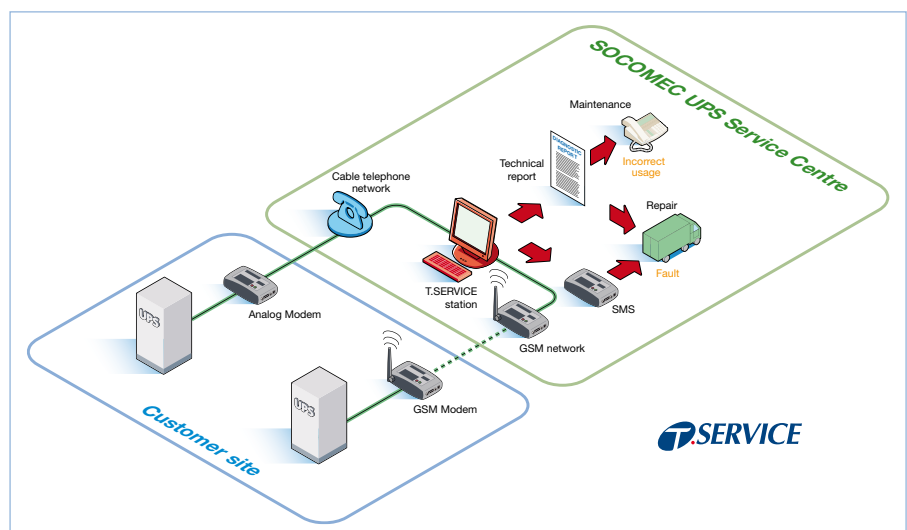


## T.SERVICE

**T.SERVICE** is a remote telephone or web based surveillance method that ensures a real time diagnosis 24 / 7 / 365. The UPS automatically sends regular reports against fault detection to the Service Centre.

### T.SERVICE advantages:

- 24/7/365 monitoring,
- prevention and early fault detection,
- risk and cost reduction,
- regular status reports,
- automatic repairing service activation,
- remote assistance of skilled technicians,
- in-depth knowledge of the plant.



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