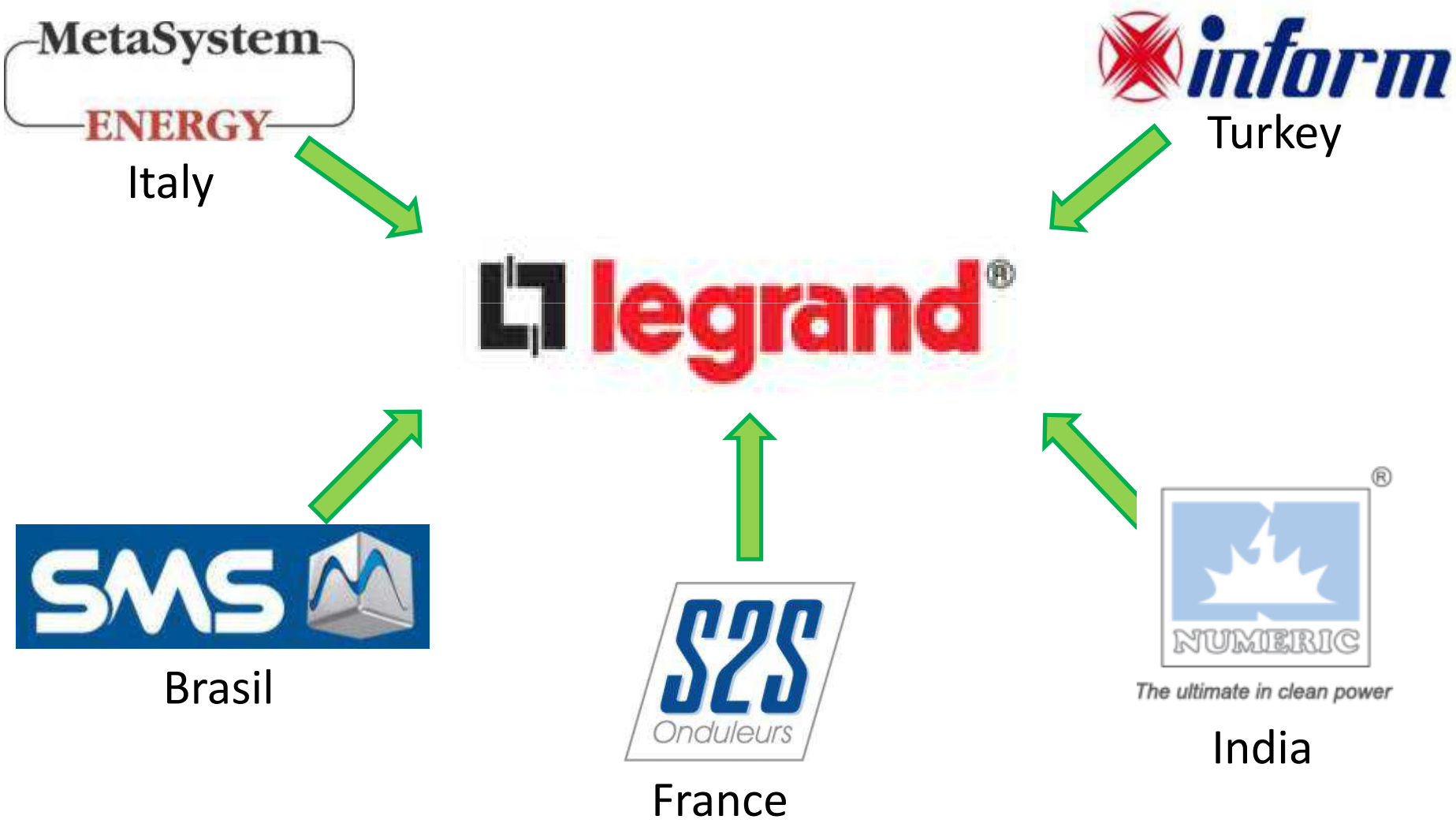


Legrand UPS 2016



Key events from 2010 to 2013:

5 UPS Company acquisitions in less than 3 years



UPS integration; Legrand Power Distrib. Systems

Hi Eff
Modular UPS

UPS Distr.
Panel



XL3 Cabinets

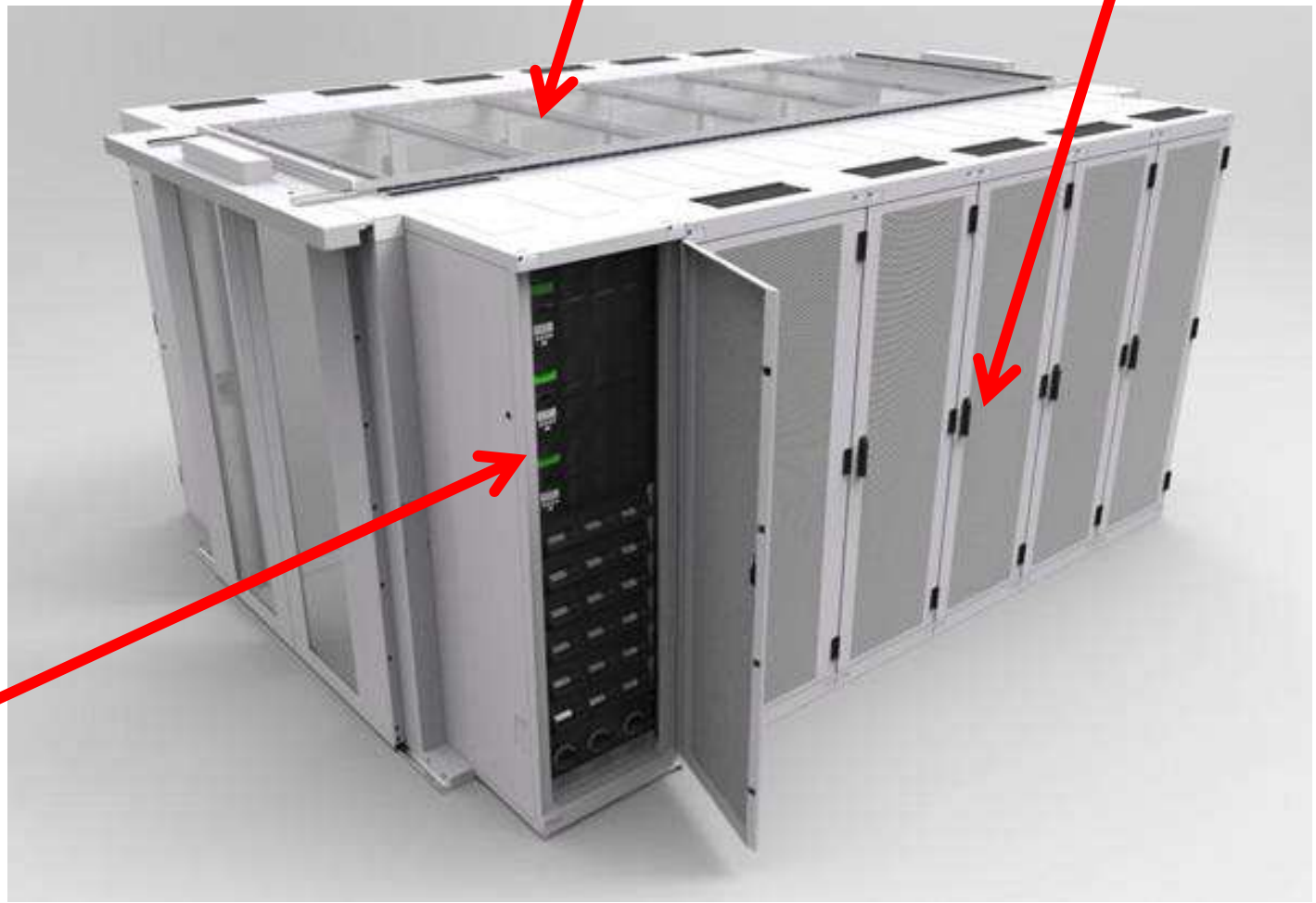


Internal
Bus Bar Distribution

Input and Output
Circuit breakers Panel

Gen Set Commutation Panel

UPS integration: Legrand Datacenter Solution



UPS integration: Legrand Building Automation



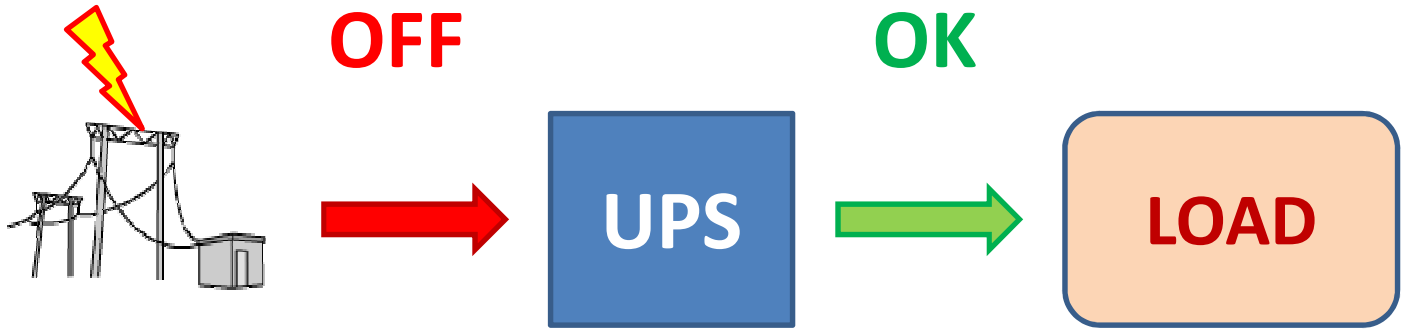




What is an UPS?

UPS is a power supply which guarantees:

Energy Continuity



&

Energy Cleaning



Energy Problems

The electric grid cannot guarantee a perfect power supply





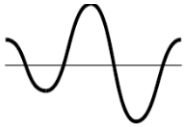




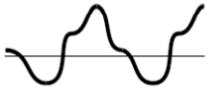
Black out.



Brown out



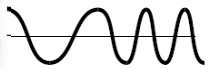
Surges



Harmonics



Spikes



Frequency Variations



EMC/RFI Disturbance

Critical Loads can be affected:

Equipment STOP

Computers STOP

Lights OFF

Workers STOP

Company STOP

Data Lost

Danger

Money Lost

Because Energy Problems…



…are a cost!!

UPS application fields



Everywhere it’s needed a safe and continue energy

UPS: How to choose?

Not Only

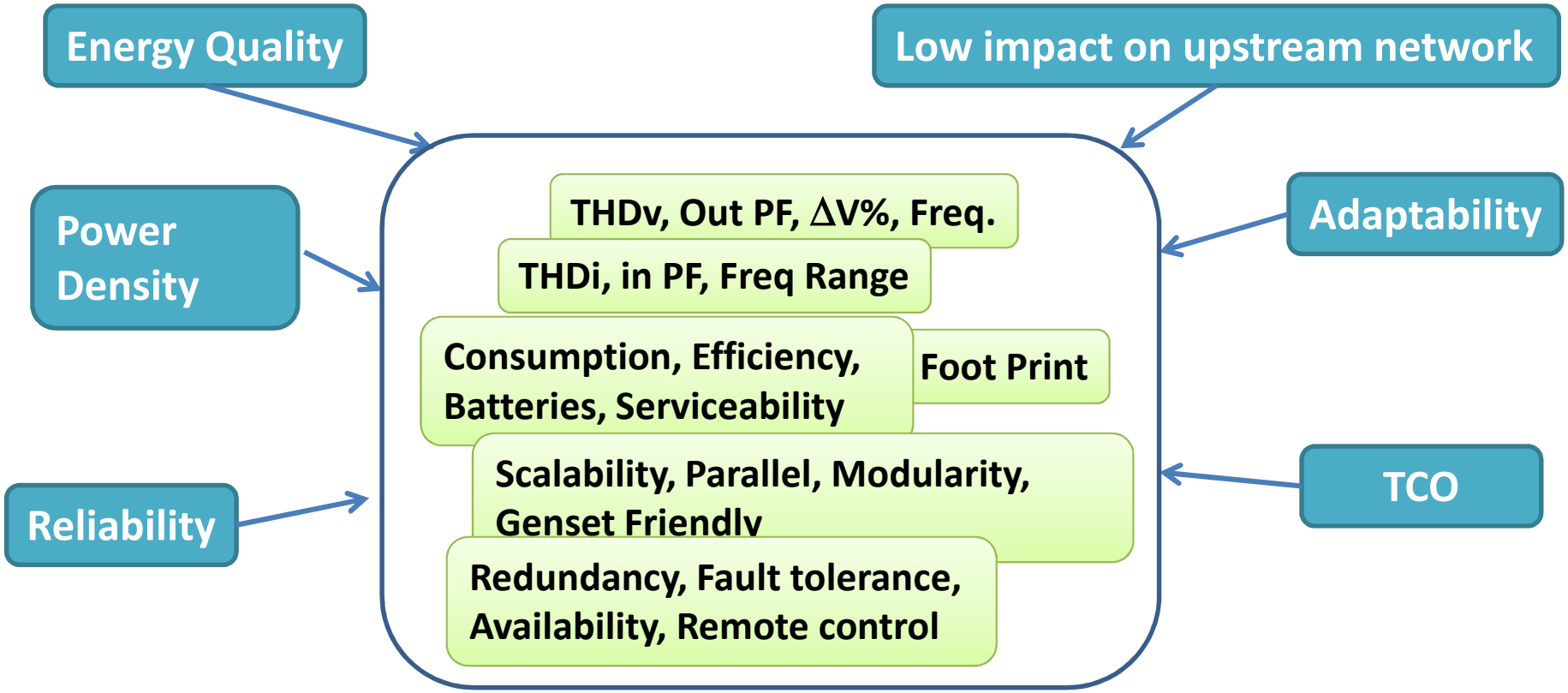






Power Autonomy Price!!

A Good choice must consider:



UPS: How to choose?

Topology

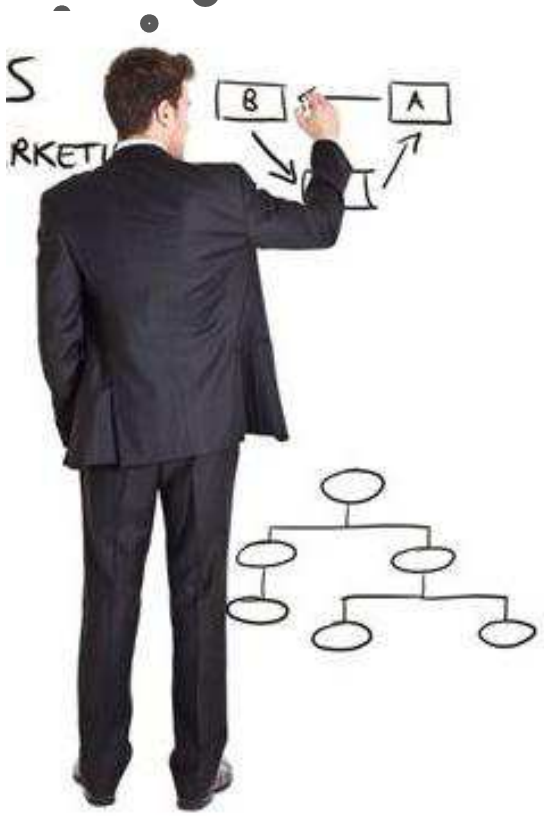
Performaces

Loads

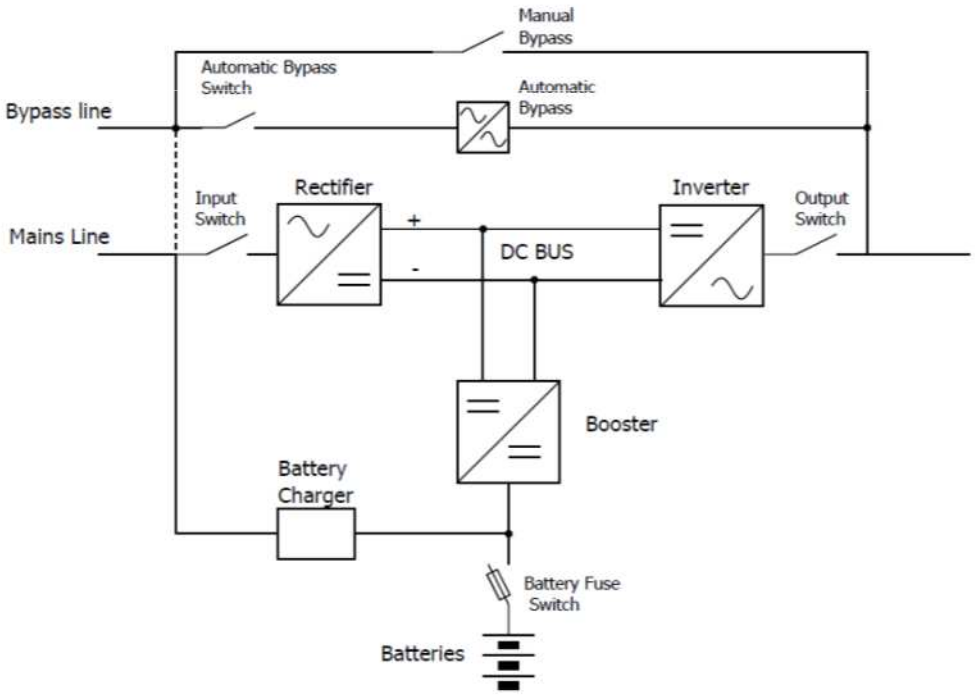
Architecture

Controls

Risks

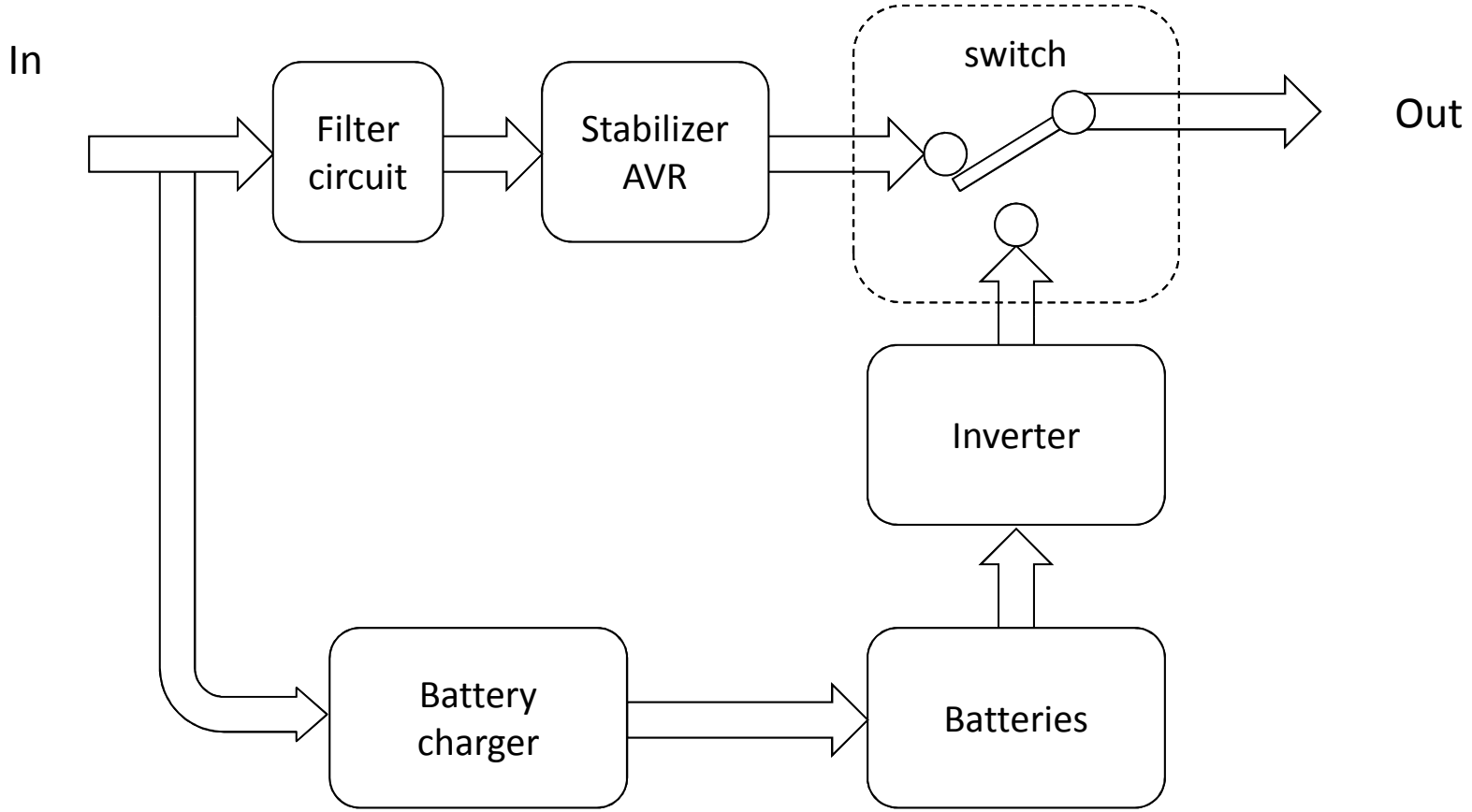


Technology
Topology



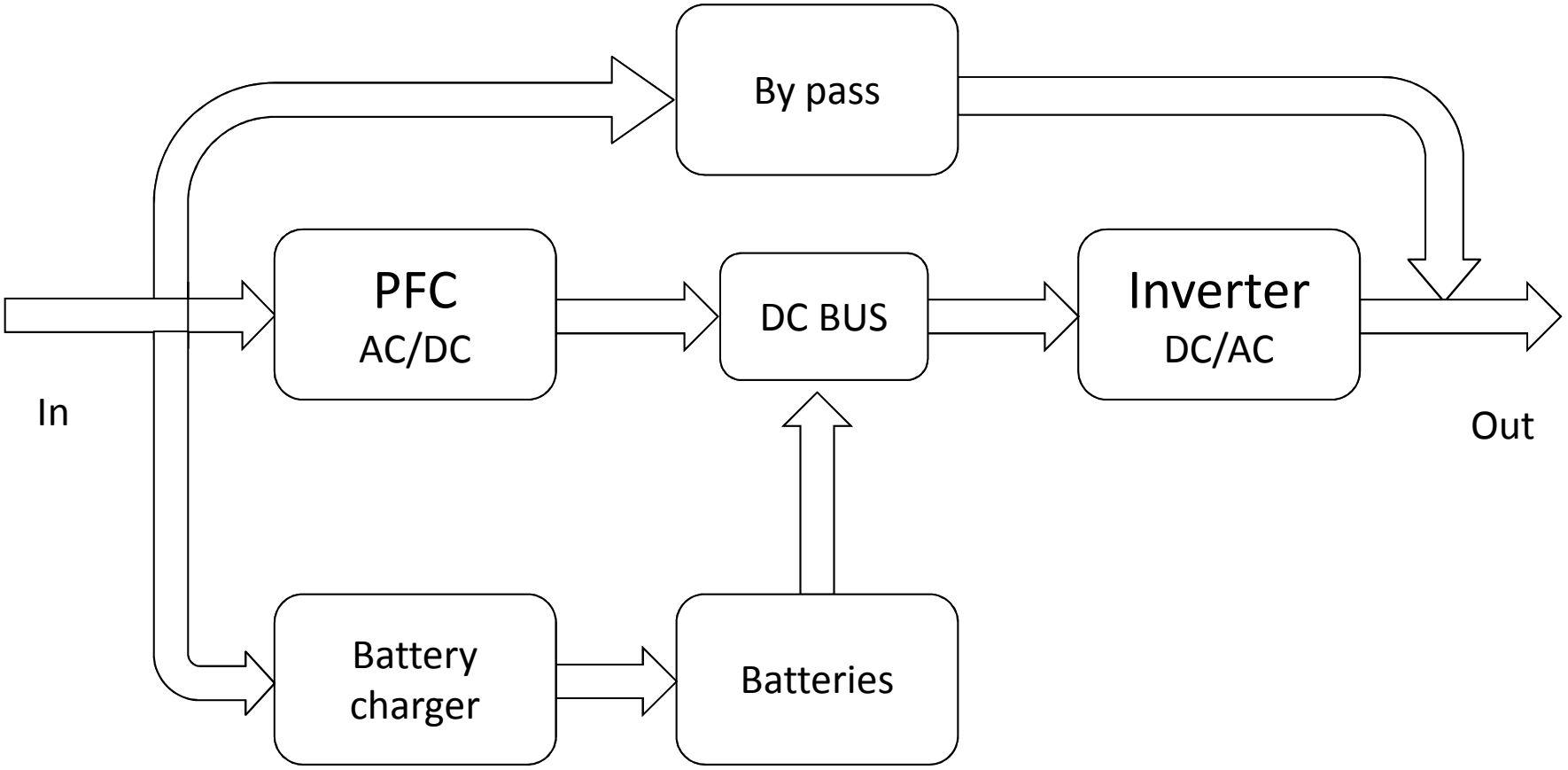
UPS Topology

LINE INTERACTIVE



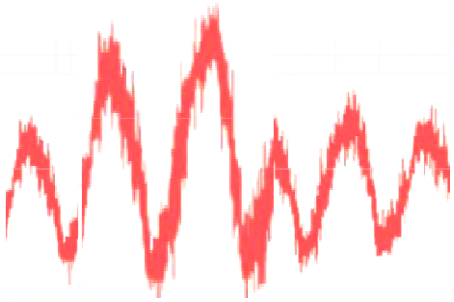
UPS Topology

ON LINE – DOUBLE CONVERSION



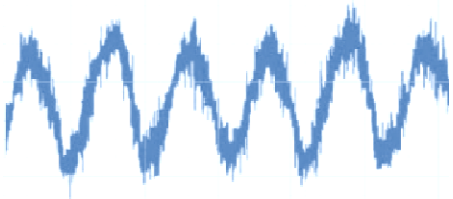
Behaviour **On Battery** and **On Mains** Run

LINE INTERACTIVE



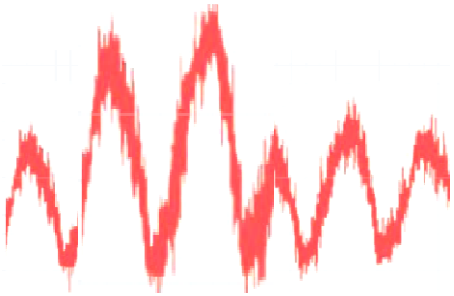
MAINS VOLTAGE





STABILIZED MAINS VOLTAGE

ON LINE



MAINS VOLTAGE

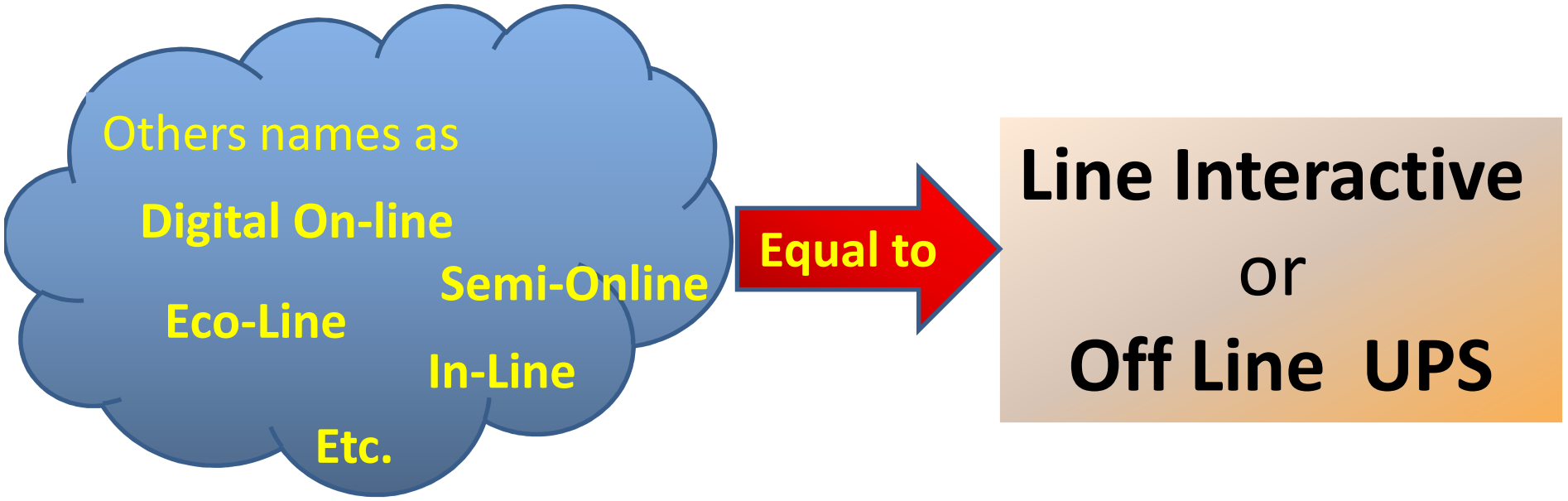




TOTALLY REGENERATED WAVE

Available technologies

- **On line Double Conversion**
- **Line Interactive**
- **Off Line**



Performances

EN 62040-3 Classification

VFI SS 111

Input Effect on the Output	
VFI	Voltage and Frequency Independent
VI	Voltage Independent
VFD	Voltage and Frequency Dependent
Output Waveform	
SS	Pure sinewave (THDu<8%)
XX	Pure sinewave (THDu>8%)
YY	Square wave
Dynamic output performance	
1°digit: during mains –battery switch (1=no interruption)	
2° digit: during linear load variation (1=no interruption)	
3° digit: during not linear load variation (1=no interruption)	

Legrand OnLine UPS

Best Performance:

VFI SS 111

The Choice of the UPS…

…depends by the nature of the load

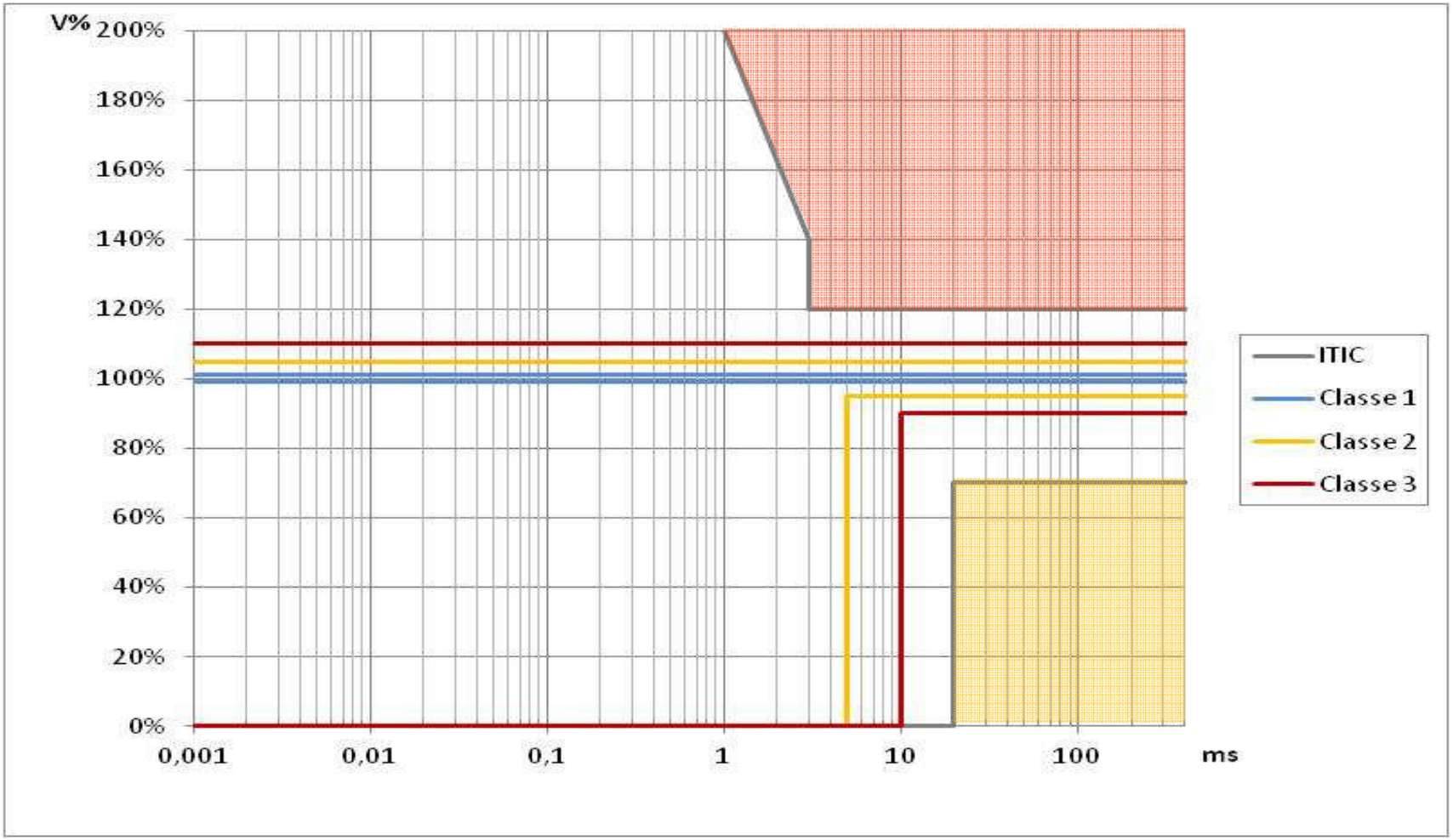


Electronic/ IT

Electric
(Not IT)



IT Loads (ITIC curve) vs EN62040-3



ITIC (Information Technology Industry Council), ex CBEMA (Computer Business Electronic Manufacturer's Association), ANSI/IEEE "Standard 446-1995: "IEEE Recommended practice for emergency and stand-by power for industrial and commercial applications"

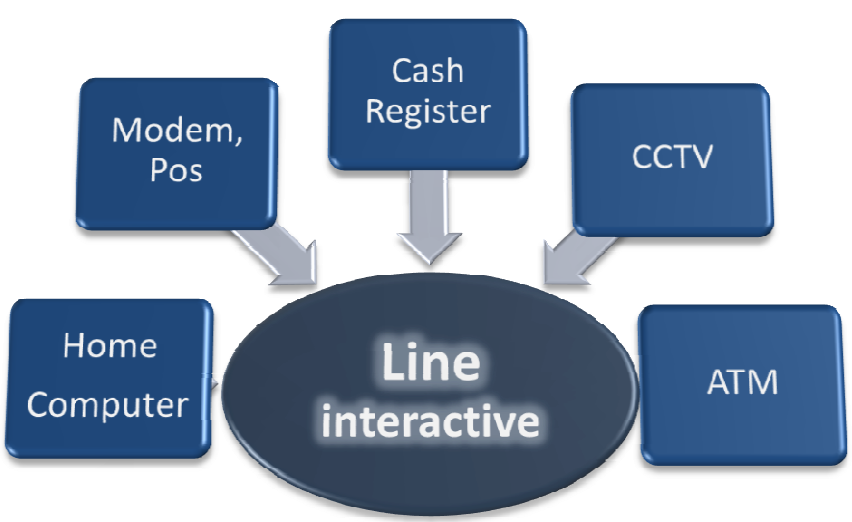
Not IT Loads

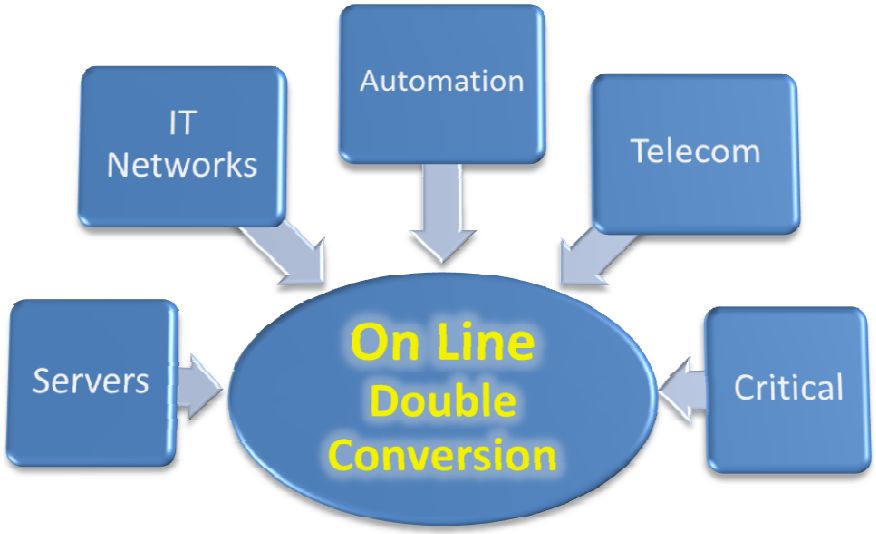
Dal punto di vista dell'UPS i carichi non informatici ai quali va posta particolare attenzione possono essere suddivisi nelle seguenti categorie:

- Needs of pure sinewave volt
- Voltage holes not admitted
- Inrush peaks
- Repetitive Inrushes
- Not Symmetric absorption
- Hi Reactive Power absorption
- Hi Harmonics
- Regenerative Energy feedbacks



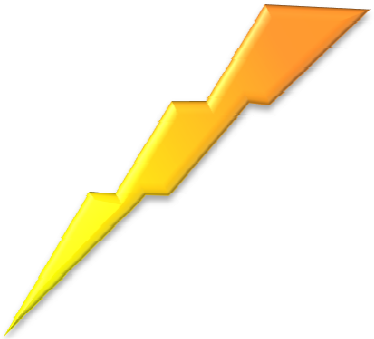
Technology vs Applications





Performance

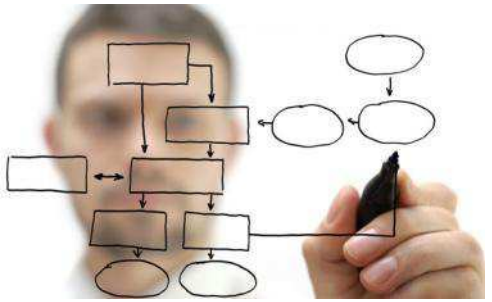




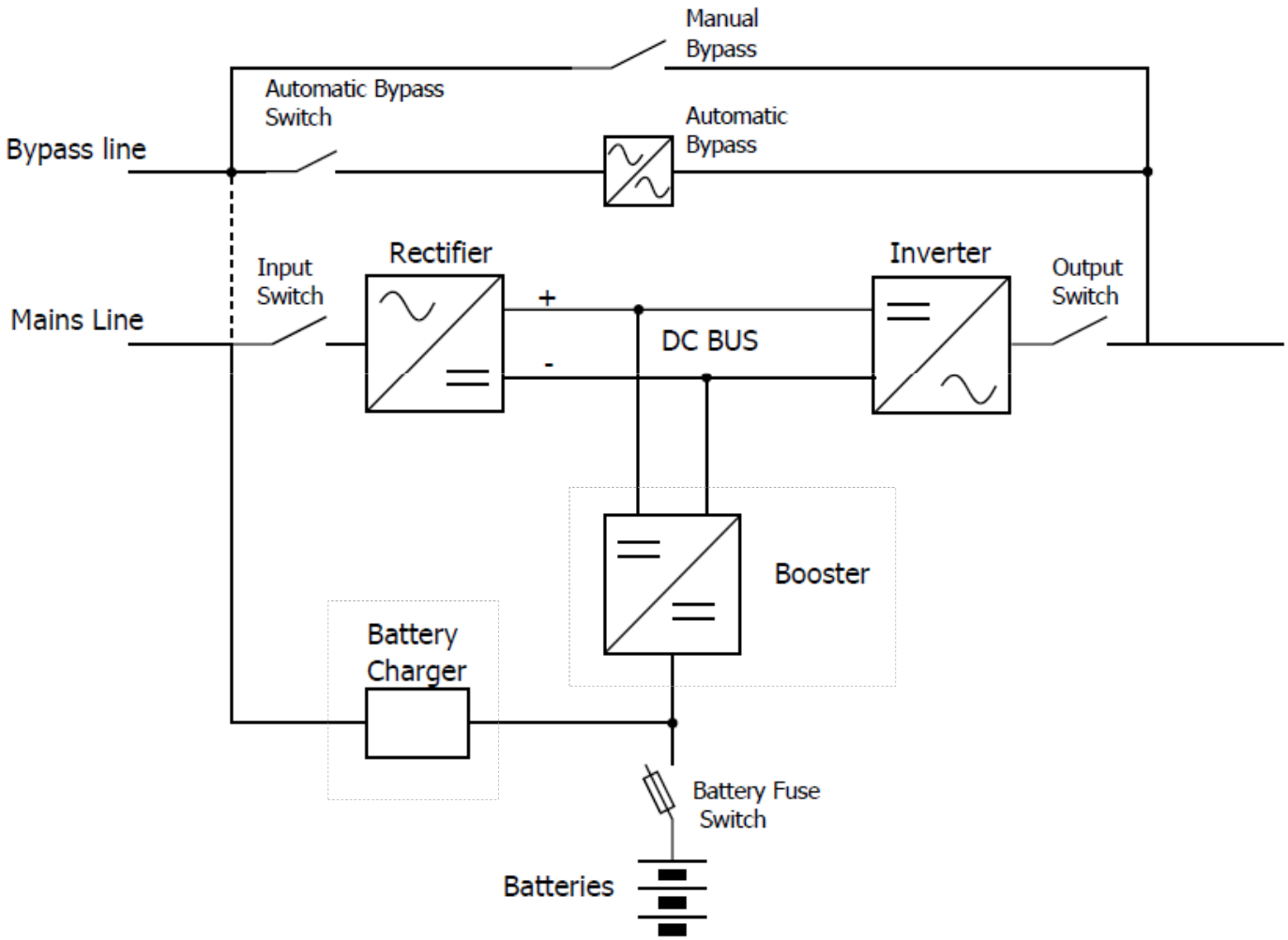


UPS Basic Parameters to choose the UPS

- **Apparent Power (VA)** ;
- **Active Power (W)** ;
- **Power Factor(PF)** = Active power (W) / Nominal (VA);
- **Back-up time**;
- **Input and Output Electric Specifications**.



On line Doppia Conversione Schema Unifilare

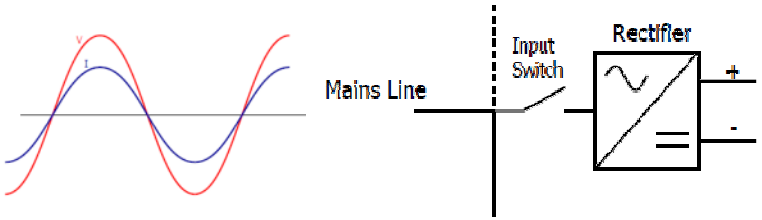


PFC

Now, the State of Art:

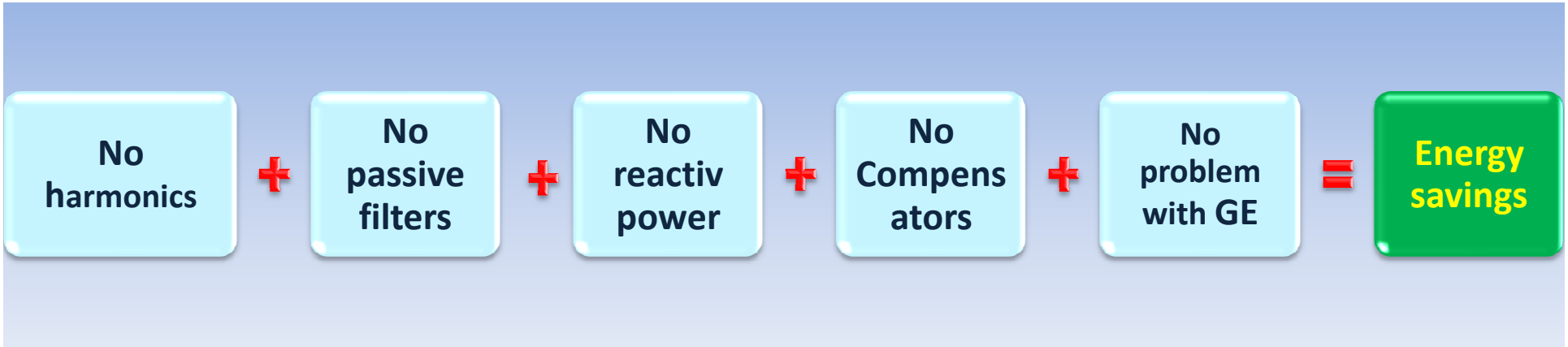
Rectifier = Active PFC (Power Factor Corrector)

Active filter for dynamic PF correction and Harmonics reduction



PF>0.99 from the 20% load

THDi <3%



Inverter: state of art

Now the state of art is:

✓PWM hi-freq (tens of kHz)

✓IGBT hi performances

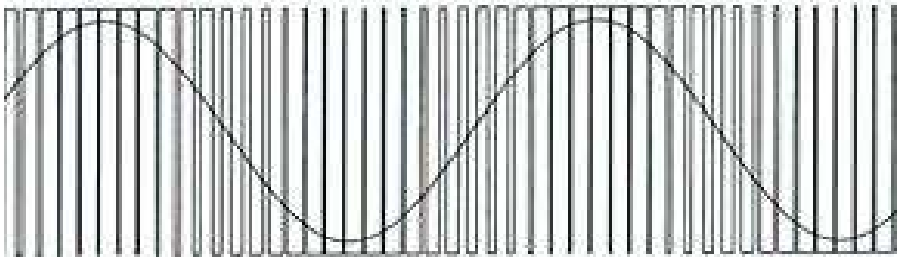
(fast switching, low consumption)

✓Advanced logic control with dynamic PWM corrections

INVERTER

+ Compact

+ Performant



Hi freq PWM

THDv% very low (<1%)

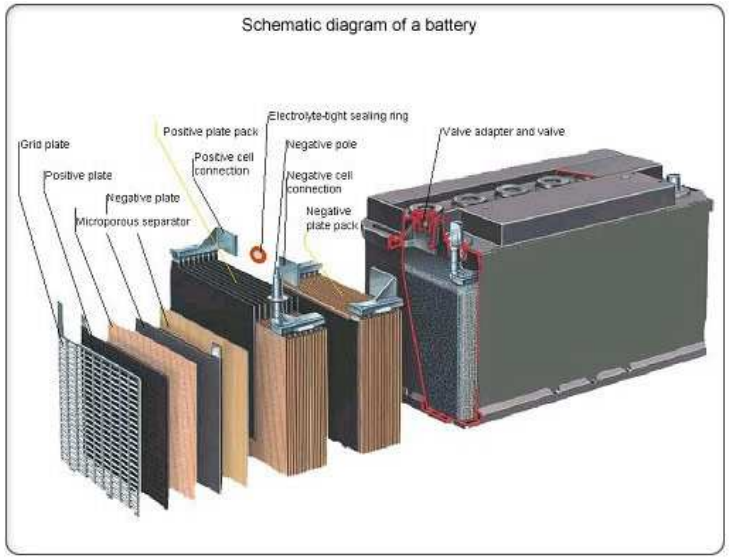
Small output filters

Inverter transfo no more needed

UPS Transformerless

Sealed Lead Acid

- Free maintenace
- Internal gas recombination
- Valve regulated (VRLA)



Most used in UPS applications:

Best Performance/Price ratio

Advantages

- Intense and incomplete discharge
- No “memory FX”
- Easy to recharge
- Mechanic strength
- Low price

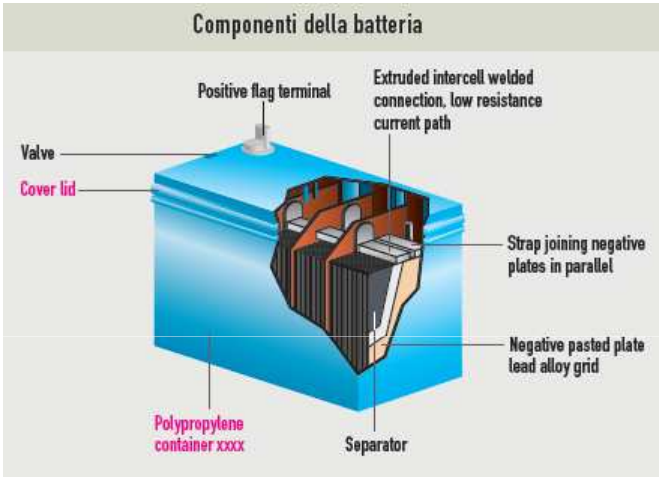
Disadvantages

- Affected by the Temperature
- Weight and dimensions
- Self discharge
- Needs protection against the deep discharge

Batteries

Two Types:

- AGM (Absorbent Glass Mat)
- Gel



Tehoretical value

Expected Life Time:

- ***5 years Standard***
- ***10 years Long Life***

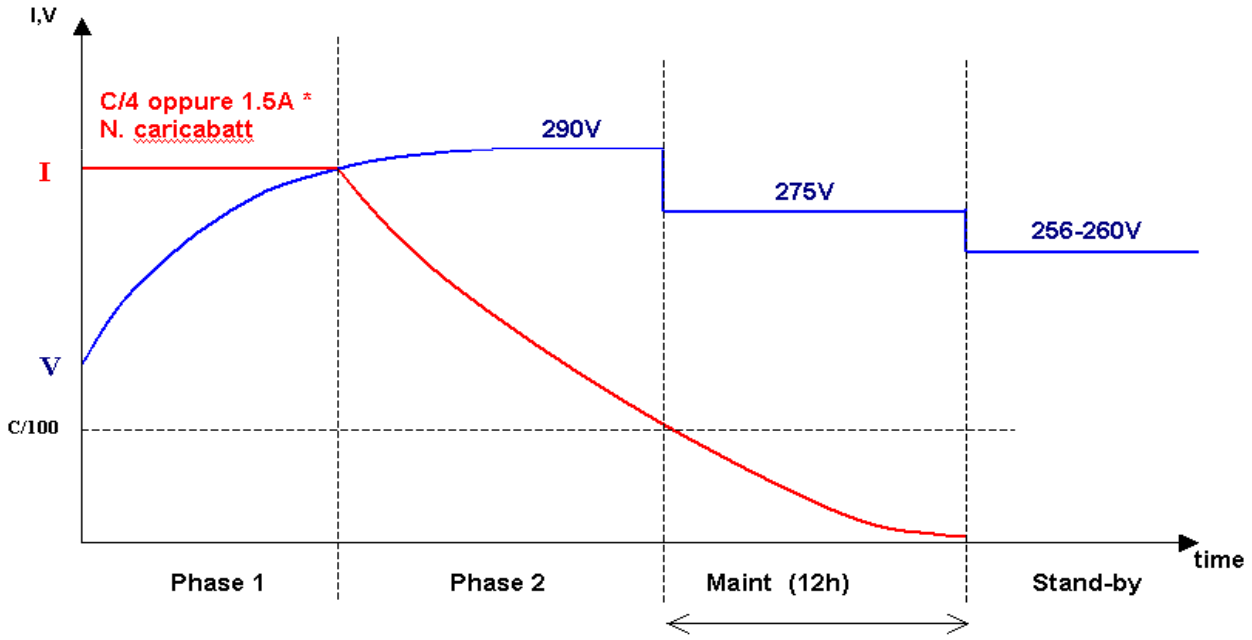
Life time depends by:

- Temperature
- Use
- Charge/Discharge

Smart Charging Method

Multy step Cycle: Boost + floating charge

Smart Charging Cycle



Architecture



Critical Applications Need:

legrand®

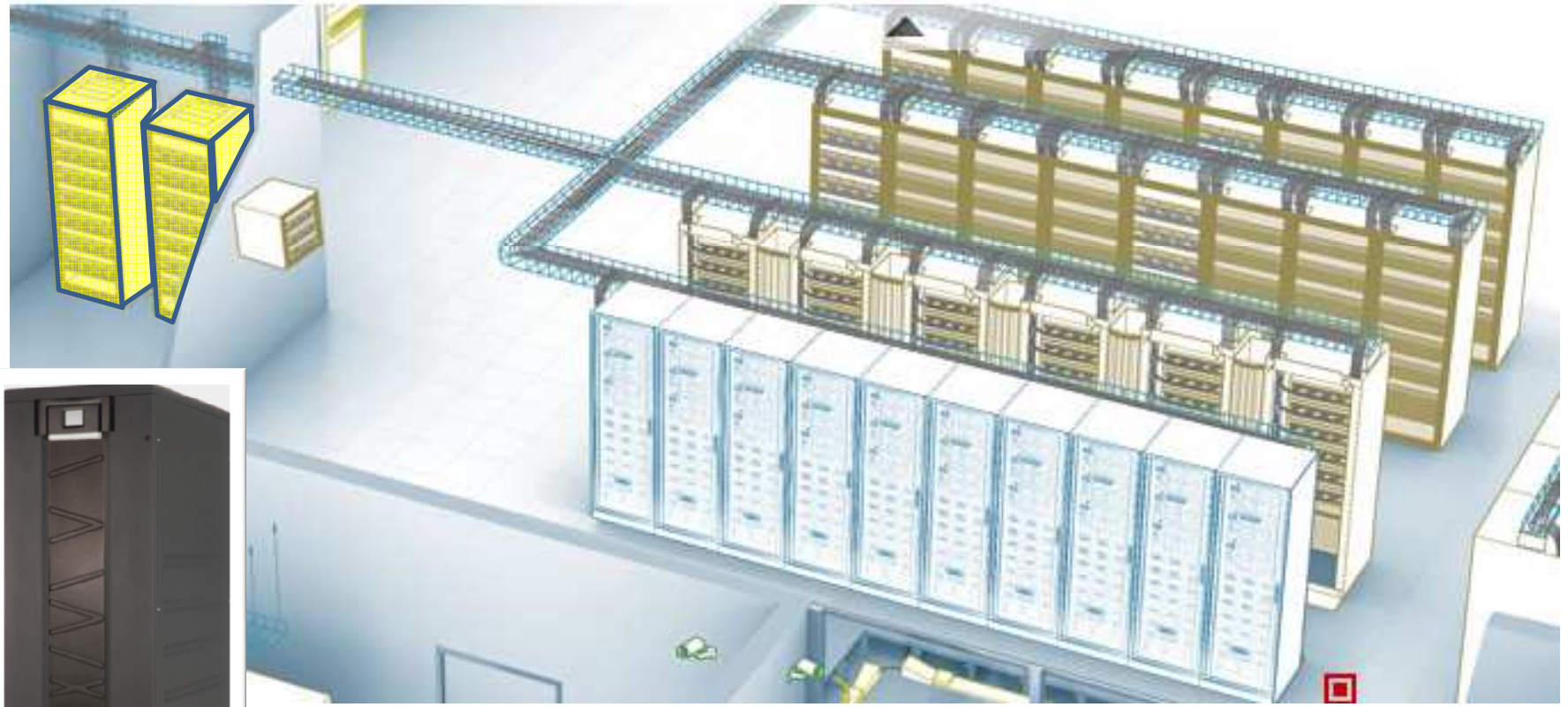
Never Stop **Scalability**



Lowest possible TCO

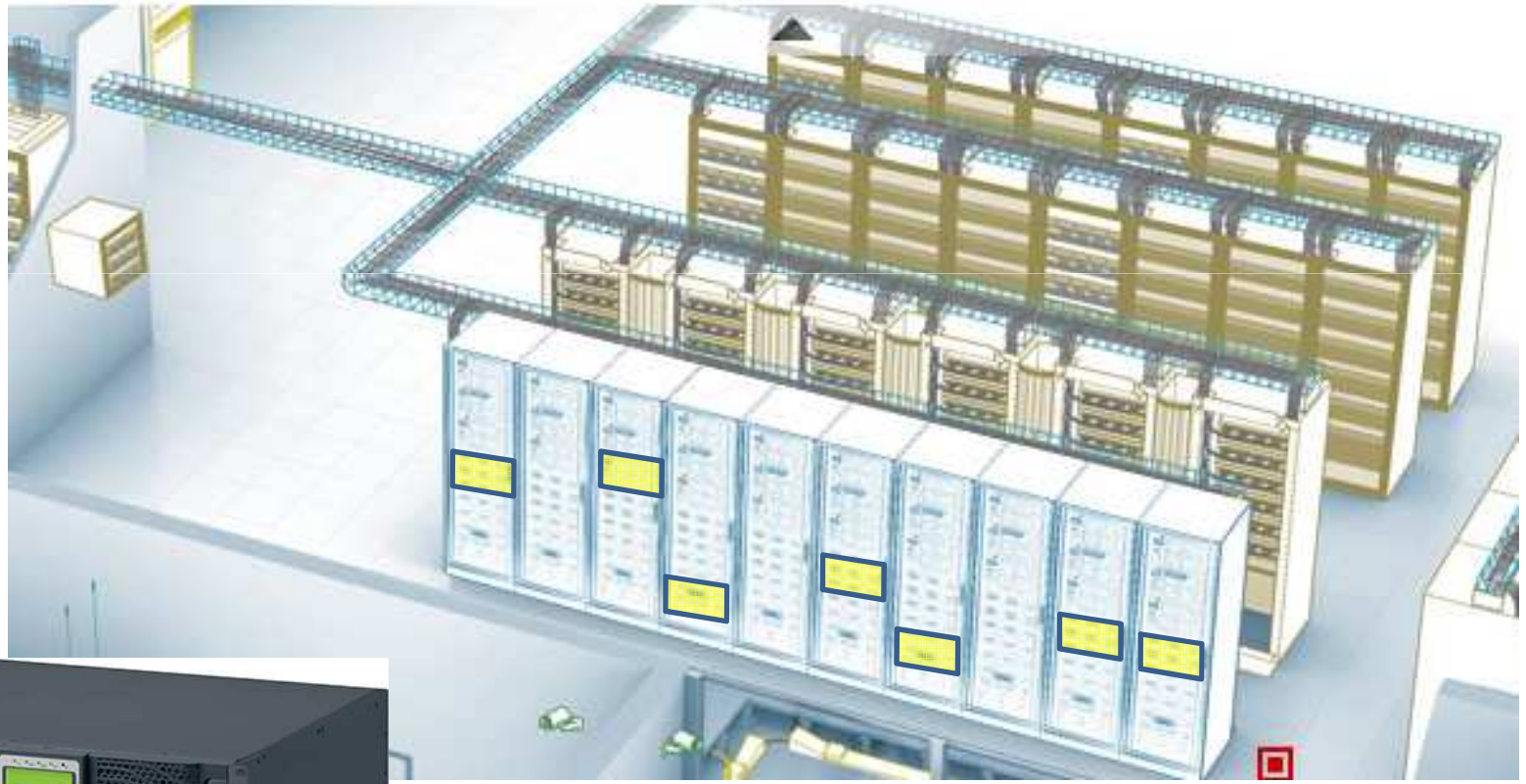
Architecture Example: Centralized UPS

UPS



Keor T, Keor HP

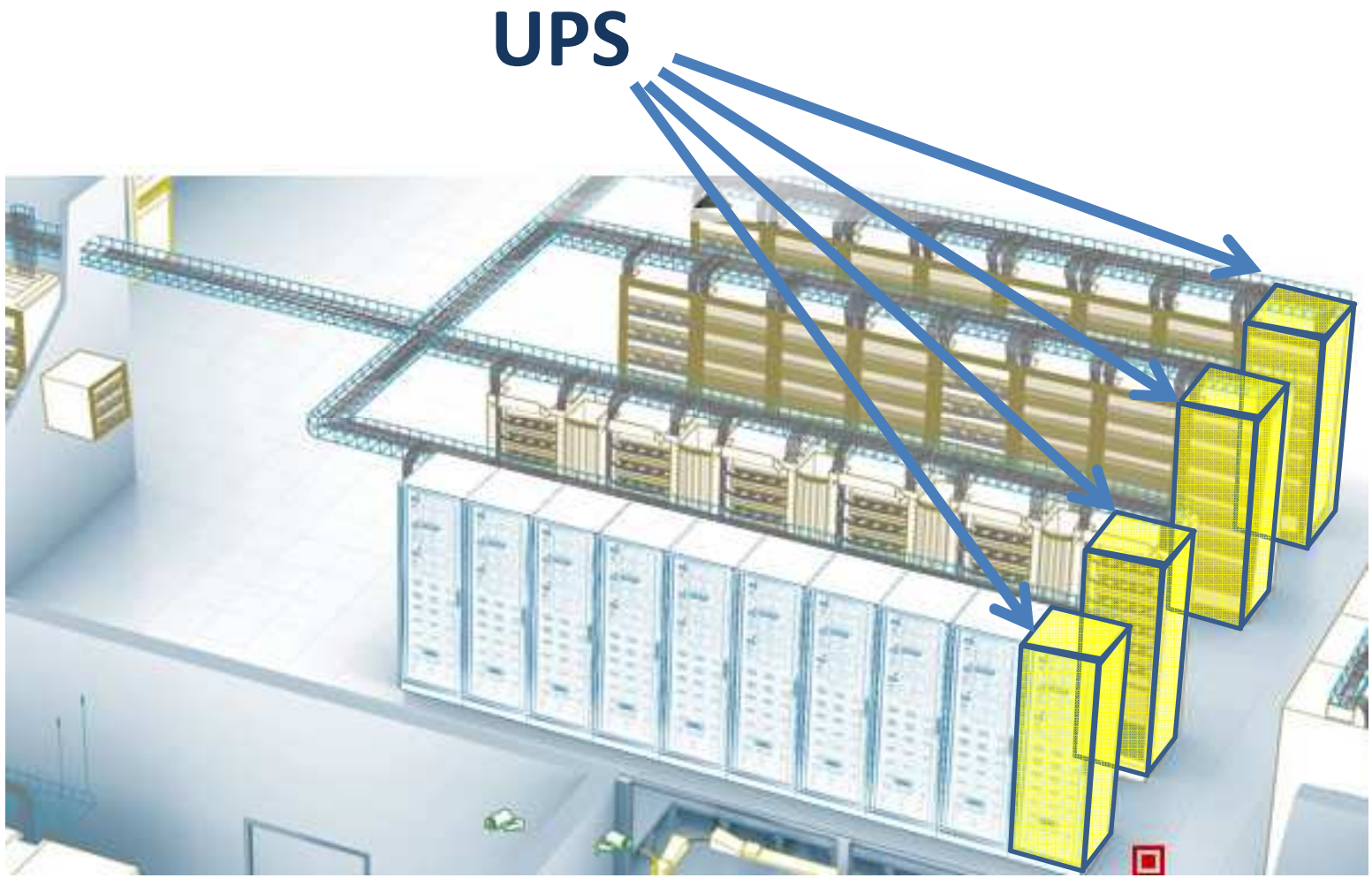
Architecture Example: Distributed UPS





Daker DK, Megaline

Architecture Example: Modular UPS



Trimod HE, Archimod HE





Legrand group offer

LEGRAND UPSs : SOLUTION FOR EVERY APPLICATIONS

OFFER



Home & Office	Medium & Small business	Large business & infrastructures

APPLICATIONS



THE RANGE OF UPS

LINE INTERACTIVE



Keor Multiplug



Niky



Niky S



Keor Line RT

UPS up to 3 kVA

KEOR Multiplug

Power size 600 and 800 VA



Main Points

- Consumer Designed Product
- Suitable for Consumer market
- Stand by technology
- USB interface for UPS management
- Telephone/modem/LAN protection
- Voltage spikes protection

Typical Applications:

Home Entertainment / Game Console

Home office

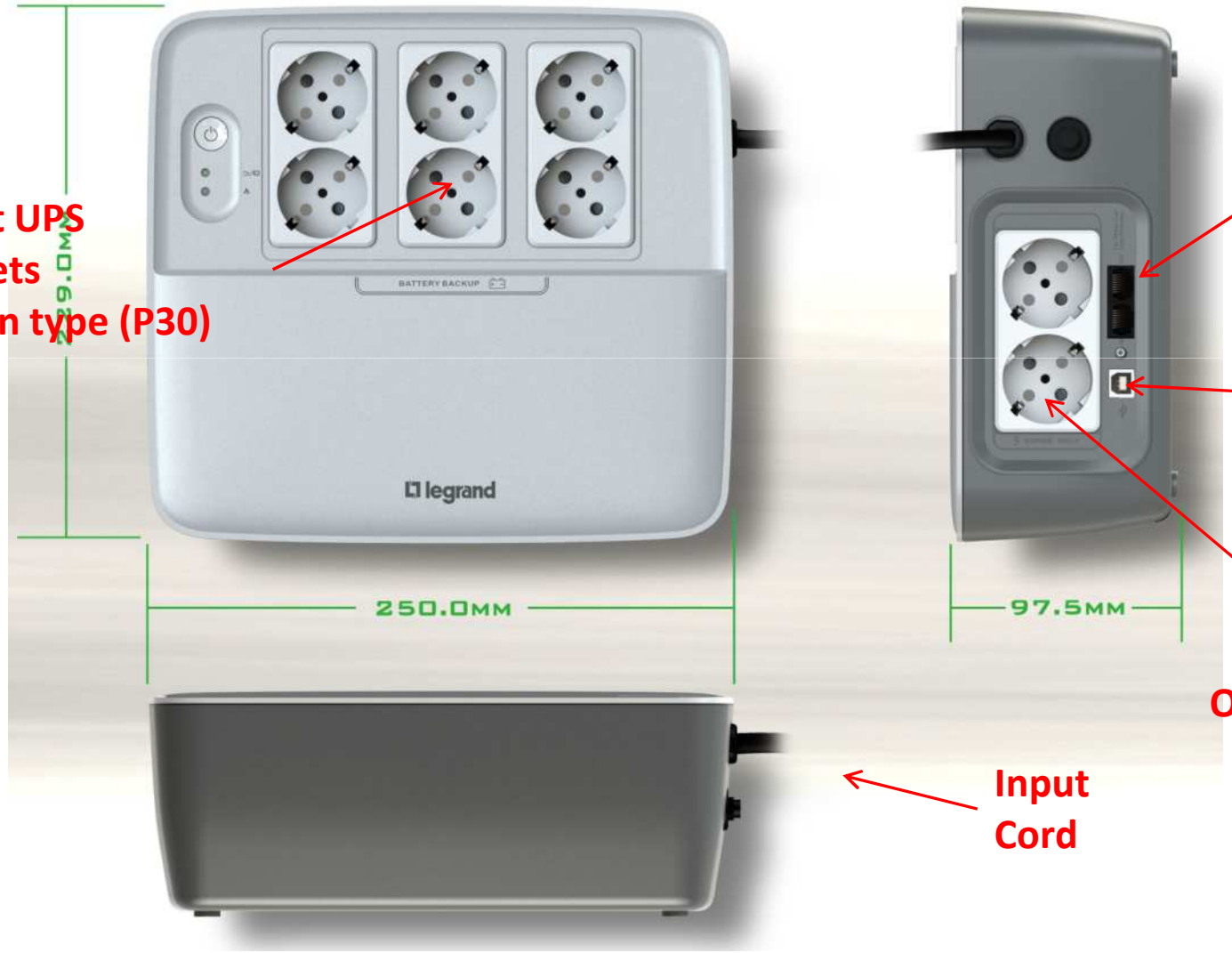
Small IT Device

ADSL Modem

Router



Input / Output plugs



KEOR Multiplug Packaging



1 Brown Carton for the transport containing 2 Gift Boxes

Line Interactive

Niky



Niky 600-800 VA



Niky 1-1,5 kVA

Key features:

- Line Interactive with AVR
- Pseudo sinewave
- Communication port RS232 and USB
- Multisocket with 3 output
- Free download Software

Typical Application :

Home Office

CCTV

ATM

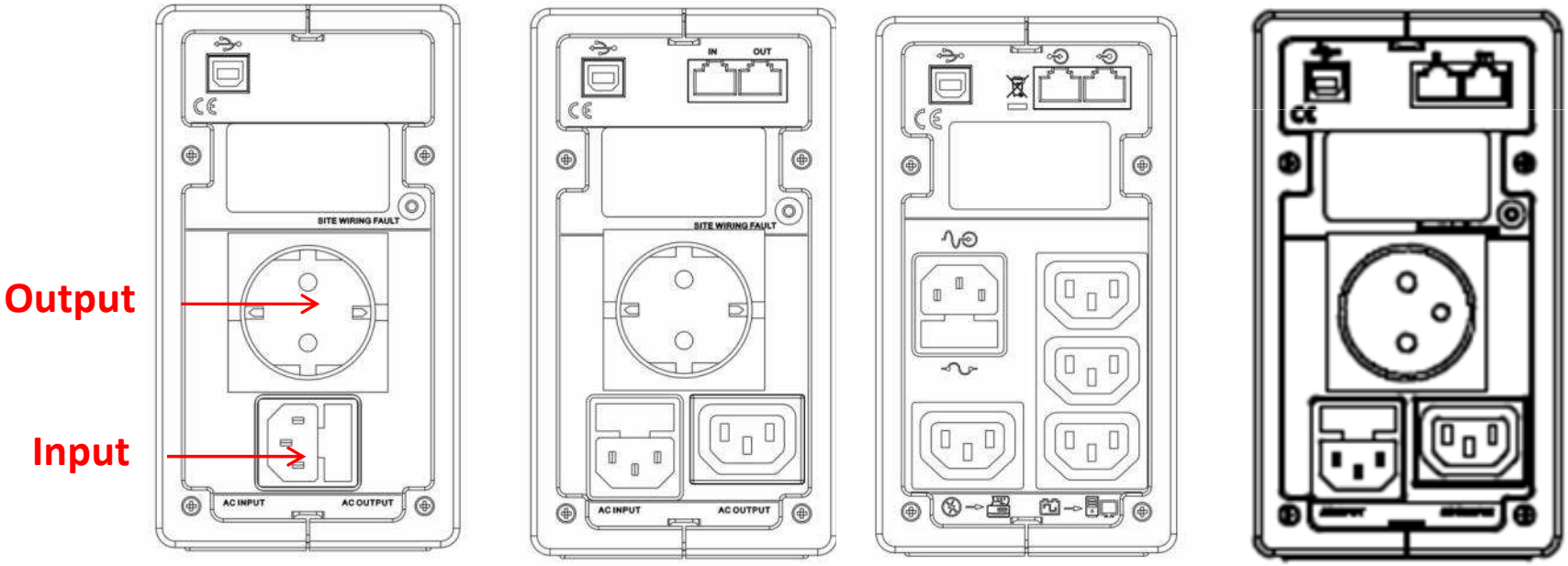
Cash registers



Line Interactive

Input /Output plug

For Niky 600/800 VA, 4 versions

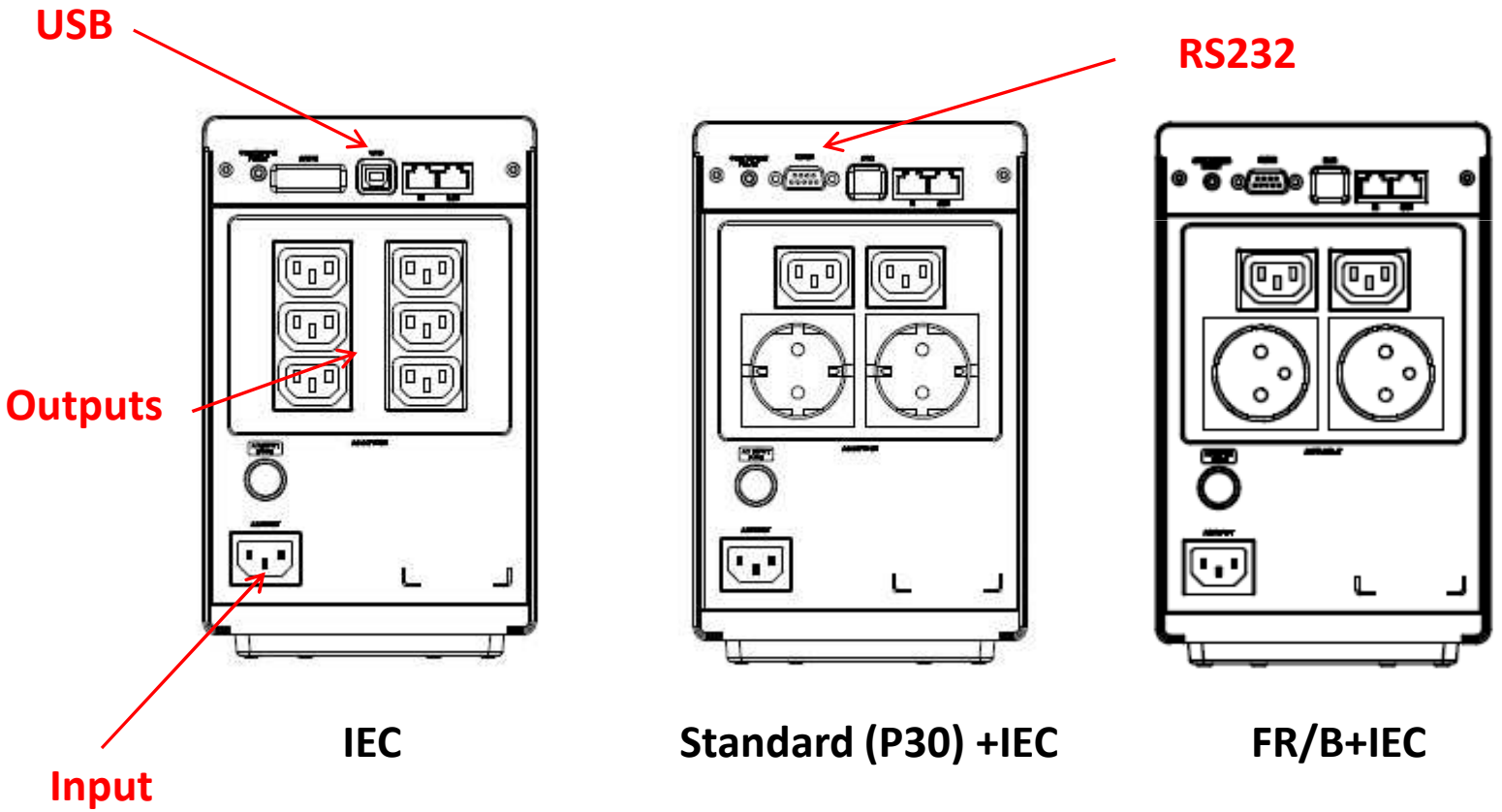


Standard (P30) **Standard (P30) +IEC** **IEC** **FR/B+IEC**

Line Interactive

Input /Output plug

For Niky 1/1.5 kVA, 3 versions



Line Interactive

Niky S



Niky S, 1-1.5 kVA



Niky S, 2-3 kVA

Key features:

- Line Interactive with AVR
- Modem/Network protection
- Pure output sinewave
- Communication port RS232 and USB
- LCD Display
- Free download Software

Typical Application :

Small servers with active PFC

Switch

Routers









Niky packaging – Retail ready



Keor Line RT

Line Interactive 1000 – 1500 - 2200 – 3000 VA

Rack - Tower



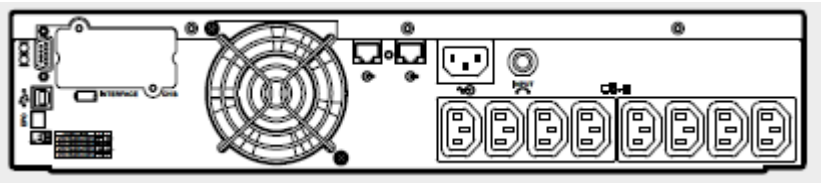
Small IT Load



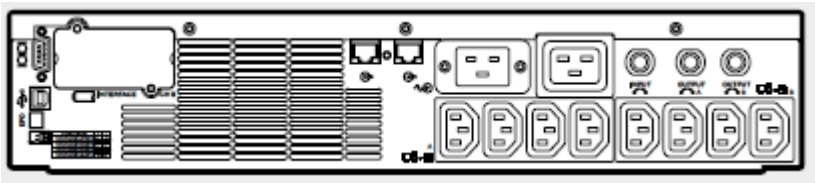
Keor Line RT



- ✓2U Rack
- ✓PF=0.9
- ✓LCD Display
- ✓IEC Outlets
- ✓Telephone line protection
- ✓Full Communication Interface
  RS232, USB, SNMP Slot



1000 – 1500 VA



2200 – 3000 VA

THE RANGE OF UPS

CONVENTIONAL ON LINE



Daker DK



KEOR LP



Keor S



Keor T

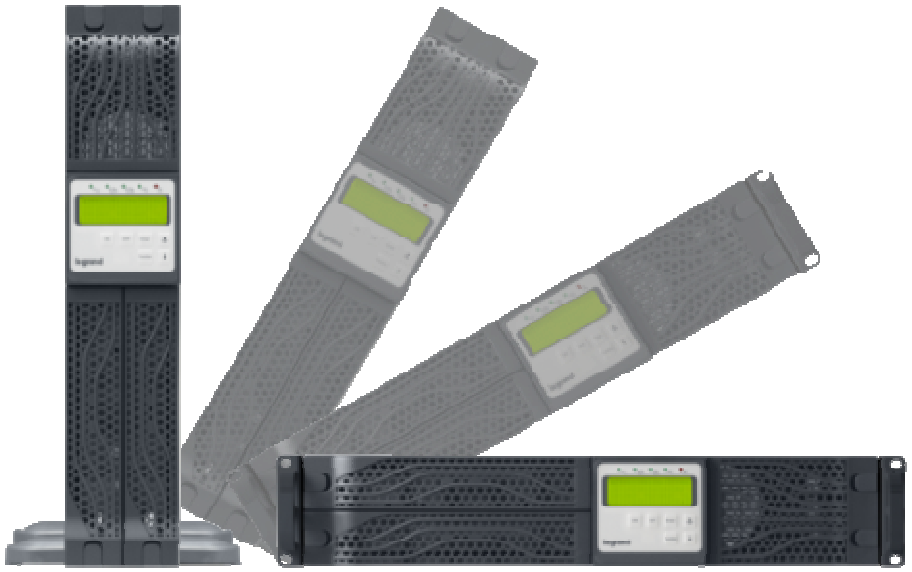


Keor HP

UPS Single phase up to 10kVA

UPS Three phase up to 800kVA

Daker DK - On line double conversion



Features:

- Convertible Rack/Tower
- Online Double Conversion VFI SS 111
- Scalable Back-up time
- Hot Swap Batteries (1,2 and 3kVA)
- Compact size
- Easy to install and use
- Full Connectivity (USB-RS232-SNMP Slot)

From 1kVA to 10kVA

Applications:

- Shops and Commercial
- Administration office
- Telecommunications
- IT Network
- Automation



Daker DK



1 – 2 - 3 kVA ~ 8min
4.5 – 6 kVA W/O Batt.

Rack 19” / Tower



4.5 – 6 kVA ~ 5min

Rack 19” / Tower



10 kVA W/O Batt.

Rack 19” / Tower

Daker DK 10 kVA 3/1

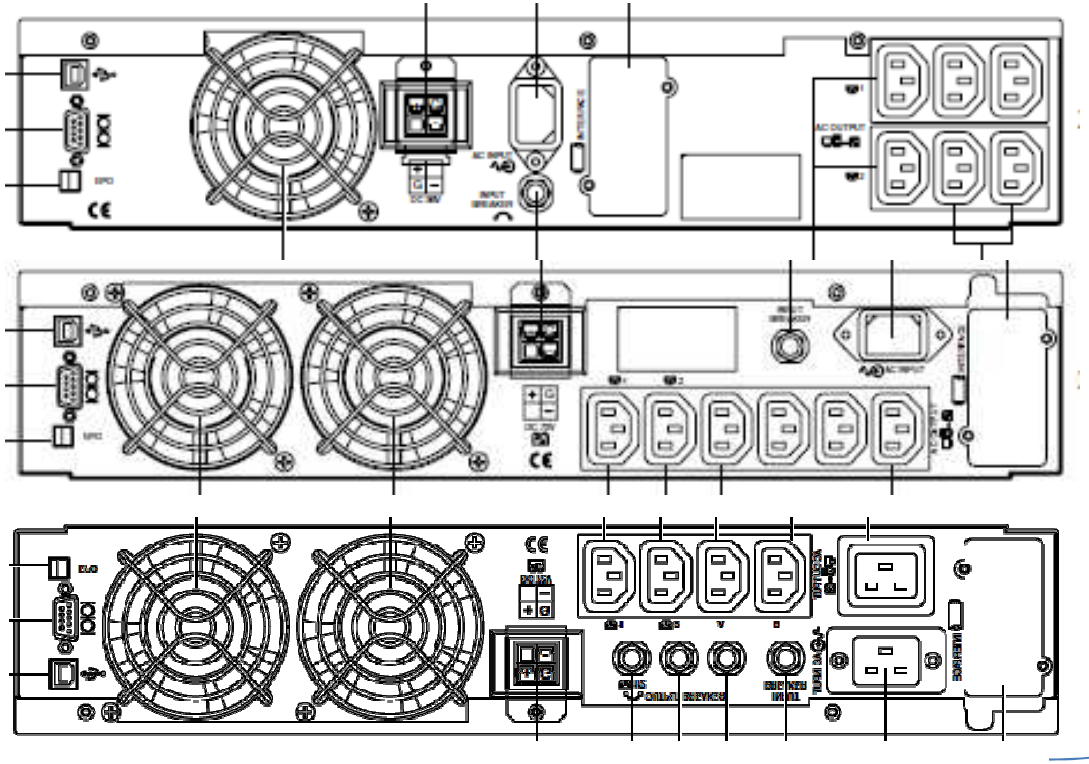
- Online Double Conversion VFI SS 111
  - High performances (protection and reliability)
    - Autonomy Expandability
      - Compact size
        - Tower or Rack Mount
- Hot swap Batteries
  - Easy to install and use
    - Connectivity





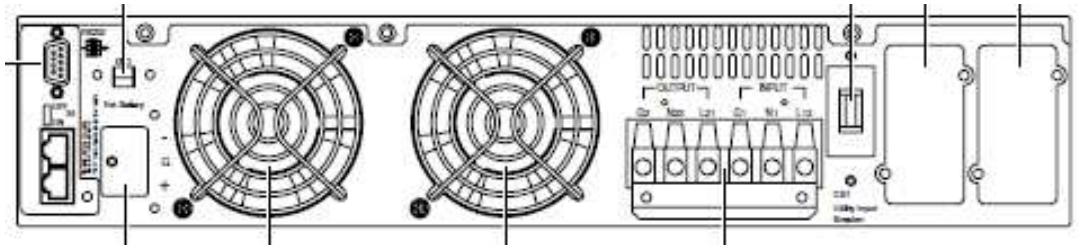
310059 UPS DAKER DK - ON LINE - 10 kVA - 3/1 - W/O BATTERY - CONVERTIBLE

Daker DK Connections



DK 1, 2, 3 kVA

IEC port;
USB, RS232, Intelligent Slot
(SNMP, Dry Contacts), EPO,
External Battery



DK 4.5, 6, 10 kVA

Hard wired;
USB, RS232, Intelligent Slot
(SNMP, Dry Contacts), EPO,
External Battery

Daker DK Dedicated Accessories



External Battery Cabinet

Manual Bypass



(models 1,2,3kVA)



(models 4.5, 6, 10kVA)



Dry Contact Card



Rack Brackets Kit



Additional Battery Chargers

Keor LP

On line Double Conversion

Tower



- ✓Single Phase
- ✓PF=0.9
- ✓Compact
- ✓Backup Extension
- ✓IEC Outlets
- ✓Full Communication Interface
  RS232, USB, SNMP Slot

1000 – 2000 – 3000 VA



WHAD



800-1000-1500 VA **2-2.5 kVA** **3-6 kVA**

KEOR S



on line double conversion

Compact
Robust
Long Autonomy

3 – 6 – 10 kVA

- ✓IGBT INVERTER
- ✓IP 31
- ✓BACK FEED PROTECTION
- ✓MANUAL BY-PASS INTEGRATED
- ✓OPERATION WITH EU VOLTAGE
- ✓GENERATOR COMPATIBLE
- ✓INSULATION TRANSFORMER OPTIONAL

Industrial Application



KEOR S – Other Features

Easy installation & use



Parallelable to increase power up to 4 units



Up to 40kVA

Integrated Protection



Small foot print



Foot print
0,2 m²

715 mm

766 mm

275 mm

legrand®

KEOR T

THREE-PHASE UPS
from 10 to 120 kVA





Keor T

3Ph Online double conversion from 10 to 120kVA



10-15-20-30 kVA



10-15-20-30 kVA
Long Back up time



40-60 kVA



80-100-120 kVA

Keor T

3Ph Online double conversion

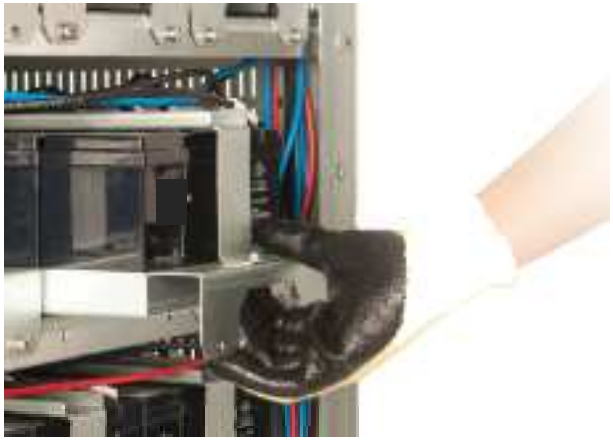


Key features:

- Transformerless - 3 level IGBT Inverter
- PF 0.9
- Hi Eff up to 95%
- THDi<3%, input PF >0.99
- Parallel Redundancy (up to 8 UPS)
- Embedded Manual Bypass
- Touch Screen Display
- GenSet Friendly
- Internal batteries up to 30kVA
- Optional Isolator Trafo
- Full Connectivity (USB-RS232-RS485-SNMP Slot)

Keor T – Additional features

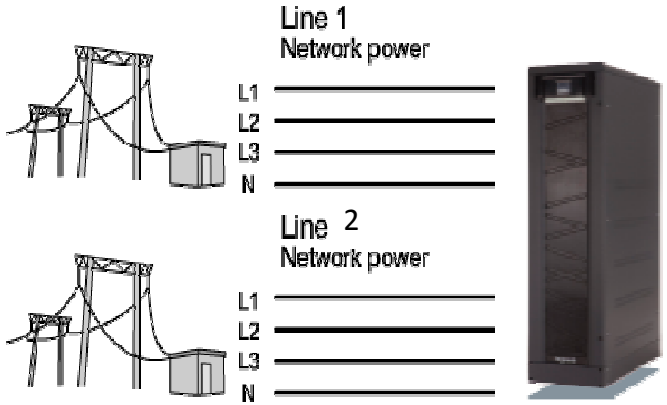
Easy installation & use



Programmable DSP microprocessors



Dual input by pass



Genset Friendly



Exclusive characteristic

MULTICOLOR LED BAR





ALARM



BATTERY
or
BY PASS



NETWORK

In compliance with

legrand

standard



Megaline



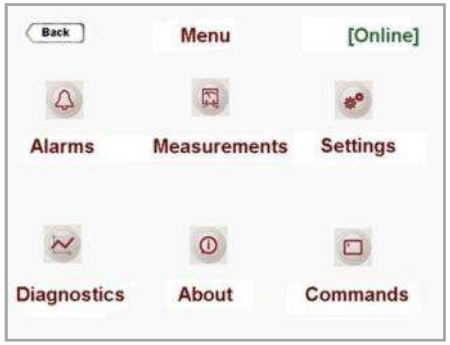
Trimod

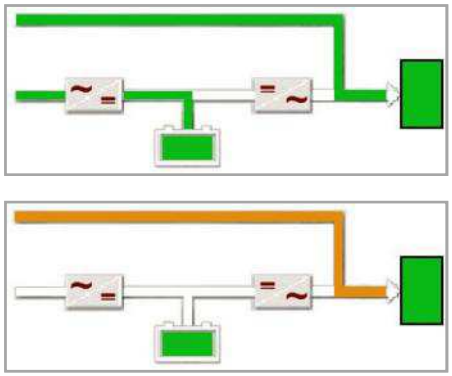
Archimod



Easy management

USER FRIENDLY 3,5” TOUCH SCREEN CONTROL PANEL



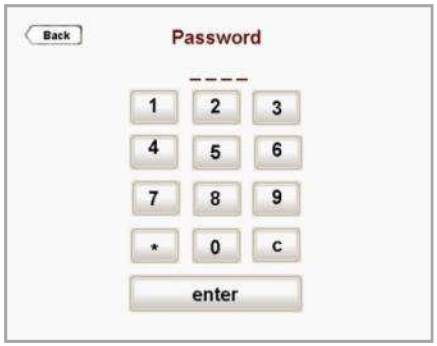


INTUITIVE
GRAPHICAL
ICONS

INFORMATION
MEASURAMENTS
STATUS
ALARMS



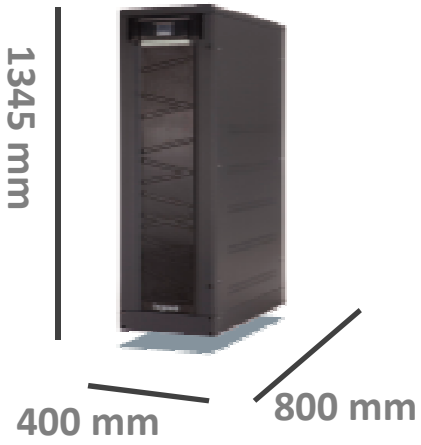
DIFFERENT
LANGUAGES
Including
English
Italian
French
German
Spanish
Portuguese
Turkish



SECURITY
Password

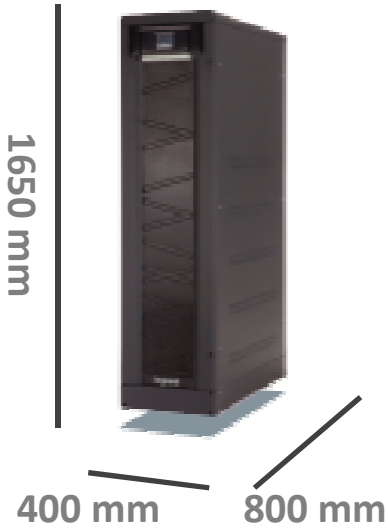


Small foot print



0,32 m²
Compact solution

Back up time:
10 min



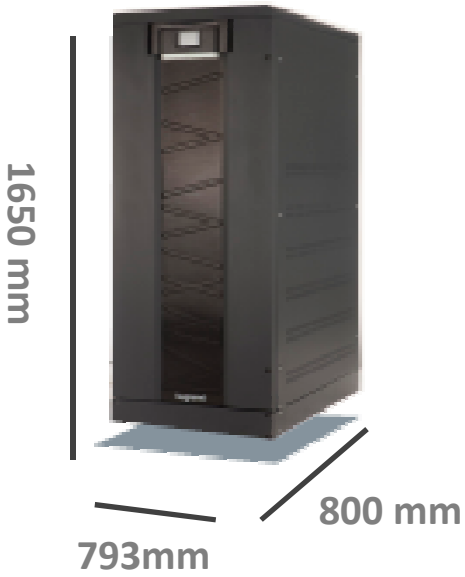
0,32 m²
Long back up

Back up time:
20 min



0,54 m²
High power

Back up time:
13 min



0,63 m²
High power

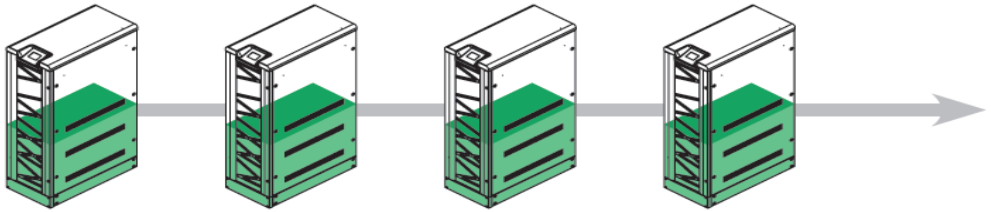
10 – 15 – 20 – 30 kVA | **40 – 60 kVA** | **80 -100-120 kVA**

Parallel: Power & Redundancy

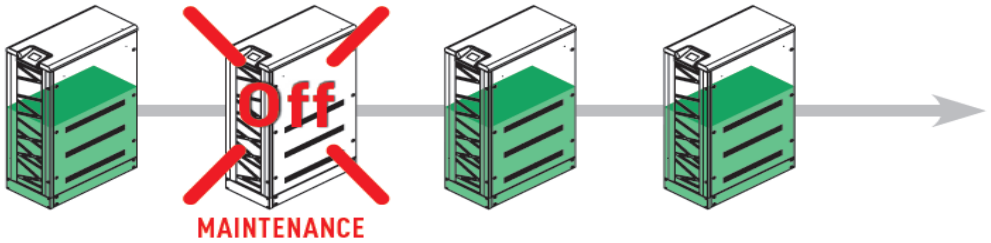
Depending on the power demand, it is possible to connect in parallel operation up to 8 units of the same power rating.



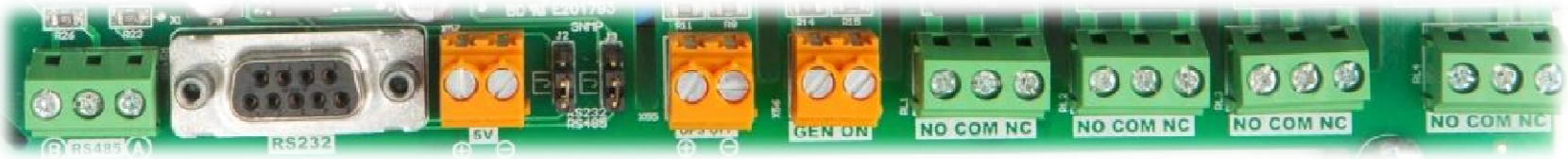
STANDARD WORKING CONDITION



AUTOMATIC LOAD RE-BALANCE IN MAINTENANCE CASE



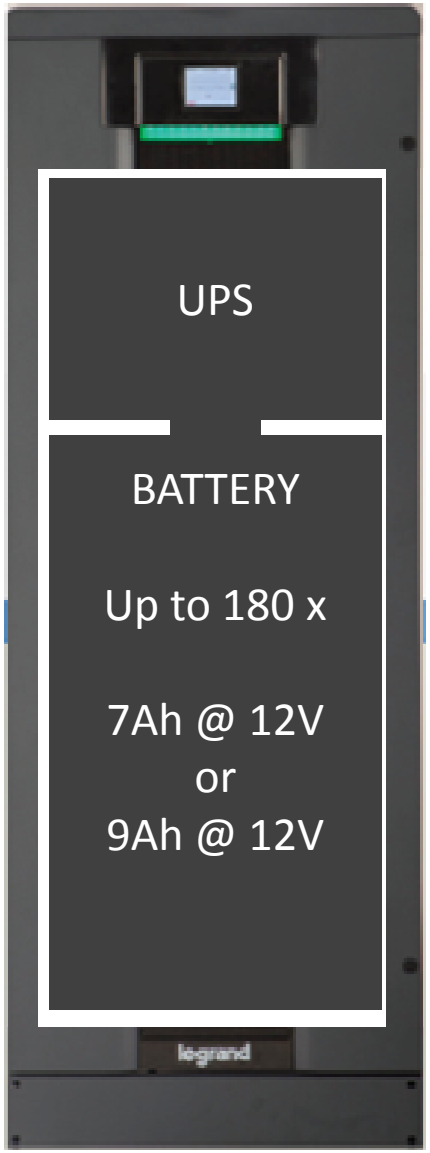
Full Connectivity



- RS 232
- RS 485 (Modbus)
- Programmable Dry Contacts
- Emergency Power Off
- Genset contact
- SNMP Interface Card



Isolation transformer inside



→ Less Space

180pcs (40&60kVA) 12V 7or 9Ah battery groups can be installed inside of UPS cabinet which provides back up time with NO additional battery cabinets

OR

Isolation transformer can be mounted inside UPS cabinet upon request

→ Less transportation costs

Decrease in transportation costs and easier positioning during installations

KEOR HP

THREE-PHASE UPS
from 100 to 800 kVA





Conventional three-phase UPS

on line double conversion



100 – 160 kVA | 200 – 300 kVA | 400 – 800 kVA

KEOR HP

Keor HP



Key features:

- IGBT Inverter & Rectifier
- PF 0.9
- Hi Eff up to 95%
- THDi<3%, input PF >0.99
- Parallel Redundancy (up to 6 UPS)
- Embedded Isolator Trafo
- GenSet Friendly
- Full Connectivity (USB-RS232-RS485-SNMP Slot)



Hi Power Applications

Keor HP – Additional features

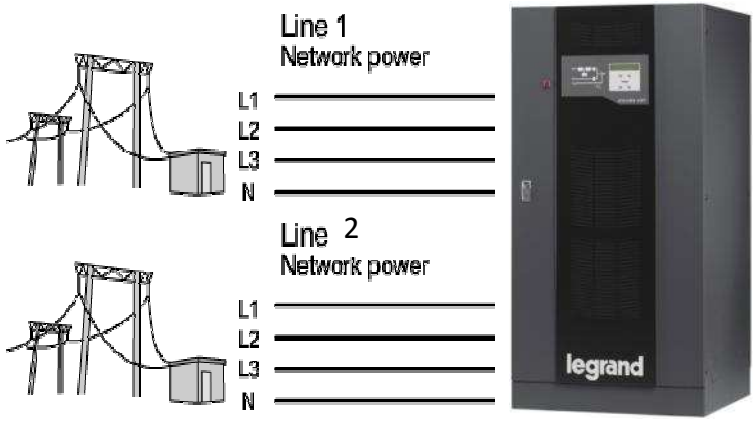
Mimic Panel + LCD



Programmable DSP microprocessors



Dual input by pass



Genset Friendly

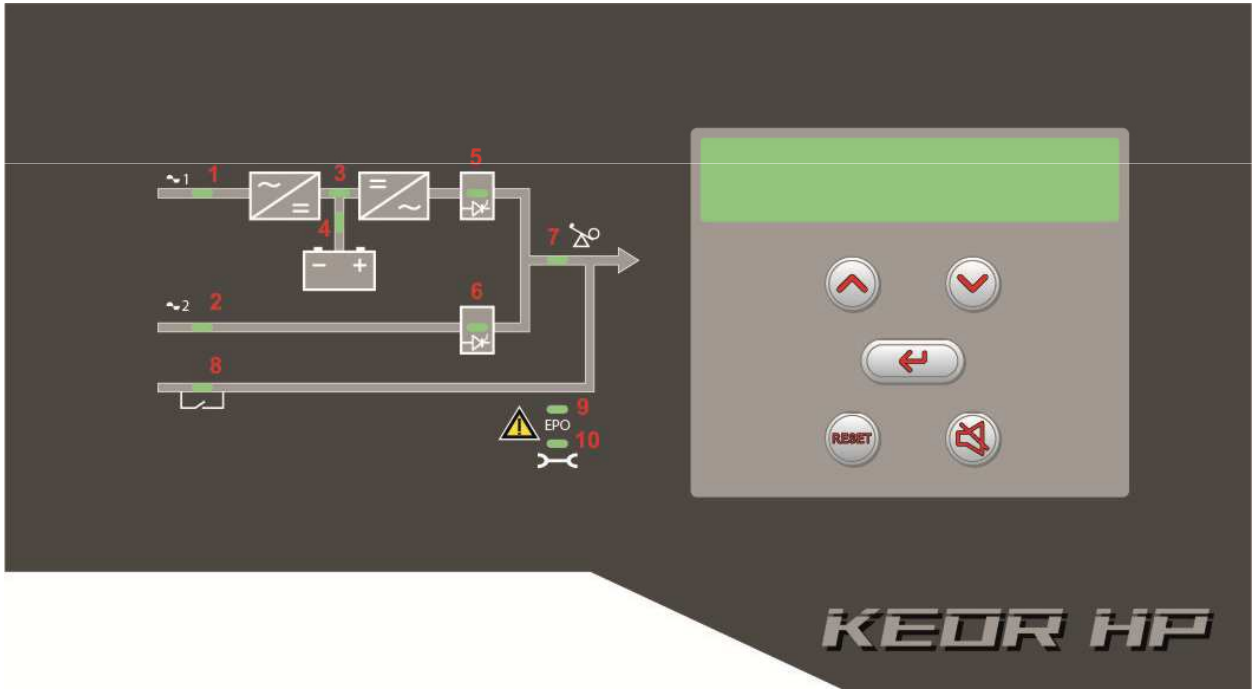


Easy management

USER FRIENDLY CONTROL PANEL

Mimic display with LEDs for operation mode

LCD with backlight, 2x40 characters



INFORMATION
MEASURAMENTS
STATUS
ALARMS

DIFFERENT LANGUAGES
(English (Standard), Italian, German, French, Portuguese, Spanish, Polish, Turkish)

Computer Controlled Adjustments

Parameter adjustments

→ Rectifier walk-in /delayed time

→ Eco-mode



→ Battery Charging
Boost-charge
Dynamic Charging Mode



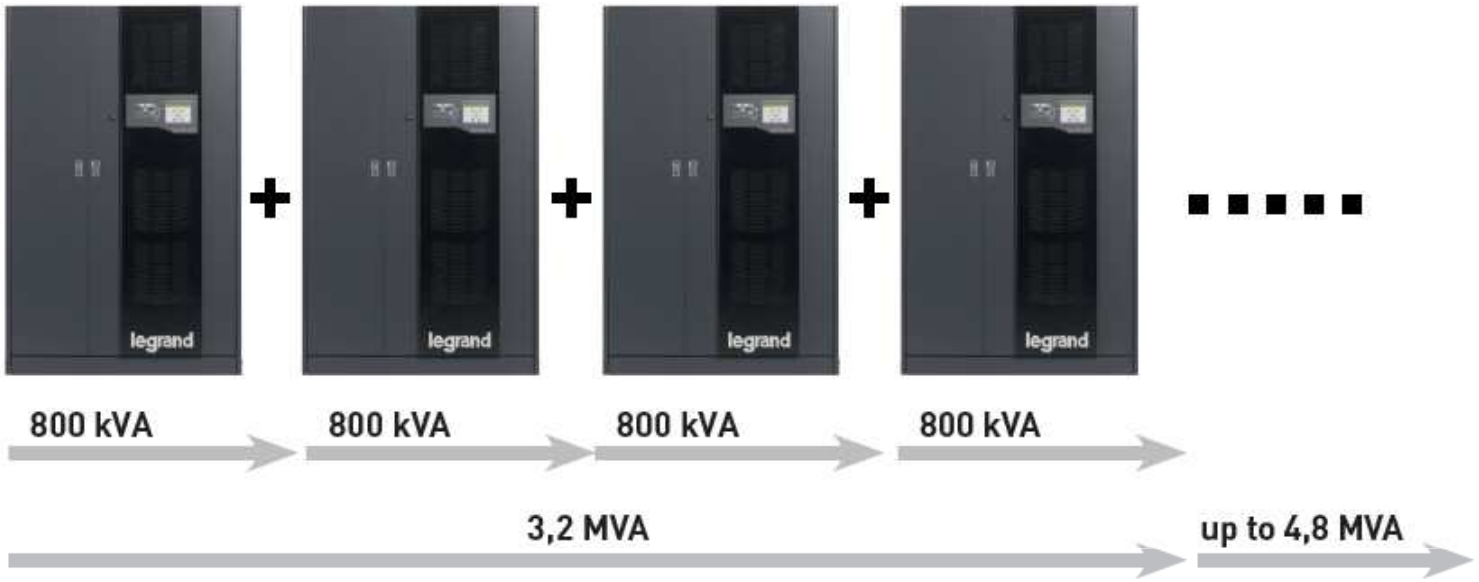
→ Frequency converter mode

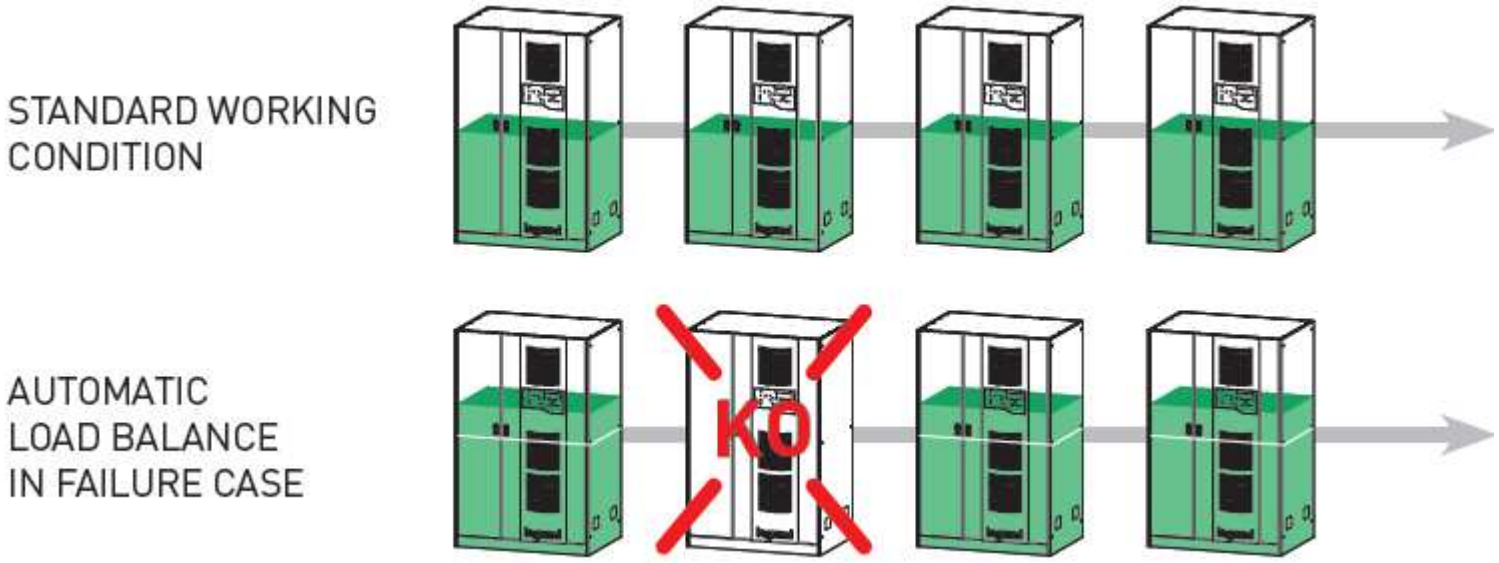




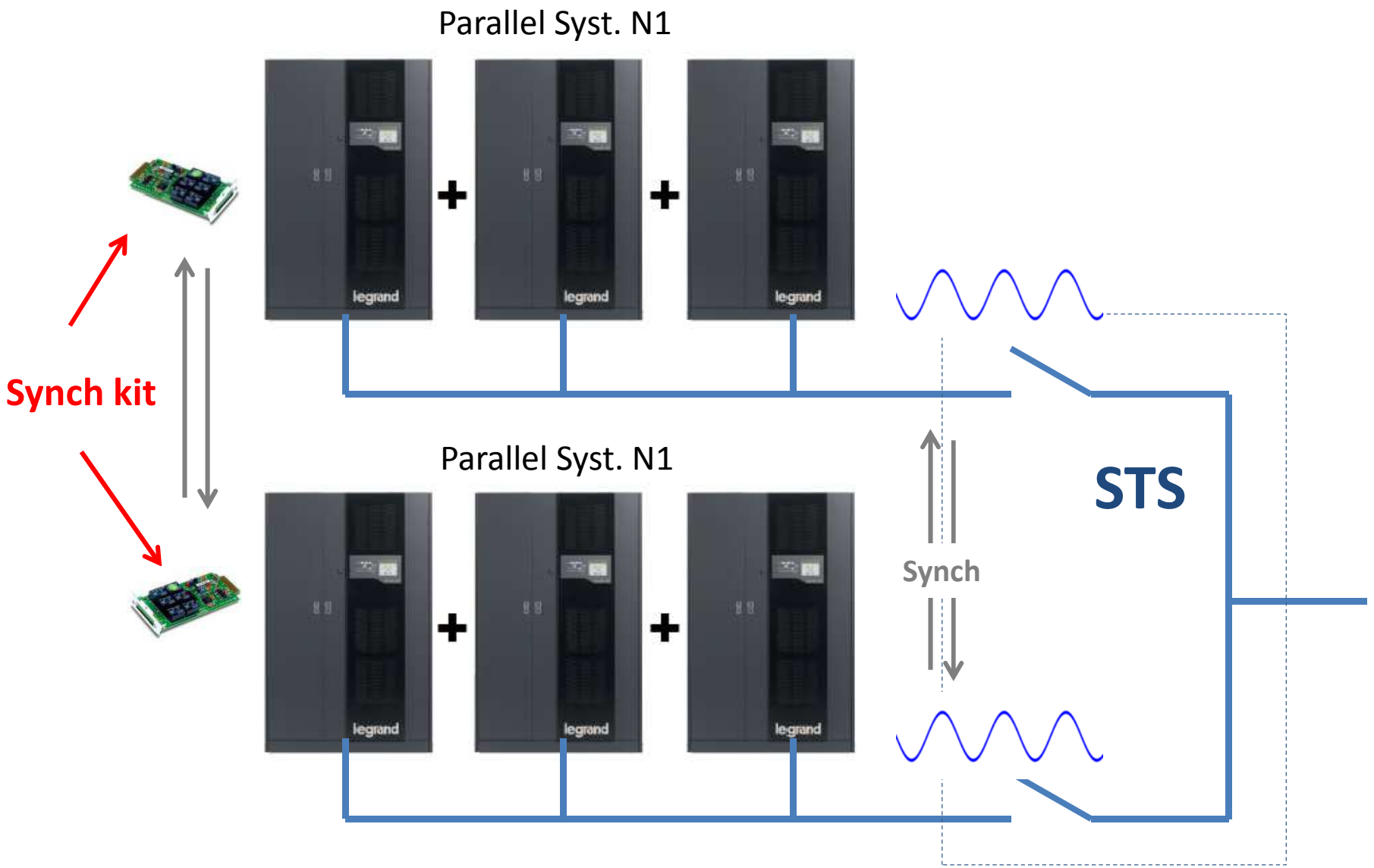
No need to modify **hardware**

Parallel: Power & Redundancy



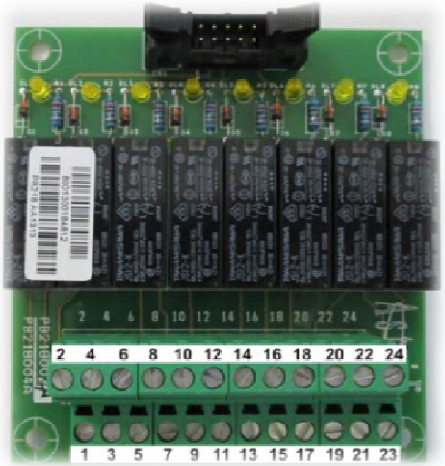


Parallel Synch Kit



Full Connectivity

- RS 232
- RS 485 (Modbus)
- Programmable Dry Contact
- Emergency Power Off
- Genset contact
- Ext Bypass Contact
- SNMP Interface Card







Modular UPS Range

Three Phase
from 10 to 480kW

Single phase
from 1 to 10kVA



Modularity means…

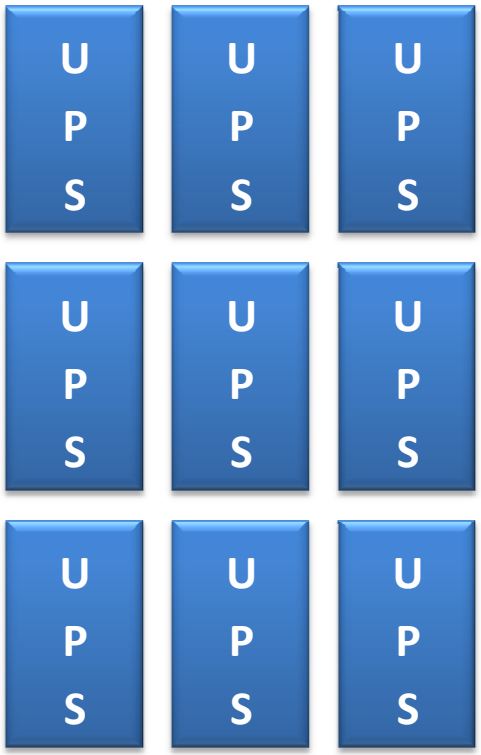
Conventional

UPS

One Monoblock System

VS

Modular



Many Small Systems (Modules)

Why Modular UPS ?



Easiness



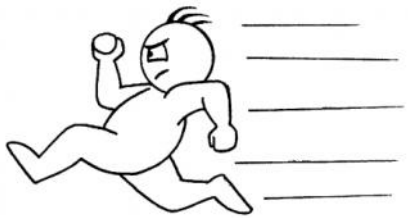
Modular System



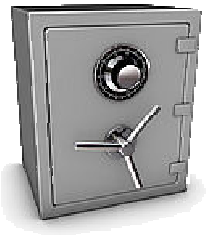
Redundancy



Adaptability



Fast Service



Reliability

Modular HE Range



Trimod HE
10 – 60 kW



Archimod HE
20 – 120 kW



Archimod 240HE
20 – 480 kW

Trimod Archimod HE Key Features

Full Power Range (10-480kW)
based on the same Power Module



Small & Light
Easy to Handle



Same Mechanics - Three Powers:
3.4 - 5 - 6.7 kW

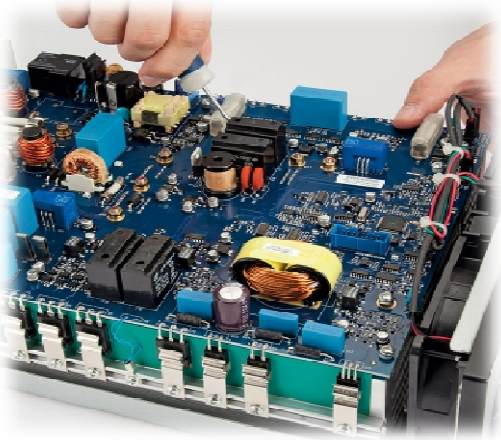
Plug n' Play & Self Detection

Trimod Archimod HE : Hi Performances



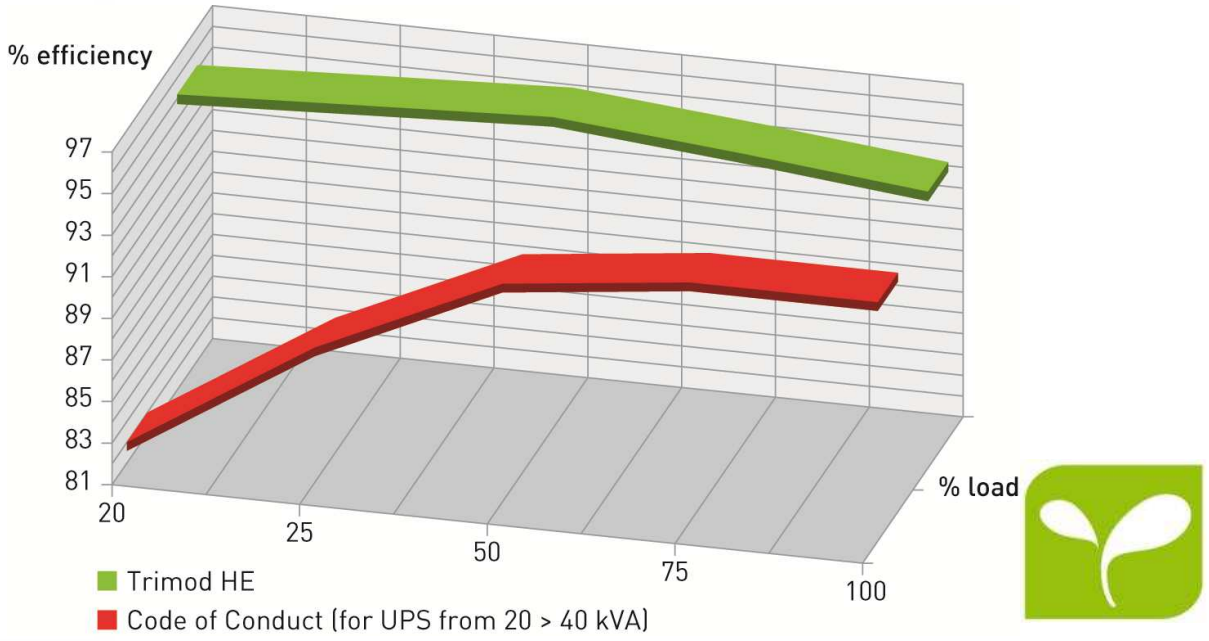
PF=1

VA = W





Hi Efficiency : up to 96%



Trimod Archimod HE : Battery

Modularity also for Batteries







Batteries housed in dedicated drawers



Low MTTR

Fast Battery Replacement

Trimod Archimod HE

Not Modular Battery Cabinet

Long Life Batteries 12V 94Ah

- 20 Blocks String for Trimod HE
- 21 Blocks String for Archimod HE



Weight with batteries 760Kg
Weight without batteries 100Kg
Dimensions LxDxH: (600X800X1635) mm
Colour RAL7016

Trimod Archimod HE HE Unique feature

Single Phase Modules:

Independent Phase Management

Power Modules in parallel in the same column



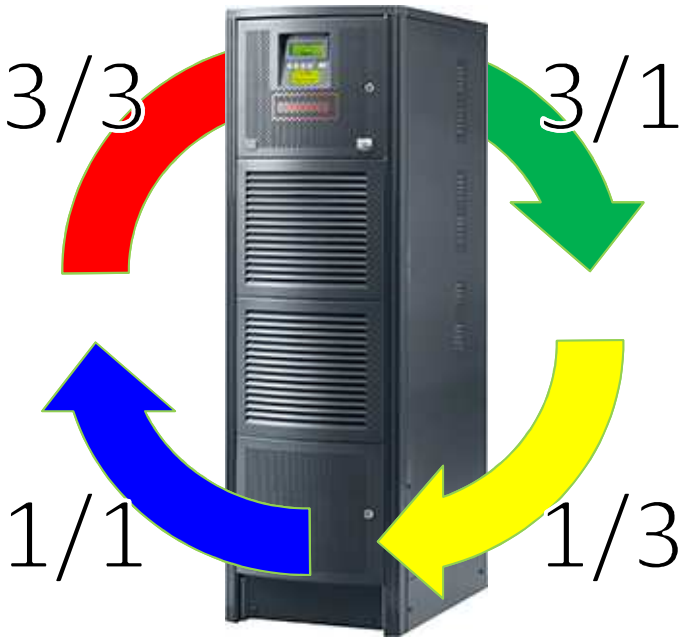


9x PM6.7kVA = 60 kVA

Trimod Archimod HE Unique feature

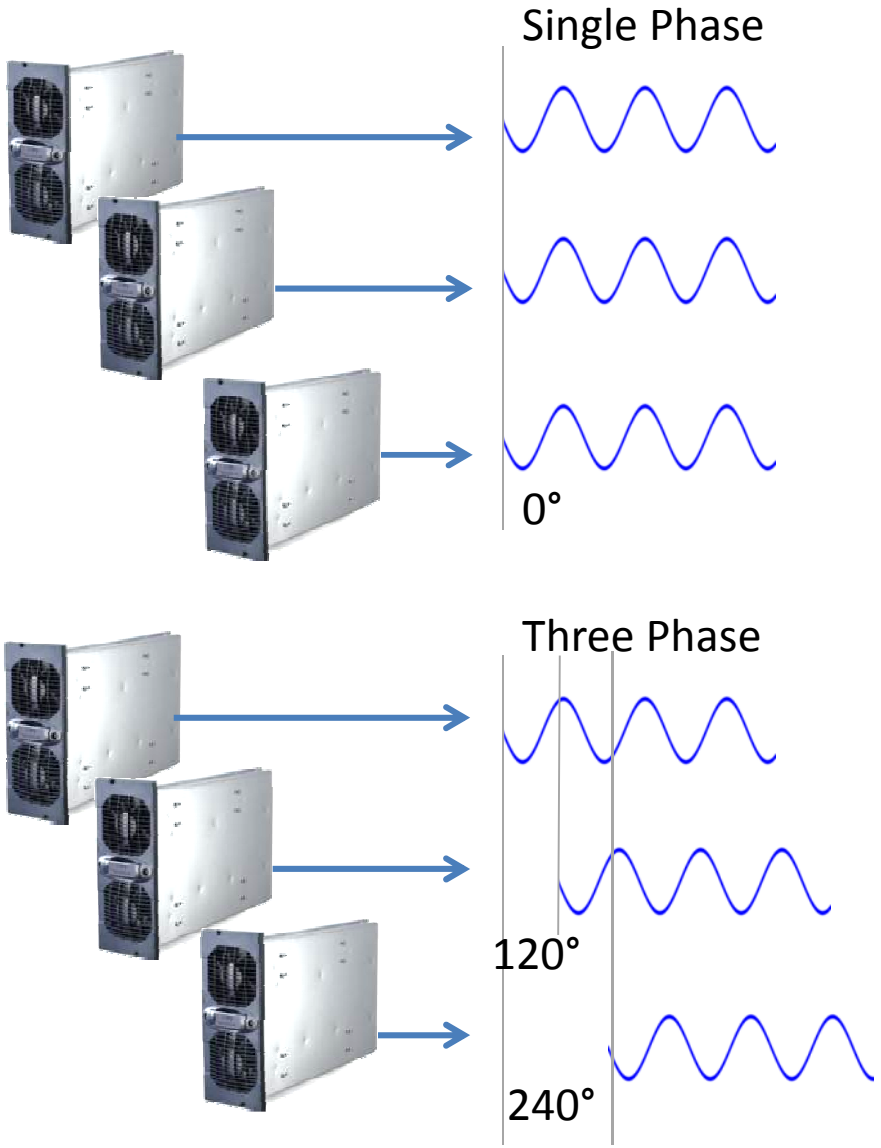
The single phase Power Module

allows to configure on site , by SW, the in/out Phase connection



Up to 30kVA in Trimod HE

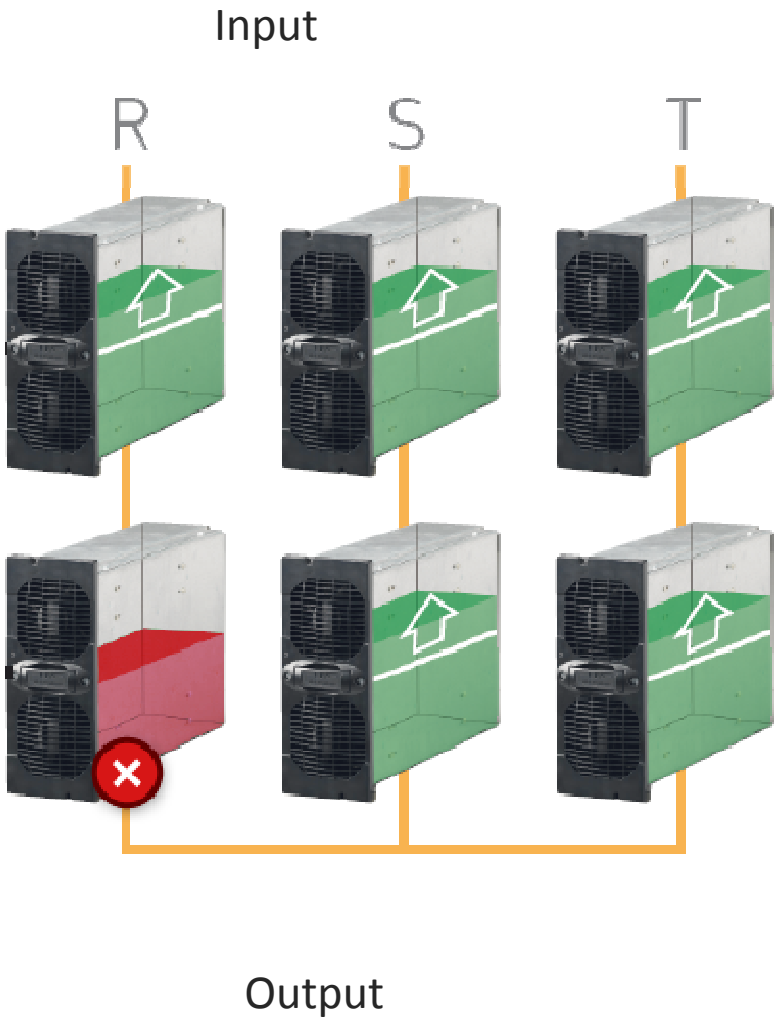
Up to 40kVA in Archimod HE



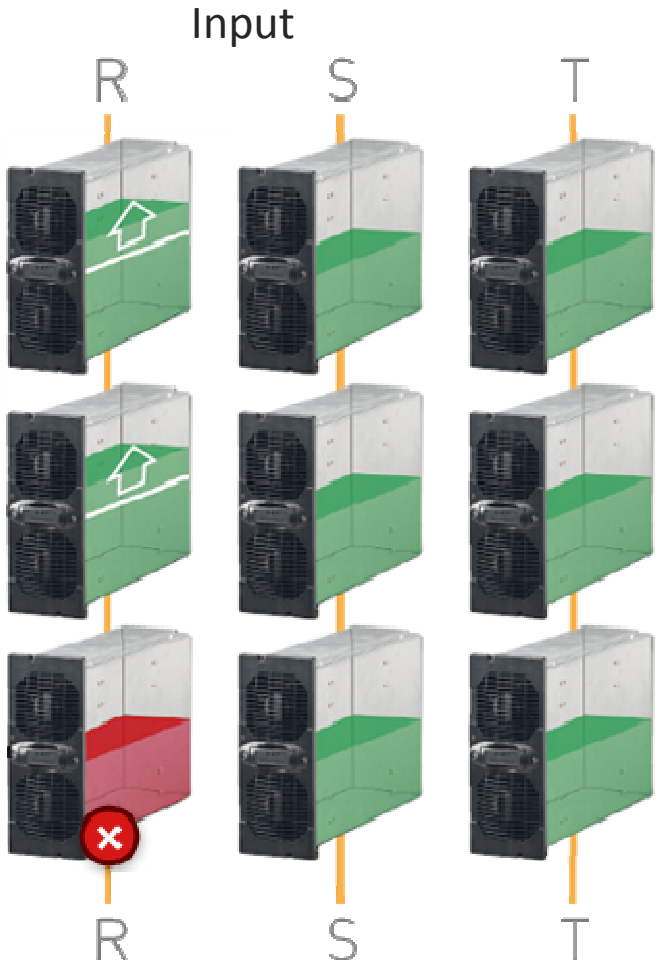
Trimod Archimod HE

Power Sharing & Redundnacy

Single phase output



Three phase output



UPS Archimod Cabinets



1 x Cabinet Inverter 3 slots

20 kVA



1 x Cabinet Inverter 6 slots

40 kVA



1 x Cabinet Inverter 9 slots

60 kVA

ARCHIMOD HE

UPS Archimod Cabinets



1 x Inverter Cabinet 12 slots

80 kVA



1 x Cabinet Inverter 15 slots

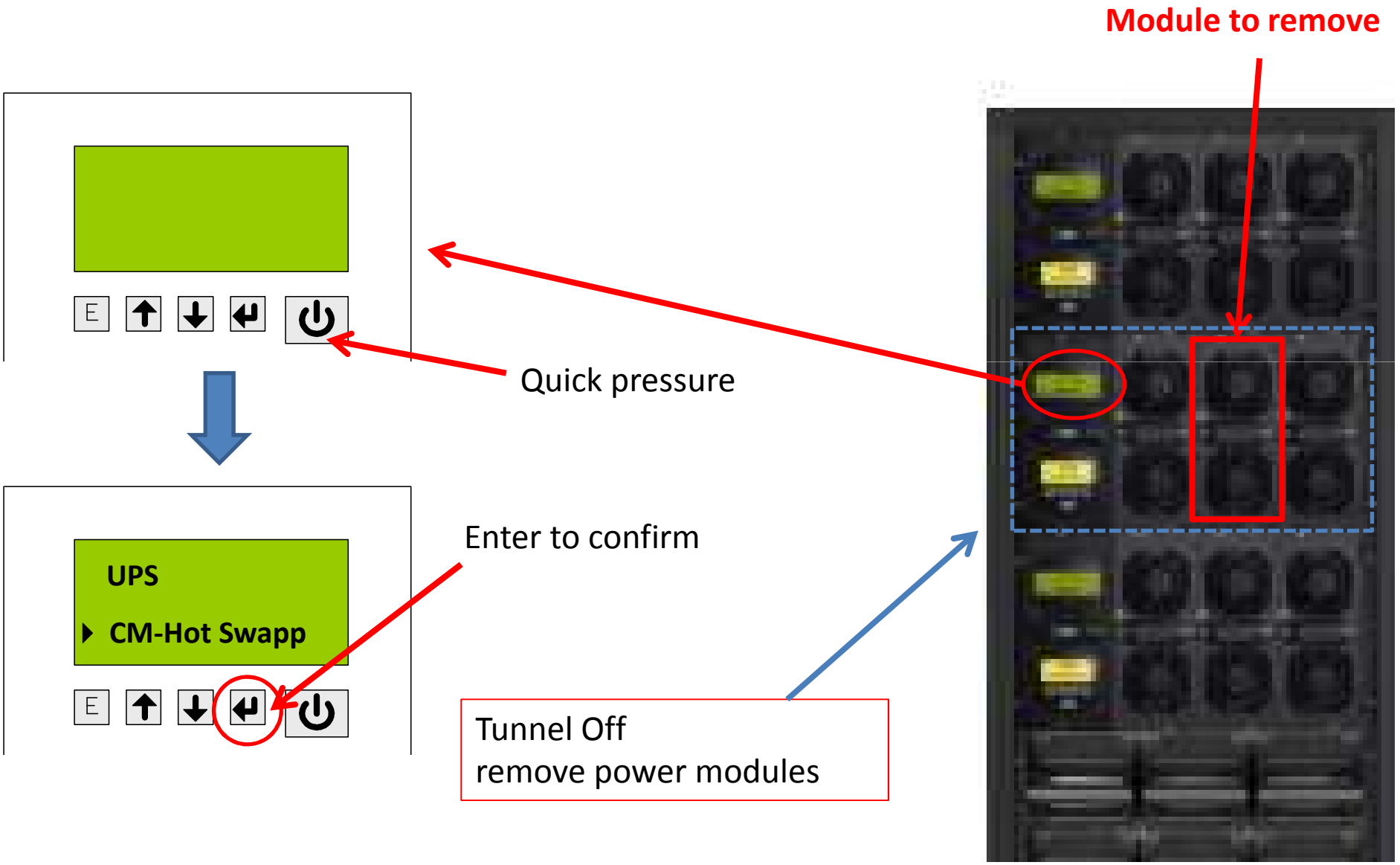
100 kVA



1 x Cabinet Inverter 18 slots

120 kVA

PM Hot-Swapp / Hot Plug

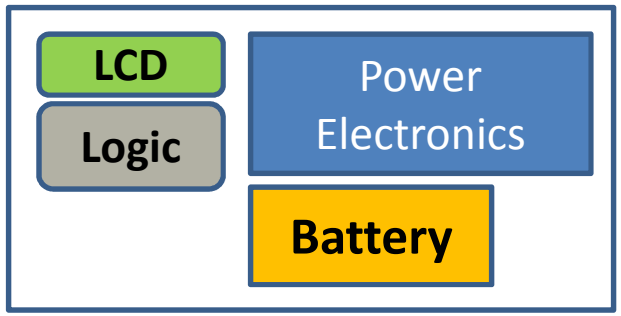


Architecture

The misconception of modular UPS architecture :

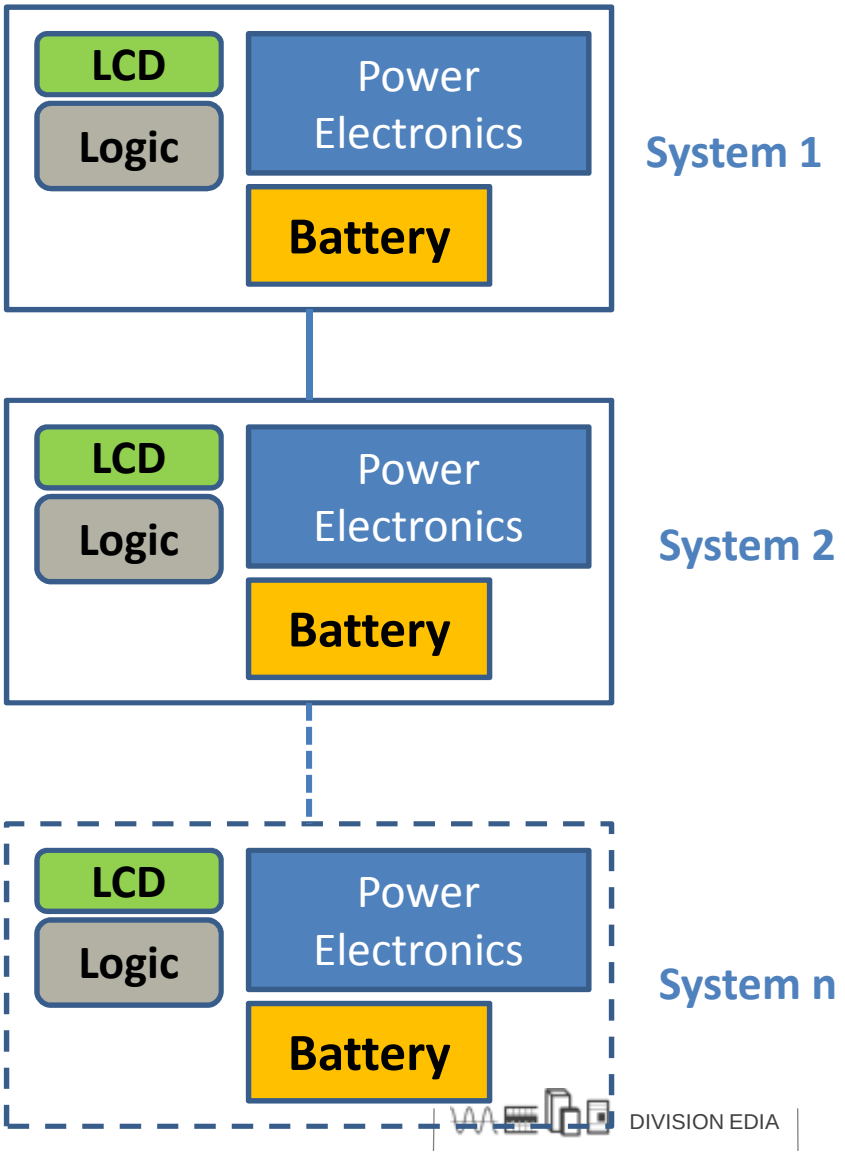
Centralized Parallel Architecture (CPA),
Decentralized Parallel Architecture (DPA)

Stand Alone

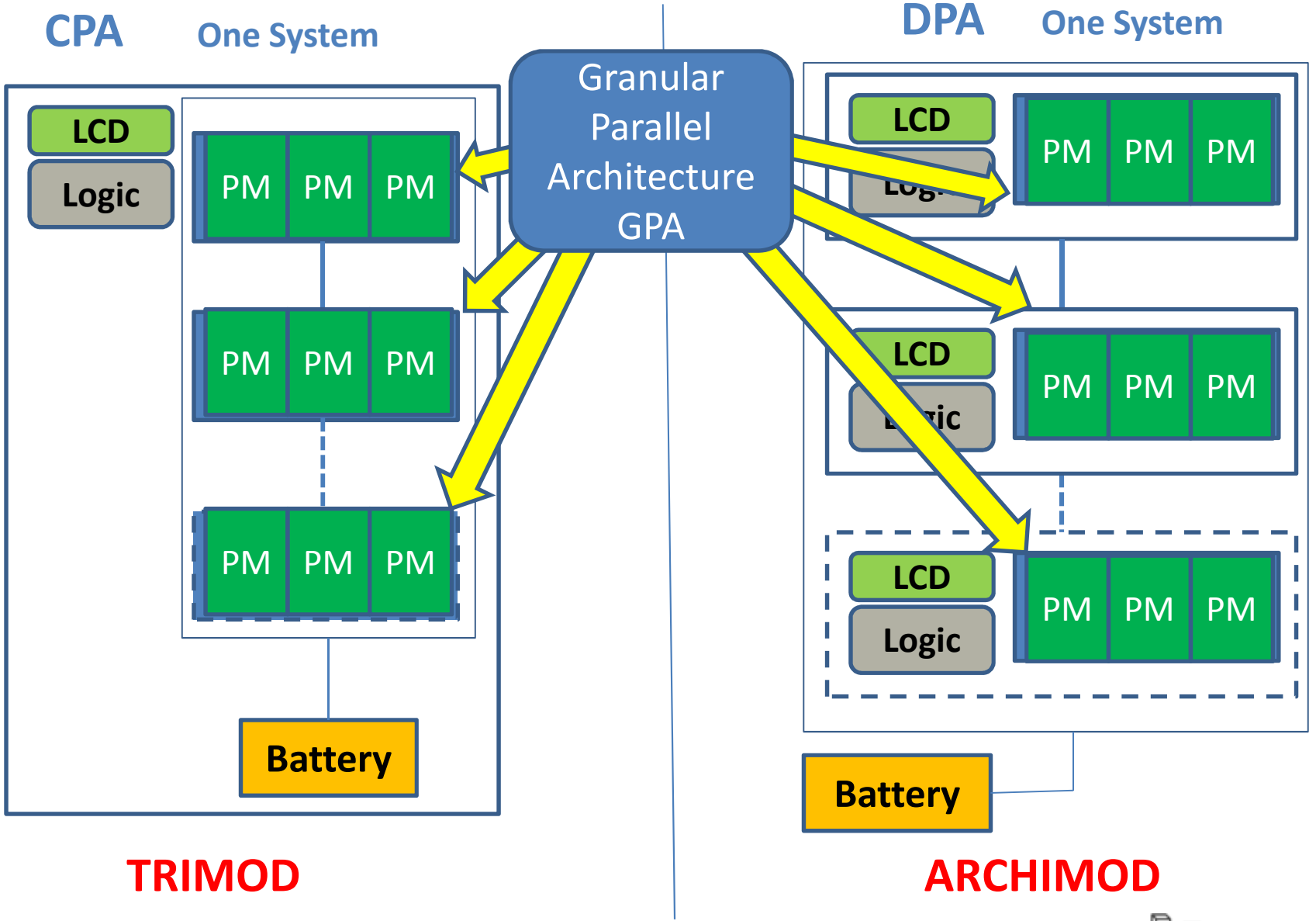


One System

Parallel N+1 (DPA)



Architecture



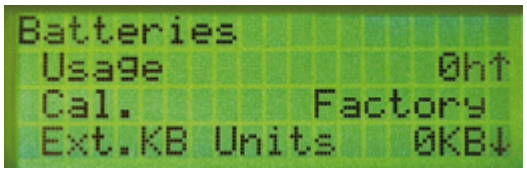
Trimod Archimod HE Control

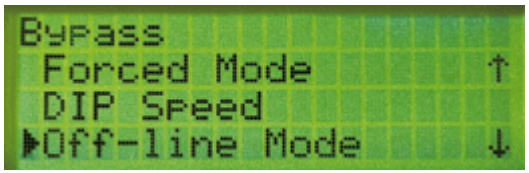
Info, measurment and diagnostics

- ✓ Compleate measures
- ✓ Full parameters control
- ✓ Advanced functions
- ✓ Events, alarms and history
- ✓ Diagnostics
- ✓ Seven Languages









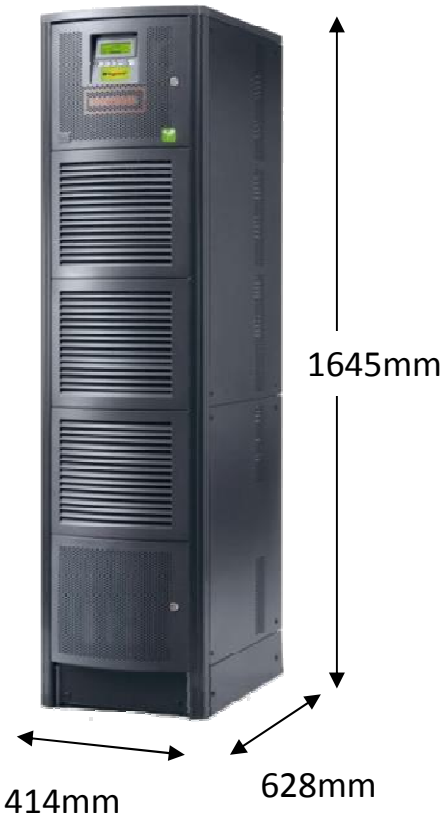


Trimod Archimod HE: Foot Print

Trimod HE
10-60kW



120 kg



181 kg

Archimod HE
20-120kW



364 kg

ARCHIMOD HE High Power



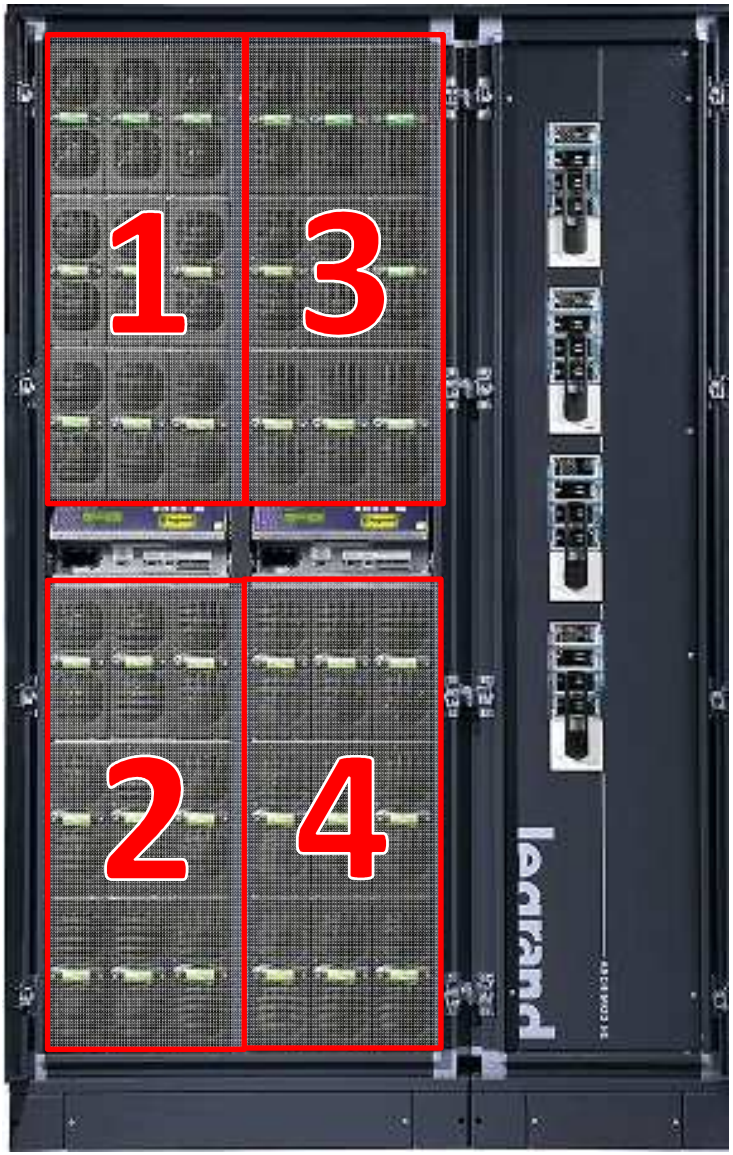
Electronics parts > Standard existing UPS

Mechanical parts > Standard XL³ Cabinets

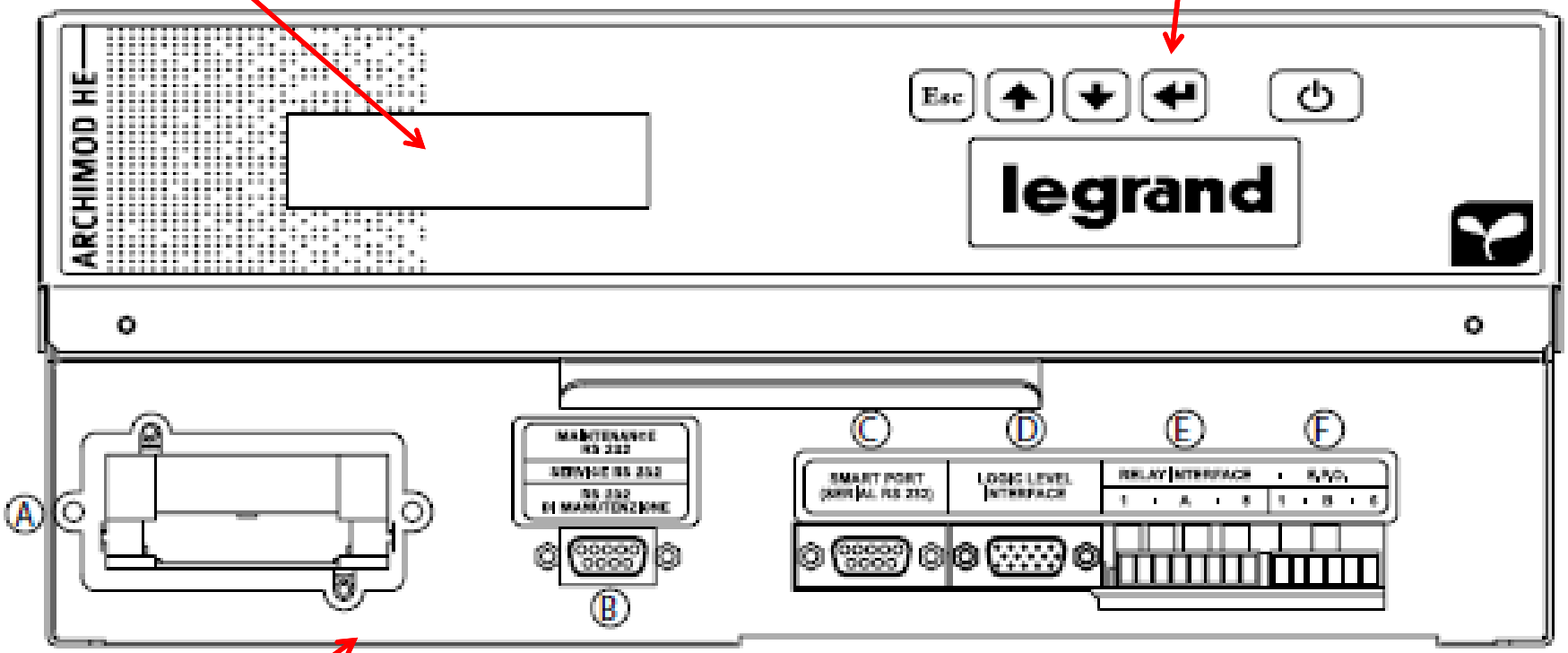
Architecture

- Up to 36 Power Modules
- 2 Display
- 4 idependent Logic Control
- Up to 4 set independent battery set (1 battery set for every 9PM block)

The same of 4 Trimod 60kVA in parallel in the same cabinet



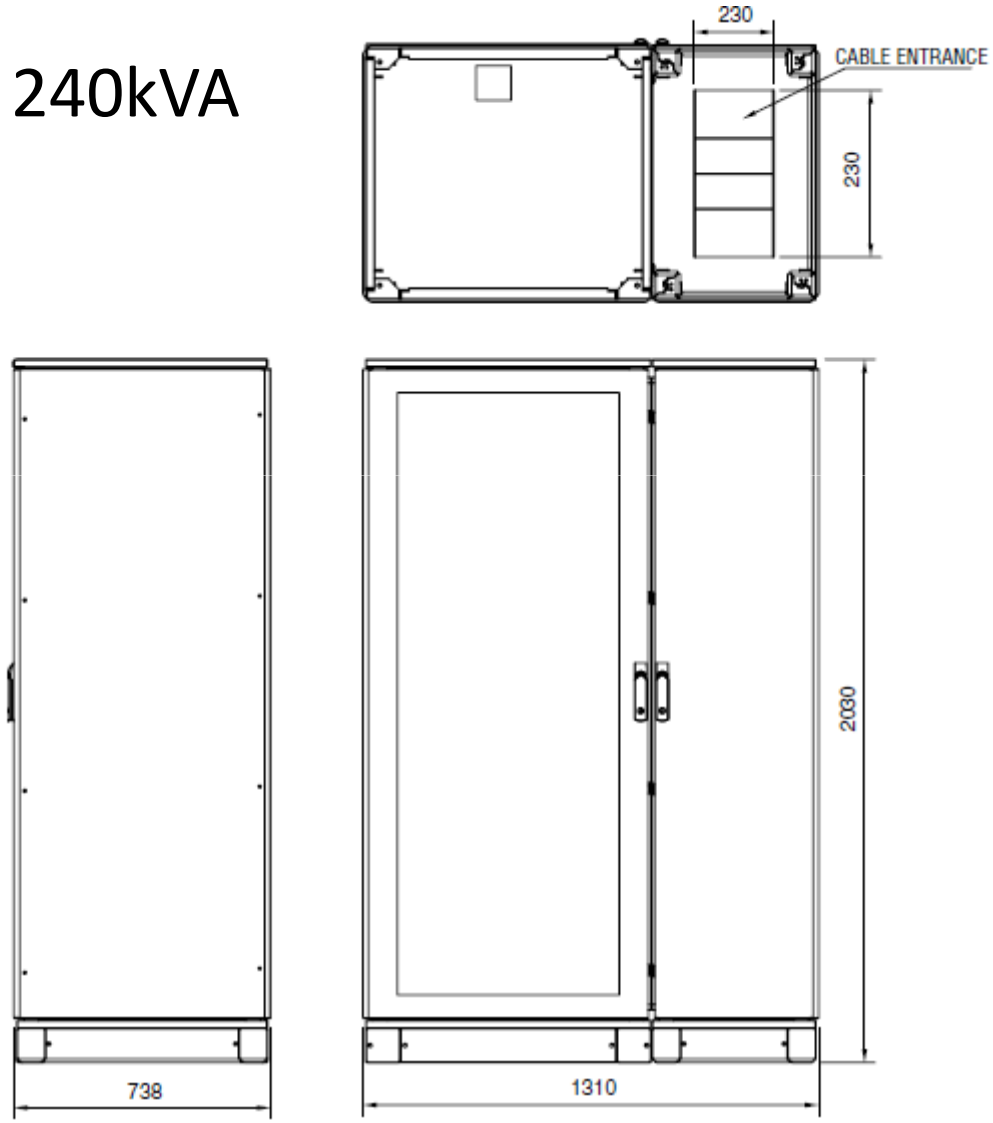
Components – Control



Frontal access for monitoring and communication interfacing

Dimensions

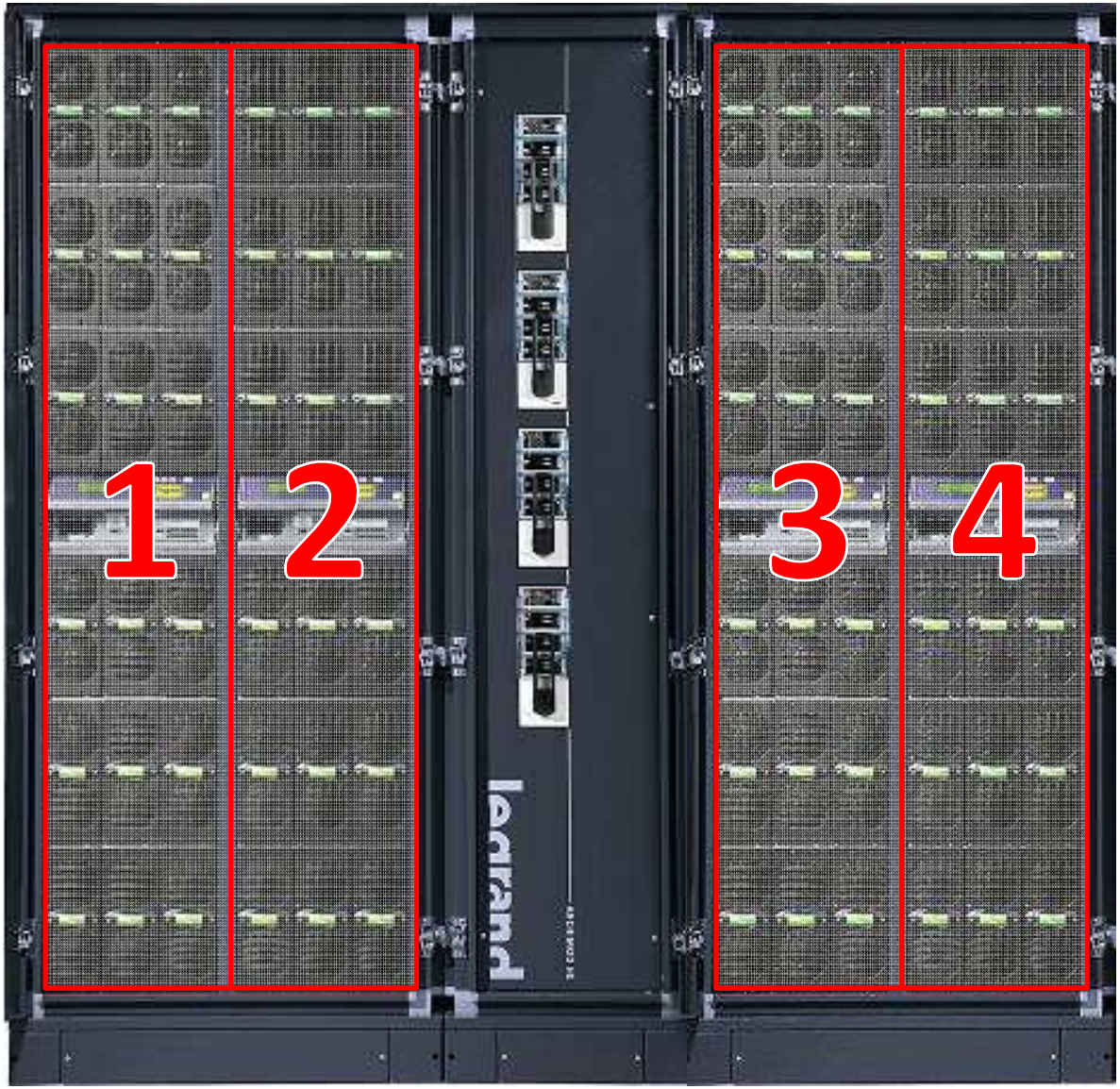
Archimod HE 240kVA



Weight 610kg

Archimod HE 480kW

- Up to 72 Power Modules
- 4 Logic Control
- 4 Independent Blocks of 120kW in parallel
- Each block can manage an independent battery set



Each block can be considered a Trimod of 120kW

Total Front access

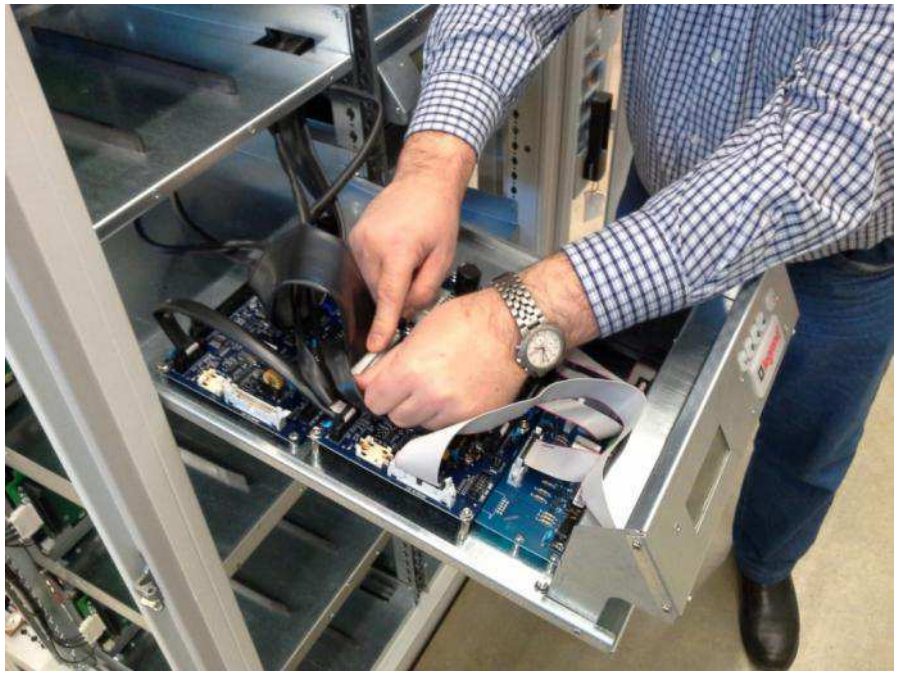


Distribution

- Robust and reliable distribution
- Maintenance Bypass
- Cabling entry: top or bottom

Total frontal acces for installation and service

Components – Control



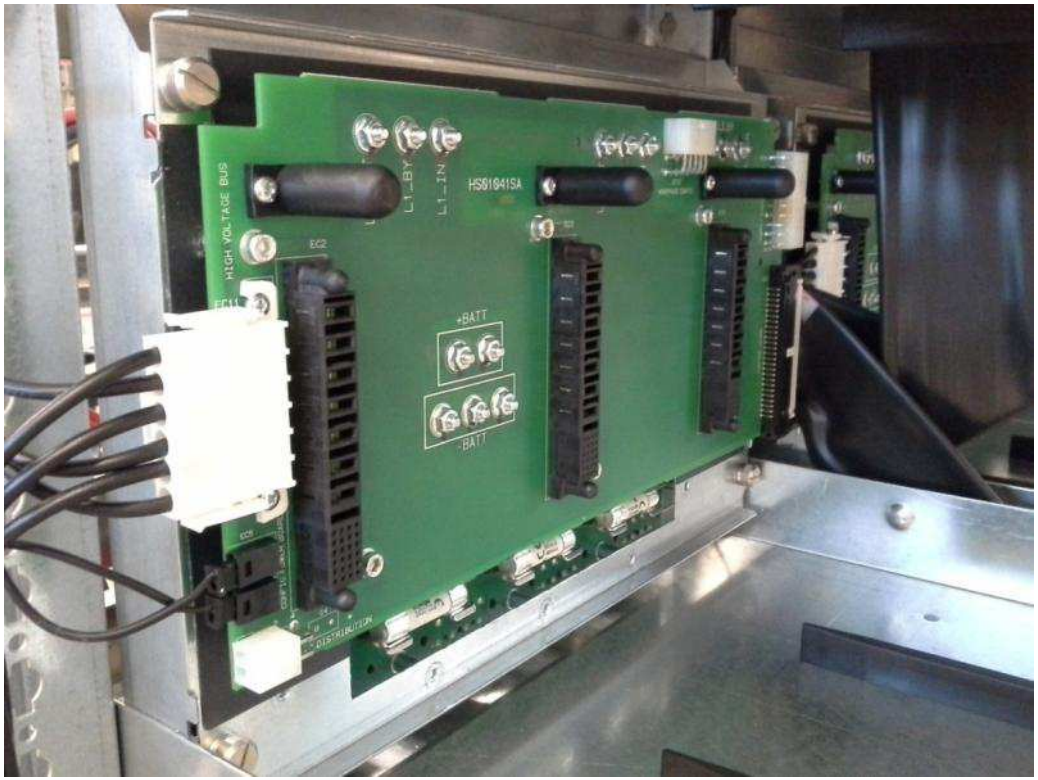
Designed to simplify the installation, maintenance, etc.



video

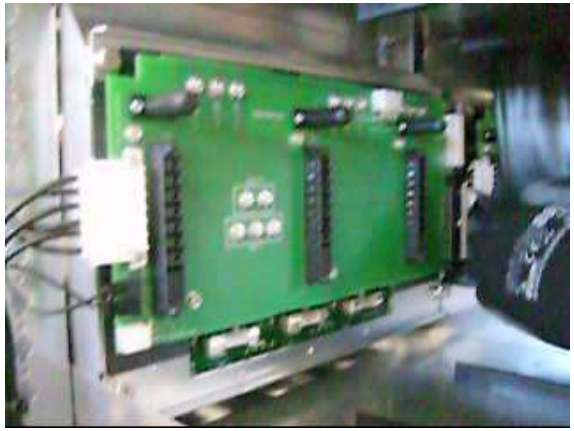
Total Front access for maintenance and auxiliary circuits cabling

Components – New back panel board



- More stable and reliable connection with Power modules
- Only passive components
- Low maintenance needs
- Easy access to Bypass circuit fuses

Total Front access for maintenance

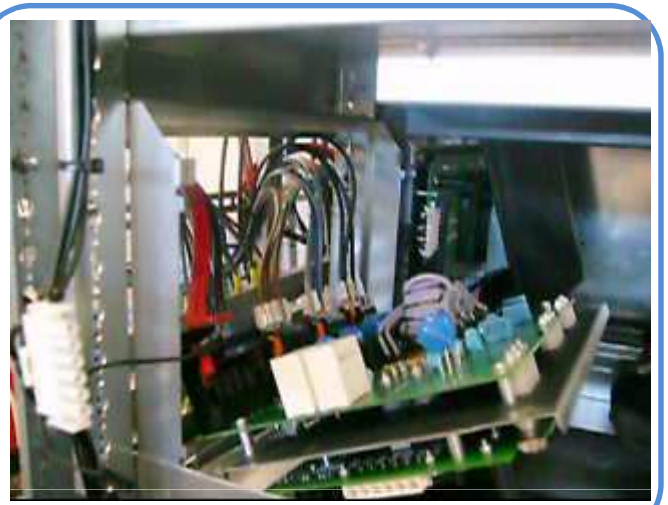


video

Components – Back panel board



Quick connections



video



Total Front access for maintenance

By Pass fuses

If the Critical load is small (few kVAs)?

Small Server Room

Advanced Work Station

IT Network Nodes & Hubs

Control System

Etc.



Small UPS – Hi Performances

Megaline



Modular On Line

Daker DK



Conventional On Line

MEGALINE: Single phase Modular UPS

From 1 to 10kVA

On Line Double Conversion





POWER MODULE



BATTERY PACK

Redundant
Scalable
Tower & Rack

Perfect For
Low Power
Critical Load





MEGALINE: Single phase Modular UPS

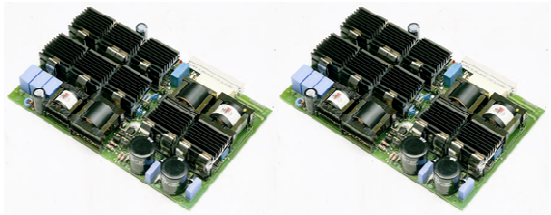
Load Sharing



MEGALINE: Single phase Modular UPS

Expandability

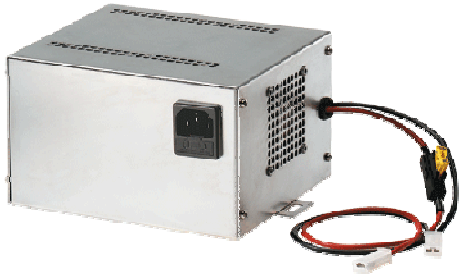
- Easy fit 1250 VA Powerboard
- Easy fit battery kit (three 9 Ah batteries)
- Additional Battery Cabinet Available
- Additional RM 3U Battery Cabinet Available



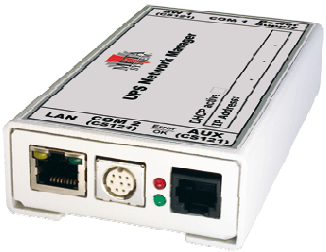


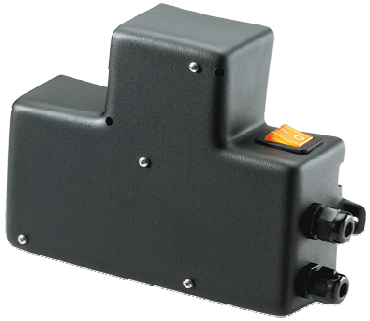
Megaline - Accessories

- Kit Battery for autonomy extension
- External Battery Charger
- External Bypass for maintenance
- Releay interface
- Net Adapter

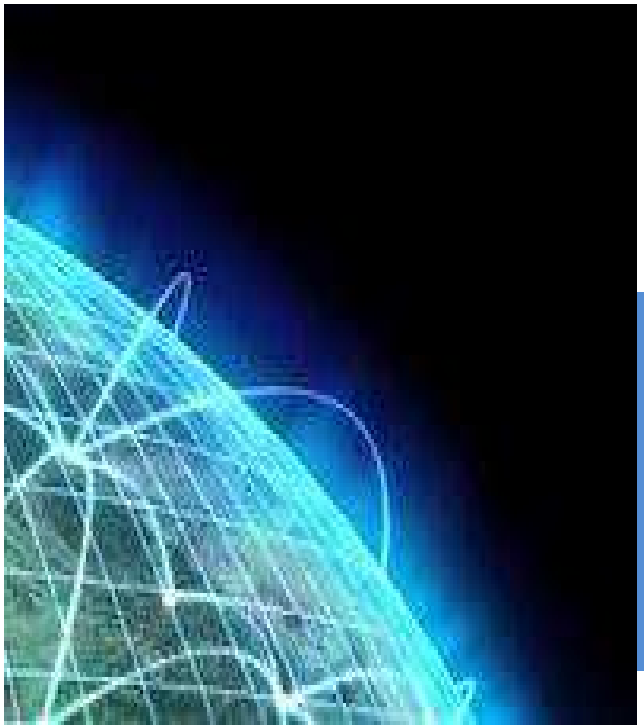












UPS SW Management

Network Cards
Monitoring System
Sensors Integrations

UPS SW Management: What is it?



UPS

Data Interfacing



UPS Status Monitoring and Control



Servers Controlled Shutdown

Sensors & Actuators Control System



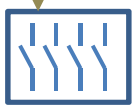
Smoking sensor



Anti-fire system command



"custom" sensors analogical and digital



Automation Systems

UPS Remote Management Structure

3 type of Software

UPS



SW Manager
Communicator



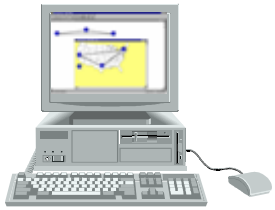


Monitor SW

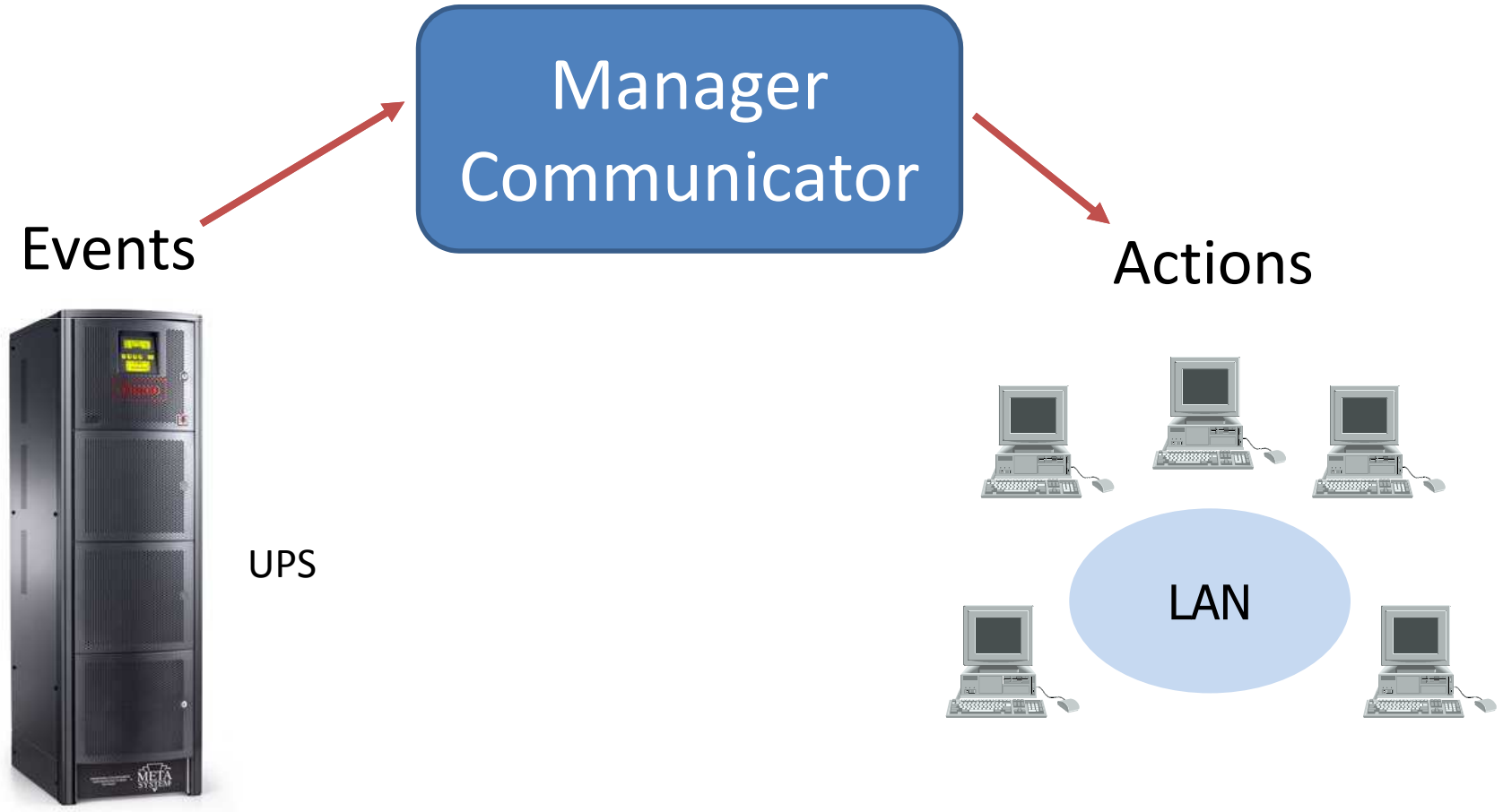
Agent SW
Remote Shutdown
Remote Command



LAN

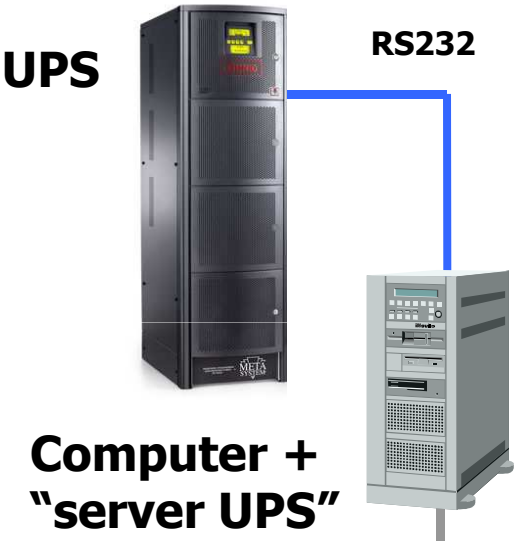


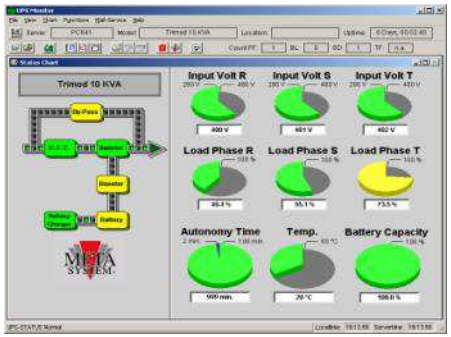
How it works?



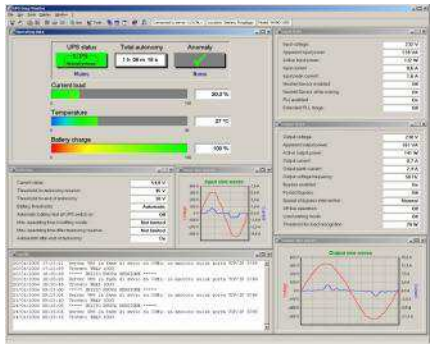
Direct connection to computer

Our Solutions:



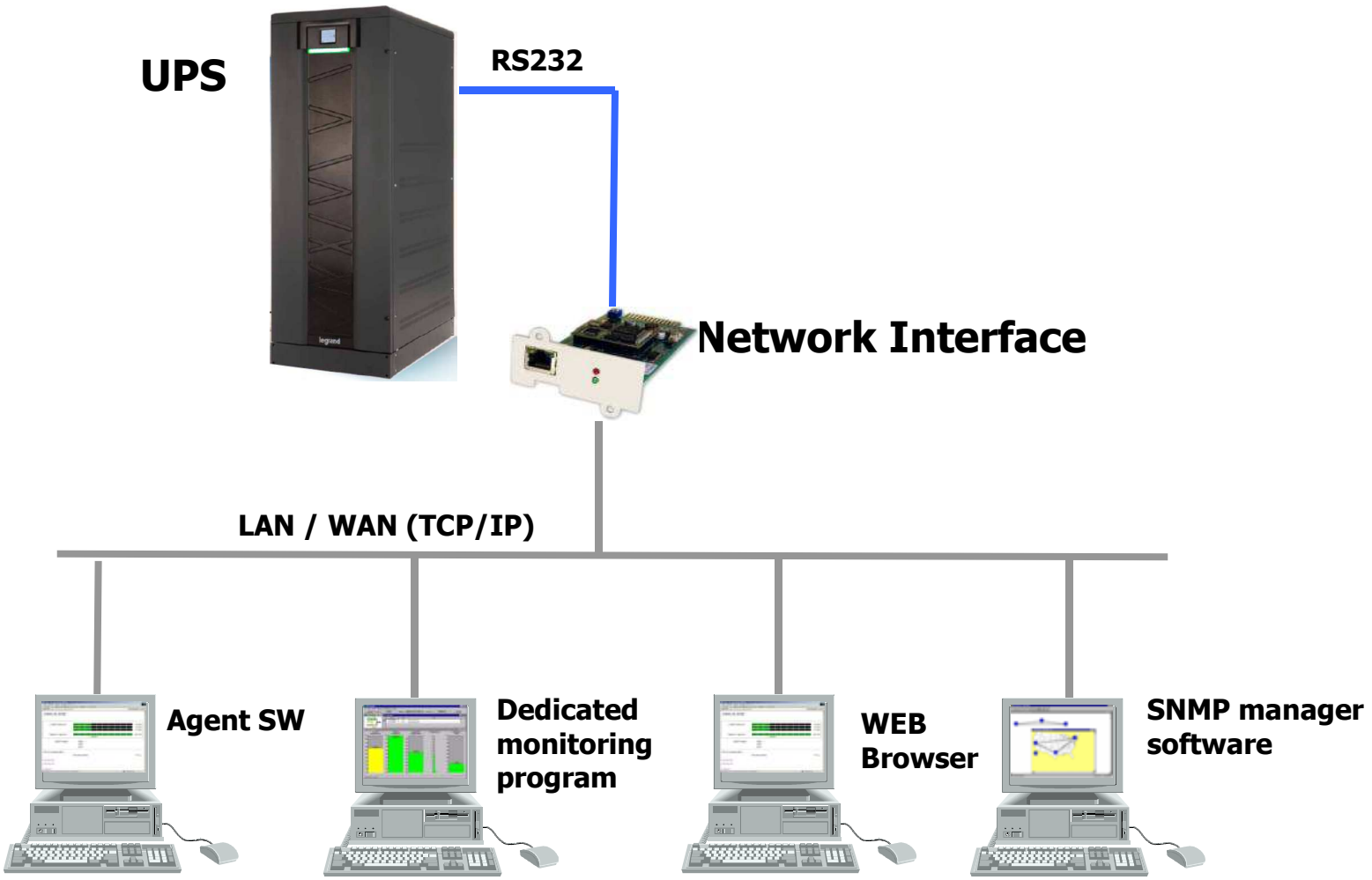


UPS Management Software



UPS Communicator

Data Network Interfacing



Net Interface CS121

Network & Power Management for all O/S

Available Models

Basic



CS121 B SK

Ethernet

Professional



CS121 SK

Ethernet, RS232,
Digital Ports

Industrial



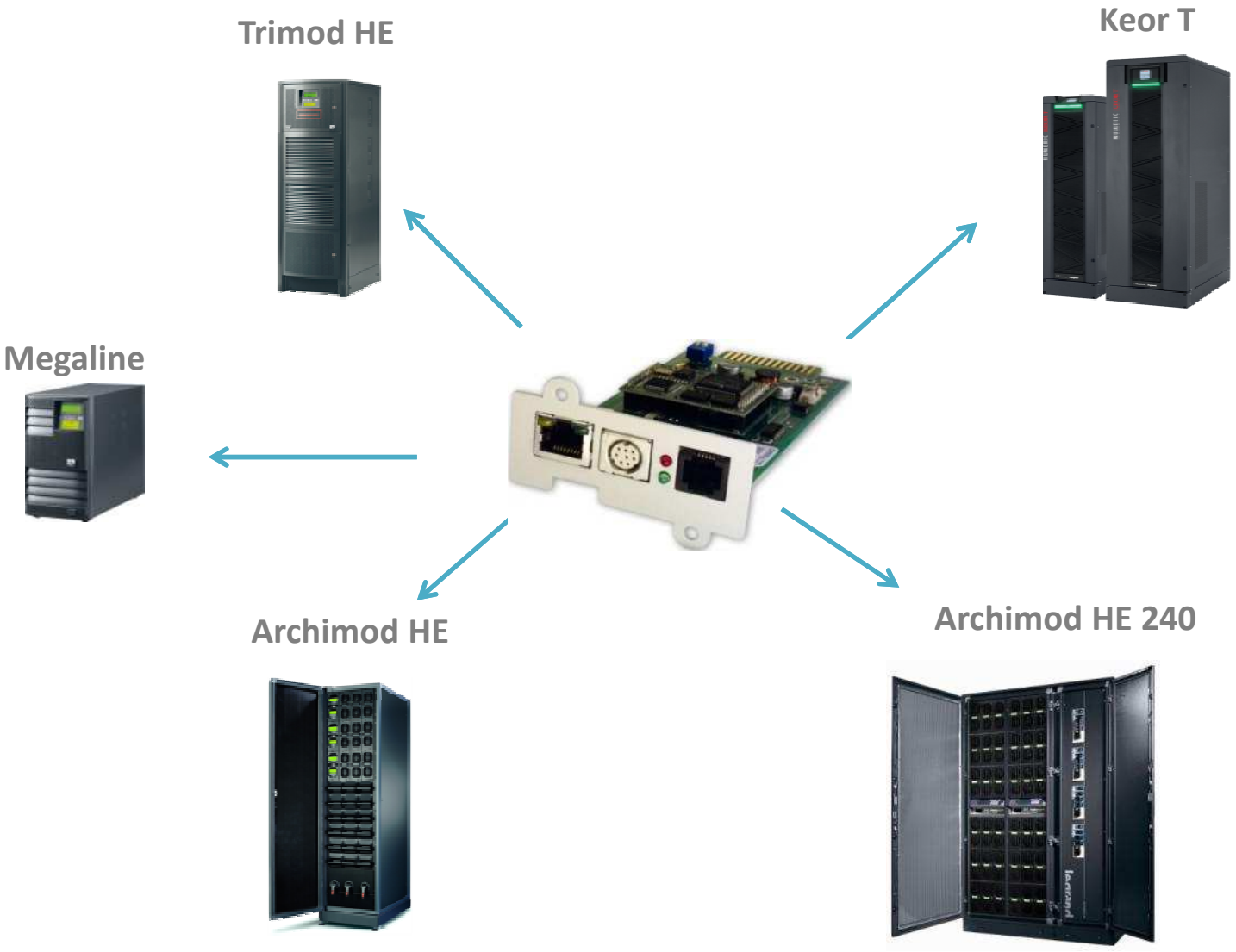
CS121M SK

Ethernet, RS485,
Digital Ports

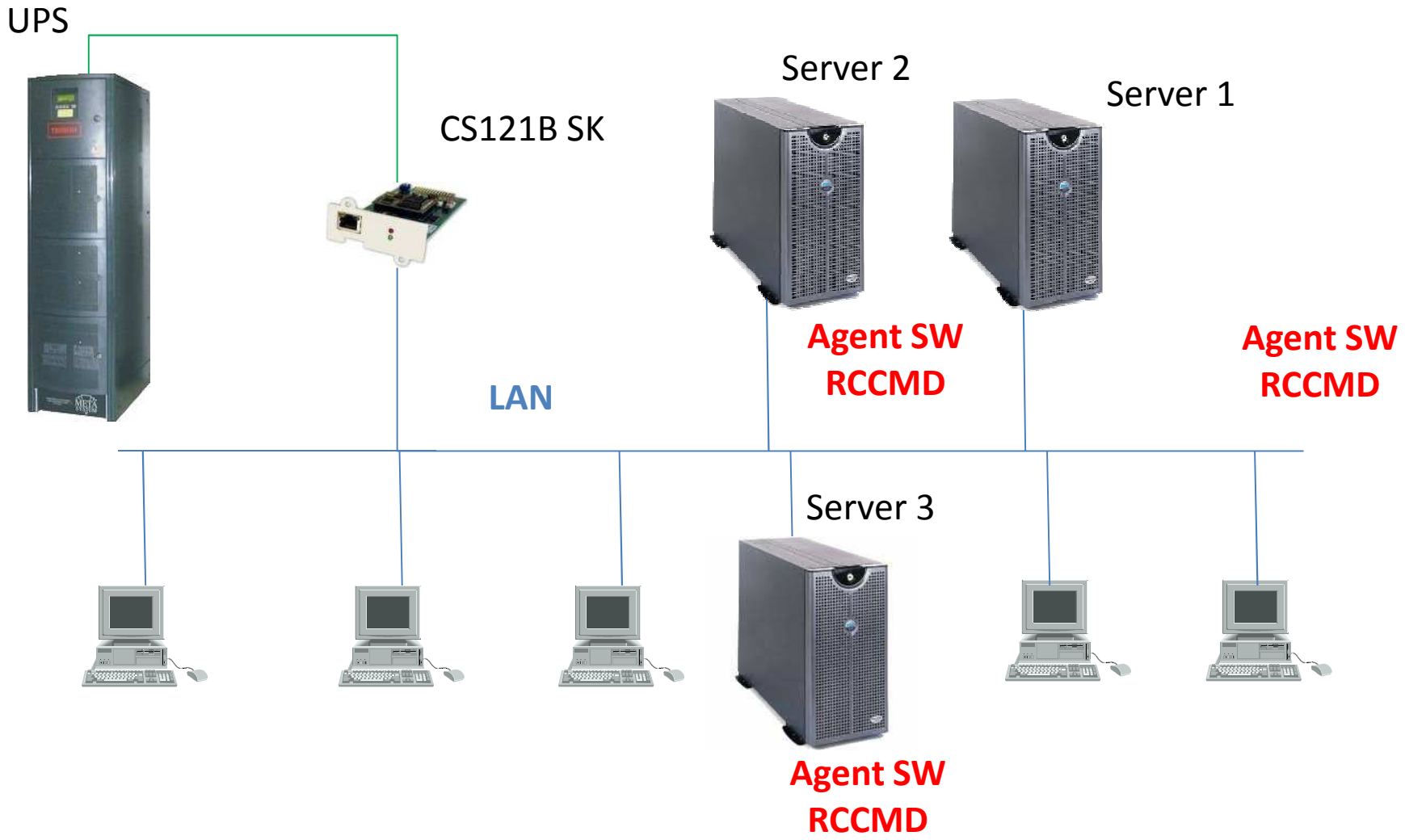
One AGENT (RCCMD) License included

Net Interface CS121

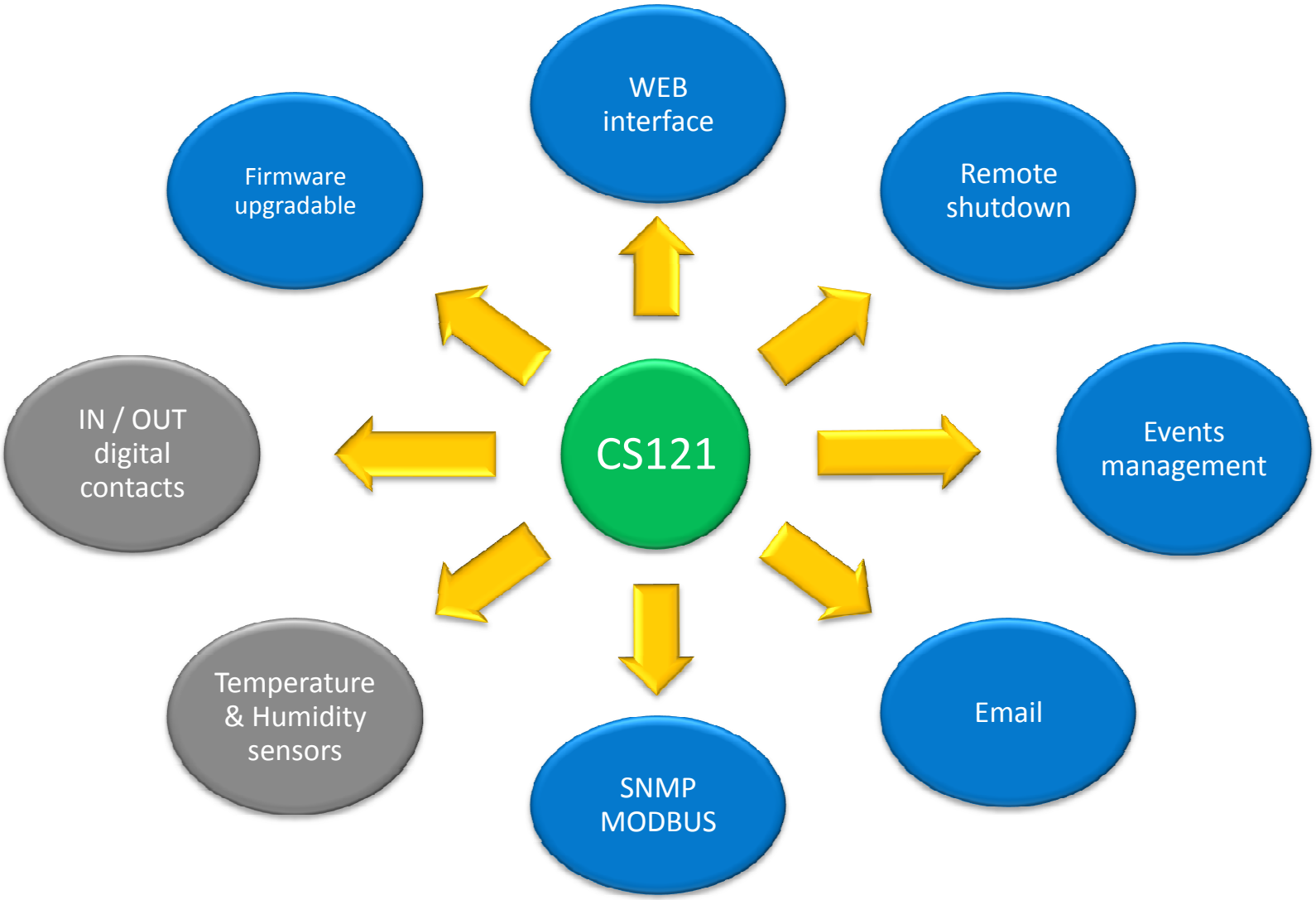
Compatible with all UPS models



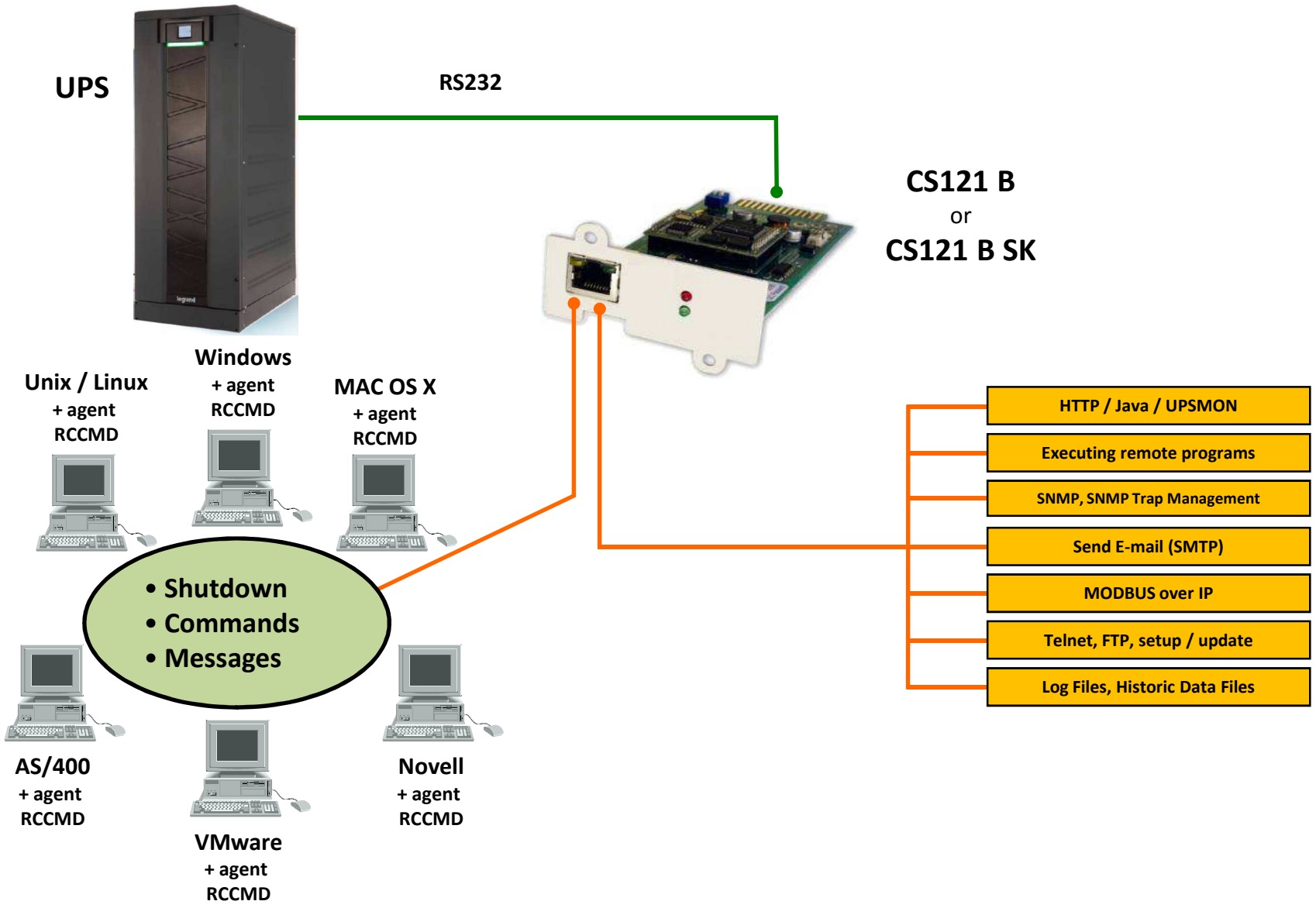
CS121 Typical Scenario



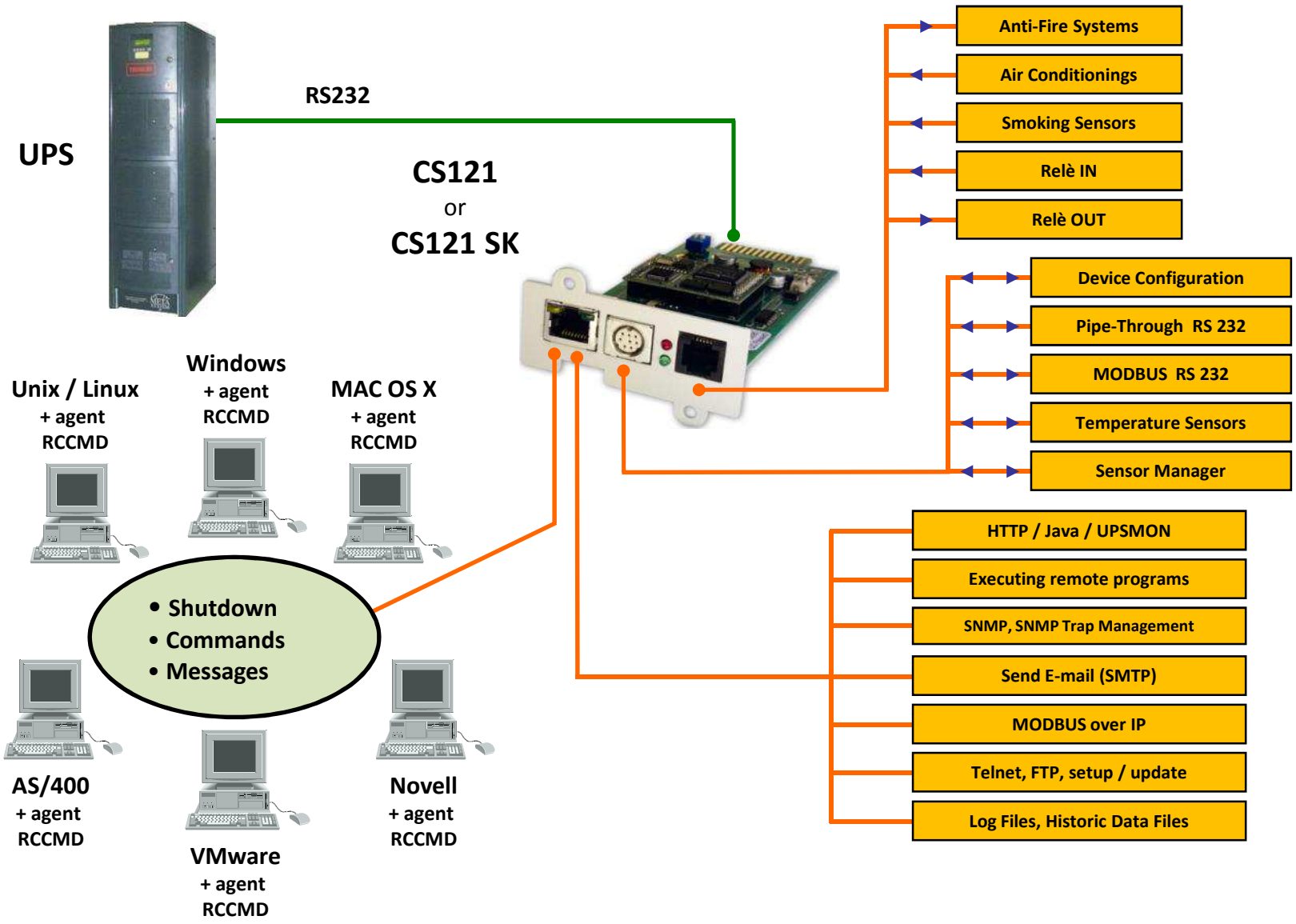
CS121 : Main functions



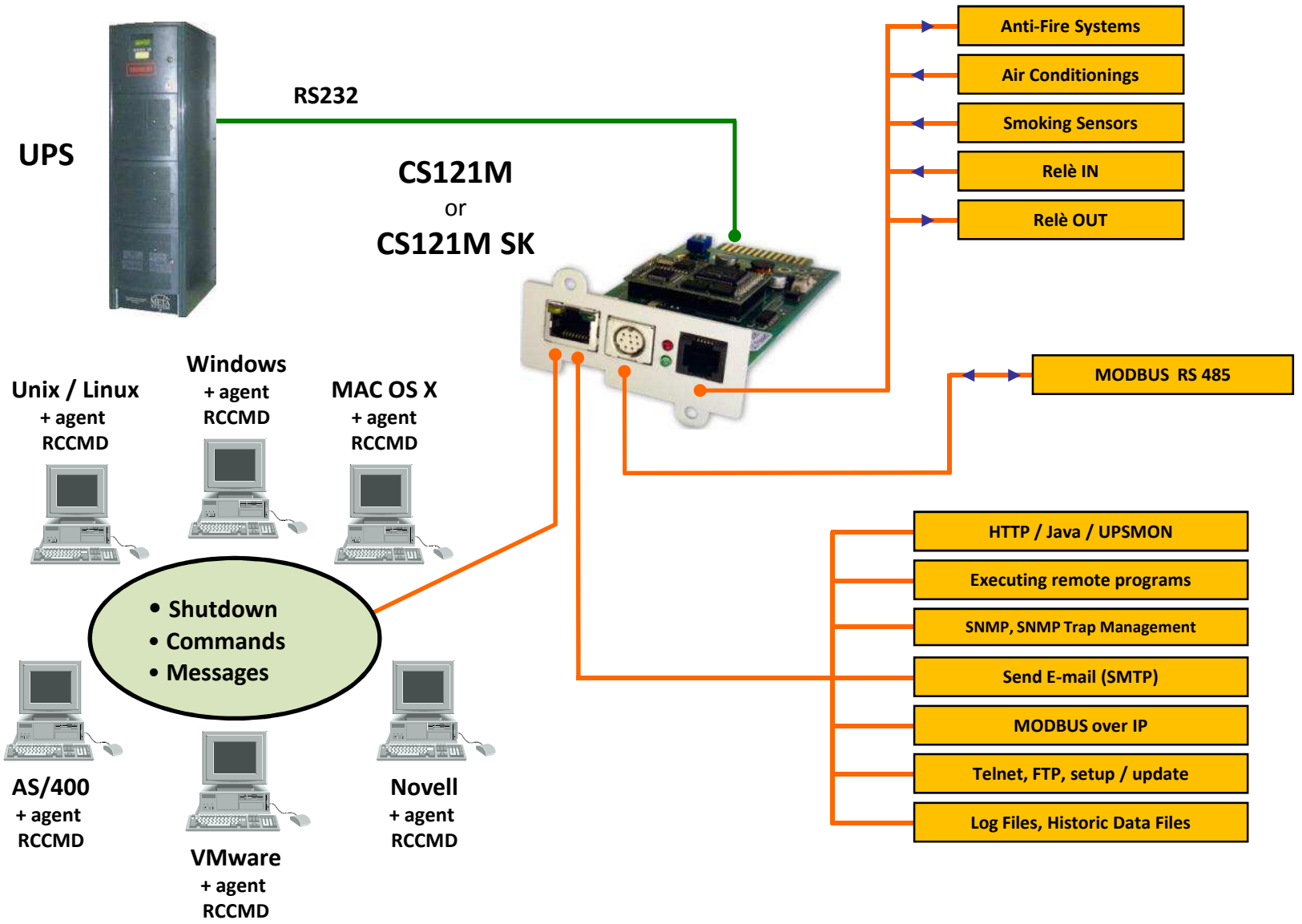
CS121B : Working scenario



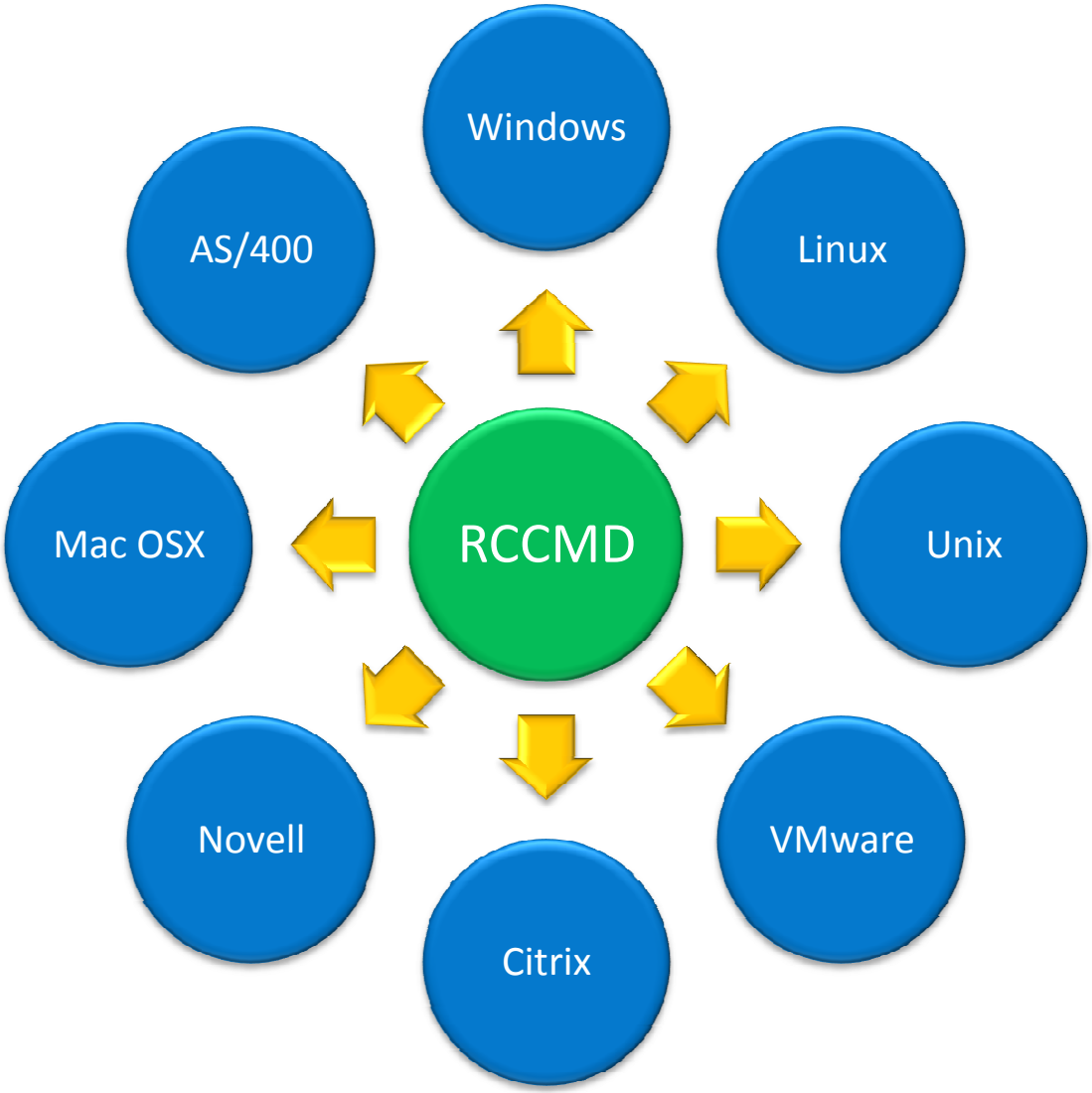
CS121 : Working scenario



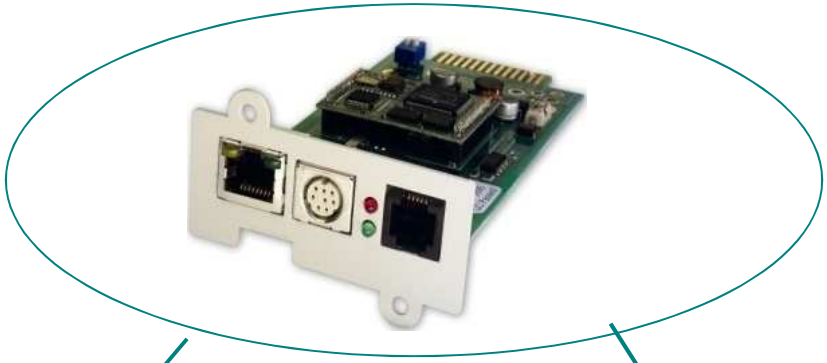
CS121M : Working scenario



RCCMD software agent OS Compatibilty



Accessories





Temperature Sensors



Temperature & Humidity Sensors



Signalling Light

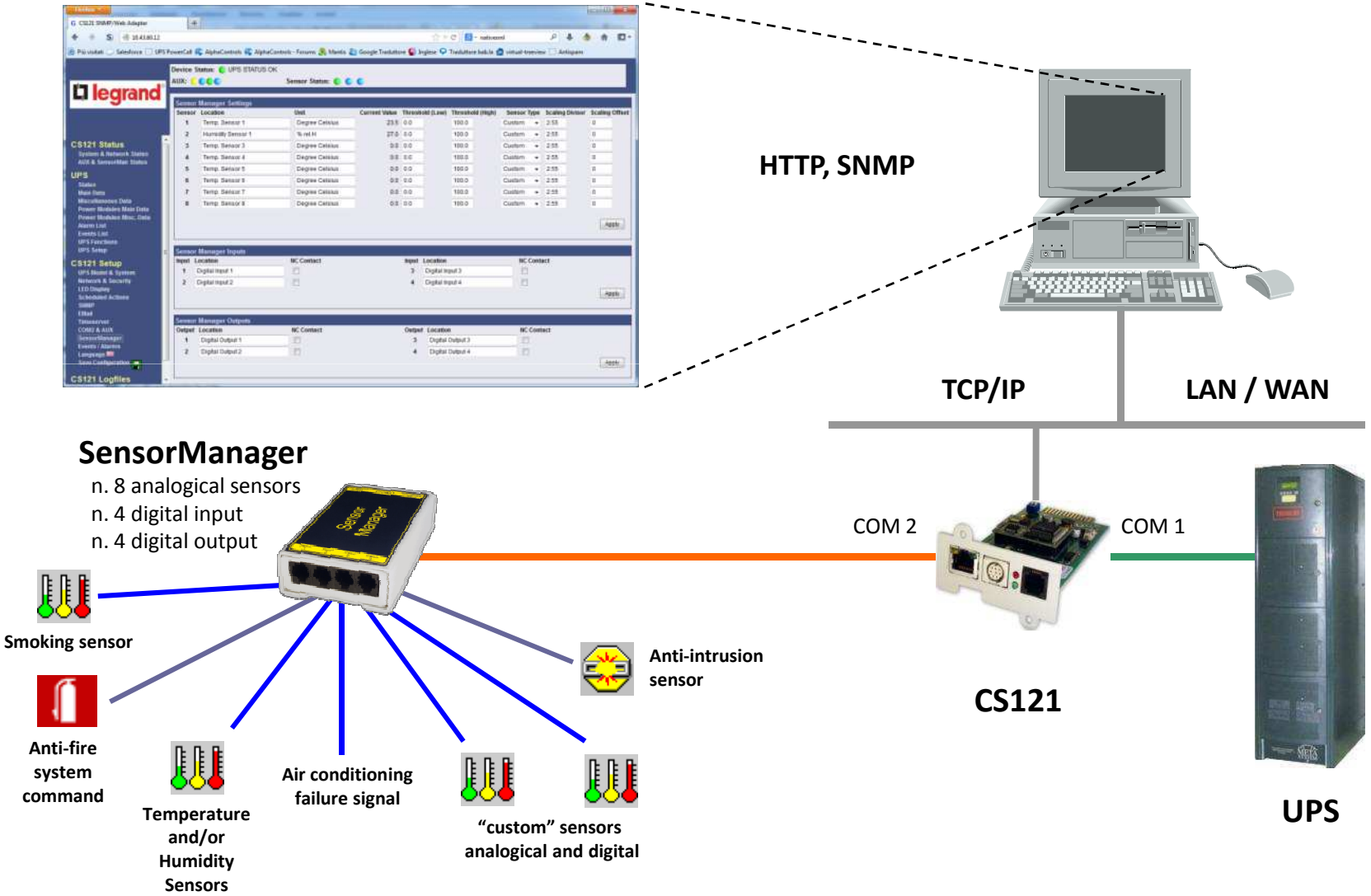


Sensor Manager

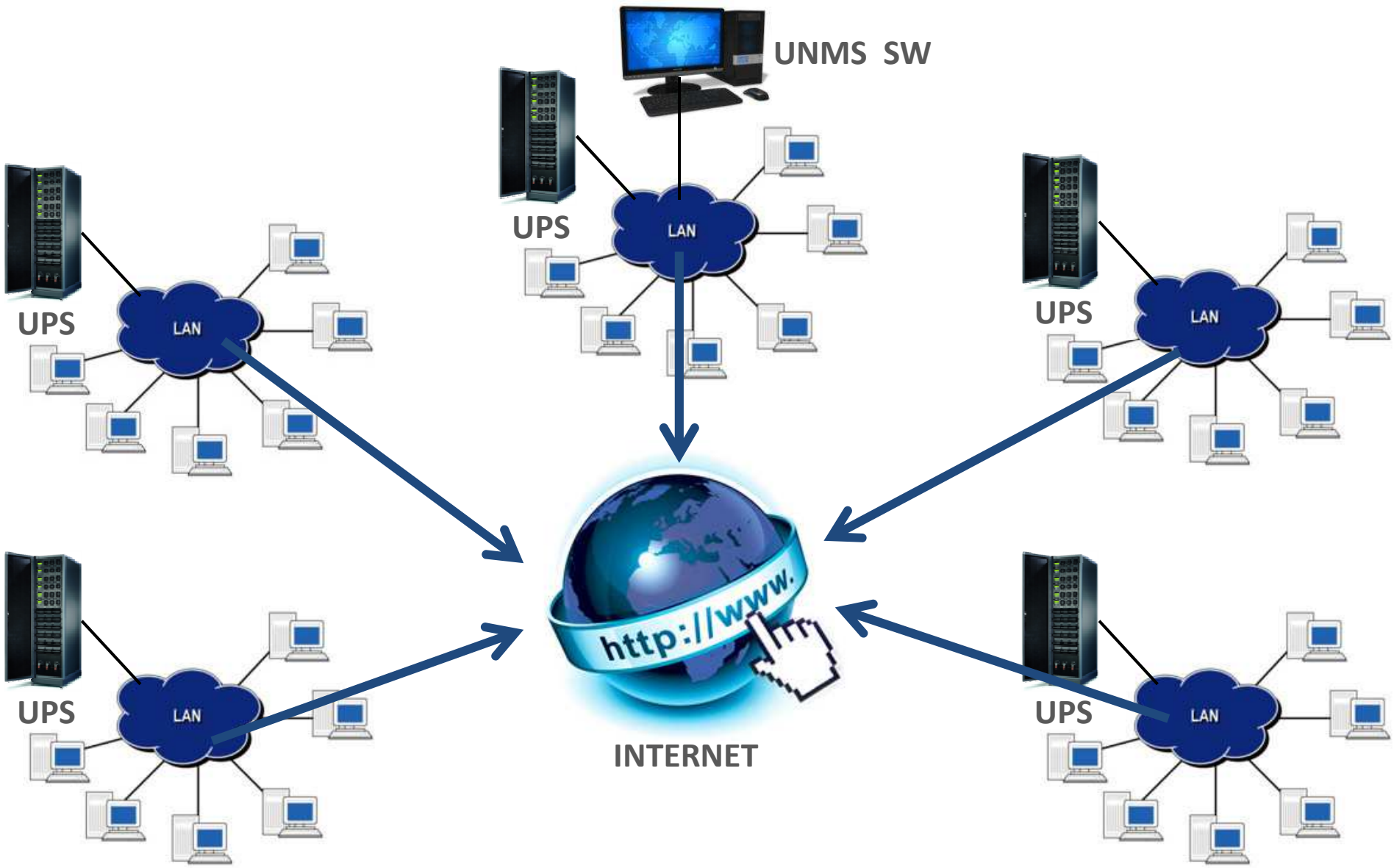


Open Door Sensor

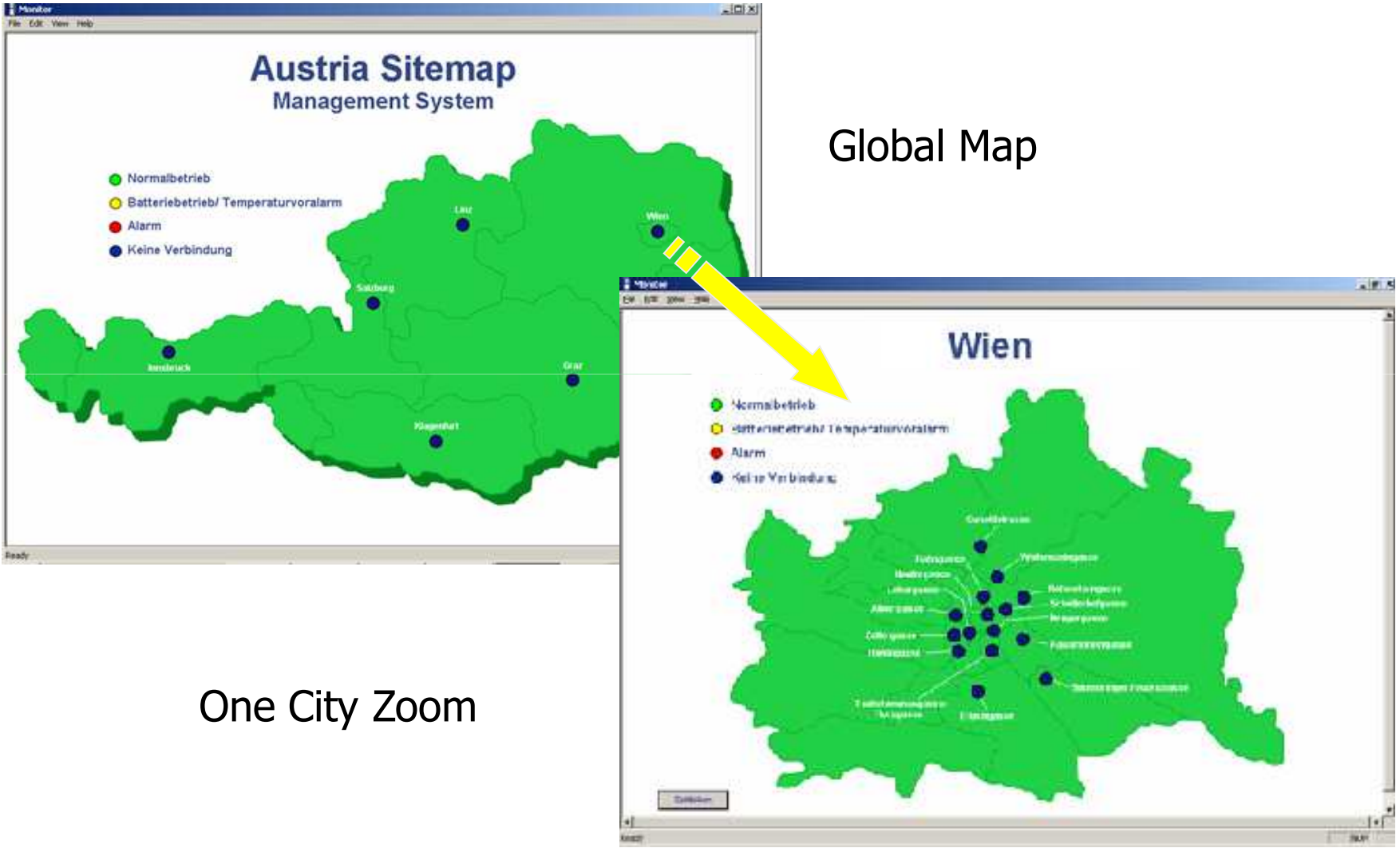
SensorManager : Working scenario



Multy UPS Control System
UNMS



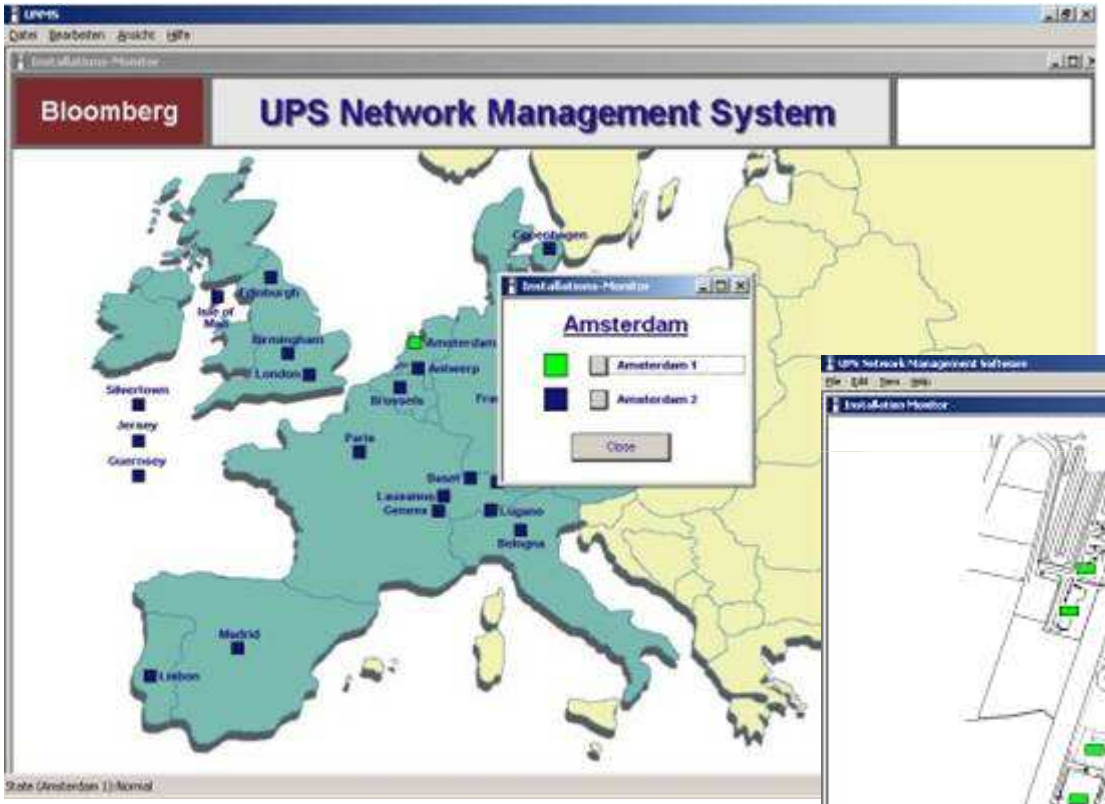
UNMS : Example of graphic layout



Global Map

One City Zoom

UNMS : Example of graphic layout





Bloomberg TV Network

Questions?



Thank you !