MUST400

10-200 kVA

MODULAR THREEPHASE UPS

3:3

The ideal solution for:

- ✓ *DATA CENTER & SERVER*
- ✓ *INTERNET CENTERS*
- ✓ *LOCAL AREA NETWORK*
- ✓ *TELECOMMUNICATIONS*

GTEC
Smart Energy Solutions

OVERVIEW

MUST400 series is modular and online double conversion UPS for sensitive equipments. The power rating covers from 10 to 400 kVA, which delivers the best combination of **reliability**, **functionality**, **hot-swappable** and **flexibility**.

- Modular design with Full Hot Swap System
- Intelligent module and system protection design
- Strong load adaptability for linear and non-linear loads
- High flexibility
- Parallel operation

TECHNOLOGY

RECTIFIER

The **IGBT rectifier** produces minimum impact on the mains thanks to the high-performance PFC (Power Factor Control), which brings to input PF 0.99.
At the same time very low input distortions are recorded. The THDi is less than 3%, allowing to optimize the upstream performance of the UPS (ideal for gen-set and transformer supply).

INVERTER

The inverter is equipped with last generation technology like 3-level IGBT, high frequency modulation and PWM driving.
High performance is also guaranteed thanks to the **digital DSP control**, which provides great stability and a pure sinewave even in case of unbalance load.
MUST400 then guarantees maximum efficiency level, also for low applied load, up to a maximum of **95% efficiency in Normal Mode**.

BATTERY CHARGER

Each power module has its own battery charger, with single or double charge level, temperature compensation, and end-of-discharge control. This allows for redundancy operation as well as a **wide battery capacity to be installed**.
It is also possible to carry out **automatic or manual tests**, so to monitor batteries status and to prevent any kind of fault.

STATIC BYPASS

MUST400 is equipped with a centralized static bypass. The bypass module is **totally HOT SWAP**, and it is sized for the full system power. This allows faster maintenance and replacement time.
This specific architecture allows to hold a **higher short-circuit current** compared to a distributed bypass, while keeping very high availability (MTBF).

PRODUCT RANGE

MUST400 120 KVA

This system is designed to house 6 units of power module 10 kVA or 20 kVA.

It is possible to expand the power **up to 360 kVA by connecting 3 cabinets in parallel**.

MUST400 200 KVA

This system is designed to house 10 units of power module 10 kVA or 20 kVA.

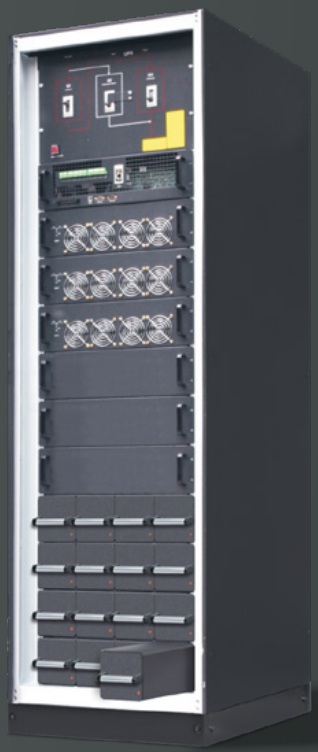
It is possible to expand the power **up to 400 kVA by connecting 2 cabinets in parallel**.

INTERNAL BATTERY SOLUTION

MUST400 60 KVA

The solution can include three modules (10 or 20 kVA each), up to 4 x 40 batteries 9Ah/12V with batteries breaker (with autonomy 16 min for typical load of 32 kW in redundant N+1 configuration).

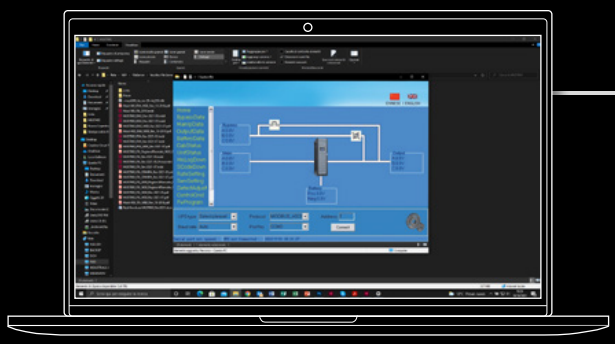
MUST400 60 kVA concept brings the advantages of **HOT SWAP** to modules of batteries, for quick and safe battery maintenance.



SOFTWARE AND DISPLAY

The monitoring software displays real time information in the form of bar charts and values for critical data such as mains voltage, UPS load and battery charge.

It allows a complete remote interrogation of UPS logs and operating parameters to help diagnose alarms through detailed information. When instructed the software can also perform an automated safe power down of the protected servers and PCs.

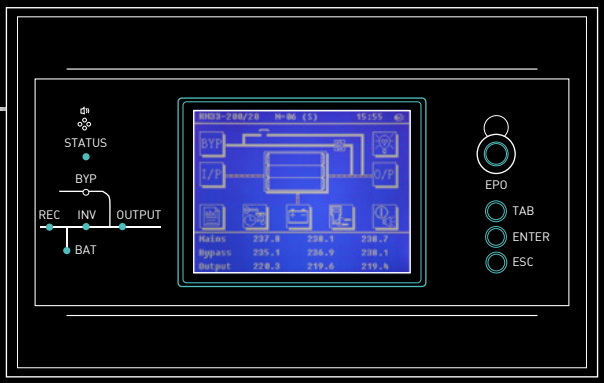


OPERATING SYSTEMS SUPPORTED

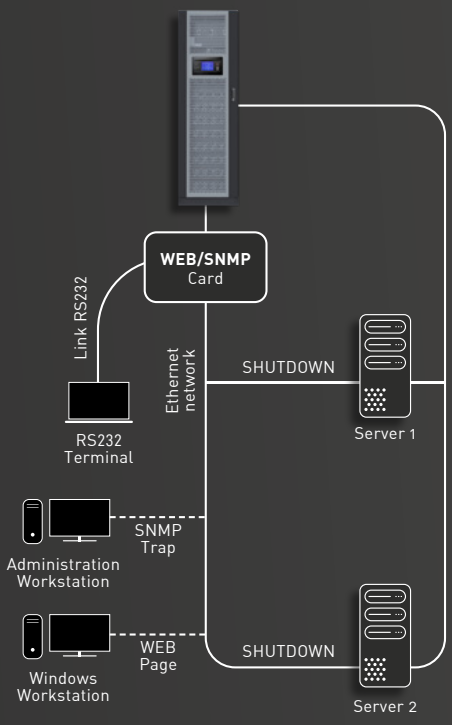
Windows; Linux; Novell Netware 3.x, 4.x, 5.x, 6; Mac OS, 9.x; IBM OS/2 Warp and Server; HP OPEN VMS; The most widely used UNIX operating systems such as: IBM AIX, HP UNIX, SUN Solaris INTEL and SPARC, SCO Unix and UnixWare, Silicon Graphic IRIX, Compaq Tru64 UNIX and DEC UNIX, BSD UNIX and FreeBSD UNIX, NCR UNIX.

SINOTTICO COMPLETO

- Touchscreen LCD display
- All mains system and modules parameters available
- EPO: emergency power off button
- Leds for an immediate acknowledgement of the system status
- Commands and settings available with 3 password levels



Direct Connection with Ethernet Network



ADVANCED COMMUNICATION

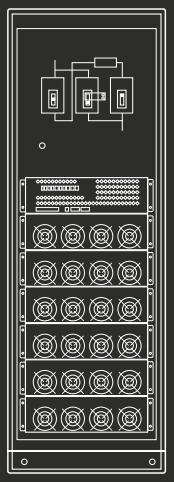
- Standard RS232 port and RS485 port with ModBus interface protocol.
- Web/SNMP card allows UPS management across a LAN using any of the main network communication protocols (TCP/IP, HTTP and network interface via SNMP). The system can notify users and administrators via email; when prolonged power failure occurs the protected computer systems can be shutdown safely.
- Scheda Relè: è costituita da un'interfaccia a contatti puliti ingresso/uscita comunemente utilizzati nei sistemi di gestione remota.
- EPO (Emergency Power Off) to power down the UPS through a remote emergency push button.

CONFIGURATION

MUST400 series is extremely flexible in terms of applied power: a wide range of configurations is available in order to meet the specific needs of each user.

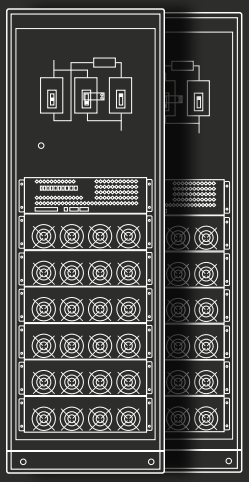
MUST400 120 kVA

SINGLE CABINET



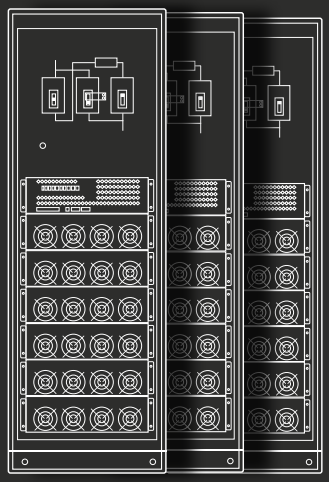
10 kVA	60 kVA
20 kVA	120 kVA

2 CABINETS IN PARALLEL



10 kVA	120 kVA
20 kVA	240 kVA

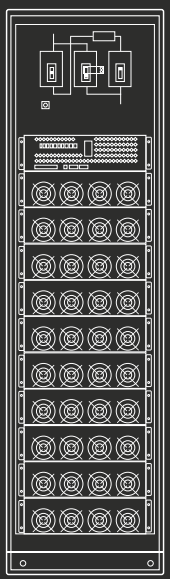
3 CABINETS IN PARALLEL



10 kVA	180 kVA
20 kVA	360 kVA

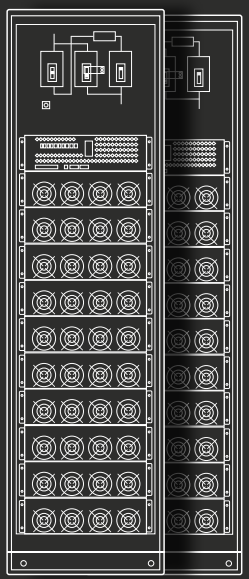
MUST400 200 kVA

SINGLE CABINET



10 kVA	100 kVA
20 kVA	200 kVA

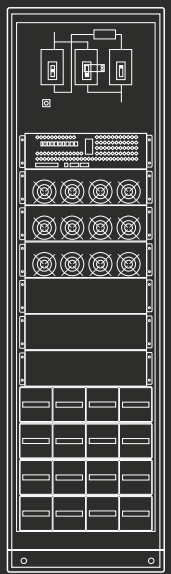
2 CABINETS IN PARALLEL



10 kVA	200 kVA
20 kVA	400 kVA

MUST400 60 kVA

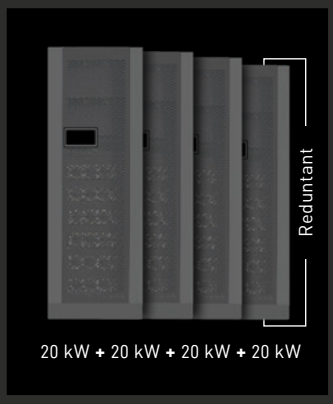
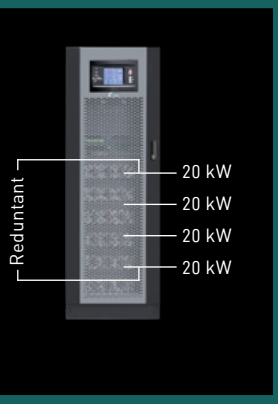
SINGLE CABINET WITH INTERNAL BATTERIES



10 kVA	30 kVA
20 kVA	60 kVA

SOLUTIONS COMPARISON

Here's below an example, for 60 kVA applied load, to show the advantages given by redundancy and Hot Swap technology of a modular system such as MUST400.

	Load power **60 kVA**		
	Solution 1	Solution 2	Solution 3
	TYPICAL UPS	**TYPICAL UPS**	**GTEC UPS**
	UPS Stand Alone 60 kVA	**UPS in parallel 4x20 kVA**	**MUST400 80 kVA Modular**
			
	STAND ALONE	**REDUNDANT PARALLEL**	**REDUNDANT MODULAR + HOT SWAP**
MTTR	**48 h**	**48 h**	**3 h (hot swap <3 min)**
UNAVAILABILITY*	**53 min/year**	**3 sec/year**	**0,03 sec/year**

* Availability calculation: A = (1 - MTTR/MTBF) * 100 - UNAVAILABILITY = 1 - A

TOP LEVEL PERFORMANCE

MUST400 has been designed to achieve the maximum flexibility with the best energy saving.
Combination of several factors makes this result remarkable:

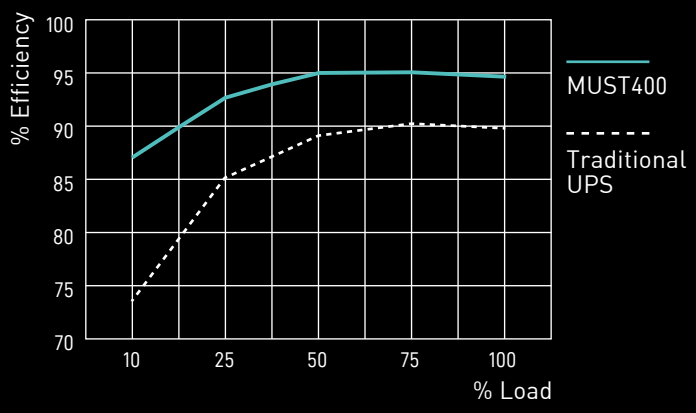
Highest levels of efficiency and minimum energy losses even at 25% load, thanks to the most recent electronic technology.

Multiple choice of power modules allows to achieve the requested power using the minimum installed capacity.

Excellent input and output electrical performances which means a clean electrical network without disturbances to other critical loads, as well as lower energy losses.

The high performance of MUST400 series is also evident for small percentages of applied load.
Its efficiency is due to the **3-level IGBT** architecture which is the state of art technology.

The extreme flexibility in use and the high performance, even at low percentages of load, mean **faster return on investment** compared to to the majority of UPSs on the market.



MODEL	MUST400-60	MUST400-120	MUST400-200
Maximum system power	60 kVA / 54 kW	120 kVA / 108 kW	200 kVA / 180 kW
Module power	20 kVA / 18 kW *		
MAIN INPUT			
Grid system	3 Phases + Neutral + Ground		
Rated voltage / Frequency	380/400/415 VAC (Phase-Phase), 50/60 Hz		
Voltage range	304~478 VAC (Phase-Phase), full load 228V~304 Vac (Phase-Phase), load decreases linearly according to the min phase voltage		
Frequency range	40~70 Hz (rectifier operating range)		
Power factor	>0.99		
Current THDi	<3%		
BYPASS INPUT			
Grid system	3 Phases + Neutral + Ground		
Rated voltage / Frequency	380/400/415 VAC (Phase-Phase), 50/60 Hz		
Voltage range	Default: -20% ~ +20% Selectable: -40% ~ +20%		
Frequency range	Selectable, ±2.5Hz, ±Hz, ±10Hz, ±20Hz		
Bypass overload	125%, long term operation 125%<load<130%, 1 hour 130%<load<150%, 6 minutes load>1000%, 100 milliseconds		
OUTPUT			
Rated voltage / Frequency	380/400/415 VAC (Phase-Phase), 50/60 Hz		
Power factor	0.9		
Voltage THDv	<1.5% (from 0% to 100% linear load); <5% (full non-linear load according to IEC/EN62040-3)		
Voltage precision	±1.5% (0-100% linear load)		
Transient response	<5% for step load (20-80%; 100-20%)		
Transient recovery	<30 ms for step load (0-100%; 100-0%)		
Inverter overload	110%, 60 minutes 125%, 1 minute 150%, 5 seconds >150%, 200 milliseconds		
Frequency regulation	50/60 Hz ±0.1%		
Synchronized range	±2 Hz (Selectable: ±1 ~ ±5 Hz)		
Synchronized slew rate	Selectable, 0.5 Hz/S ~ 3 Hz/S, default 2 Hz/S		
Crest factor	3:1		
BATTERIES			
Battery rate voltage	±240 VDC		
Number of batteries	Standard: 40 batteries 12 V Selectable: 32-44 batteries 12 V (<36 only with reduced power, pf=0.8)		
Charger voltage precision	1%		
Batteries arrangement	Internal and/or external	External	
Battery type	Pb / Ni-Cd		
SYSTEM			
Efficiency	Normal operation: 95% Eco Mode operation: 99% Battery operation: 95%		
Display	LED + LCD + Touch screen		
Protection degree	IP20		
Interface	Standard equipment: RS232, RS485, USB, dry contacts, Cold Start Optional: SNMP, parallel kit, dust filter		
ENVIRONMENT			
Operating temperature	0 ~ 40 °C		
Storage temperature	-40 ~ 70 °C		
Relative humidity	0 ~ 95% (no condensing)		
Noise (dBA at 1 meter far)	65 dB maximum		
Altitude	<1000 m; load derated 1% per 100 m, from 1000 ~ 2000 m		
MECHANICAL DATA			
Power module dimensions W*D*H (mm)	440*590*134		
Power module weight (Kg)	22		
Cabinet dimensions W*D*H (mm)	600*900*2000	600*900*1600	600*900*2000
Cabinet weight (Kg)	260	194	240
Colour	Cabinet: RAL 7021 textured - Door: RAL 7012		

Note: technical specifications and data could be changed without notification

* System can be setup with 10kVA/9kW power modules, upon request

GTEC SERVICE

GTEC supports its customers throughout the whole product life cycle, providing technical assistance and after-sales service at the highest professional standards, so to produce the best partnership experience.

MAINTENANCE is an essential activity in order to guarantee a safe and stable load protection. GTEC shows maximum care about this topic, providing the best service in terms of experience, instrumentation and safety level.

Through the dedicated **CALL CENTER**, customers receive prompt answers to any request, and the specialized technicians directly schedule maintenance activities.

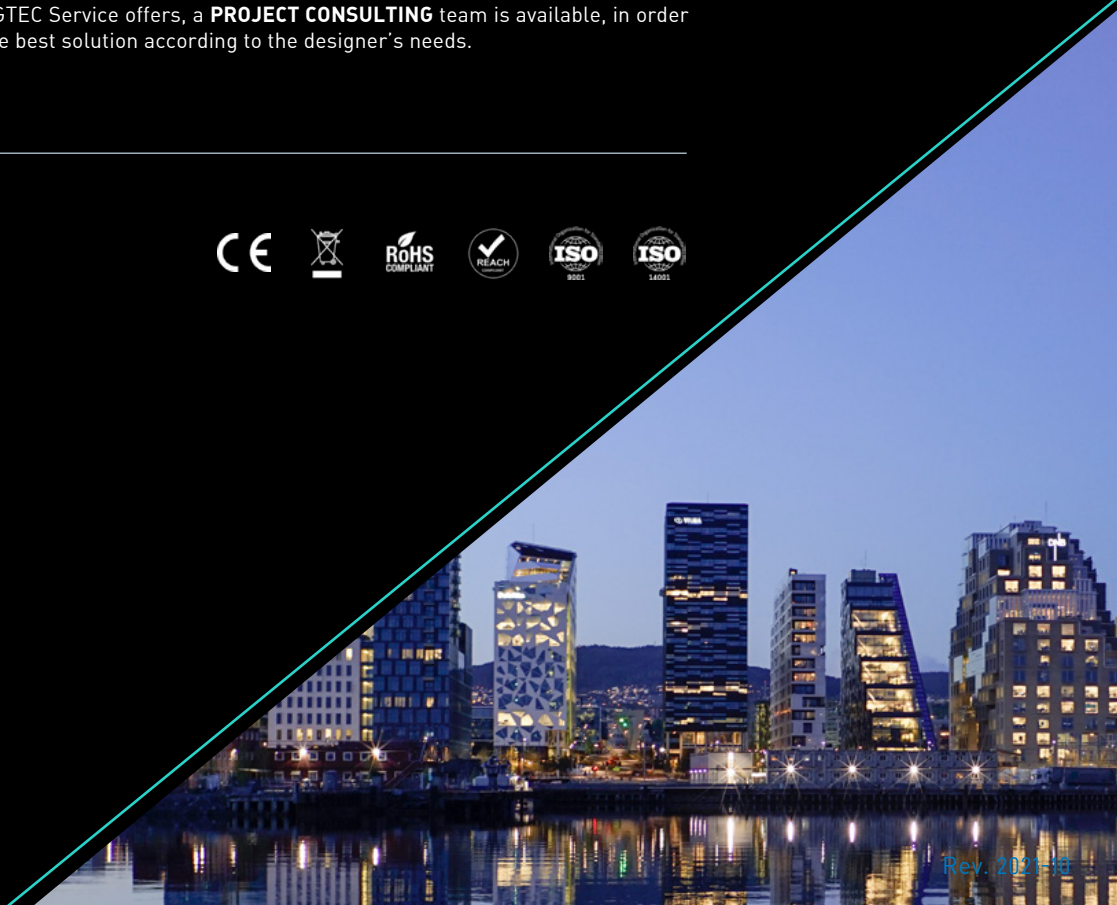
The partnership between GTEC and its customers gets consolidated through the **TRAINING SESSIONS** proposal for technical staff, so that each user can operate on the UPSs with maximum consciousness and safety.

Also, in the GTEC Service offers, a **PROJECT CONSULTING** team is available, in order to provide the best solution according to the designer's needs.

GTEC Europe srl
Strada Marosticana, 81/13
36031 Dueville (VI), Italy
Tel. +39 0444.361321
info@gtec-power.eu

GTEC France
france@gtec-power.eu

www.gtec-power.eu



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