



# MUST400

10-400 kVA Threephase



- + DATACENTER & SERVERS
- + INTERNET CENTERS
- + LOCAL AREA NETWORKS (LAN)
- + TELECOMMUNICATION DEVICES





- + MODULAR DESIGN, HOT SWAPPABLE
- + STRONG LOAD ADAPTABILITY FOR LINEAR AND NON-LINEAR LOADS
- + INTELLIGENT MODULE AND SYSTEM PROTECTION DESIGN
- + AVAILABLE PARALLEL CONTROL FOR CABINETS

**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.

## Solutions comparison

Modular solution MUST400 (N+1) vs Stand Alone UPS in parallel

Load Power 60 kW	Solution 1: Stand Alone 60 kW	Solution 2: Parallel 4x20 kW	Solution 3: MUST400 4x20 kW
<b>Availability calculation:</b> $A = (1 - MTTR/MTTBF) * 100$ <b>UNAVAILABILITY = 1 - A</b>	60 kW 	20 kW 20 kW 20 kW 20 kW 	
	<b>STAND-ALONE</b>	<b>REDUNDANT PARALLEL</b>	<b>REDUNDANT PARALLEL + HOT SWAP</b>
<b>MTTR</b>	48 h	48 h	<b>3 h</b> (hot swap < 3 min)
<b>UNAVAILABILITY</b>	53 min / year	3 sec / year	<b>0,03 sec / year</b>

## OPERATING SYSTEMS SUPPORTED

Windows; Linux; Novell Netware 3.x, 4.x, 5.x, 6; Mac OS X, 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.



As standard MUST400 has local monitoring software that provides user-friendly UPS management. The 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 performs an automated safe power down of the protected servers and PCs.

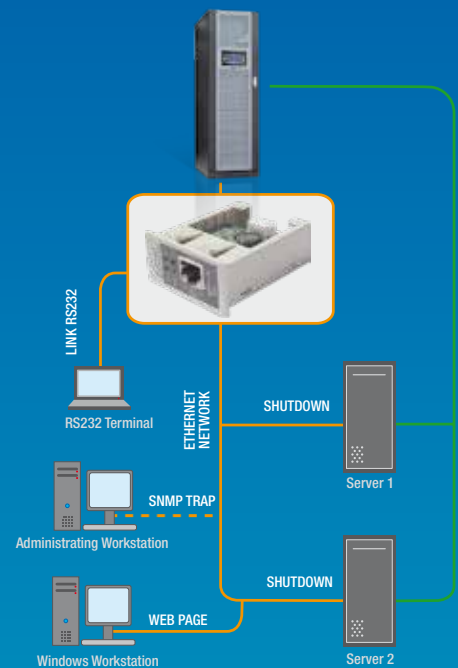
## Advanced communication

- Standard RS232 port and RS485 port with ModBus interface protocol.
- EPO (Emergency Power Off) to power down the UPS through a remote emergency push button.
- **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.
- **Relay/AS400 card** is an interface for input/output dry contacts and AS400 series computer, the common manner for industrial and building management systems.



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

## Direct Connection with Ethernet Network





# Product range

## MUST400 up to 120 kVA

This system is designed to house 6 units of power module 10 kVA or 20 kVA. It is the ideal solution for a medium load that requires redundancy or the possibility to expand the power in the future.

**Module and bypass HOT SWAP feature** contributes to guarantee an easy and safe maintenance.

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



## MUST400 up to 200 kVA

It is designed to house 10 units of power module 10 kVA or 20 kVA. It is an ideal solution for medium to large loads.

UPS capacity can be doubled to achieve 400 kVA by connecting two systems together.



## MUST400 up to 60 kVA with batteries on board

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.



**HOT SWAP**



# Configuration

## POWER MODULE



10 kVA  
20 kVA



10 kVA  
20 kVA



60 kVA  
120 kVA



30 kVA  
60 kVA

## TOTAL POWER



120 kVA  
240 kVA



100 kVA  
200 kVA



180 kVA  
360 kVA



200 kVA  
400 kVA

## The highest technology level

Every power module is equipped with:

**RECTIFIER** Advanced technology with IGBT rectifier. Minimum impact to the mains thanks to PFC (Power Factor Control) system: input PF 0,99. It means no harmonic distortions through the mains therefore very low THDi, less than 3%. Optimize the upstream infrastructure without over rating the supply device (ideal for gen-set and transformer supply).

**INVERTER** The inverter uses last generation technology with 3 level IGBT power technology and high frequency modulation with PWM driving. High performance digital control with DSP, very stable and perfect sinusoidal waveform even in case of unbalance load. High power density with PF=0,9 and efficiency at maximum level starting from even less than 50% of load. Efficiency up to 95%.



**BATTERY CHARGER** Each module has its own battery charger. It means redundancy and wide range of battery capacity installable. Smart battery management. Single and double level of battery charger, temperature compensation, end of discharge voltage control. Automatic self battery test to prevent battery fault. Optimized for the most common battery types as sealed VRLA, AGM or wet lead acid and NiCd.

**STATIC BYPASS** Centralized static bypass is sized for the full power of the system. Completely hot swappable bypass reduces at minimum the maintenance process and guarantees best availability levels.



# Maximum flexibility

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.

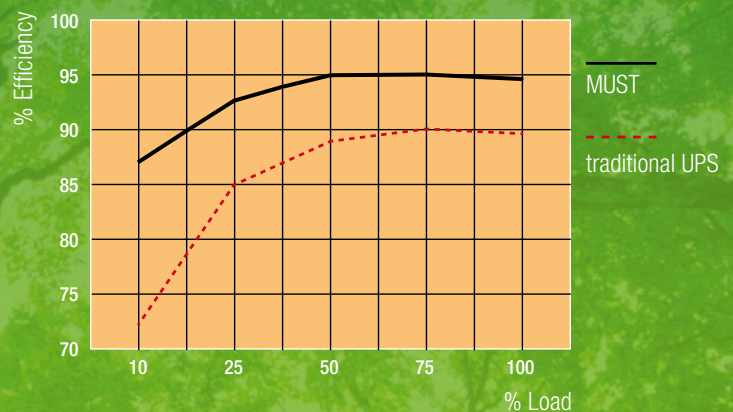


## Green technology

### ENERGY SAVING

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 the majority of UPSs on the market.





# Technical specifications

Model	MUST400-60	MUST400-120	MUST400-200
Maximum system power	60kVA/54kW	120kVA/108kW	200kVA/180kW
Module power	20kVA/18kW *		
<b>MAIN INPUT</b>			
Grid system	3 Phases + Neutral + Ground		
Rated voltage / Frequency	380/400/415VAC (Phase-Phase), 50/60Hz		
Voltage range	304~478 VAC (Phase-Phase), full load 228V~304Vac (Phase-Phase), load decreases linearly according to the min phase voltage		
Frequency range	40~70Hz		
Power factor	>0.99		
Current THDi	<3%		
<b>BYPASS INPUT</b>			
Grid system	3 Phases + Neutral + Ground		
Rated voltage / Frequency	380/400/415VAC (Phase-Phase), 50/60Hz		
Voltage range	Default: -20% ~ +20% Selectable: -40% ~ +20%		
Frequency range	Selectable, $\pm 2.5\text{Hz}$ , $\pm 5\text{Hz}$ , $\pm 10\text{Hz}$ , $\pm 20\text{Hz}$		
Bypass overload	125%, long term operation 125%<load<130%, 1 hour 130%<load<150%, 6 minutes load>1000%, 100 milliseconds		
<b>OUTPUT</b>			
Rated voltage / Frequency	380/400/415VAC (Phase-Phase), 50/60Hz		
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	$\pm 1.5\%$ (0-100% linear load)		
Transient response	<5% for step load (20-80%; 100-20%)		
Transient recovery	<30ms for step load (0-100%; 100-0%)		
Inverter overload	110%, 60 minutes 125%, 1 minute 150%, 5 seconds >150%, 200 milliseconds		
Frequency regulation	50/60Hz $\pm 0.1\%$		
Synchronized slew rate	Selectable, 0.5Hz/S ~ 3Hz/S, default 2Hz/S		
Crest factor	3:1		
<b>BATTERIES</b>			
Battery rate voltage	$\pm 240\text{VDC}$		
Number of batteries	Standard: 40 batteries 12V Selectable: 32-44 batteries 12V (<36 only with reduced power, pf=0.8)		
Charger voltage precision	1%		
Batteries arrangement	Internal and/or external	External	
Battery type	Pb / Ni-Cd		
<b>SYSTEM</b>			
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		
<b>ENVIRONMENT</b>			
Operating temperature	0 ~ 40°C		
Storage temperature	-40 ~ 70°C		
Relative humidity	0 ~ 95% (no condensing)		
Noise (dBA)	65dB maximum		
Altitude	<1000m		
<b>MECHANICAL DATA</b>			
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

Note: technical specifications and data could be changed without notification

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

# G-Tec Service

**G-Tec supports its customers throughout the whole product life cycle, providing technical assistance and after-sales service at the highest professional standards.**

**MAINTENANCE** is an essential activity in order to guarantee a safe and stable load protection. G-Tec 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 interventions.

The partnership between G-Tec 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.

A **PROJECT CONSULTING** team is also available in G-Tec Service offer, in order to provide to designers the best solution according to their specific needs.



[www.gtec-power.eu](http://www.gtec-power.eu)



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