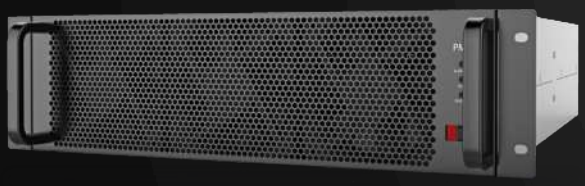
MODULAR ONLINE UPS · DOUBLE CONVERSION

IST6

200–500 kVA

50 kVA power modules in cabinets of 200, 300, 400 and 500 kVA. Up to 98.1% efficiency, THDi ≤ 1.5% and up to eight UPS in parallel for large data centres and critical buildings.





50 kVA POWER MODULE · HOT-SWAP

50→500
kVA in 50 kVA steps

N+1
one extra power module for redundancy

98.1%
efficiency, new-generation 50 kVA module

Hot-swap
Modular technology: power modules replaced online

WHY IST6

Key features
IST6 200–500 kVA

Efficiency, flexibility and advanced functions for critical loads from 200 to 500 kVA per cabinet.

200→500

Sized to the site

Four cabinets with 4, 6, 8 or 10 power modules of 50 kVA; modules added when the load grows.

98.1%

High efficiency

Up to 98.1% in double conversion with the new-generation 50 kVA module, plus ECO and WECO modes and redundancy sleep for spare modules.

≤ 1.5%

Clean for the grid

Input power factor ≥ 0.99 and THDi ≤ 1.5% at full load: smaller upstream cables, transformers and generators.

Hot-swap

Continuity first

Power modules and the bypass module are inserted and removed with the load running, each secured by its ready switch.

30–50

Battery set on site

30 to 50 blocks of 12 V per string, lead-acid or lithium; charging current up to 30 A per power module.

Touch

Easy to run

Touch screen with live power flow, 10,000 events, wave capture of faults and monthly energy records.

OPERATING COST

What 98.1% means at 240 kW

Every point of efficiency is heat that is not paid for at the meter and in the room cooling.

4.6 kW
losses at 98.1% efficiency

24,300
kWh saved per year vs a 97% UPS

≈ € 4,860
saved per year at € 0.20/kWh

Each additional point of efficiency at this load saves about 2.5 kW, that is about 22,100 kWh per year.

IST6 300 kVA at 80% load (240 kW), 8,760 h/year, cooling excluded. Losses = P × (1/η − 1). Indicative values.

DESIGNED FOR

Data centres · Telecom · Banking & finance · Networks & IT rooms · Transport · Public buildings

THE RANGE

Models and range
IST6 200–500 kVA

Single-column cabinets for 200 and 300 kVA, double-column cabinets for 400 and 500 kVA: the same power module, the same display, the same functions.



200 · 300 kVA
single column · 607 mm



400 · 500 kVA
double column · 1203 mm

Cabinet	200 kVA	300 kVA	400 kVA	500 kVA
Power modules (50 kVA)	4	6	8	10
Bypass module	200 kVA · 3U	300 kVA · 3U	400 kVA · 3U	500 kVA · 4.5U
W × D × H (mm)	607 × 860 × 2000	607 × 860 × 2000	1203 × 864 × 2000	1203 × 864 × 2000
Weight without power modules	224 kg	236 kg	459 kg	506 kg
Mains input current	345 A	518 A	690 A	863 A
Cooling air flow (min.)	2420 m³/h	3630 m³/h	4840 m³/h	6050 m³/h

Cabinets 2000 mm high: single column 607 mm, double column 1203 mm wide.

CODE
IST6-200
Cabinet for up to 4 × 50 kVA modules, without modules.

CODE
IST6-300
Cabinet for up to 6 × 50 kVA modules, without modules.

CODE
IST6-400
Cabinet for up to 8 × 50 kVA modules, without modules.

CODE
IST6-50-J
50 kVA / 50 kW power module. 500 kVA cabinet: code on request.

Power and bypass modules
IST6 200–500 kVA

Rectifier, inverter and DC/DC converter in each 3U power module; the bypass module carries the static switch. Power modules and the bypass module are hot-swappable.

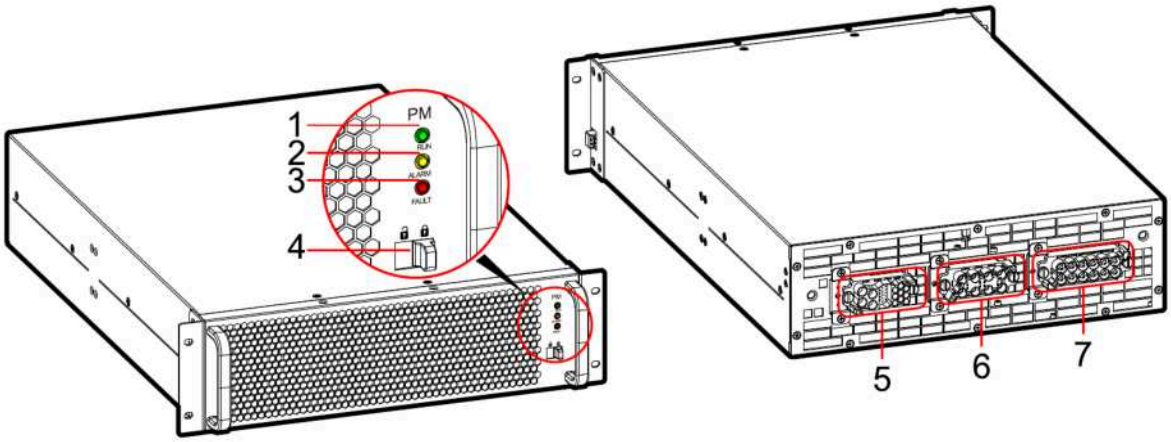


50 kVA power module, front



Bypass module · 3U (200–400 kVA) · 4.5U (500 kVA)

Front and rear · user manual Fig. 2-15



1. **RUN** · green
2. **ALARM** · yellow
3. **FAULT** · red
4. **Ready switch** · green unlocked · red locked
5. **Communication port** · rear
6. **Output port** · rear
7. **Input port** · AC input and DC battery

STEP 1

Unlock

Ready switch to unlocked: indication green, the module can be removed.

STEP 2

Pull out

Remove the fixing screws and pull the module out by its handles onto a lift truck; the other modules keep supplying the load.

STEP 3

Insert and lock

Slide the new module in, fasten the screws and lock: indication red, the module joins the system.

39 kg
power module, 500 × 650 × 130 mm

23–50 kg
bypass module, 200 to 500 kVA cabinet

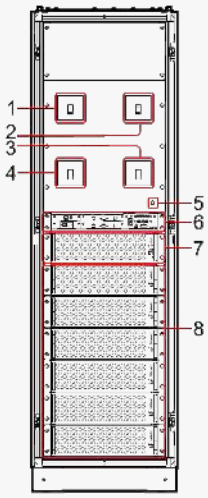
≧ 15 min
wait before opening a removed module

INSIDE THE CABINET

Cabinet layout
IST6 200–500 kVA

300 kVA and 500 kVA with the door open, next to their structure layouts from the user manual.





Module sequence
Bypass module
Power module 1
Power module 2
Power module 3
Power module 4
Power module 5
Power module 6

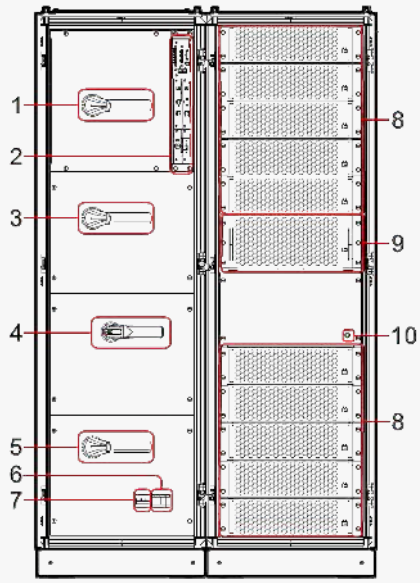
200 / 300 kVA · Fig. 2-11

1. **Bypass switch**
2. **Maintenance bypass switch**
3. **Output switch**
4. **Mains switch**
5. **Battery cold start button**
6. **System control box**
7. **Bypass module**
8. **Power modules** · 1–6

Photo: 300 kVA, door open, numbered as Fig. 2-11. 200 kVA: 4 module slots.



500 kVA · door open, 10 × 50 kVA power modules



500 kVA · user manual Fig. 2-14 · 400 kVA: 8 module slots

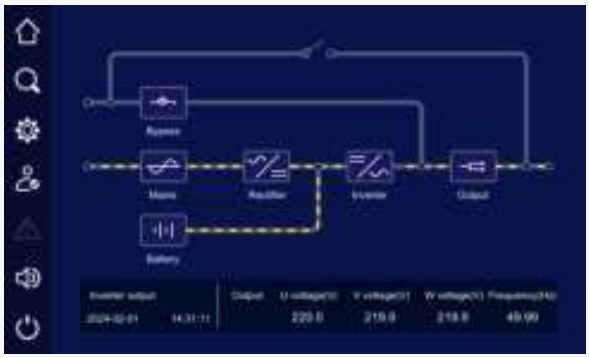
400 / 500 kVA · numbered as Fig. 2-14

1. **Output switch**
2. **System control box**
3. **Maintenance bypass switch**
4. **Bypass switch**
5. **Mains switch**
6. **SPD** · optional
7. **SPD switch** · optional
8. **Power modules** · even above, odd below
9. **Bypass module · 4.5U (3U on 400 kVA)**
10. **Battery cold start button**

ARCHITECTURE

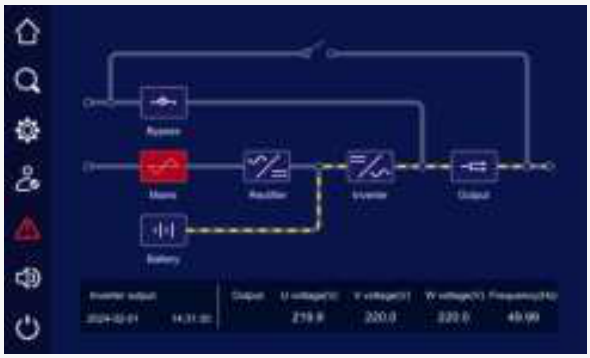
Operating principle
IST6 200–500 kVA

Each operating mode as shown on the touch screen: N power modules in parallel and one bypass module.



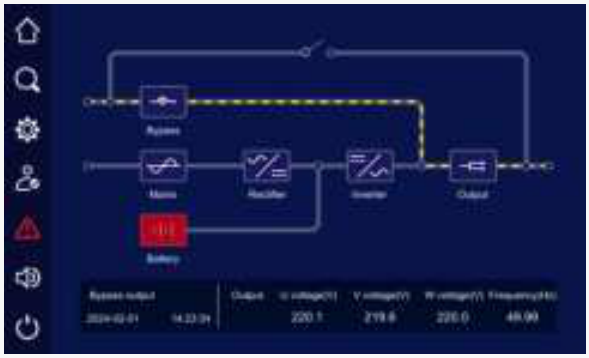
Mains mode

Each module rectifies the mains and the inverter supplies the load; the battery is charged.



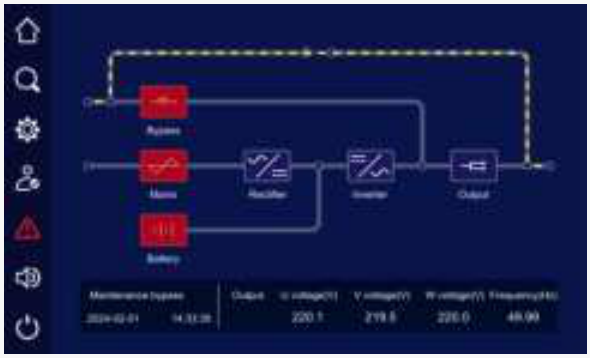
Battery mode

Mains abnormal: the DC/DC converter boosts the battery to the inverters, 0 ms.



Bypass mode

Overload or fault: the bypass module supplies the load.



Maintenance bypass mode

Bypass, mains and output switches open: the load stays on the maintenance bypass for service.

×2

Two control cards

Primary and secondary system control cards, hot-swappable, backing each other up.

CAN

Synchronised modules

CAN communication inside and between cabinets for synchronisation and current sharing.

≤ 5%

Current sharing

Load shared equally between power modules within 5%.

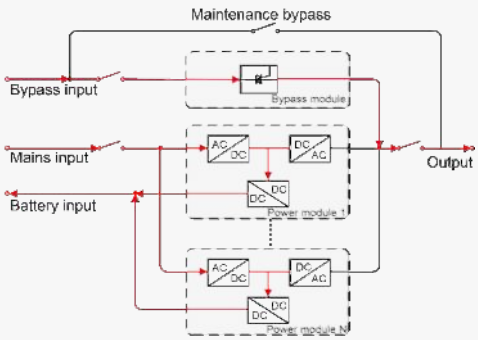
0 ms

No break

Mains ↔ battery transfer time 0 ms; bypass ↔ inverter < 1 ms synchronised.

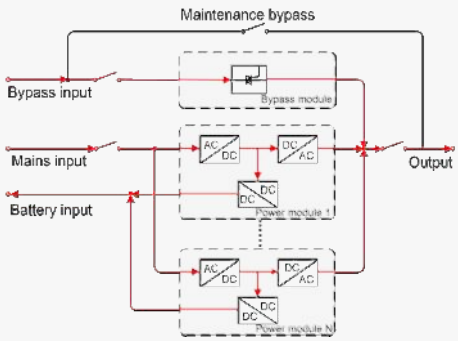
Energy-saving functions
IST6 200–500 kVA

Power flow of each mode as drawn in the user manual.



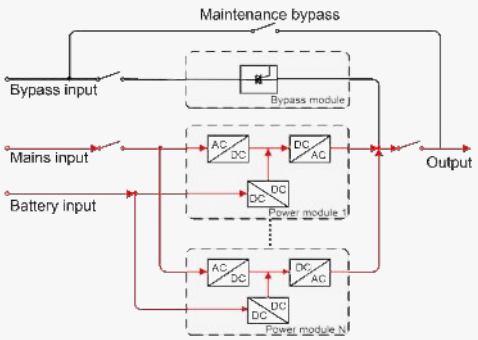
ECO mode · Fig. 2-31

Bypass within the ECO window: the static bypass supplies the load and the inverter is in standby; the rectifier keeps the battery charged.



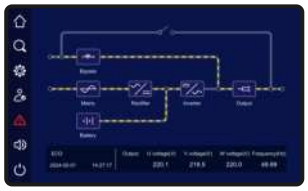
WECO mode · Fig. 2-32

Grid-tied operation on top of ECO: the inverter compensates the harmonics of the input current, raising the power factor and lowering THDi.

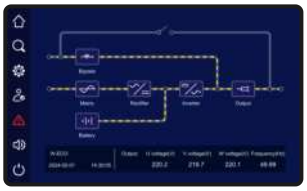


Mains and battery source share · Fig. 2-29

When the mains is too low to support the load, mains and battery supply the power modules together; when the mains recovers, the UPS returns to mains mode and recharges the battery.



ECO, live



WECO, live



ECO window set on screen



Sleep and generator mode

GENERATOR

Generator mode

Start generator output and generator-mode input, set from the dry-contact pages.

COMMISSIONING

Grid-tied self-load

Load test shown live on the home page, with its own alarms (self-load switch, time-out).

OUTPUT

Frequency converter

Frequency converter output state available on the home page.

±5 … ±15%

ECO voltage window, default ±15%

±2 / ±4%

ECO frequency window, default ±2%

Charge off

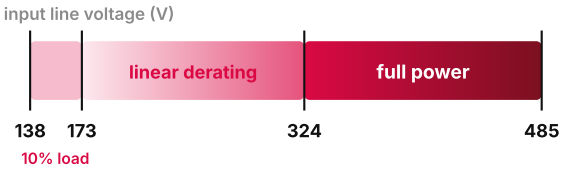
battery charging can be prohibited on generator

PERFORMANCE

Input and output performance
IST6 200–500 kVA

Input window

Full power from 324 to 485 V line voltage; below, the load capacity is derated linearly down to 10% at 173 V, and the UPS still runs down to 138 V.



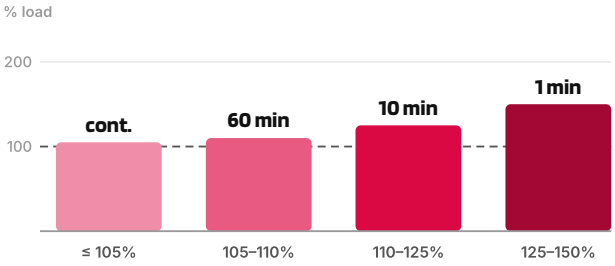
40–70 Hz · PF ≥ 0.99 · THDi ≤ 1.5% at full load · TN-S, TN-C, TN-C-S, TT. RCD breakers upstream not recommended.

Output

Voltage	**380 / 400 / 415 V ± 1%**
Power factor	**settable 0.8–1.0, default 1.0**
THDv	**≤ 1% linear · ≤ 4% non-linear**
Phase error	**≤ 1° balanced · ≤ 3° unbalanced**
Frequency, mains abnormal	**50 / 60 Hz ± 0.1 Hz**
Load step 0↔100%	**< 5%, recovery ≤ 20 ms**
DC component	**−200 … +200 mV**
Transfer bypass ↔ inverter	**< 1 ms synchronised · < 15 ms**
System	**3Ph+N+PE · 3Ph+PE optional**

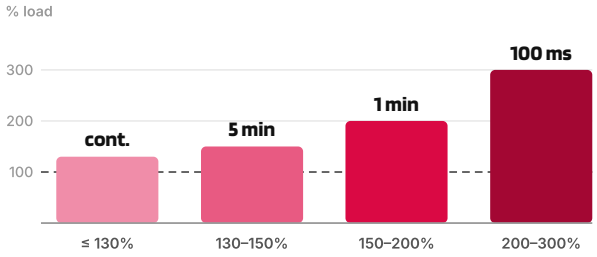
Overload capacity

Inverter · linear load, PF 1



Above 150%: to bypass at once. PF 0.9: 105–110% 60 min, above 110% to bypass; PF 0.8: above 105% to bypass.

Bypass



Above 300%: immediate protection.

LOADS

Suited loads

Resistive, resistive-capacitive and slightly inductive loads; not for regenerative loads or half-wave rectifiers.

OPTION

Output isolation transformer

An isolation transformer of the same capacity is available at the output.

BYPASS

Settable bypass window

Max. +10 … +25% (default +15%), min. −10 … −30% (default −20%), frequency ±2 … ±20%.

138–485 V
input line voltage

≤ 1.5%
THDi, full load

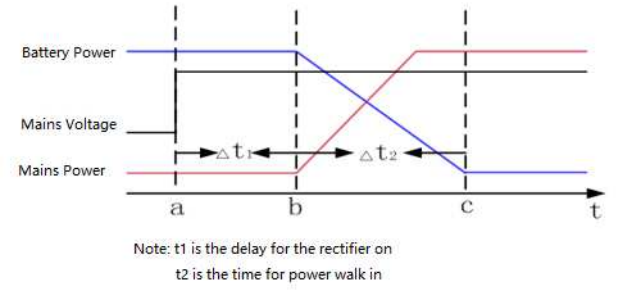
≤ 1%
output voltage accuracy

300%
bypass for 100 ms

ADVANCED PROTECTION

Protection functions
IST6 200–500 kVA

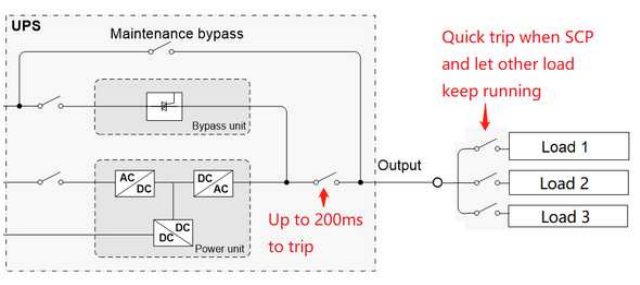
Three functions of the 50 kVA power module that protect the grid, the load and the maintenance staff.



01 · POWER WALK-IN

No step on the mains or the generator

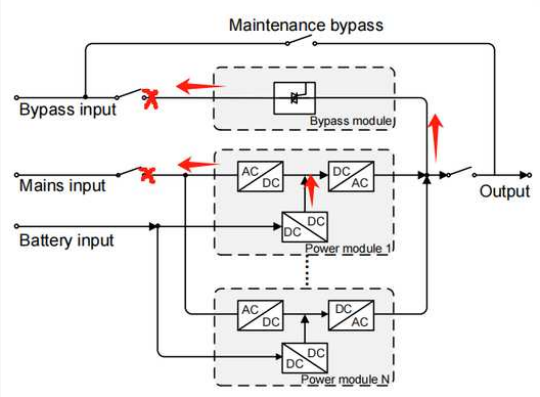
When the mains returns after an outage, the rectifier waits a delay t1, then takes the power over from the battery gradually during t2: a smooth transfer from battery mode to double conversion, with no impact on the input grid or on a generator.



02 · SHORT-CIRCUIT PROTECTION

Settable trip time, up to 200 ms

On an output short circuit the UPS supplies a high current for a set time, from 20 to 200 ms, so that the breaker of the faulty load trips quickly while the other loads keep running.



03 · BACKFEED PROTECTION

Safe upstream maintenance

If the static bypass fails, the UPS detects it and a dry-contact output (bypass SCR abnormal) opens the backfeed device on the bypass input, so no voltage returns towards the upstream switchboard. Enabled from the settings.

t1 + t2
delay and walk-in time

20–200 ms
short-circuit trip time

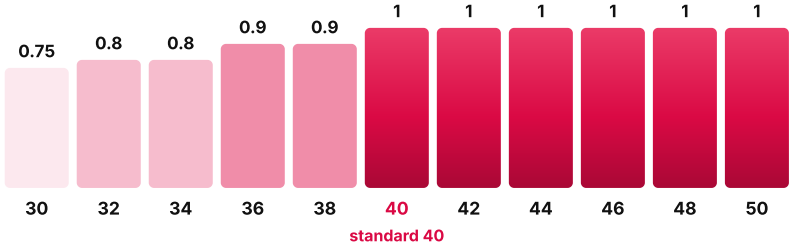
SCR
bypass fault detected

Battery options
IST6 200–500 kVA

String length set on site

Split battery +/N/–, ±240 V DC nominal (40 blocks of 12 V); 30 to 50 blocks accepted, with the output factor below for short strings.

12 V blocks per string (lead-acid) and output factor



30 A

max. charging current per power module (system default 20 A)

±256 V

lithium nominal, 120–200 cells (standard 160), with the BMS card



Battery setting

Cell voltages for protection, alarm, equalising and floating charge, charging current, test time.



Charge management

Charge limit coefficient in C, temperature compensation, timed and forced equalising charge.



Battery test

Standard or depth test with mains normal, battery floating and load ≥ 15%.

SHARED

Common battery

Shared battery pack mode available for parallel systems.

COLD START

Start from battery

Battery cold start button: hold more than 3 s to start the UPS from the battery.

LITHIUM

BMS card

Optional BMS expansion card with charge- and discharge-disable inputs.

OPTIONS

Sensor and trip kit

Battery temperature kit for charge compensation; battery trip kit (24 V DC) for the DC breaker.

0.05–0.5 C
charge limit, lead-acid (default 0.2 C)

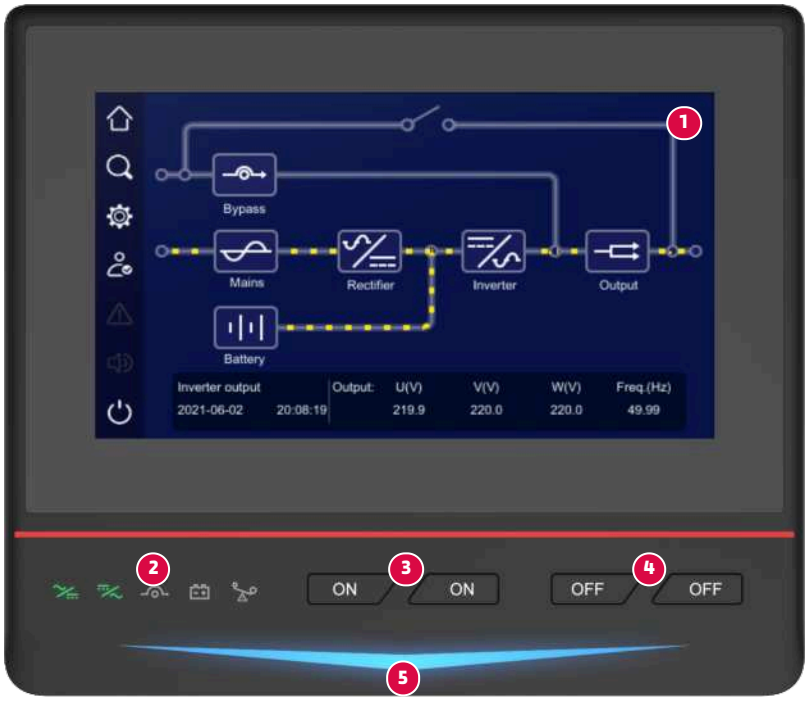
0.05–1 C
charge limit, lithium (default 0.5 C)

20–30 °C
best battery temperature

3 months
recharge interval for stored batteries

OPERATOR PANEL

Operator panel
IST6 200–500 kVA



1. **Colour touch screen**
   Live power flow, measurements, settings and records.
2. **Five status LEDs**
   AC/DC, DC/AC, bypass, battery, load: green when normal or active, red when abnormal.
3. **ON keys**
   Press both keys for 3 s to power on: no accidental switching.
4. **OFF keys**
   Press both keys for 3 s to power off.
5. **Status light bar**
   Shows the UPS state in colour, also from across the room.

Status light bar

Four states, one colour each: the operator knows how the UPS is doing before reaching the screen. Alarms also light the yellow or red ambient lamp.



Blue
Normal operation



Blue, flashing
Battery mode



Yellow
Abnormal, UPS still running



Red
Abnormal, UPS stopped

Status LEDs

LED	Green	Red
AC/DC	Rectifier normal	Rectifier abnormal
DC/AC	Inverter normal	Inverter abnormal
Bypass	Bypass output	Bypass abnormal
Battery	Battery output	Battery low voltage
Load	Output normal	Output overload

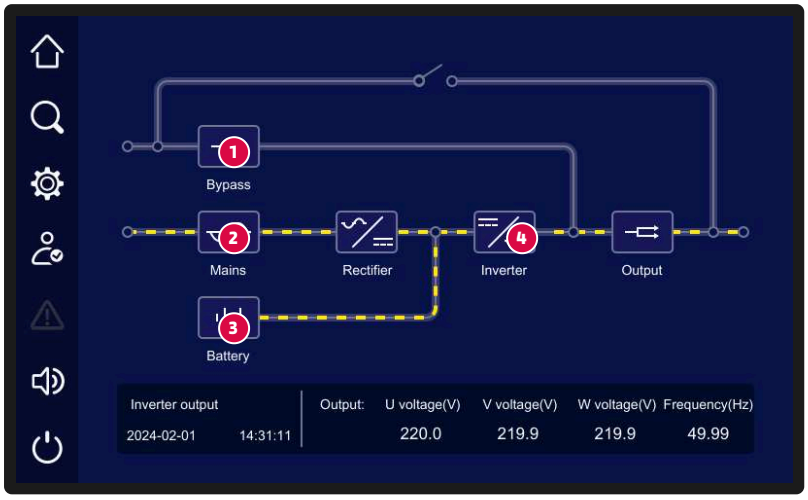
Screen settings



- Date and time
- Backlight time
- Language
- Brightness

TOUCH SCREEN

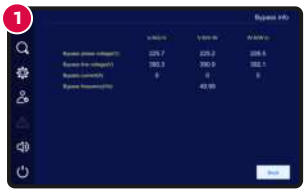
Touch screen display
IST6 200–500 kVA



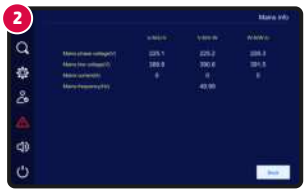
Live single-line diagram

The home page draws the UPS as it runs: yellow dots trace the active power path, abnormal blocks turn red, and the bottom line shows output voltage and frequency.

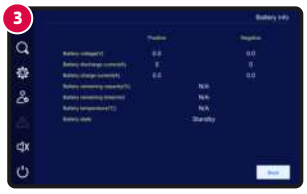
Touch a block (bypass, mains, battery, rectifier, inverter, output) to open its page.



Bypass info
Phase and line voltage, current and frequency of the bypass input.



Mains info
Phase and line voltage, current and frequency of the mains.



Battery info
Voltage, charge and discharge current, remaining capacity and time, temperature, state.



Inverter info
Output voltage, current, power and load of each module.

Menus



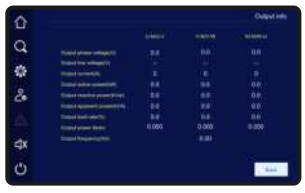
Information menu
Running info, history, user log, smart record, device info, wave capture, energy info.



Settings menu
Cabinet, battery, battery test, output, smart mode, dry contact, screen, password, communication, records.

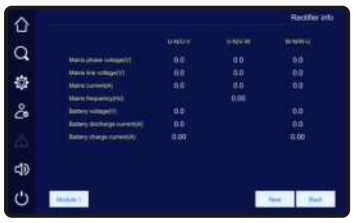


Running info
UPS info, parameter match between UPS, UPS status, system cards 1 and 2.



Output info
Voltage, current, active, reactive and apparent power, load, PF and frequency.

More pages



Rectifier info
Mains and battery voltage and current, module by module.



Dry contact
Inputs and outputs, each assigned to a function.



Communication
Modbus address 1–247, baud rate 2400–19200 bps, SNMP card protocol.

RECORDS

Event records
IST6 200–500 kVA



10,000

records in the history, newest first. When the record is full, the earliest entry is overwritten.

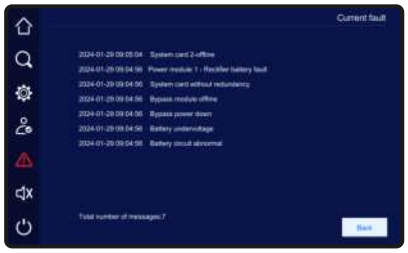
MWh

input and output energy recorded month by month (energy info).



User log

User operations listed with date and time.



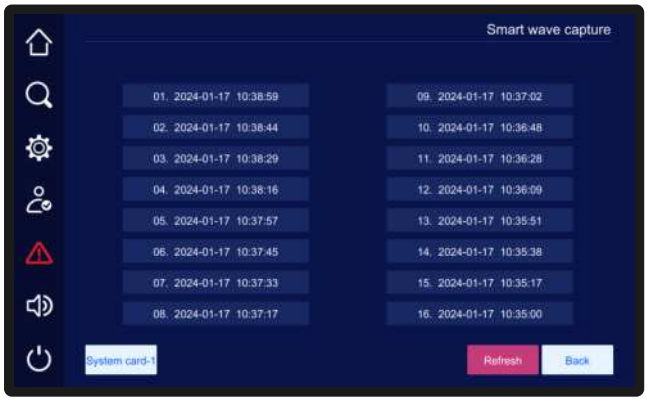
Current fault

Active faults, time-stamped, from the alarm icon of the menu bar.



Smart record

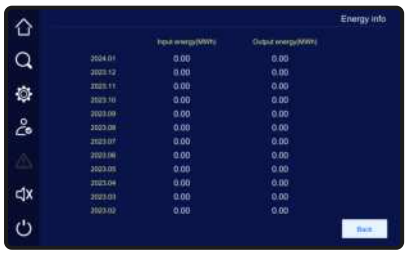
Maintenance actions such as part replacements.



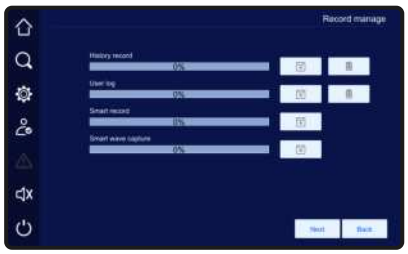
Smart wave capture

When a fault occurs, the UPS stores the voltage and current waveforms of the event, listed with date and time.

- Energy info: input and output energy per month
- Record manage: save or clear history, user log, smart record and wave capture



Energy info



Record manage

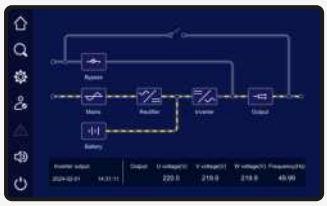


Battery test

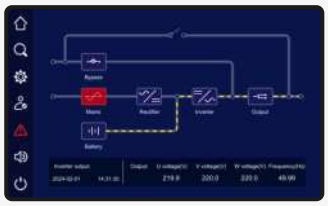
OPERATION

Operating modes
IST6 200–500 kVA

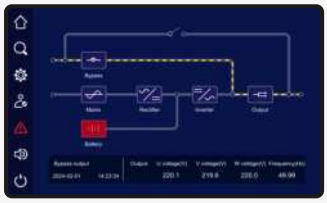
Real screens of the IST6 200–500 kVA: the yellow dotted line traces the active power path.



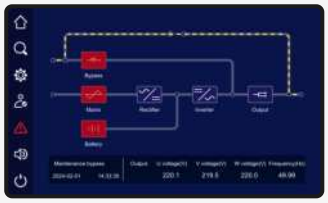
Inverter output



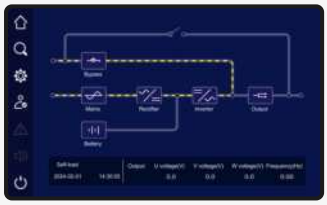
Battery



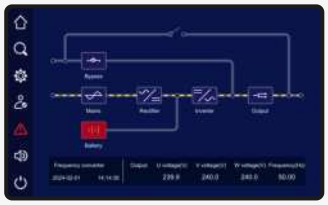
Bypass



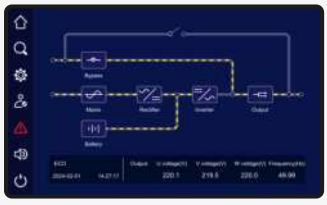
Maintenance bypass



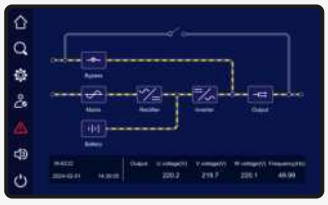
Grid-tied self-load



Frequency converter



ECO



WECO

Transfers

0 ms
mains ↔ battery

< 1 ms
inverter ↔ bypass, synchronised

< 15 ms
inverter ↔ bypass, not synchronised

RESTART

After a long outage

After battery under-voltage protection, the UPS restarts and recharges the battery when the mains returns.

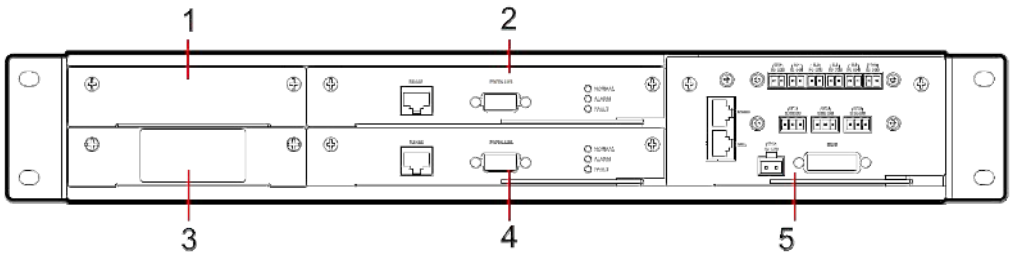
FAULT

A faulty module steps aside

A faulty power module is isolated from the system automatically; the others go on, with reduced redundancy.

Communication and connectivity
IST6 200–500 kVA

System control box, from the user manual: all five cards are hot-swappable.



System control box, user manual Fig. 2-19: ① expansion card position (optional) ② system control card 1 ③ SNMP card position (optional) ④ system control card 2 ⑤ system monitoring card.

4 inputs (NO) · 10 functions

- Battery abnormal
- Battery grounding abnormal
- Battery switch off
- Bypass switch off
- Generator mode
- SPD abnormal
- Maintenance bypass open
- Mains switch off
- Environment smoke abnormal
- Lamp belt switch off

3 outputs (NO / NC, 30 V DC / 2 A) · 17 functions

- Inverter mode
- Bypass mode
- Battery mode
- Battery trip
- Battery under-voltage alarm
- Battery under-voltage protection
- Output overload
- UPS abnormal
- Bypass abnormal
- Mains abnormal
- Start generator
- ECO mode
- Inverter abnormal
- UPS ON
- Fan abnormal
- UPS alarm
- Bypass SCR abnormal

Options



SNMP card
Ethernet, SNMP or Modbus



Dry contact expansion card
+3 inputs, +2 outputs (30 V DC / 2 A)



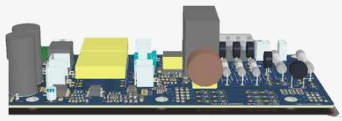
BMS expansion card
BMS port, charge / discharge disable inputs



Class C SPD
with SPD switch, factory fitting recommended



Battery temperature kit
charge voltage compensated by temperature



Battery trip kit
24 V DC trip signal for the battery breaker

4 + 3
inputs + outputs, standard

7 + 5
with the expansion card

Modbus
RS232 · RS485 · SNMP

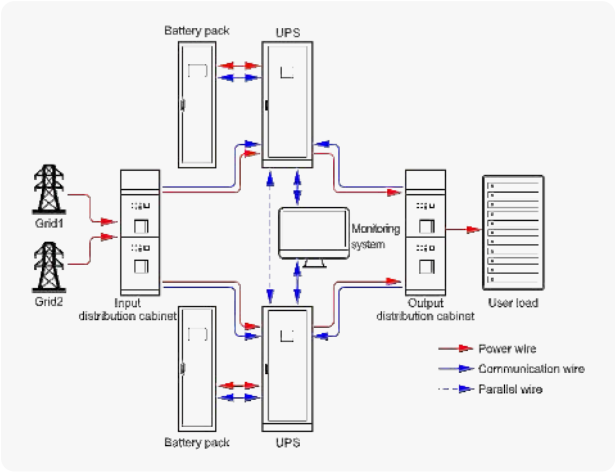
2
EPO inputs (NO and NC)

Parallel and multi-bus systems
IST6 200–500 kVA

System layouts from the user manual.

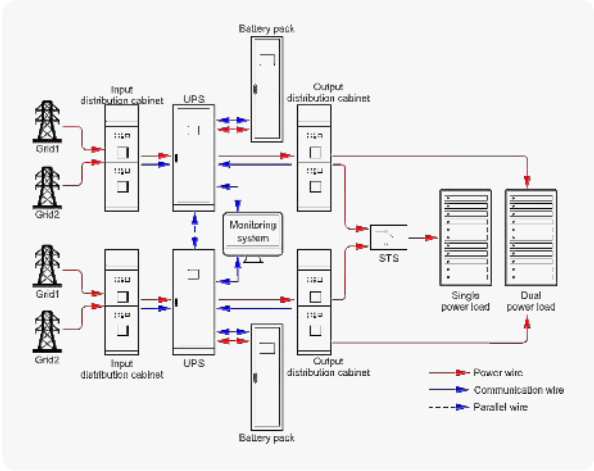
Parallel system · up to 8 UPS

Mains, bypass and AC outputs of the UPS connected in parallel; the control modules keep all UPS synchronised and share the load (imbalance ≤ 5%).

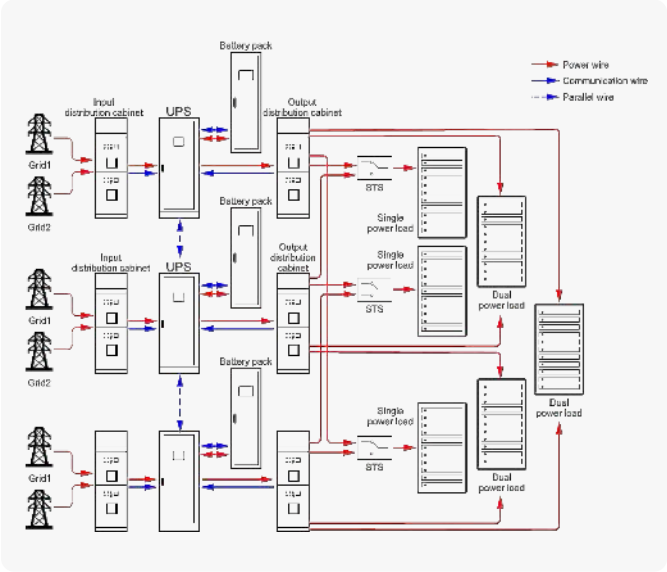


BSC dual-bus system

Two independent UPS systems synchronised by the bus sync controller; an STS supplies single-input loads.

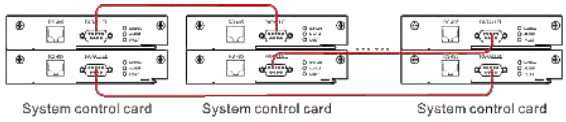


Multi-bus · three buses



Parallel ring

PARALLEL ports of the system control cards in a ring: N UPS need N cables. A 7 m cable is supplied with each UPS.



- Output of each UPS within ± 2 V and ± 0.1 Hz of the system setting.
- Parallel mode, parallel address and BSC address set on the screen.
- EPO linkage: one EPO stops the whole system, or only its UPS (set by AEC service).
- Shared battery pack and parallel ECO available.

8	≤ 5%	3	7 m
UPS in parallel, up to	current imbalance	buses in multi-bus mode	parallel cable supplied

TECHNICAL DATA

IST6 200–500 kVA

Cabinet	200 kVA	300 kVA	400 kVA	500 kVA
Power modules · rating	4 × 50 kVA	6 × 50 kVA	8 × 50 kVA	10 × 50 kVA
Bypass module	200 kVA · 3U	300 kVA · 3U	400 kVA · 3U	500 kVA · 4.5U
INPUT				
System · voltage	3Ph+N+PE · 380 / 400 / 415 V; 138–485 V (full power 324–485 V, linear derating below)			
Frequency · PF · THDi	40–70 Hz · ≥ 0.99 · ≤ 1.5% at full load			
Bypass	304–438 V; synchronisation 50 ± 5 / 60 ± 6 Hz; settable window			
BATTERY				
Lead-acid	±240 V DC nominal (±180 … ±300 V), 30–50 × 12 V blocks, standard 40			
Lithium (with BMS card)	±256 V DC nominal (±192 … ±294.4 V), 120–200 cells, standard 160			
Charging current	up to 30 A per power module · cold start · shared battery			
OUTPUT				
System · voltage	3Ph+N+PE (3Ph+PE optional) · 380 / 400 / 415 V ± 1%			
Power factor · THDv	settable 0.8–1.0 (default 1.0) · ≤ 1% linear, ≤ 4% non-linear			
Frequency · phase error	tracks the bypass; 50 / 60 ± 0.1 Hz with mains abnormal · ≤ 1° balanced, ≤ 3° unbalanced			
Transfer	mains ↔ battery 0 ms · bypass ↔ inverter < 1 ms synchronised, < 15 ms			
Inverter overload (PF 1)	≤ 105% continuous · 105–110% 60 min · 110–125% 10 min · 125–150% 1 min · > 150% to bypass			
Bypass overload	≤ 130% continuous · 130–150% 5 min · 150–200% 1 min · 200–300% 100 ms			
SYSTEM				
Efficiency · modes	up to 98.1% · ECO, WECO, source share, redundancy sleep			
Parallel	up to 8 UPS, current imbalance ≤ 5% · BSC dual bus and multi-bus (3 buses)			
Communication	Modbus · RS232 · RS485 · 4 inputs / 3 outputs dry contact · options: SNMP, expansion, BMS			
Environment	0 … 40 °C · 0–95% RH · ≤ 2000 m (derating to 4000 m) · IP20 · < 70 dB · EMC C3			
W × D × H (mm)	607 × 860 × 2000	607 × 860 × 2000	1203 × 864 × 2000	1203 × 864 × 2000
Weight without power modules	224 kg	236 kg	459 kg	506 kg

Power module 500 × 650 × 130 mm, 39 kg. Data from the IST6 200–500 kVA user manual. Specifications are subject to change without notice.

Ordering codes

Code	Description
IST6-200	Modular cabinet, max. 4 × 50 kVA power modules, without modules
IST6-300	Modular cabinet, max. 6 × 50 kVA power modules, without modules
IST6-400	Modular cabinet, max. 8 × 50 kVA power modules, without modules
IST6-50-J	50 kVA / 50 kW power module
PAR - IST6	Parallel kit

500 kVA cabinet: code on request.