

THYCON

Est.1968



Industrial UPS

MPX Industrial 10 – 1600kVA

THYCON





800kVA UPS with APR

Thycon's world-leading Static Flywheel Technology provides an efficient and robust UPS power solution.

Concept

Uninterruptible Power Supplies (UPS) protect critical equipment and facilities from being exposed to mains power failures. During normal functioning the UPS converts power from the mains to DC and stores it in a battery. When a mains failure occurs the UPS inverts the power from the battery to provide a conditioned supply of controlled frequency and voltage that keeps the critical equipment going unaffected by the quality or the availability of mains power.

Applications

UPS protect critical applications that cannot afford to be disrupted by mains power failures such as

computer systems and networks for defence, commerce and industry, newspaper presses, manufacturing machines and stadium lighting.

Modern, highly critical computer networks are often designed with redundancy to ensure continuing supply in the unlikely event of a UPS failure.

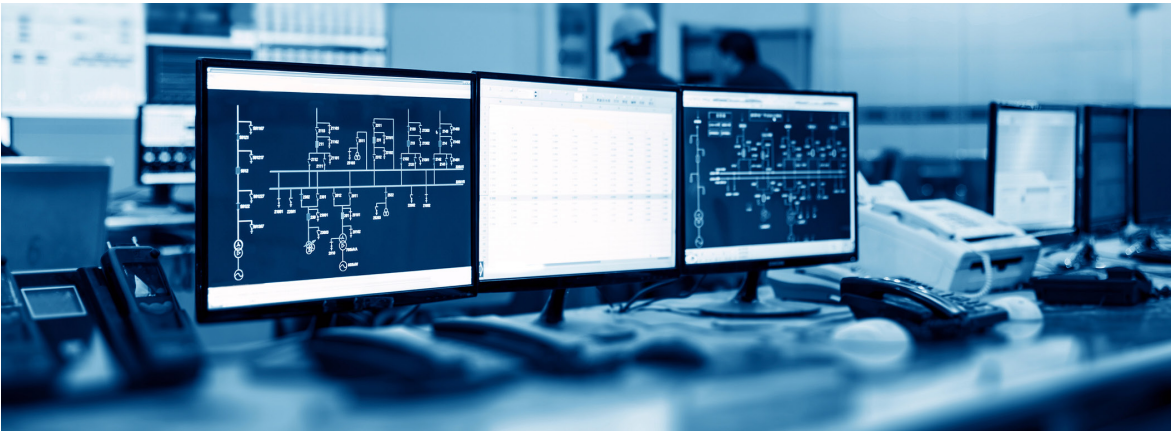
Redundancy methods are provided by:

- dual cord system design
- N+1 design with static transfer switch
- N+1 design with static bus tie

MPX features and benefits

- Thycon's Static Flywheel Technology
- continuous, accurate voltage and frequency regulation
- microprocessor-based diagnostics and controls
- supplies leading power factor load without de-rating

- high fault clearing capability
- high overload capacity
- low harmonic distortion
- input unity power factor
- energy saving
- soft-start control
- robust technology
- no moving parts
- fuseless design
- high efficiency
- high reliability
- long life
- cost effective
- low maintenance cost
- compact, modular construction
- indoor or outdoor enclosures
- Australian made



Principle of operation

Thycon has adopted a total system approach in designing the MPX Series UPS. Major innovations in the design of transformers, reactors and static converters and a commitment to high manufacturing standards have enabled us to produce a system of simple construction offering high efficiency, output range capability and space saving features. The system is user friendly with functions controlled by in-built digital processors. Compatible with standard computer specifications, it is built to meet AS, BS, IEC and VDE standards.

Thycon's world-leading Static Flywheel Technology provides an efficient and robust UPS power solution. Our approach combines the best of rotary and static concepts to produce a system that has the high current capacity and energy storage of the former with the efficiency, reliability, low mean time to repair and lower cost of the latter.

The development of Thycon Static Flywheel technology allows our UPS system to store substantial reserve power for transient conditions and high crest factor loads. Combining our proprietary technology with the high efficiency switching means of our converters ensures very low harmonic voltage distortion, current distortion and power loss.

Inherently capable of supplying up to 0.8 leading power factor without de-rating, the MPX Series has been proven by over 300 MVA of Thycon installations to deliver reliable performance and long equipment life.

Installation and testing

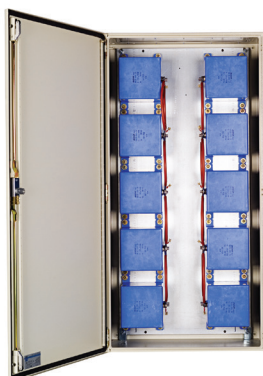
The MPX offers modular design for quick and easy site installation. All that is required is the installation of power cables and control/monitoring cabling. The MPX is tested comprehensively prior to delivery and needs minimal site commissioning.

A MPX can also be provided as a complete containerised assembly that can be placed in the harshest Australian conditions and easily relocated to other sites.

Reliability and maintenance requirements

Thycon has been supplying uninterruptible power supplies for over 40 years and has demonstrated their high reliability and low maintenance demands in critical applications for defence, telecommunications, computer centres and manufacturing.

Transformers and power electronic converters can be forced or naturally cooled, which contributes to high reliability and low ongoing maintenance. The power components (capacitors, transformers, switchgear and instrument transformers) are all standard commercial products of proven reliability and long life expectancy.



Inherently capable of supplying up to 0.8 leading power factor without de-rating

Thycon MPX maintenance requirements are dependent on environmental and application conditions. We accommodate customer requirements from basic to full warranty maintenance. Each maintenance plan ensures the equipment operates in top condition with maximum availability of engineers and parts at minimum cost to the customer. Qualified engineers perform the maintenance with the full back up and resources of Thycon.

Training and support

Training and support can be provided to on-site personnel to ensure that they are fully versed in the operation, maintenance and fault rectification of the Thycon UPS.

Control and monitoring

Smart digital signal processing provides control and regulation of the MPX. The control is automatic

and continuous ensuring an inherently fast transient response.

MPXs can be controlled and monitored from the unit itself and remotely via serial, TCP/IP or SCADA The system is totally automatic and does not require manual restarting for fault initiated supply disturbances.

Control and status

The standard UPS provides a simple control and status interface.

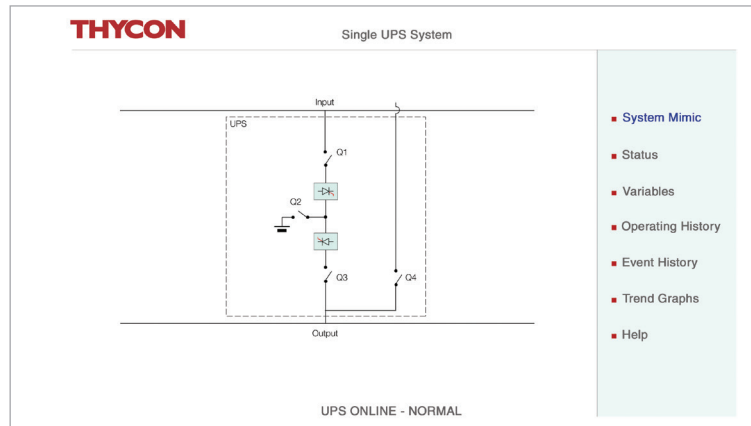
Start, Stop, or Transfer push-buttons allow you to operate the equipment and to go on-line. LEDs indicate the standby, online, bypass or alarm status of the UPS. A *Cancel* button is used as an audible silence alarm acknowledge. The system monitor mimic diagram allows you to see the path of power flow at a glance.

Monitoring

The MPX system monitor is a smart LCD panel featuring a simple and effective user interface that incorporates advanced diagnostic facilities enabling immediate access to:

- input/output/bypass power monitoring of voltage, current, kW, kVA, power factor/harmonic distortion
- operating status and alarms
- event history
- password protected user defined settings
- service control and test options

The system monitor stores the last 200 system events in a non-volatile information buffer for fast, efficient fault diagnosis and status indication even after a re-start or a complete power outage.



UPS power system monitor

... a system of simple construction offering high efficiency, output range capability and space-saving features.

Low-level interface

Operating status of the equipment to a remote monitoring system can be performed in the form of 8 standard voltage-free contacts. An additional summary alarm and load on bypass relay is available for secondary monitoring or remote interlocking.

High-level interface

Real-time performance monitoring of the UPS is performed via serial or TCP/IP connection. A basic hardcopy of operating events and data can be obtained by connecting a printer. An optional high-level interface via Modbus, SNMP or web html can be provided for immediate performance monitoring and analysis. Additional features enable you to notify your network

server of alarm conditions, perform automatic low battery autonomy shutdowns of the critical load and send emails to designated recipients.

UPS data such as real-time waveforms, alarms and system events can be stored in solid state, non-volatile memory holding up to 500 MBs of information. Connecting the UPS to a PC using any of the available ports allows you to maintain a full history of the equipment over its lifetime.

Options

Input/bypass galvanic isolation

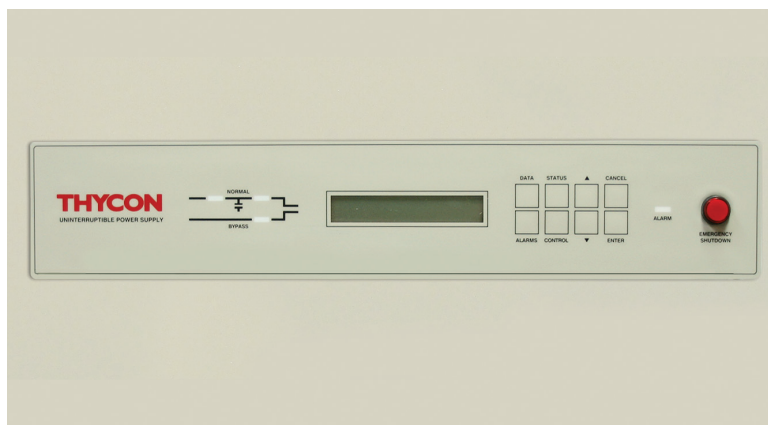
Galvanic isolating transformers can be incorporated within the input or bypass supply to isolate the system from electrical noise and the effects of harmonic currents generated within the distribution network.

Active pf and harmonic filtering control

High input impedance reduces voltage notching and input harmonics, thereby minimising required ratings of standby generator equipment.

Typical input power factors are 0.85 for 6-pulse and 0.92 for 12-pulse systems, although a pf of 0.99 is available when combined with a Thycon Active Power Factor Regulator (APR). These values remain stable under varying loads on the UPS.

A Thycon APR can provide additional power factor and harmonic filtering to ensure 0.99 pf and <5% THID (or <1% THVD) at the UPS and bypass supply.



Remote monitoring

Modem connection enables the MPX to dial and notify Thycon or a remote user automatically whenever an alarm condition arises. Thycon's Service Centre automatically logs data, performs analysis and diagnostics and then alerts our 24-hour staff if further intervention is required. All MPX utilisation and incidents found or reported are logged and a full report is provided for each occurrence. The report highlights remedial actions, cautions and follow up recommendations. Alternatively, the remote user can interrogate the MPX at will.

Thycon power system monitor

The MPX monitor offers the user a web-based interactive diagnostic tool and database management system for continuous real-time monitoring of MPX system utilisations, alarms, events and variables. The database management logs data to your PC's hard disk for future analysis and display.

Battery data logger

A Battery Data Logger (BDL) automatically measures, stores and analyses large numbers of batteries and battery banks. The operator is alerted when a non-performing condition arises.

Maintenance records and operating data are stored for the life of the battery resulting in simplified maintenance and compliance with QA requirements. Stored data can be displayed locally, or transmitted via modem to the Thycon Service Centre for monitoring and maintenance support purposes.

Expansion

Future expansion and redundancy can be achieved by parallel connection of the MPX modules. Each module can be isolated manually or automatically from the load bus without affecting availability of supply.

Container modules

The MPX can be provided as a complete containerised assembly that can be placed in the harshest Australian conditions and easily relocated to other sites. Each module is self-contained enabling use in applications varying from city building rooftops to coastal oil rigs to outback mining stations.

Thycon MPX advantages

Design advantages

Simple, reliable design	Uncomplicated design facilitates high strength, durability and reliability. The power circuit uses simple, robust switches to form a sine wave by line commutation control technology. This method of control eliminates the switching stresses, losses and interference that high frequency, forced commutated conversion systems such as IGBT technology experience.
Robust technology	Robust construction achieves reliable performance and long equipment life, as proven by 40 years of Thycon installations.
Component rating	Commercially available standard mains frequency thyristors are used as single devices up to 2.4kA. No series or parallel matching of components is required to achieve high power applications.
Thyristor technology	Use of thyristors (SCRs) eliminates the need for special high-speed semiconductor fuses and “crowbar” arrangements and results in a simpler design with increased reliability. Thyristors have the highest power and fault tolerance of all semiconductor devices and can withstand faults of up to 10 times the current for 1000 times the period of IGBT and transistor switching technologies.
Environment	The equipment can be used in computer rooms or in harsher environments without de-rating. Thycon equipment can be containerised to provide a complete solution for extreme environments. In many cases there is no need for special air conditioning, reducing operating and capital costs.
Fuseless design	No power fuses are required. Power components are liberally over-rated so that simple and reliable methods of circuit breaker protection can be used. This greatly reduces down time and eliminates the need for stock control of spare fuses.
Surge protection	Built in surge protection increases the attenuation of over-voltages caused by distribution faults and lightning.
Isolating transformers	Incorporation of these within the input or the bypass supply enable complete isolation from electrical noise and the effects of harmonic currents generated within the distribution network.
Isolation between input and output	Incorporation of full galvanic isolation using an earth-screened transformer provides greater safety levels.

Performance advantages

Output source impedance	Low output source impedance eliminates the effect of the load on UPS output voltage waveform and the danger of interaction between loads.
Battery compatibility	Compatibility with all battery types facilitates the support of battery manufacturers' guarantees.
Battery type flexibility	Ability to use a variety of battery capacities, types and manufacturers to ensure maximum flexibility in DC bus voltage application. DC bus voltage design ranges from 560 to 3000Vdc depending on system or site requirements.
Battery charging	Offers three different modes for charging batteries: on generator, charging to float, and equalise or boost charging. All modes allow adjustable charge current limiting to account for various battery types.
Battery discharge protection	Ensures that the batteries are never over discharged. This facility greatly improves the longevity of the batteries and simplifies battery equalisation and maintenance.
Battery ripple currents	Ripple in the DC link circuit is kept low so that internal battery heating, corrosion and sulphate levels are kept within acceptable levels under steady state, discharging and charging conditions.
Battery temperature	DC voltage may be temperature regulated to prevent under and over charging of the batteries and preserve their performance and lifetime. Keeping the battery temperature within acceptable levels results in longer battery life.
Compatibility	The control panel provides the operator with an efficient, user-friendly interface.
Microprocessor monitoring	Externally monitored microprocessor via multistage hardware ensures that the critical load is not affected should it fail.
Modular construction	Construction from standardised components and modules ensures high mean time between failures (MTBF) and low mean time to repair (MTTR).

Thycon MPX advantages

Performance advantages

Input power factor	Typical input power factors are at 0.85 for 6-pulse and 0.92 for 12-pulse systems, with a pf of 0.99 when combined with a Thycon APR. These values remain stable under varying loads on the UPS.
Input current harmonics	High input impedance reduces voltage notching and input harmonics, thereby minimising the required rating of standby generator equipment.
Output voltage harmonics	Low output impedance inherently inhibits the effect of non-linear, high harmonic loads on the output voltage waveform. Output harmonic distortion at linear loads < 2%. Output harmonic distortion at non-linear loads < 4%.
Current ratio	Low input to output current ratio (in most cases, ratings of the input supply cables are the same as the output) minimise installation costs and demand from the distribution system.
Efficiency	System operates up to 94.5% efficiency resulting in lower running costs and heat dissipation.
Frequency tracking	A widely controllable frequency tracking range to ± 2.5 Hz ensures its compatibility with the bypass supply.
Load crest factor	Low output impedance allows it to drive high crest factor loads without risking component damage, current limitation or excessive waveform distortion.
Noise attenuation	Common mode high frequency attenuation (line to ground and neutral) is more than 135 dB and more than 70 dB at normal mode (line to neutral). Consequently load switching, mains or generator switching, externally generated industrial noise or storms do not affect the load.
Thycon's Static Flywheel Technology	The MPX uses Thycon's proprietary Static Flywheel Technology to provide fast continuous regulation of voltage and harmonic distortion. This technology also allows the MPX to store substantial reserve power for transient conditions and high crest factor loads.
Transient response	A fast dynamic response enables correction of transient step load changes within one power cycle period.
Fault current capability	Supplies 10–20 times the rated current under load fault short circuit conditions.
Output overload	Voltage is regulated beyond 300% overload and, unlike systems with output current limiting, will not stray outside the allowable tolerances when supplying inrush current.
Leading power factor load	System can operate with a leading power factor load without any de-rating factor. "Dual cord" power supplies fitted with harmonic filter capacitors has resulted in computer room loads operating at leading power factors, requiring many other UPS systems to operate with a de-rating factor of up to 60%.
Static transfer	Transfer to and from the load is fully automatic requiring no user checks or adjustments before it is initiated, thus removing the possibility of human error.
Parallel operation	Easy paralleling with similar systems at any stage of the UPS lifetime means increased flexibility and permits future growth as required.

Technical data 20 kVA - 60 kVA

	MPX-20	MPX-30	MPX-40	MPX-60
Input - three phase	20kVA	30kVA	40kVA	60kVA
Voltage	415 VAC	415 VAC	415 VAC	415 VAC
Voltage tolerance	+10% - 15%	+10% - 15%	+10% - 15%	+10% - 15%
Phases	3 + neutral	3 + neutral	3 + neutral	3 + neutral
Frequency	50 Hz \pm 5%	50 Hz \pm 5%	50 Hz \pm 5%	50 Hz \pm 5%
Power walk-in	15s	15s	15s	15s
Current output - three phase				
System rating	20kVA / 16kW	30kVA / 24kW	40kVA / 32kW	60kVA/48kW
Power factor range (within rated kW)	0.7 lag to 0.8 lead	0.7 lag to 0.8 lead	0.7 lag to 0.8 lead	0.7 lag to 0.8 lead
Overload for 10min. / 1min.	125% / 150%	125% / 150%	125% / 150%	125% / 150%
Voltage	415V / 240VAC	415V / 240VAC	415V / 240VAC	415V / 240VAC
Voltage tolerance:				
balanced load	\pm 1%	\pm 1%	\pm 1%	\pm 1%
100% unbalanced load	\pm 3%	\pm 3%	\pm 3%	\pm 3%
Voltage adjustment	\pm 5%	\pm 5%	\pm 5%	\pm 5%
Voltage transient performance:				
50% full load step	\pm 8%	\pm 8%	\pm 8%	\pm 8%
Loss / return of AC input	\pm 5%	\pm 5%	\pm 5%	\pm 5%
Uninterrupted transfer of critical load				
from UPS to bypass or from bypass to UPS	\pm 5%	\pm 5%	\pm 5%	\pm 5%
Recovery time	10ms	10ms	10ms	10ms
Phase displacement:				
balanced load	120° \pm 1°	120° \pm 1°	120° \pm 1°	120° \pm 1°
100% unbalanced load	120° \pm 3°	120° \pm 3°	120° \pm 3°	120° \pm 3°
Frequency	50 Hz	50 Hz	50 Hz	50 Hz
Frequency tolerance (unlocked)	\pm 0.1%	\pm 0.1%	\pm 0.1%	\pm 0.1%
Frequency tracking rate	10Hz / s	10Hz / s	10Hz / s	10Hz / s
THD	2%	2%	2%	2%
Efficiency	88%	89%	90%	91%
Environmental - UPS system				
Ambient temperature range	0 to 40°C	0 to 40°C	0 to 40°C	0 to 40°C
Heat dissipation at full load	2.2 kW	3.0 kW	4 kW	5 kW
Audible noise at 2 metres	58 dBA	60 dBA	60 dBA	60 dBA
Dimensions - UPS system				
w x d x h (mm)	600 x 800 x 1600	600 x 800 x 1600	600 x 800 x 1600	600 x 1000 x 1800

Specifications are subject to change without notice

Technical data 90 kVA - 200 kVA

	MPX-90	MPX-120	MPX-150	MPX-200
Input - three phase	90kVA	120kVA	150kVA	200kVA
Voltage	415 VAC	415 VAC	415 VAC	415 VAC
Voltage tolerance	+10% - 15%	+10% - 15%	+10% - 15%	+10% - 15%
Phases	3 + neutral	3 + neutral	3 + neutral	3 + neutral
Frequency	50 Hz \pm 5%	50 Hz \pm 5%	50 Hz \pm 5%	50 Hz \pm 5%
Power walk-in	15s	15s	15s	15s
Current output - three phase				
System rating	90kVA / 72kW	120kVA / 96kW	150kVA / 120kW	200kVA / 160kW
Power factor range (within rated kW)	0.7 lag to 0.8 lead	0.7 lag to 0.8 lead	0.7 lag to 0.8 lead	0.7 lag to 0.8 lead
Overload for 10min. / 1min.	125% / 150%	125% / 150%	125% / 150%	125% / 150%
Voltage	415V / 240VAC	415V / 240VAC	415V / 240VAC	415V / 240VAC
Voltage tolerance:				
balanced load	\pm 1%	\pm 1%	\pm 1%	\pm 1%
100% unbalanced load	\pm 3%	\pm 3%	\pm 3%	\pm 3%
Voltage adjustment	\pm 5%	\pm 5%	\pm 5%	\pm 5%
Voltage transient performance:				
50% full load step	\pm 8%	\pm 8%	\pm 8%	\pm 8%
Loss / return of AC input	\pm 5%	\pm 5%	\pm 5%	\pm 5%
Uninterrupted transfer of critical load				
from UPS to bypass or from bypass to UPS	\pm 5%	\pm 5%	\pm 5%	\pm 5%
Recovery time	10ms	10ms	10ms	10ms
Phase displacement:				
balanced load	120° \pm 1°	120° \pm 1°	120° \pm 1°	120° \pm 1°
100% unbalanced load	120° \pm 3°	120° \pm 3°	120° \pm 3°	120° \pm 3°
Frequency	50 Hz	50 Hz	50 Hz	50 Hz
Frequency tolerance (unlocked)	\pm 0.1%	\pm 0.1%	\pm 0.1%	\pm 0.1%
Frequency tracking rate	10Hz / s	10Hz / s	10Hz / s	10Hz / s
THD	2%	2%	2%	2%
Efficiency	91%	92%	92%	93%
Environmental - UPS system				
Ambient temperature range	0 to 40°C	0 to 40°C	0 to 40°C	0 to 40°C
Heat dissipation at full load	7 kW	8.4 kW	10 kW	12 kW
Audible noise at 2 metres	60 dBA	60 dBA	60 dBA	<65 dBA
Dimensions - UPS system				
w x d x h (mm)	600 x 1000 x 1800	1200 x 1000 x 1800	1200 x 1000 x 1800	1800 x 1000 x 1800

Specifications are subject to change without notice

Technical data 300 kVA - 600 kVA

	MPX-300	MPX-400	MPX-500	MPX-600
Input - three phase	300kVA	400kVA	500kVA	600kVA
Voltage	415 VAC	415 VAC	415 VAC	415 VAC
Voltage tolerance	+10% - 15%	+10% - 15%	+10% - 15%	+10% - 15%
Phases	3 + neutral	3 + neutral	3 + neutral	3 + neutral
Frequency	50 Hz ± 5%	50 Hz ± 5%	50 Hz ± 5%	50 Hz ± 5%
Power walk-in	15s	15s	15s	15s
Current output - three phase				
System rating	300kVA / 240kW	400kVA / 320kW	500kVA / 400kW	600kVA / 480kW
Power factor range (within rated kW)	0.7 lag to 0.8 lead	0.7 lag to 0.8 lead	0.7 lag to 0.8 lead	0.7 lag to 0.8 lead
Overload for 10min. / 1min.	125% / 150%	125% / 150%	125% / 150%	125% / 150%
Voltage	415V / 240VAC	415V / 240VAC	415V / 240VAC	415V / 240VAC
Voltage tolerance:				
balanced load	± 1%	± 1%	± 1%	± 1%
100% unbalanced load	± 3%	± 3%	± 3%	± 3%
Voltage adjustment	± 5%	± 5%	± 5%	± 5%
Voltage transient performance:				
50% full load step	± 8%	± 8%	± 8%	± 8%
Loss / return of AC input	± 5%	± 5%	± 5%	± 5%
Uninterrupted transfer of critical load				
from UPS to bypass or from bypass to UPS	± 5%	± 5%	± 5%	± 5%
Recovery time	10ms	10ms	10ms	10ms
Phase displacement:				
balanced load	120° ± 1°	120° ± 1°	120° ± 1°	120° ± 1°
100% unbalanced load	120° ± 3°	120° ± 3°	120° ± 3°	120° ± 3°
Frequency	50 Hz	50 Hz	50 Hz	50 Hz
Frequency tolerance (unlocked)	± 0.1%	± 0.1%	± 0.1%	± 0.1%
Frequency tracking rate	10Hz / s	10Hz / s	10Hz / s	10Hz / s
THD	2%	2%	2%	2%
Efficiency	93%	93%	94%	94%
Environmental - UPS system				
Ambient temperature range	0 to 40°C	0 to 40°C	0 to 40°C	0 to 40°C
Heat dissipation at full load	18 kW	24 kW	26 kW	31 kW
Audible noise at 2 metres	<65 dBA	<65 dBA	<65 dBA	<70 dBA
Dimensions - UPS system				
w x d x h (mm)	1800 x 1000 x 1800	2400 x 1000 x 1800	2400 x 1000 x 1800	3000 x 1000 x 1800

Specifications are subject to change without notice

Technical data 800 kVA - 1600 kVA

	MPX-800	MPX-1200	MPX-1600
Input - three phase	800kVA	1200kVA	1600kVA
Voltage	415 VAC	415 VAC	415 VAC
Voltage tolerance	+10% - 15%	+10% - 15%	+10% - 15%
Phases	3 + neutral	3 + neutral	3 + neutral
Frequency	50 Hz \pm 5%	50 Hz \pm 5%	50 Hz \pm 5%
Power walk-in	15s	15s	15s
Current output - three phase			
System rating	800kVA / 640kW	1200kVA / 960kW	1600kVA / 1280kW
Power factor range (within rated kW)	0.7 lag to 0.8 lead	0.7 lag to 0.8 lead	0.7 lag to 0.8 lead
Overload for 10min. / 1min.	125% / 150%	125% / 150%	125% / 150%
Voltage	415V / 240VAC	415V / 240VAC	415V / 240VAC
Voltage tolerance:			
balanced load	\pm 1%	\pm 1%	\pm 1%
100% unbalanced load	\pm 3%	\pm 3%	\pm 3%
Voltage adjustment	\pm 5%	\pm 5%	\pm 5%
Voltage transient performance:			
50% full load step	\pm 8%	\pm 8%	\pm 8%
Loss / return of AC input	\pm 5%	\pm 5%	\pm 5%
Uninterrupted transfer of critical load			
from UPS to bypass or from bypass to UPS	\pm 5%	\pm 5%	\pm 5%
Recovery time	10ms	10ms	10ms
Phase displacement:			
balanced load	120° \pm 1°	120° \pm 1°	120° \pm 1°
100% unbalanced load	120° \pm 3°	120° \pm 3°	120° \pm 3°
Frequency	50 Hz	50 Hz	50 Hz
Frequency tolerance (unlocked)	\pm 0.1%	\pm 0.1%	\pm 0.1%
Frequency tracking rate	10Hz / s	10Hz / s	10Hz / s
THD	2%	2%	2%
Efficiency	94.5%	95%	95%
Environmental - UPS system			
Ambient temperature range	0 to 40°C	0 to 40°C	0 to 40°C
Heat dissipation at full load	37 kW	50 kW	67 kW
Audible noise at 2 metres	<70 dBA	<70 dBA	<70 dBA
Dimensions - UPS system			
w x d x h (mm)	3000 x 1000 x 1800	4800 x 1000 x 1800	5400 x 1000 x 1800

Specifications are subject to change without notice



THYCON

THYCON INDUSTRIAL PTY LTD

20 Audrey Ave Coburg

3058 VIC Australia

PH 61 3 9319 9000

FAX 61 3 9319 9001

ABN 17 068 011 049

www.thycon.com.au

info@thycon.com.au

24 HR Service Australia

1800 670 700