

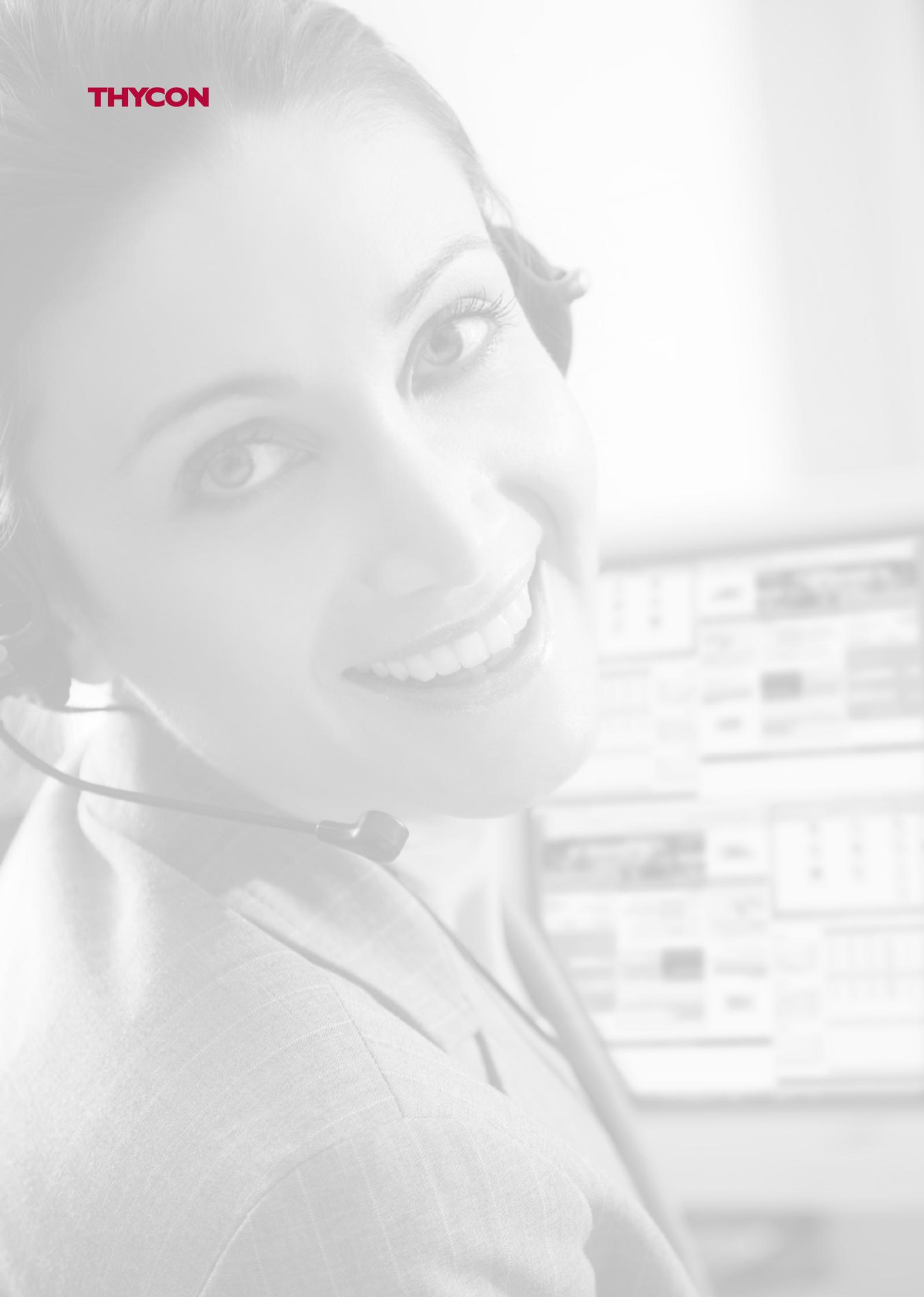
THYCON

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Services and Refurbishment Options

THYCON



Introduction

Thycon offers expert services to maintain and upgrade our products and to address any other power quality and power control needs you may have.

Key services include:

- preventive maintenance / extended warranty
- refurbishment and upgrade programmes
- remedial service
- engineering services

Adaptable to customer needs

Local design and manufacture means we can modify our products to meet specific customer requirements quickly and efficiently. Modifications can be made during production or on site as required.

Preventive maintenance services

The most effective method of ensuring product reliability is through regular preventive maintenance. Thycon offer several levels of preventive maintenance cover backed by an online service programme that permits inspection without interfering with the equipment's normal operation.

Refurbishment and upgrade programmes

Thycon equipment is built to last and many of our field units have exceeded 20 years of continuous service. As technology advances we are able to incorporate innovative solutions to improve the performance and capabilities of underlying proven systems.

Refurbishment programmes allow us to incorporate new technologies and to address issues of component obsolescence without the costs associated with a total equipment replacement.

Easy upgrades through modular design

Upgrades of Thycon products such as transformer input isolation, input harmonic filtering, input power factor correction and 12 or 24 pulse operation are easy and cost-effective due to their modular design. Upgrade modules can be incorporated without major re-working of or disruption to existing installations.

As we evaluate and improve our product range we take great care to ensure that all current models are backward compatible. This means customers can enjoy the advantages of technological improvements as soon as they become available.

Remedial service

Remedial service is available 24 hours a day, 365 days a year. Thycon engineers, with priority access to genuine replacement parts, are available Australia-wide to ensure prompt and effective service.

Engineering services

For nearly 40 years Thycon has provided Australian companies with engineering advice on and solutions to:

- power quality issues such as voltage surges, sags, spikes, flicker, brownouts and blackouts; low power factor; high harmonics and severe notching
- power control requirements such as voltage, current and frequency conversion; power rectification and power inversion

We are experts in providing answers to power factor and harmonic issues. Thycon Engineering Services can perform a detailed analysis of your site power situation and remedy any problem with practical and economical solutions.

PREVENTIVE MAINTENANCE SERVICES

Preventive maintenance services

Thycon delivers two levels of preventive maintenance service via a variety of programmes to suit your specific needs.

Online service

Our Online Service is based on the recognition that shutting down a customer's system is rarely a simple matter.

Incorporating a web server into your system allows you to interrogate your equipment using web-based software via your intranet. Your Thycon product can then automatically notify Thycon via email of any critical alarm.

A fast response is guaranteed by our 24-hour emergency escalation service, which allows us to inspect your system without interfering with its normal operation. We can interrogate the equipment's past and present performance, operating parameters and battery condition and provide a detailed report of our findings.

Regular remote Internet interrogation can also be included with your maintenance agreement and enables Thycon to provide secure, non-intrusive feedback on the state of your system.

Offline service

The Thycon Offline service is a more intrusive examination and involves the complete shutdown of the equipment.

We verify the power, control and alarm systems and perform mains failure simulations and battery discharge tests for UPS applications. A final report summarises the findings, raises matters of concern and makes upgrade recommendations.

Preventive maintenance programmes

Thycon offer different levels of preventive maintenance cover:

- Basic
- Standard
- Extended Warranty

Each uses a combination of online and offline services.

Basic maintenance

This agreement incorporates:

- a set number of service visits based on the equipment type, age and environment
- 24-hour priority emergency telephone support
- optional remote monitoring and interrogation

Standard maintenance

An extension of the Basic programme, it provides:

- a set number of service visits based on the equipment type, age and environment
- 24-hour priority emergency telephone support
- optional remote monitoring and interrogation
- 24-hour remedial labour in the event of a breakdown

Extended warranty maintenance

Our highest level of maintenance cover can provide lifetime warranty of the Thycon product.

It includes:

- a set number of service visits based on the equipment type, age and environment
- 24-hour priority emergency telephone support
- optional remote monitoring and interrogation
- 24-hour remedial labour in the event of a breakdown
- software updates
- parts (excluding batteries)
- consulting services
- training of site technical staff

**MPU UPGRADE/
REFURBISHMENT OPTIONS**

Introduction

The Thycon MPU series of UPS equipment was first released in late 1989. Continuous innovation and technological advancement have provided considerable performance improvements over the original design. Many of these systems have been in service for 10 to 15 years and a number of upgrade options are now available to enhance their operation.

CPU software/firmware upgrade

A software upgrade is simple to perform and can substantially improve system performance. For equipment still running on original software, Thycon actively reviews and improves code to address minor issues and add to functionality. Many older UPS units are likely to be running slow processors. Upgrading to a faster, modern processor also provides significant performance benefits.

CPU battery

The CPU battery backs up the RAM on the CPU card. Over time these batteries deteriorate to a point that suspect behaviour can occur. Replacement of the battery is a simple task and may provide a substantial performance improvement.

Cooling fans

Cooling fans have a design life of 5 years. Periodic replacement of the fans is therefore recommended.

Circuit breakers/switchgear

Some circuit breakers and switchgear installed in older systems are no longer manufactured. Thycon can retrofit modern switchgear to replace these units. Customers in this situation can purchase a retrofit kit or spare circuit breaker to reduce MTTR should the need arise.

Improved output harmonic distortion

Modifications to the control and power circuit can improve the output waveform quality of the UPS supply. Thycon can achieve distortion levels as low as 3.5% by modifying older equipment.

Converter bridge refurbishment

Over time, components subject to heat, thermal expansion and contraction and mechanical vibration can deteriorate. Thycon's preventive replacement programme addresses this situation by ensuring that electronics and protective RC snubber networks are easily upgraded.

Static interrupter

Installation of a static interrupter ensures that the UPS inverter can be isolated from the load within microseconds of a fault being detected.

Active power factor and harmonic correction

It is now known that power factor correction can realise significant cost savings. Thycon has a range of active power factor equipment that provides precise, dynamic correction of the power factor without the coarse correction utilised in simple switched capacitor arrangements.

A Thycon Active Power Factor Regulator (APR) can be connected to existing Thycon equipment or installed alone to improve power factor, current distortion and overall total harmonic voltage distortion of the supply.

Parallel UPS electronics upgrade

All MPU equipment can be upgraded to enable parallel operation with a second UPS unit. Fibre optic communications are used to isolate the two units from each other and provide maximum redundancy.

Thycon power system monitor

Including a Thycon Internet server in your MPU UPS system, allows your equipment to be monitored over a TCP/IP network using web browser software. The UPS can then notify users automatically of changes via email and provide simultaneous support for the high-level MODBUS communications protocol used in many building monitoring systems.

HPU UPGRADE/ REFURBISHMENT OPTIONS

Introduction

Thycon manufactured HPU UPS units until late 1991 when they were superseded by the MPU range.

Designed with quality and reliability foremost in mind, almost all components in the series are over-engineered with a huge built-in tolerance margin. As a result, most of the equipment has a potential service life well in excess of 20 years.

Since HPU production ceased Thycon has received requests from many clients wishing to upgrade and refurbish their systems to ensure optimal service beyond the initial 15 years or to provide additional features and capabilities not present in the original.

Upgrade or refurbishment of the HPUs can involve any of the following.

Digital MOS card upgrade

The digital MOS card was developed to replace the old analog MOS card and to provide superior synchronisation of the UPS inverter to the bypass supply and greater immunity to noise.

MPU PLC card upgrade

A new PLC offers superior accuracy in the firing signals sent to the frequency converter bridges and can be especially important when addressing disturbances in the UPS output.



Commutation choke

The new PLC card also permits the UPS, in conjunction with modifications to the power circuit, to implement 12-pulse output waveforms. This produces dramatically lower harmonic distortion and a much purer sinusoidal output voltage waveform.

Software upgrade

A software upgrade is simple to perform and can substantially improve system performance. For equipment still running on original software, Thycon actively reviews and improves code to address minor issues and to add to functionality.

CPU battery

The CPU battery backs up the RAM on the CPU card. Over time, these batteries deteriorate to a point that suspect behaviour can occur. Replacement of the battery is a simple task and may provide a substantial performance improvement.

Firing cards

A number of improvements made to the original converter firing cards means that they can now support the changes that have occurred over the last 20 years in electrical requirements for thyristors.

Converter bridges refurbishment

Older thyristors may degrade over time due to imperfections in the original manufacturing process or thermal expansion and contraction and mechanical vibration. In the long term, these factors may impact on the operation of the UPS. Replacing these with modern thyristors, which are much improved in manufacture and design, eliminates these concerns.

Commutation chokes

Variations in thyristor characteristics has often led to variations in commutation chokes requirements over the years. In older units, delamination of the commutation choke cores can cause greater noise and reduce their usefulness. Investigation of the existing chokes is needed to confirm whether modern thyristors can be used.

Enhanced static switch fault capability

In the event of a downstream load fault the UPS transfers the load to static bypass. During this operation, the load is dependent on the operation of the static switch. If the load fault activates the protection around the static switch, a loss of output may result. The possibility of this arising can be reduced by implementing changes to the power circuit such as by installing special current limiting inductors and surge suppression around the static switch.

Fully rated static switch

During the transfer between UPS internal bypass and UPS inverter supply, the load is supported by a short-term rated static switch. The switch is designed to carry the load in the period during which both the inverter and bypass supply circuit breakers are open.

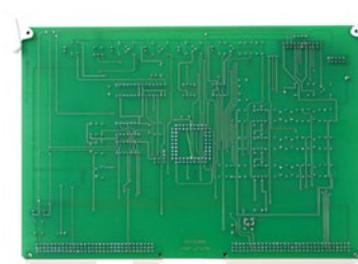
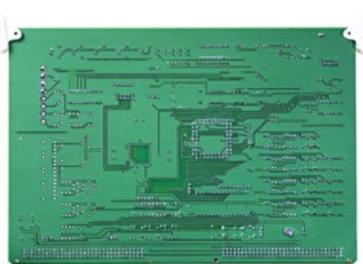
By upgrading your existing short-term rated static switch to a fully rated version, you eliminate the possibility of a circuit breaker failure affecting the availability of supply to the critical load.

Static interrupter

Installation of a static interrupter ensures that the UPS inverter can be isolated from the load within microseconds of a fault being detected.

Removal of MC5 contactor module

The MC5 contactor module was installed in many HPU Series units to allow complete isolation of the static switch without removing power to the UPS unit. This



Upgrade electronics

capability is no longer deemed necessary, especially as it reduces the overall reliability of the unit. We recommend its removal to simplify UPS operation and to improve the reliability of the equipment.

Optical isolation of communications bus

HPU NBPS/Static Switch systems communicate via a direct electrical connection between each NBPS module and the static switch. By incorporating optical isolation over the communications bus, a power surge affecting the electronics of one module cannot damage other equipment on the communications bus. It also improves noise immunity from outside sources.

Active power factor correction

It is now known that power factor correction can realise significant cost savings. Thycon has a range of active power factor equipment that provides precise, dynamic correction of the power factor without the coarse correction utilised in simple switched capacitor arrangements.

A Thycon Active Power Factor Regulator (APR) can be connected to existing Thycon equipment or installed alone to improve power factor, current distortion and overall total harmonic voltage distortion of the supply.

MPX electronics upgrade

Thycon can totally replace the electronics of the HPU Series with current MPX technology.

This requires a major rebuild of the UPS, which can be done onsite or at our Melbourne factory, but it gives you all the advantages and features of a new system without the expense of buying one.

For example, it:

- guarantees compatibility with currently manufactured components
- eliminates problems with obsolete components and availability of replacement parts
- implements all performance improvements in currently manufactured systems
- allows remote monitoring of the UPS over the local TCP/IP network or Internet
- eliminates all potential problems associated with age-related degradation of electronic components
- allows individual units to be paralleled in the future if required



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