

WHITE PAPER

Drive maintenance

Essential yet overlooked



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Technology and serviceability

ABB drives are designed for the highest reliability. Combined with preventive maintenance, this enables a longer operational lifetime for OEM machines. Serviceability is built into ABB drives to maintain our customers' competitiveness from setting up production capacity to production maturity and equipment upgrades over the decades. Today, end customers are increasingly requesting faster, yet accurate, end-to-end support and service directly from their OEM suppliers. ABB can help with this.

A challenge in communication

It's a commonly held belief that industrial products equipped with electronic components do not require any specific maintenance. However, our experience shows that the likelihood of such equipment failing increases after years of operation.

Both OEMs and end users could benefit from a better understanding of the need for maintenance. Awareness amongst OEMs of the drive services that ABB offers is not as great as it could be.

In turn, end users may not even be aware that their machines contain components such as drives, let alone of the fact that these drives require maintenance or that maintenance services are available on the market.

This document aims to rectify this situation. Correctly scheduled preventive maintenance can transform a drive's operational capabilities and its life cycle.

Aging components that are poorly, infrequently or never maintained may result in other parts of the drive being damaged, leading to increased risk of failure and a decrease in its functional lifetime.

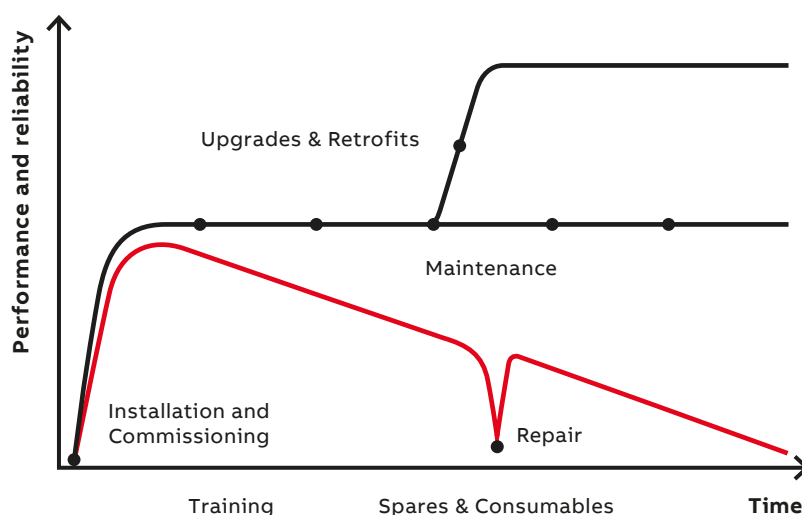
Regular predefined preventive maintenance schedules circumvent these tendencies and facilitate service budgeting on a basis optimal to the product's true potential. Guaranteeing the maximum machine uptime and delaying the cost of machine replacement are clear business priorities for end users. Maintenance schedules are the only means through which this additional layer of good customer service can be achieved.

The solution in action

The best way for OEMs to develop a real-life understanding of the role maintenance should play in making systems less prone to failure and keeping them in better working order for longer is to engage their service engineers with ABB's drive maintenance training. More information on these courses and their importance follows.

An outline of ABB's service offering also follows, including details of how the preventive maintenance program works and information on our unique ABB life cycle management model, which is the foundation of our status as a predictable, trusted and long-term partner to our customers.

The need for maintenance



Maintenance is an under-discussed yet vital component of electric motor and drive operation.

The main reason for system failures is aging components, and the aging rate depends on operational conditions. High temperatures and heavy cyclical loads may shorten aging components' lifetimes substantially. High temperatures may not necessarily be the root cause of a failure, but reduced cooling power due to dirty air filters may well be.

Reduced cooling power may cause a domino effect where increased temperature accelerates semiconductor aging. Hence, an aging component may cause consequential damage to other parts of the drive, including power semiconductors. A demanding environment, such as high ambient temperature, humidity, dirt, dust and cyclic heavy loads, can shorten component lifetime as well as maintenance and component replacement intervals.

To function properly over specified lifetime, drives require systematic regular preventive maintenance. The only ways to keep drives and OEM machines functioning properly over years or even decades are systematic preventive maintenance and replacing ageing components before they fail.

The best way to learn more

ABB offers comprehensive training to introduce and provide theoretical and practical examples of maintenance in action. This is the best way to develop a real-life understanding of the role maintenance should play in order to make systems less prone to failure and remain in better working order for longer.

We encourage all OEMs who work with us to have at least one senior service engineer attend our maintenance training. Maintenance is an elemental part of system lifetime performance, and engineers' hands-on experience of this will have positive ramifications for each player in the value chain, finally resulting in increased end-user satisfaction and improved customer service.

Training typically comprises theoretical presentations and hands-on exercises. ABB offers hundreds of courses, which are available on the Internet. Examples of training topics include product features, applications, installation and startup procedures, programming, PC tools, maintenance and identifying faults. The majority of training is delivered at ABB training centers. Some courses can be organized at the customer's location by request.

ABB can offer convenient learning paths and certification programs that help OEMs to provide better support and service to their end customers. Learning paths on this topic are available at <http://new.abb.com/drives/services/training>.

ABB's main pillars of cooperation in service

International OEM support

OEMs provide the major share of drives support and service to end customers. Moreover, the demand for faster support and service is increasing. End customers expect OEMs to provide a complete range of services for all devices in their machines, including drives. Thus, OEMs have a growing need to solve customers' problems with first-tier support services. ABB is well placed to help OEMs improve their service capabilities to respond to this demand. We offer hands-on maintenance where relevant, and we supply maintenance training to OEMs and end users in the majority of cases.

Local service

ABB's global service network can support OEMs when needed all over the world. This network is based on authorized local service, from ABB or from a partner. Our authorization program is the backbone of the superior service quality ABB offers for drives to customers all over the world.

You can find your local ABB service contacts from www.abb.com/searchchannels.

In most countries, ABB provides 24/7/365 technical support via telephone and email, covering all stages of the value chain. Should further support be needed, ABB utilizes an escalation process by which the query is brought up through ABB Regional and Global Service Centers to the factory R&D level, until it reaches an appropriate respondent and is answered.

DriveHelp – standard process for drives under warranty

DriveHelp is a warranty support service specially designed for our OEM customers. It's based on using a global single point of contact so OEMs are sure that whatever support is needed, it is only one phone call away – wherever and whenever the need arises. This means that there is a dedicated team covering all the time zones 24/7.



Premium DriveHelp – contract-based priority support

The Premium DriveHelp service coordinates international OEMs service requests. It features one single point of contact and priority-based handling of warranty cases. Additionally, it includes after-warranty services such as spare parts logistics and direct access to field services, all year round. The service allows on-line case tracking.

Preventive Maintenance program

To increase drive reliability and cut operational costs, ABB has developed the Preventive Maintenance program. Drive preventive maintenance consists of annual inspections and component replacements according to drive-specific maintenance schedules. Maintenance schedules are based on ABB's decades of experience of manufacturing and maintaining electric drives.

OEM applications sometimes need customized maintenance schedules and documentation, in which cases ABB can help the OEM in question to create an optimized maintenance schedule and documentation for their machines, including drives.

For example, components such as a drive's cooling fan may require yearly inspection, with replacement necessary after six years if in operation under hard conditions, and every three years thereafter. On the other hand, various component connections and cables may only require inspection, without regularly scheduled replacement.

The benefits of scheduled preventive maintenance:

- Reduced risk of failure
- Increased lifetime
- Controlled maintenance costs

Life cycle management model

ABB's life cycle management model helps ensure the availability of drives services across the machine's life cycle and can provide a smooth transition to new drives technology as the machine lifetime reaches its final stages.

Our life cycle management, resources and experience distinguish ABB from the competition, making us a predictable, trusted and long-term partner to our customers, who can rely upon ABB's technologies, products and services for decades without the need to fear unexpected life cycle changes.

The model in practice

ABB drives follow a four-phase model for managing the life cycles of its drives. The life cycle phases are Active, Classic, Limited and Obsolete. The service offering is defined for every drive separately. The availability of individual services depends on the drive's current life cycle phase. This model provides customers with a transparent method for managing their investment in drives, with clear visibility over which services are available in each phase.

To ensure the availability of complete life cycle services, a drive must be in the Active or Classic phase of the life cycle.

ABB issues life cycle status statements for every drive type, defining the services available and duration of the life cycle phase. Life cycle status statements are available at www.abb.com/drives/services. Life cycle status change announcements are distributed a minimum of half a year prior to the status change.

Each drive product family follows its own life cycle planning policies. For more information about drive life cycle service policies and future plans, contact your ABB representative.

ABB drives life cycle phases explained:

	Active	Classic	Limited	Obsolete
	Full range of life cycle services and support		Limited range of life cycle services and support	Replacement and end-of-life services
Product	Product is in active sales and manufacturing phase.	Serial production has ceased. Product may be available for plant extensions, as a spare part or for installed base renewal.	Product is no longer available.	Product is no longer available.
Services	Full range of life cycle services is available.	Full range of life cycle services is available. Product enhancements may be available through upgrade and retrofit solutions.	Limited range of life cycle services is available. Spare parts availability is limited to available stock.	Replacement and end-of-life services are available.

Drives services matching your needs

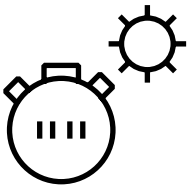
End customers and OEMs can have diverse needs. Some require a rapid response capability, while others seek to extend the lifetime of their assets, improve their performance or simply maximize equipment uptime. To respond to these needs, ABB has various service solutions available.

These services can be implemented by the customer, the OEM, an ABB service partner or by ABB itself, as appropriate. To help each party plan and manage their service strategy more efficiently, ABB has defined standard service offerings to serve the most common needs. In practice, one service solution can satisfy several customer needs.

Is rapid response a key consideration?

Repair services

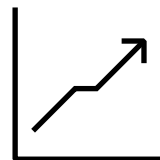
All on-site and workshop repair work is carried out by ABB-authorized service engineers who use the latest diagnostic, repair and testing practices. While carrying out a repair, service engineers are also able to examine the root cause of the fault. This can include on-site examination of the supply network, an analysis of the harmonic content of the supply, as well as other factors that may have resulted in the need for repair. Workshop repair is performed in dust-free areas protected from electrostatic discharge. Before repair, the drives are thoroughly cleaned, and they are tested with a full load after repair.



Operational excellence



Rapid response



Life cycle management



Performance improvement

Is uptime your priority?

Example services include:

- Installation and Commissioning
- Spare Parts
- Preventive Maintenance
- Reconditioning
- ABB Drive Care agreement
- Drive Exchange

Is rapid response a key consideration?

Example services include:

- On-site Repair
- Response time agreements
- Training

Need to extend your assets' lifetime?

Example services include:

- Life Cycle Assessment
- Upgrades, Retrofits and Modernization
- Replacement, Disposal and Recycling

Is performance most critical to your operation?

Example services include:

- ABB Tailored Solutions and Services
- Energy Appraisal
- Extended warranty

Spares, order and delivery

Our online ordering tool and after-sales product catalog is accessible via <http://online.abb.com/>. Both public standard and restricted customized ordering solutions are available. Using online ordering tools, customers can typically check product availability and order status as well as become familiar with product data and documentation. Express delivery options ensure that drives and spare parts are delivered rapidly, either from local or regional stock or directly from the factory.

Need to extend your assets' lifetime?

OEM machine lifetimes may be of some considerable length. ABB drives can support long lifetimes and improve the performance of machines through drive hardware or software upgrades, retrofits or replacements.

Life Cycle Assessment service

In Life Cycle Assessment, data from the drives at a particular facility, combined and analyzed with their criticality to the process or application. Assessment provides a clear understanding of the drive installed base, sets clear priorities for maintenance, and defines clearly when to upgrade, retrofit or replace listed drives. This means improved service budget management as all plant maintenance actions can be planned and budgeted for years to come.

Upgrade and Retrofit services

Retrofit service

In a retrofit project, existing cabling, motors and cabinets often remain in use, while the drive or drive system is replaced either completely or partly. Retrofitting is typically carried out during planned production shutdowns, without causing extra production downtime.

Hardware Upgrade service

A hardware upgrade provides the latest product improvements and enhancements to maintain reliable operation. These can be performed during scheduled maintenance to avoid unnecessary downtime.

Control Upgrade service

ABB provides control upgrades for Legacy MV drives in the Limited or Obsolete life cycle phases. After completion of the upgrade, the drive is returned to the Classic life cycle phases with full life cycle services available. With the control

upgrade, all aging components from the system are removed and a new, up-to-date control platform is installed. This service is available for the following products:

- SAMI MEGASTAR W
- PSR CYCLOCONVERTER
- MEGADRIVE CASCADE
- MEGADRIVE LCI (PSR1&PSR 2)

Replacement programs and recycling

ABB can support your replacement program in many ways. We can analyze all of your installed drive base data and make suggestions on which drives should be replaced, when and how. We then help to select the optimal replacement drive with the correct features for the application.

Is uptime your priority?

Drive Exchange service

ABB maintains the quick availability of fully reconditioned drive exchange units. Customers can rapidly replace a faulty drive with an exchange unit and return the old drive to ABB. With OEMs who control larger installed drive bases, ABB can set up a maintenance process where drives circulate between the OEM and ABB. This enables OEMs to provide their end customers with a quick service experience and utilize ABB's expertise in the background.

Installation and Commissioning services

A number of helpful PC tools are available to facilitate installation and commissioning. Before and during the installation, accurate advice and timely support are available from ABB and its channel partners. On request, they can also undertake the entire drive installation.

ABB-certified engineers adjust the drive parameters to meet the precise demands of the application. All startup information, including the process parameters, is saved so that it is easily available at a later date.

Preventive Maintenance service

Preventive Maintenance is needed to ensure that drives perform properly over the course of their lifetime. OEMs that offer preventive maintenance services to their own customers might also want to offer the ABB drive Preventive Maintenance service, including Preventive Maintenance kits. ABB is able to provide an attractive pricing structure and transfer preventive maintenance know-how to OEMs, subject to a separate agreement.

Drive-specific Preventive Maintenance kits contain all the genuine factory spare parts needed to perform a specific maintenance task. Maintenance kits are priced more cheaply than purchasing spare parts separately.

Preventive maintenance kits are available from our online ordering tool at <http://online.abb.com/>

Reconditioning service

Authorized ABB drive service workshops worldwide can restore ABB drives to their original condition. Reconditioning of a drive includes full inspection, thorough cleaning and individual component analysis and replacement. The reconditioned drive undergoes complete full-load testing and comes with a oneyear warranty. (In some markets areas, the word “refurbishment” is used instead of “reconditioning”).

The workshop reconditioning service is an attractive preventive maintenance option for drives between nine and 12 years old. Changing and maintaining aging electrolytic capacitors on circuit boards and DC link capacitors require skills and facilities that an OEM doesn’t necessarily have. This service lets the OEM focus on the customer relationship and provides an effective means to utilize ABB’s expertise in the background.

Could performance be improved?

Energy Appraisal service

Given that power consumption savings of 50% can be made by reducing the motor speed by just 20%, and with payback times being as short as six months, it is worthwhile considering an ABB energy appraisal. Free tools to calculate energy savings, known collectively as EnergySave, can be used to quickly calculate the energy-saving potential.

ABB Tailored Solutions and Services

Our tailored solutions are based on production, safety and energy efficiency analyses of machines and drive systems. We take care of any specific requirements that you might have during the procurement, operation and maintenance of your assets.

We are able to carry out detailed harmonic surveys of currents and voltages using proprietary equipment and to offer advice for avoiding or rectifying any problems with harmonics.

Also, we understand electromagnetic compatibility (EMC) issues and can help ensure that the installation complies with the latest standards and regulations.

Drive mobile apps

ABB offers two smartphone apps – Drivetune and Drivebase – to ease and enhance the use of ABB drives. These apps provide a user-friendly and easy-to-use approach to the commissioning, servicing and use of ABB drives. The apps can be downloaded from the Apple App Store, Google Play and Windows Store.

Drivetune mobile app

Drivetune is an app that is capable of connecting wirelessly to ABB drives. By using a user-friendly interface, it is possible to more quickly and efficiently start up and tune a drive and the application it controls. The appealing dashboard intuitively displays drive status, performance and configuration.

Drivebase mobile app

Drivebase is an app that allows easy access to product manuals and a search function for ABB contacts. The app also facilitates reporting service actions and provides users with service recommendations for their drives installed base. Should problems occur, Drivebase app users can scan a dynamic QR code generated by a drive on its control panel and receive troubleshooting information. Drives can also be registered to get an additional warranty.

Drive registration

By registering new drives in ABB’s installed drives database, the end customer, the OEM and ABB will each benefit and get first-hand information about drives installed, their location and service records. This will improve installed base life cycle management and facilitate any possible troubleshooting and service processes. Qualified and registered OEM drives receive a free six-month extended warranty. Ask your ABB representative for more information or visit www.abb.com/drivereg

Extended warranty

ABB’s five-year extended warranty extends the product-specific factory warranty terms for drives to the maximum period of 60 months from the date of manufacture. For a small extra cost, you get peace of mind that if a drive fails, your material costs are covered in getting it fully operational again, regardless of whether it is repaired or replaced.

Begin a service collaboration

ABB works towards long-standing cooperation with its OEM customers, filling support and service needs across product generations. Joint product data management, life cycle management, and support and service network management create a base for superior operational excellence and end-customer experience.

An OEM service frame agreement is an essential tool to manage cooperation in a structured way in today's global environment. Please ask your ABB representative for details.

Training service

The best way for OEMs to develop a real-life understanding of the role of maintenance is to engage their service engineers with ABB's drive maintenance training. We strongly encourage all OEMs who work with us to give ABB training a try and have at least one senior service engineer attend one of our OEM learning paths, available at <http://new.abb.com/drives/services/training>

ABB Drive Care agreement

ABB Drive Care is a contract-based packaged service which allows OEM's end customers to receive maintenance, repair and support for their drives. OEMs can sell these service package to their end customers under their own brand, with actual service delivery done by ABB experts. A Drive Care service package decreases the burden of maintenance, allowing customers to focus on their core business. For OEMs, a Drive Care contract is an attractive option to mitigate risk in cases where the machine has a long product or uptime guarantee. The most complete Drive Care package of services includes Preventive Maintenance and drive repair or replacement, as well as guaranteed response time and technical support.

For further information please contact
your local ABB representative or visit:

www.abb.com/drives

www.abb.com/drivespartners

