



Low voltage drives

Life cycle services  
Improving productivity of  
processes and applications

Power and productivity  
for a better world™



# Profile

**From industry to utilities through to residential and commercial buildings, the goal remains the same: to keep all processes and equipment running in the most energy and cost efficient way.**

On the road to achieving this goal, businesses and users of motor-driven applications face:

- Increasing demands for higher reliability
- Escalating operational and capital expenditure associated with running a plant, process, system or installation
- Rising energy prices
- Pressures to improve productivity
- Stricter environmental and safety regulations



## **ABB can help**

One of ABB's key objectives is to maximize the uptime of its customers' processes by ensuring reliable operation and optimum lifetime of all ABB products in a predictable, safe and low cost manner.

The services offered for ABB low voltage drives span the entire value chain, from the moment a customer makes the first enquiry to disposal and recycling of the drive.

Among the benefits of using ABB drive services are higher reliability, lower operational costs, improved productivity, reduced environmental impact and enhanced safety.

## **Higher reliability**

Across industries, the amount of automation with complex machinery and equipment is constantly increasing. The growing number of machines, equipment and systems means there are more points of failure. Critical reliability challenges increase with these added points of failure.

ABB's extensive knowledge in industrial applications and processes can be used to help identify and improve critical reliability. This is accomplished by evaluating the status of electric drives. Based on the results of the evaluation ABB can propose a critical reliability improvement plan.

## **Lower operational costs**

At each stage of the value chain, ABB can help lower operational expenses.

During the pre-purchase stage, sound technical advice can ensure that the correct drive is selected and dimensioned to bring maximum efficiency and performance to a process and therefore lower running costs.

An energy appraisal can identify the applications which, by using drives, have energy saving potential. The appraisal provides accurate energy saving calculations often showing up to 60 to 70% reduction in energy consumption, with payback in less than two years.

ABB's preventive maintenance programs have a significant impact on minimizing production downtime and lowering operational costs.

## **Improved productivity**

Keeping a plant running is the number one priority of the ABB services team. For example, a structured preventive maintenance plan built around product specific maintenance schedules is essential in avoiding any risk of plant or process stoppage.

One of the most efficient ways to improve productivity and to maximize process uptime is to establish a contract which can include a combination of individual services such as training, technical support and preventive and corrective maintenance.

**Reduced environmental impact**

Before purchasing a drive, ABB offers an energy appraisal to determine which applications can benefit from the use of drives. During operation and maintenance, tuning of the drive maximizes its energy savings. Additionally, when the drive life cycle is complete, ABB can ensure that the drive is disposed of in a way that meets all local environmental regulations.

**Enhanced safety**

Seeking advice from ABB at the selection and dimensioning stage helps ensure that the right drive is chosen with the correct safety features. Helpful safety advice continues into the installation and commissioning stage.

Throughout the drive’s lifetime, services such as remote monitoring help protect the safety of the plant by rapidly diagnosing and rectifying faults.

**Maximizing return on investment**

At the heart of ABB’s services is its drive life cycle management model. All services available for ABB low voltage drives are planned according to this model. For customers it is easy to see which services are available at which phase.

Drive specific maintenance schedules are also based on this four-phase model. Thus, a customer knows precisely

the timing of the part replacements plus all other maintenance related actions. The model also helps the customer when deciding about upgrades, retrofits and replacements.

Professional management of the drive’s life cycle maximizes the return on any investment in ABB low voltage drives.

**ABB drive life cycle management model**

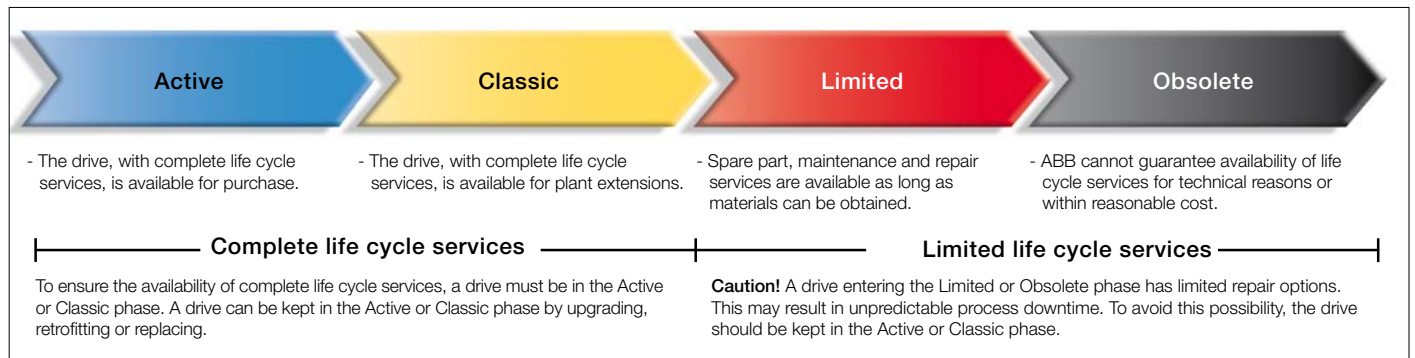


ABB follows a four-phase model for managing drive life cycles, which brings enhanced customer support and improved efficiency.

Examples of life cycle services are: selection and dimensioning, installation and commissioning, preventive and corrective maintenance, remote services, spare part services, training and learning, technical support, upgrade and retrofit, replacement and recycling.

# Introduction

The services offered for ABB low voltage drives span the entire value chain, from the moment a customer makes the first enquiry to disposal and recycling of the drive. Throughout the value chain, ABB provides training, technical support and customized contracts. All of this is supported by one of the most extensive global drive sales and service networks.

## Pre-purchase

ABB provides a range of services that help guide the customers to the right products for their applications.

## Order and delivery

Orders can be placed through any ABB office or through ABB's channel partners. In some countries orders can be placed and tracked online.

ABB's sales and service network offers timely deliveries including express delivery.

## Installation and commissioning

While many customers have the resource to undertake installation and commissioning on their own, ABB and its channel partners are available to advise or undertake the entire drive installation and commissioning.

## Operation and maintenance

Through remote monitoring, ABB can guide the customer through a fast and efficient fault-finding procedure as well as analyze the operation of the drive and the customer's process. From maintenance assessment to preventive maintenance and reconditioning of drives, ABB has all the options covered to keep its customers' processes operational.

Should corrective maintenance of drives be needed, ABB offers on-site and workshop repair facilities, fully backed up by the most extensive spare holding.

## Upgrade and retrofit

An existing ABB drive can often be upgraded to the latest software or hardware to improve the performance of the application.

Existing processes can be economically modernized by retrofitting the latest drive technology to mechanical control equipment, such as inlet guide vanes or dampers or older generations of drives.

## Replacement and recycling

ABB can advise on the best replacement drive while ensuring that the existing drive is disposed of in a way that meets all local environmental regulations.

## Entire value chain services

The main services available throughout the entire value chain include:

- Training and learning - ABB offers product and application training both in classrooms and on the internet.
- Technical support - At each stage of the value chain, an ABB expert is available to offer advice to keep the customer's process or plant operational.
- Contracts - Customized contracts can be devised between the customer and ABB.



# Services

## Pre-purchase



**With offices in over 90 countries, ABB is well placed to offer the best technical advice and local support around the clock.**

From cooling towers, furnaces and extract fans to water supply pumps, tunnel boring machines and monorails, there are very few applications that are beyond ABB's specialists. References from ABB's installed base of drives are available upon request.

Additionally, a number of helpful PC tools are available to facilitate decision making at the pre-purchase stage.

### **Selection and dimensioning**

Correct drive selection and dimensioning ensure a drive installation, powerful enough for the motor requirements, yet sized to fit a budget.

### **Energy appraisal**

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 energy saving calculation tools, FanSave and PumpSave can be used to quickly calculate energy savings.

### **Harmonic survey**

ABB is able to carry out detailed harmonic surveys of currents and voltages using proprietary equipment and to offer advice for avoiding or rectifying any harmonic problems.

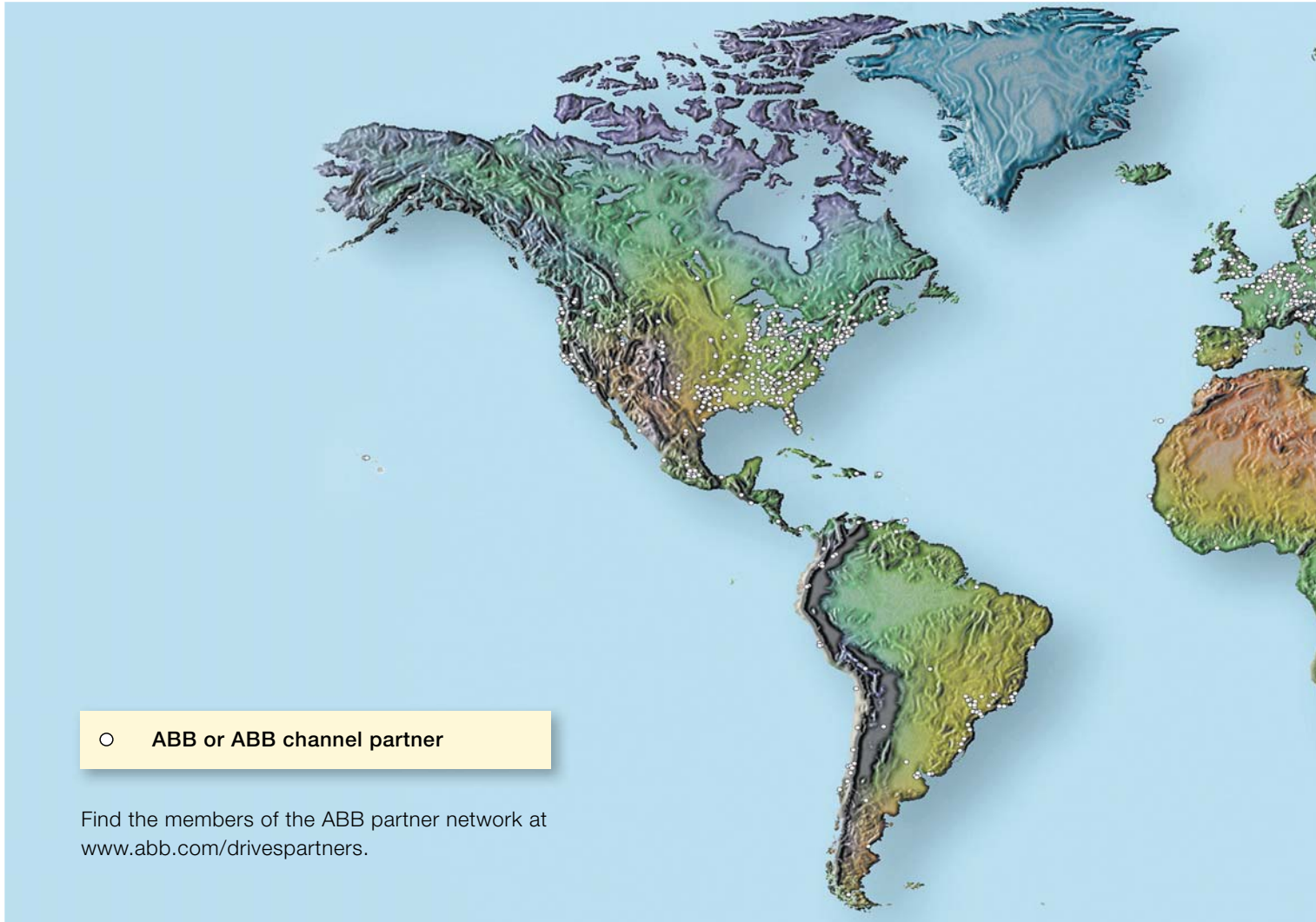
### **EMC assessment**

ABB understands electromagnetic compatibility (EMC) issues and can help ensure that the installation complies with the latest standards and regulations.



# Services

## Order and delivery



### ○ ABB or ABB channel partner

Find the members of the ABB partner network at [www.abb.com/drivespartners](http://www.abb.com/drivespartners).

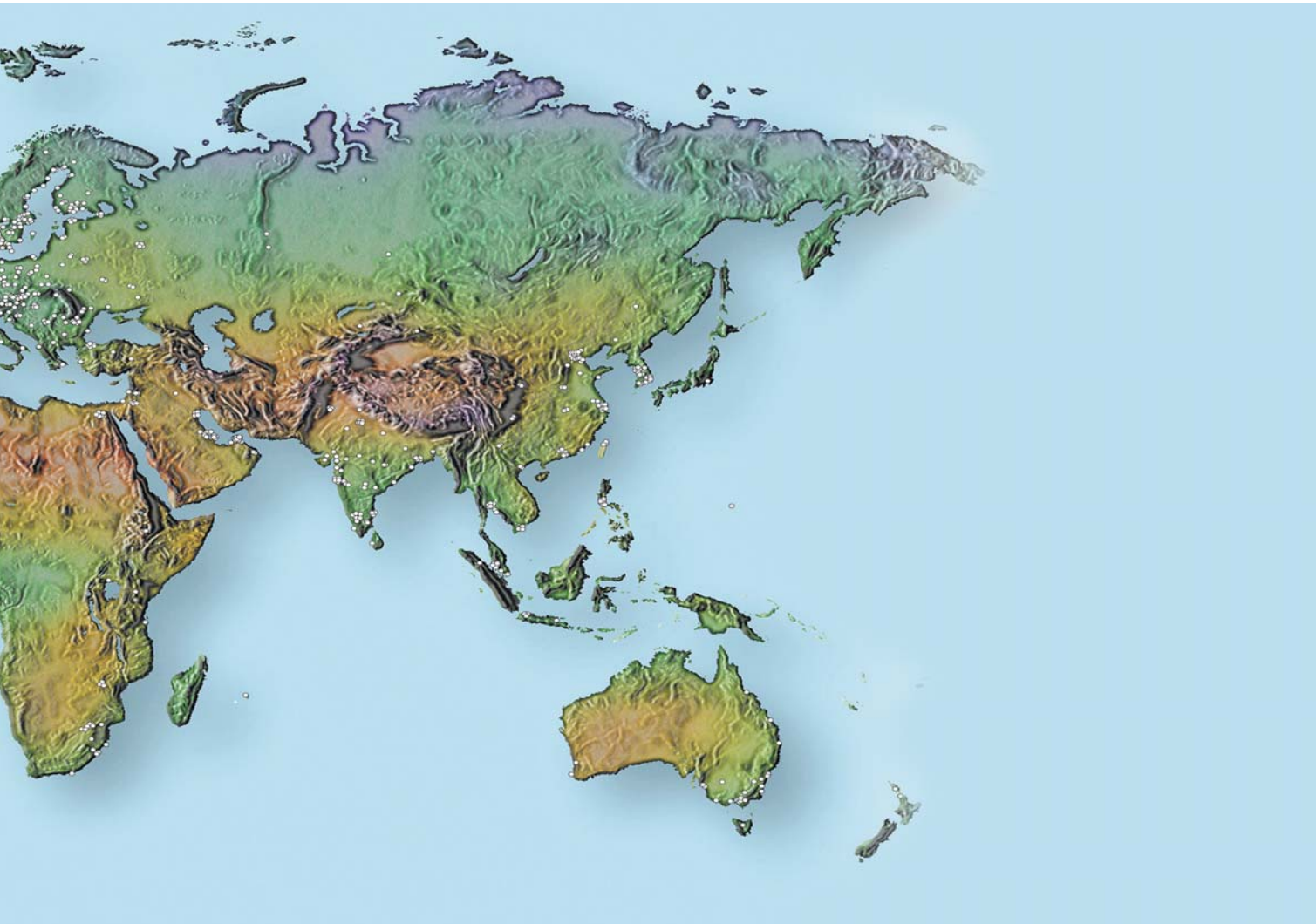
**ABB drives, spare parts and services can be purchased from more than 1400 companies, located throughout the world and able to serve customers locally, often in their own language. These companies include ABB's own offices and authorized channel partners.**

Supporting local ABB offices and channel partners, there is a network of regional ABB drive service hubs that are capable of offering complete drive life cycle services.

### **Prompt deliveries from local and central stocks**

In many countries, ABB with its channel partners, stock drives and spare parts locally, providing high availability and, often, same day delivery.





To minimize its customers' costly downtime, ABB's logistics network operates 24 hours a day, seven days a week, using air freight and express courier services.

#### Ordering on-line

Depending on the country, ABB and its channel partners offer different ways to order drives and spare parts on-line. Both standard and customized ordering solutions are available.

Using on-line ordering tools customers can typically check product availability and order status as well as become familiar with product data and documentation.

#### Express delivery

Express delivery options ensure that drives and spare parts are delivered rapidly either from local or regional stock or directly from the factory. Read more about spare part options on page 13.



# Services

## Installation and commissioning

All ABB drives are designed with easy installation and commissioning in mind. A range of features from easy access wiring terminals, withdrawable pedestal units to bookshelf design and intuitive control panels, all contribute to saving installation and commissioning time and cost.

A number of helpful PC tools is available to facilitate installation and commissioning.

ABB's technical manuals are comprehensive, including all the details needed for easy installation and commissioning.

### From advice to complete installation

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.

### From installation inspection to total commissioning

ABB certified engineers adjust the drive parameters to meet the precise demands of the application. All start-up information with process parameters are saved, should the engineer need to recall any information at a later date.



# Services

## Operation and maintenance

At the heart of good life cycle services is the support given during the operation and maintenance phase. It is a phase ABB is well-equipped for: from its remote monitoring of drives through to detailed preventive maintenance programs.

### Evaluation for improving critical reliability

A critical reliability evaluation carried out by ABB or an ABB channel partner looks into the electric drives of industrial processes to identify potential points of failure and provide an improvement plan.

### Maintenance assessment - the basis for a long term maintenance and improvement plan

A maintenance assessment carried out by ABB or an ABB channel partner provides the foundation for developing a long-term drive maintenance and improvement plan. The assessment defines measures for lowering operational costs, improving productivity, reducing environmental impact and enhancing safety.

An effective improvement plan not only helps customers budget maintenance and training costs, but also helps plan for future drive upgrades, retrofits and replacements.

### Optimizing operation through remote monitoring and intelligent diagnostics

ABB offers remote monitoring services that allow an ABB drive installed at the customer's site to be remotely monitored by ABB or its channel partners.

Through remote monitoring it is easy to collect a multitude of data related not only to electric drives but also to process variables such as pressure, temperature and flow rate. Analyzing the data provides the basis for taking corrective actions which is the key to optimal operation. All this can be carried out by the customer, ABB or its channel partners.

Benefits of remote monitoring include: better knowledge about the process and its variations, prevention of potential failures and maximized process uptime.



# Services

## Operation and maintenance

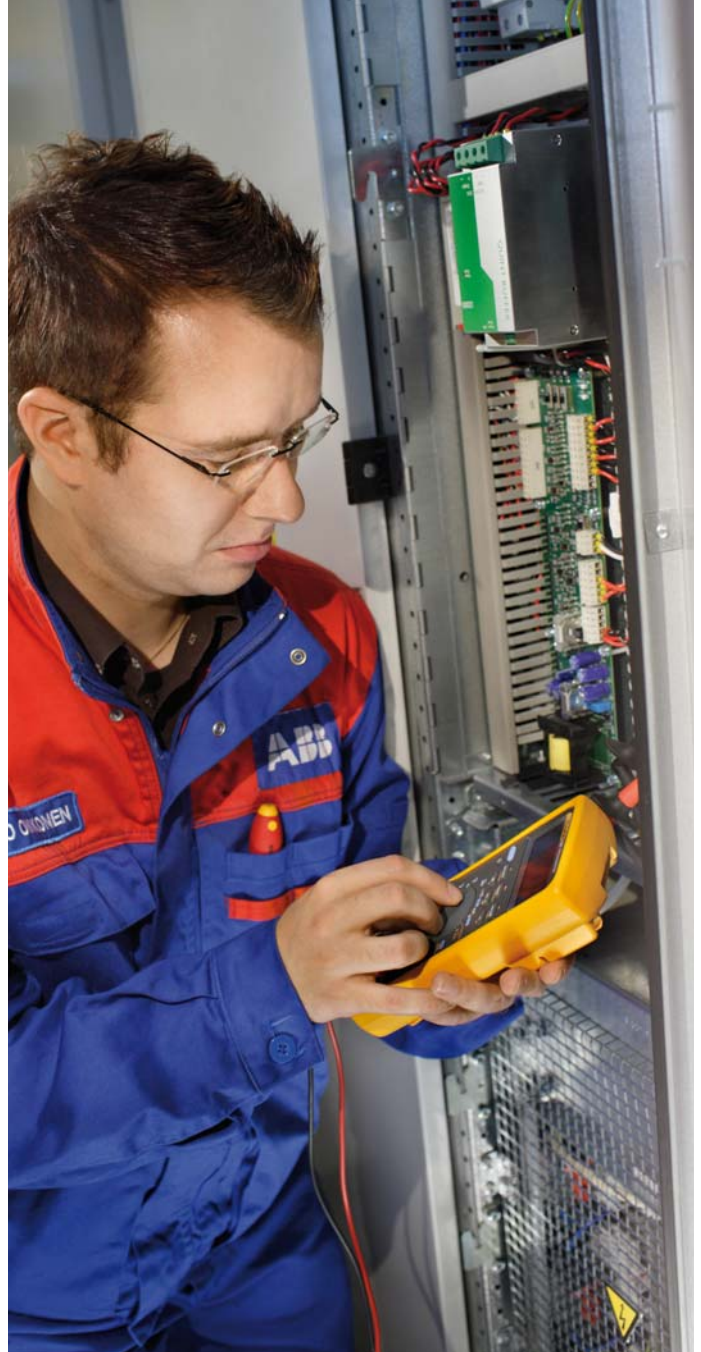
### Preventive maintenance for reducing operational costs

A drive typically performs critical duties in a process or a plant. A drive failure can result in loss of production and revenues, and may have safety and environmental impacts.

Adopting preventive maintenance schedules reduces the risk of failure and increases the lifetime of the drive, thus lowering the overall operational costs. Regular predefined preventive maintenance facilitates budgeting.

Drive preventive maintenance consists of annual inspections and component replacements according to the drive specific maintenance schedules. Maintenance schedules are based on ABB's decades long experience of manufacturing and maintaining electric drives. See an example of a maintenance schedule on the next page.

Without preventive maintenance, the probability of a drive failing typically increases. The most common failures are due to component aging or operational conditions, such as varying ambient temperature, high humidity, excessive and heavy loads.



# Services

## Operation and maintenance

### Maintenance schedule example

	Years from startup																					
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
<b>Start-up</b>	P																					
<b>Cooling</b>																						
<b>Air-cooled unit</b>																						
Internal/additional cooling fan for ACS800-01, -04, -11, -31, -104 (IP20, IP21 and IP55)		I	I	R	I	I	R	I	I	R	I	I	R	I	I	R	I	I	R	I	I	R
Cooling fan for ACS800-01, -02, -04, -07, -11, -17, -31, -37, -14, -104, DSU, ISU, ALCL		I	I	I	I	I	R	I	I	I	I	R	I	I	I	I	I	I	R	I	I	I
Cooling fan for DSU+V992 (mains supply frequency 50 Hz)		I	I	I	I	I	R	I	I	I	I	R	I	I	I	I	I	I	R	I	I	I
Cooling fan for DSU+V992 (mains supply frequency 60 Hz)		I	I	R	I	I	R	I	I	R	I	I	R	I	I	R	I	I	R	I	I	R
Cooling fan for TSU		I	I	R	I	I	R	I	I	R	I	I	R	I	I	R	I	I	R	I	I	R
Enclosure extension cooling fan (ACS800-02)		I	I	R	I	I	R	I	I	R	I	I	R	I	I	R	I	I	R	I	I	R
Extra cooling fans inside cabinet (ACS800-x7, ACS800 md)		I	I	I	I	I	R	I	I	I	I	R	I	I	I	I	I	I	R	I	I	I
Extra IP54 cooling fan on roof of cabinet (ACS800-07, ACS800 md)		I	I	I	I	I	R	I	I	I	I	R	I	I	I	I	I	I	R	I	I	I
<b>Liquid-cooled unit</b>																						
Cooling fans		I	I	I	I	I	R	I	I	I	I	R	I	I	I	I	I	I	R	I	I	I
Addition of inhibitor		I	P	I	P	I	P	I	P	I	P	I	P	I	P	I	P	I	P	I	P	I
Change of coolant in the internal cooling circuit									R										R			
Heat exchanger cleaning			I			P						P							P			
Expansion tank air pressure			I			I						I							I			
Expansion tank									R										R			
Cooling liquid pump assembly		I	I	I	I	I	R	I	I	I	I	R	I	I	I	I	I	I	R	I	I	I
Cooling liquid pipe connections		I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
<b>Aging</b>																						
Electrolytic capacitors (DC circuit)									R										R			
Memory backup battery replacement in the APBU-xx unit		I	I	I	I	I	R	I	I	I	I	R	I	I	I	I	I	I	R	I	I	I
<b>Connections and environment</b>																						
AINT+ flat cables, CINT, NRED, discharging resistors									R										R			
Tightness of terminals							I						I						I			
Quick connector of converter module (ACS800-x7/ and ACS800 md)																						
Door filters (IP20 to 42)		I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
Door filters (IP54 and above)		R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
Condition of contactors							I						I						I			
Fiber optic cables (connections)																						
Dustiness, corrosion and temperature		I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
Quality of supply voltage		I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
<b>Improvements</b>																						
Based on product notes		I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
<b>Measurements</b>																						
Basic measurements with supply voltage		P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
<b>Spare parts</b>																						
Spare parts		I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
DC circuit capacitors reforming		P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P

Note:  
Recommended maintenance intervals and component replacements are based on specified operational and environmental conditions. ABB recommends annual drive inspections to ensure the highest reliability and optimum performance. More detailed maintenance information can be found in maintenance instructions, product manuals and on the Internet.

Legend:  
I = Inspection (visual inspection and maintenance action if needed)  
P = Performance of on/off-site work (commissioning, tests, measurements or other work)  
R = Replacement of component



# Services

## Operation and maintenance



### Reconditioning - giving a drive a new life

Authorized ABB drive service workshops throughout the world 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 testing and comes with a warranty.

### Preventive maintenance kits

Drive specific preventive maintenance kits contain all the genuine spare parts needed to perform a specific maintenance task.

The number of drive specific maintenance kits varies from drive to drive and their selection is different depending on the drive age. Maintenance kits are more economical to purchase compared to purchasing the spare parts separately.



# Services

## Operation and maintenance



### Versatile spare part services

ABB and its channel partners provide genuine spare parts, spare part kits and preventive maintenance kits accompanied by relevant documentation. In addition to new spare parts, exchange units (return of old part required) and reconditioned parts are offered, as a more economical alternative to new parts. Spare parts can be included in service contracts to ensure that critical parts are at hand at customer's premises.

### Corrective maintenance - extensive services on-site and in authorized ABB drive service workshops

#### On-site repair – fast turnaround

On-site repair uses the latest diagnostic, repair and testing practices to maximize the ABB drive performance while minimizing production or process downtime. All work is carried out by ABB authorized service engineers.

While carrying out a repair, service engineers are also able to examine the root cause of the repair. This can include an 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. Advice may also be given on the operation and maintenance of the drive so as to help improve machine or process performance.

Whenever repair is not possible, an exchange unit, if available, is offered. An exchange unit can be an entire reconditioned drive, a drive module or a drive component.

#### Workshop repair – in-depth investigation

Authorized ABB drive service workshops offer component replacement and software upgrades as well as major and emergency repairs.

All work is performed by ABB certified personnel in dust-free, electrostatic discharge protected areas. Before repair, the drives are thoroughly cleaned, and after repair, fully tested.

As with on-site repair, should a drive repair not be feasible, an exchange unit, if available, is offered. An exchange unit can be an entire reconditioned drive, a drive module or any drive component.



# Services

## Upgrade and retrofit

**From the latest software and hardware upgrades through to expert advice on when to retrofit, ABB provides the best technical assistance.**

### **Upgrades for maximized return on investments**

Drive upgrades are designed for improving the performance and extending both the functionality and the lifetime of the drive to provide end users with the best possible return on their investments.

Upgrade services comprise both hardware and software updates. Advice on upgrade feasibility with detailed instructions is available from ABB sales and service personnel as well as from ABB's channel partners.

Benefits of upgrading a drive typically include lower maintenance costs and reduced energy consumption.

### **Retrofits - modernizing drives economically**

Stricter production or process requirements often call for replacing an existing drive or a complete drive system. Other reasons for drive replacement include lack of spare parts and limited services offering.

Instead of replacing an entire drive or drive system, it is often more economical to modernize the old installation by reusing all relevant parts of the original equipment and purchasing new where necessary.

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.

According to the ABB drive life cycle management model, it is recommended that a drive be modernized or replaced at the end of its life cycle's Classic phase.



# Services

## Replacement and recycling



Replaced drive



New drive



For drive replacements ABB offers a wide portfolio of low voltage drives. And with complete recycling of old equipment, ABB is a good place to start your replacement program.

### Replacing a drive - world's widest portfolio of drives available from ABB

Whenever there is a need to replace an entire drive - from ABB or any other drive manufacturer - ABB offers its customers the world's widest portfolio of low voltage drives.

ABB helps select an optimal replacement drive with correct features for the application.

According to the ABB drive life cycle management model, it is recommended that a drive be modernized or replaced at the end of its life cycle's Classic phase.

### Recycling for a greener world

Depending on the country, ABB aims to remove and dispose of any ABB or non-ABB drive and associated equipment in line with the environmental regulations enforced within that country.



# Services

## Training and learning

**Hundreds of courses covering all aspects of drives and their applications and geared towards personnel at various educational levels are available, on-site, on-line or at ABB premises.**

**Investment in professional training improves productivity**  
Throughout the value chain, from pre-purchase to replacement and recycling of a drive, ABB offers product, application and general technical training both in classrooms and over the internet. Versatile training is also provided by ABB channel partners.

Training typically comprises theoretical presentations and hands-on exercises. To meet its customers' growing interest in e-learning, ABB offers hundreds of course modules available in the Internet. Examples of training topics include product features, applications, installation and start-up procedures, programming, PC tools, maintenance and fault finding. The number of e-learning courses is extensive.

The majority of training is delivered by ABB training centers. Versatile training services are also offered by local ABB sales and service companies and their channel partners. Some courses are organized at the customer's location.



Benefits of professional training include enhanced personnel and plant safety, reduced downtime, improved productivity and increased employee motivation.

More information about ABB's training centers and the courses can be found from the ABB University at [www.abb.com/abbuniversity](http://www.abb.com/abbuniversity). Local ABB offices and ABB's channel partners around the globe can provide detailed information on their training and services offering.



Training and learning

Technical support

Contracts

# Services

## Technical support



**Throughout the life cycle services chain, ABB experts are on hand to lend support from the simplest to the most challenging of queries.**

### **Local support with global back-up**

In most countries, ABB provides 24/365 technical support, via telephone and email and covering all stages of the value chain. Should further support be needed, ABB utilizes an escalation process, and the query is elevated throughout ABB up to the factory R&D, until the query is answered.

### **DriveHelp - special support for global OEMs**

DriveHelp is ABB's global service for handling ABB drive warranty claims from global OEMs (Original Equipment Manufacturers).

An OEM makes a DriveHelp agreement with ABB. The agreement ensures that whatever support is needed, it is available - only one phone number away - throughout the world and 24/365.

Benefits of DriveHelp include quick and professional problem solving, minimized downtime, one simple, global process/procedure, improved end customer satisfaction, availability of fault history and transparency of the follow-up process.



# Services

## Contracts



**Depending on the needs of the customer, ABB and its channel partners can bundle individual services in one contract. A contract can be made at any stage of the value chain.**

Examples of contracts are spare parts agreements and agreements on preventive or corrective maintenance.

Benefits include improved cost control, enhanced operational efficiency, lower capital expenditure, reduced downtime and extended lifetime of drives.

### **ABB drive care contract for continuous running of ABB low voltage drives**

One example of ABB's contract offering is the ABB drive care contract. This contract offers the user of an ABB low voltage drive the security that the drive remains fully functional throughout its life cycle.

The drive's user can select from various services to be included within a drive care contract. For example, technical support is provided via telephone or email.

Another service is preventive maintenance which includes managing the orders, deliveries and manpower.

The complete package of services includes preventive maintenance and drive repairs, or replacement if the drive cannot be repaired.

The drive care contract can include a guaranteed response time which ensures that an ABB authorized service engineer attends customer's site at the agreed time.

A drive care contract aims to take away the burden of maintenance from the customers, letting them focus on their core business.





# Contact us

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