Paper Machine Drive System PMC800
Engineered solutions for success

Power and productivity
for a better world™

ABB

PMC800 Overview

The Paper Machine Drive System PMC800 gives papermakers increased performance, greater energy savings and improved product quality.

Whether the ABB drives are used on paper machines, coaters, calendars or winders, mills can expect fast startups and high reliability. ABB uses its in-depth knowledge of the papermaking process to deliver drives that integrate easily with other mill automation.

PMC800 drive system is designed to reduce the cost of ownership over the automation lifecycle and improve energy efficiency during production. Used on paper machines for control, drive units and motors, ABB Drive Systems have been installed in more than 3,000 mills worldwide.

Consistent and repeatable

ABB's PMC800 drives are engineered for performance, delivering:

- Highly reliable components and design, increased availability
- High level of control precision
- A design for intrinsic safety
- Energy efficient products and design
- Wide range of product features for more flexibility
- Standardized communication between control systems
- Conformance to standards and process requirements

Global network, in-depth expertise

With a global network of 4,000 experts in over 40 countries, ABB is uniquely positioned to bring leading automation and electrical systems to pulp and paper mills. ABB puts its expertise to work from planning through implementation.

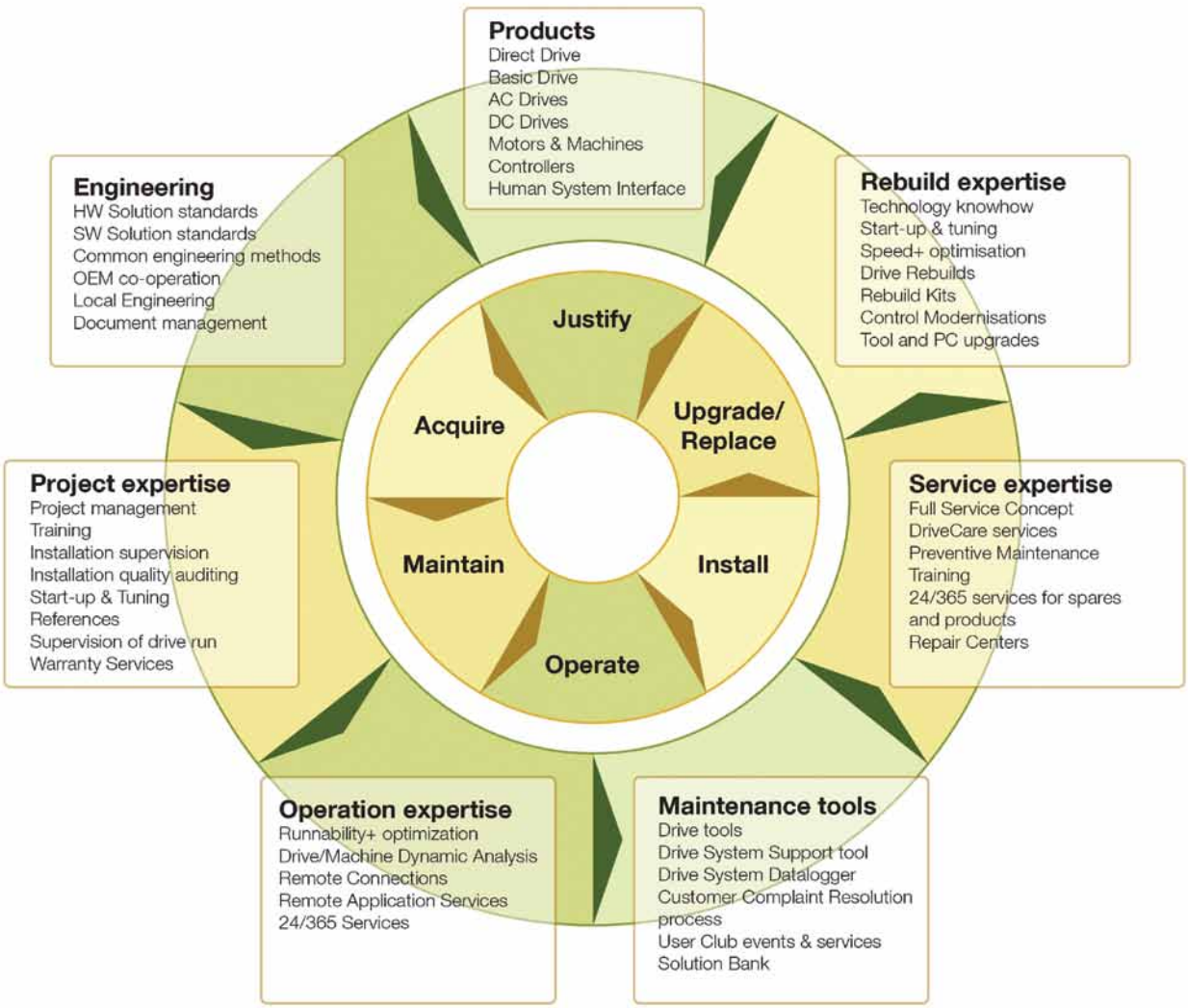
Paper Machine Drives are an integral part of the production process and it's critical that they are installed to work smoothly with all connecting automation. On average, ABB starts-up a Paper Machine Drive system twice a week, giving us the experience to expertly handle even the most demanding startups.

Proven technology

At the core of the PMC800 drives: high-performance ABB's engineered ACS800 multidrives, M3 or M4 type motors and 800xA automation that stresses maintainability and energy efficiency for industrial applications. Design features include:

- High efficiency IGBT technology with the high performance DTC control
- High power density by small drive dimensions, liquid or air cooled
- Advanced drive diagnostics combined with advanced automation control features and tools for efficient operation
- Latest motor designs for process performance and high efficiency motors

ABB's full content for Paper Machine Drive System.



A Drive System for all machines

The PMC800 system operates smoothly with the drives and motors found in any pulp and paper application, including air or liquid-cooled AC drives with DC link, standard AC drives, DC drives, and drive modules for rebuilds as well as Direct Drive with Permanent Magnet motors.

AC drives

ABB's AC drives have a few carefully sized bookshelf type of core modules that can be combined in parallel to provide a range of power from 250 up to 5200kVA. By using parallel 3-phase units ABB drives also offer redundant operation increasing availability. Modules with plug-in connectors are also easy to handle for maintenance. With a reduced set of core modules, spare parts are reduced as well.

DC drives

ABB's newly designed and modern DC drive portfolio, from 9 to 18000 kW, provides the highest power-to-size ratio on the market. ABB DC drives are available as complete cabinets, modules for cabinet assembly and as retrofit kits. With built-in field exciters and integrated PLC's, they are the best DC drives choice for all new and retrofit applications.

Direct Drive

Direct Drive is an ABB innovation designed specifically for pulp and paper applications. It provides a technology for higher efficiency by eliminating gearboxes. The drive system improves efficiency with high-torque permanent magnet motors that are installed directly on the in-drive of a paper machine section. This means fewer components and simpler configurations, easier installation, and more efficient use of mill floor space. In addition to elimination of the gearboxes the pulse encoders are eliminated as well, increasing availability and reducing maintenance cost. The synchronous PM motors provide better control and accuracy.

Liquid-cooled drives

The ACS800 liquid-cooled multidrive with direct liquid cooling and robust design is an ultimate solution for applications where space savings and silent operation are an advantage. Since the coolant takes care of 98% of the heat losses, no additional filtered air-cooling is needed. This decreases the noise level and increases the total efficiency of the converter installation. The high-efficiency liquid cooling removes the need for air-conditioning in the installation rooms, bringing installation and operation costs down.

ABB's motors have earned an excellent reputation for performance and reliability. The product range consists of both induction and synchronous motors.

Induction motors

Induction motors are the workhorses of the industry due to their versatility, reliability and simplicity. In a power range up to 10 MW, a squirrel cage induction motor is usually a mill's first choice. For paper machine drive systems mainly low voltage induction motors are used, and powers range in practice from 2 kW up to max 2-3000 kW in one system.

Synchronous motors

Synchronous motors are typically considered for higher power ratings. In addition to their high power capabilities, synchronous motors offer the benefits of high efficiency, high performance and an adjustable power factor. Permanent magnet motors are synchronous motors that do not need separate excitation.

An energy efficient drives system

In the design of any PMC800 system, special attention is paid to engineering an energy efficient solution based on appropriate dimensioning, high efficiency of individual components and proper matching of drives, motors and process demands.

Engineering

ABB's ability to provide energy efficient drive systems is based on decades of experience in dimensioning and working on the complete power chain. We understand the ways that motors and drives can minimize energy losses – and we use that understanding to design our high efficiency systems.

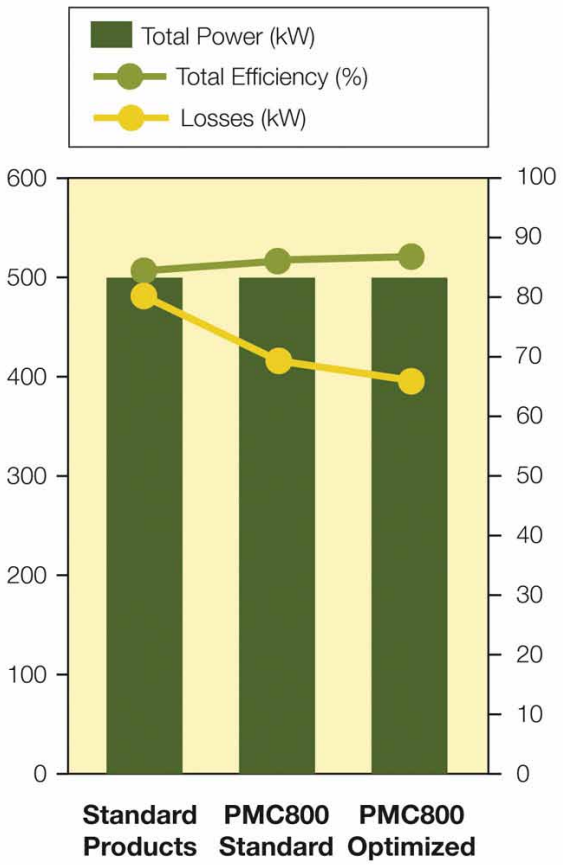
High availability

Energy efficiency is directly influenced by the process and system availability. PMC800 aims at high overall process availability through choosing reliable components, creating wide range of diagnostics and system functionality that responses effectively to unexpected process variations. All these increase process availability, and are supported also by means of expert services.

Optimal dimensioning

Optimization of each separate component isn't enough to create the most efficient solution. ABB also focuses on optimal dimensioning, configuration and the efficiency of all components working together as a whole, as well as motors, incomers and other products on the power circuit. Overall optimization ensures that energy losses in motors, cables, drives and transformers are minimized.

ABB's PMC800 is designed for the highest possible total system efficiency. One of the system's unique benefits is that motor/inverter pair's efficiency is balanced optimally. This is made by choosing the inverter's switching frequency to minimize, not either the motor losses or inverter switching losses, but the combination of the both. Motor efficiency is balanced with variable speed drives for improved operation. Furthermore, with the PMC800 Direct Drive, gear losses are eliminated completely.



The figure shows total efficiency and losses for three different dimensioning methods applied to a winder with a required drive capacity (rdc) of 500 kW.

Better motors and machines

PMC800 provides considerable productivity because the drives' engineering is based on ABB's high efficiency Process Performance Motors. Designed for lower temperatures and an extended component lifetime, ABB motor range offer higher efficiency values, which can result in significant cost savings.

Elimination of gearboxes

ABB's Direct Drive is designed for the highest total efficiency of the system. The solution does away with gearboxes for many drives points. With its Direct Drive permanent magnet motor, a special application for the M3 motor frame, mechanical drives (gears) and pulse encoders is eliminated, leading to greater efficiency and improved control.

Direct Torque Control eliminates encoders

One of ABB's DTC control's unique features is that it optimizes the switching pulses for better overall efficiency. High motor efficiency is formed in a balance with variable speed drive efficiency. The switching frequency and output voltage of the variable speed drive, as well as the motor design itself, has impact on total system efficiency and cos phi. ABB's design is optimal for paper machine operating conditions, and as a result it provides the best total energy efficiency for sectional drive systems.

ABB's Direct Drive solution not only saves energy but also reduces transmission noise and maintenance requirements.

Papermakers prefer ABB engineered drives systems

The PMC800 capitalizes on ABB's decades of experience on thousands of projects, incorporating the unique demands required of a paper machine drive system. The system software, the automation platform, dedicated controllers, drives and motors are all designed to provide the highest levels of reliability, functionality and efficiency.

Engineered solutions

The PMC800 Paper Machine Drive provides papermakers with many options. Each project is carefully designed, dimensioned and configured to meet the requirements of each process and the conditions of each machine. Solutions may include traditional AC drives, Direct Drive, DC drives or a combination. ABB's experience with all of these technologies allows for the optimum solution for each paper machine drive system.

With a system designed for integrated drives and production functionality, backed-up by a global network of expertise, ABB offers PMC800 users:

- reliability and control precision to ensure production quality
- proven and patented control features for optimal process performance
- efficiency, safety and availability to secure production costs and personnel

A global team and local presence brings many clear benefits for users

- Worldwide resources, worldwide presence and strong local organizations from account management to service.
- Global operations enable ABB's Paper Machine Drives to provide comprehensive system guarantees that support papermakers.
- Smooth and efficient project execution using consistent engineering methods, drive optimization services, rebuild concepts and compatible new technologies during the lifecycle of the paper machine.
- Dedicated paper machine commission teams with the experience to ensure fast and safe startups.
- Strong global service operations.
- Remote Service capabilities allowing ABB experts to search the process remotely for the root causes of problems. Fast system access saves unplanned downtime and enables rapid stabilization of the process.
- Large installed base gives mills the confidence that ABB has the experience to ensure their project will be successful.
- Standard application developed through experience with several thousands of reference sites.
- Direct contacts with the major world OEM's machine divisions and consultants.

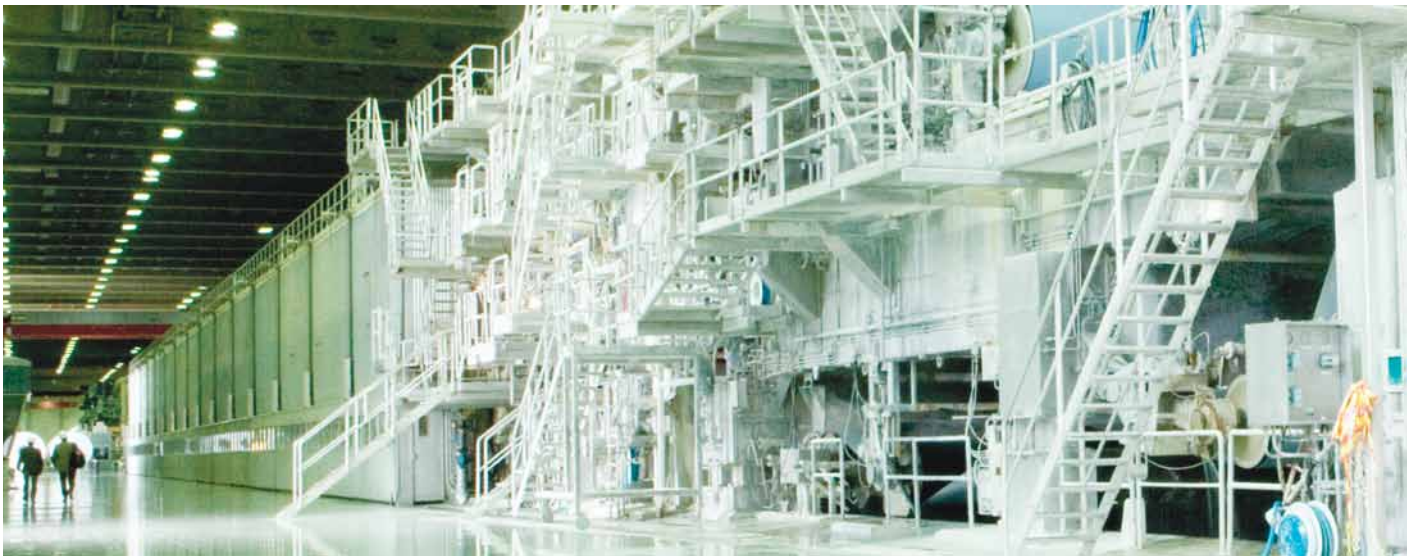
Safety in design and function

Safety features provide security

Safety functions are an essential feature of today's variable speed drives. ABB provides safety features that comply with the requirements of the European Union Machinery Directive 2006/42/EC, which is linked with standards like IEC 62061 (Safety Integrity Level) and ISO 13849-1 (Performance Level). ABB provides a well documented system and proven safety performance, as well as a lifecycle approach to safety.

During product development, ABB performs a detailed safety evaluation that includes necessities such as the prevention of unexpected start, emergency stop functions and other process and maintenance related system functions.

Lifecycle support
Drives system rebuilds



To boost process performance, ABB offers a wide range of partial or complete paper machine drives rebuilds.

Replacing drives

We provide modern rebuilds for both AC and DC drives of all generations. When Preventive Maintenance Kits are no longer enough for secure operation, drive modules can be replaced with Rebuild Kits. These rebuilds are the latest generation inverter modules with an adaptive component that can be installed on the old drive cabinet and the power supply, making replacement very fast.

With larger modernizations, a whole drive line-up replacement offers the best solution. With clear modernisation steps, often 2 to 4 stages, the whole drive system is effectively replaced. ABB offers ready designed connection configurations between older drive set-ups and the new ones.

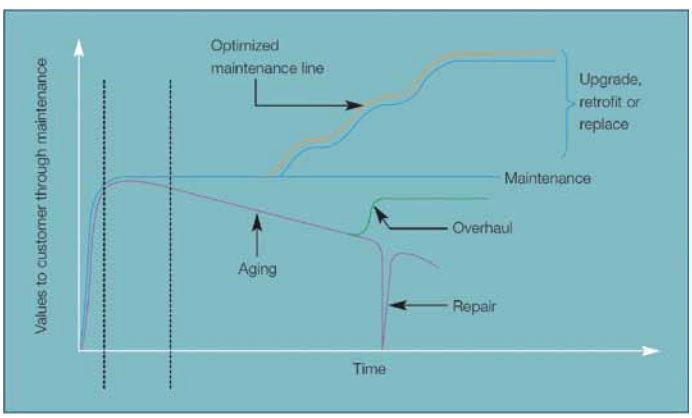
Rebuilding a DC drive system is cost efficient because older components, such as thyristors, power cables or busbars, contactors, power parts and DC motors, can often be re-used. Digital technology with up-to-date communication interfaces and control performance offers increased process availability, quality and productivity. A drive system rebuild is a low-budget way to obtain considerable improvement.

Expert assessment

Years of experience developing different types of paper machine drives gives ABB the expertise to accurately assess your existing system and provide you with the best solution for your operational environment.

Shut-down time for a drive system rebuild is short compared to the shut-down time for installing a new system. Additionally, mills can use the spare parts stocked for old DC motors or old power stacks.

Lifecycle of a plant.



Rebuilds lengthen equipment life

By providing papermakers with versatile options like rebuilds, ABB helps mills save money by lengthening the life of their existing equipment.

Evaluating safety

When we do system replacements, safety is a top priority. For rebuild targets, in addition to the drive system delivery, ABB can offer also safety checks for the remaining older drive installation and other surrounding electrical installations.

Secure path to updated operation and control

It's important to schedule partial or complete control system rebuilds along with the renewal of power components because the availability of old electronic components or PC equipment can affect to the whole process line. With PMC800, drive communication interfaces are designed to work with older systems so that operator controls and process stations can be fully integrated.

Process graphics based on the latest Windows technology

System 800xA features a Process Graphics package based on the latest Windows technology. Simple and intuitive, this package has a state-of-the-art graphics builder that promotes faster engineering and more efficient use.

Along with the object-oriented architecture of System 800xA, Process Graphics plays a key role in helping operators work efficiently and make sound decisions. Drive system displays help mill personnel make rapid and accurate evaluations concerning the drive status for the whole paper machine.

Cost-effective maintenance tool

For operator ease, system programming tools are carefully maintained in the original computing environment. ABB Paper Machine Drives offer a range of new and modern PC-toolsets for existing drives, a crucial part of rebuilding the whole system economically and without disturbances.

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