# ACS6080 drives

## Your right choice for high performance applications

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# ACS6080 drives

The new ACS6080 medium voltage drives are tailored to meet the needs of demanding applications that require high dynamic performance, precision, reliability and safety. On top of ABBs new MP$^3$C control technology, the drive provides easy-to-use interfaces to simplify operation and ABB Ability™ remote condition monitoring to ensure the drive is accessible and maintainable anywhere in the world.

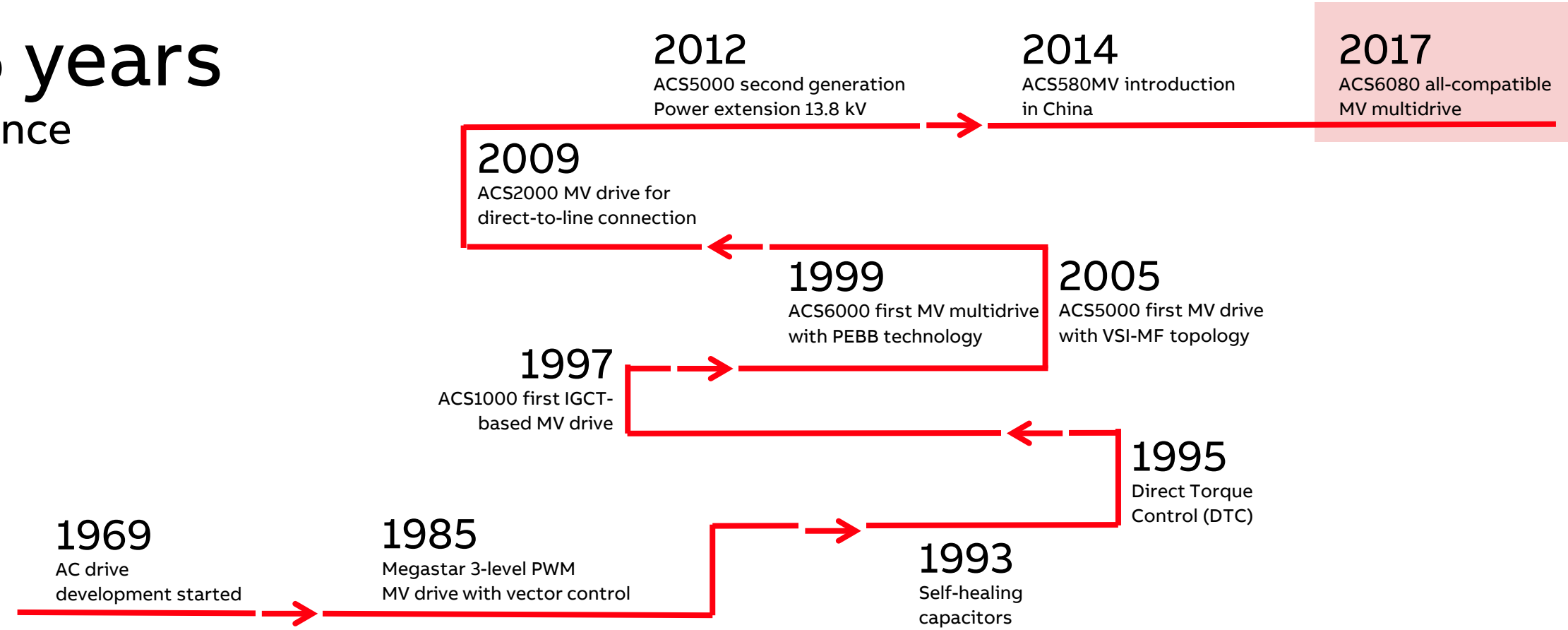
The accomplished expert for heavy industries offers you unlimited possibilities of configurations to drive both single- and multi-motor applications. Industry-specific functions and unique features ensure reliable control of your processes and systems.

# ACS6080 drives

Based on long-term experience and in-depth knowledge

## > 45 years

experience



# ACS6080 drives

## Complementing our broad portfolio of drive solutions

### Energy efficiency – emission reduction

#### ACS580MV

Applications:

- pumps, fans

Segments:

- Infrastructure, water, HVAC
- Auxiliary applications in heavy industry, metals, cement, power generation, ..

Focus:

- Non-specification driven
- Non-critical applications (can run without drive in bypass mode)
- Capex – energy safings made affordable

#### ACS5000 / LCI

Applications:

- Large compressors, pumps, fans, GT starters

Segments:

- Oil & gas
- Power generation
- Water

Focus:

- High power
- High reliability and availabitly
- Highest level of personal safety

### Process Control

#### ACS1000 / ACS2000

Applications:

- Pumps, fans, mills, conveyors, extruders, mixers, hoists, ..

Segments:

- Mining, Cement
- Oil&gas, petrochem
- Marine, offshore
- Power generation, water

Focus:

- Flexible to configure for the specific needs
- High reliability and availabitly
- Highest level of personal safety

#### ACS6080 / PCS6000

Applications:

- Mills, conveyors, propulsion, wind mills, hoists, ..

Segments:

- Metals, mining, marine
- Test stands, special applications
- Renewable power generation

Focus:

- Flexible to configure for specific needs
- High performance
- High reliability and availabitly
- Highest level of personal safety

# ACS6080 drives

At a glance

## Highlights

- Voltage source inverter, 3-level neutral point clamped topology
- Voltage range: 2.3-3.3kV
- Power range: up to 36 MW
- Common DC bus for single and multi-motor operation and energy recuperation
- Based on ABB’s well proven IGCT semiconductor platform

# ACS6080 drives

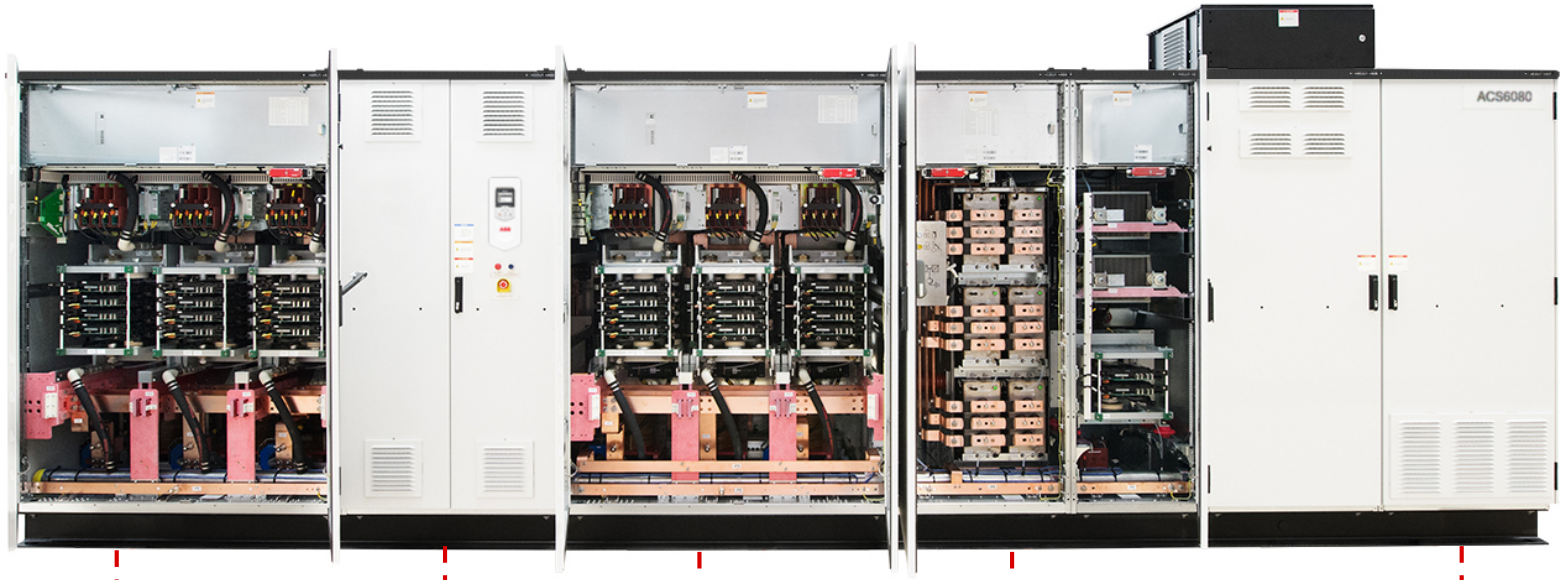
At a glance

## Highlights

- MP$^3$C control technology for exceptionally high torque,  speed performance and motor friendliness
- Control any type of motor: synchronous, asynchronous and permanent magnet
- Line Supply Unit (LSU) for two-quadrant operation with a constant power factor of 0.95 over the whole speed range
- Active Rectifier Unit (ARU) for four-quadrant operation and reduced harmonics, adjustable power factor

# ACS6080 Drives

## Product overview




**Active Rectifier Unit (ARU)**
Self-commutated, 6-pulse, 3-level voltage source inverter with IGCT technology to rectify the line voltage from AC to DC

**Terminal and Control Unit**
Contains the power terminals and the control swing frame

**Inverter Unit (INU)**
Self-commutated, 6-pulse, 3-level voltage source inverter with IGCT technology to invert the voltage from DC to AC

**Capacitor Bank Unit**
DC capacitors for smoothing the intermediate DC voltage

**Water Cooling Unit**
Supplies deionized water for cooling the main power components

# ACS6080 drives

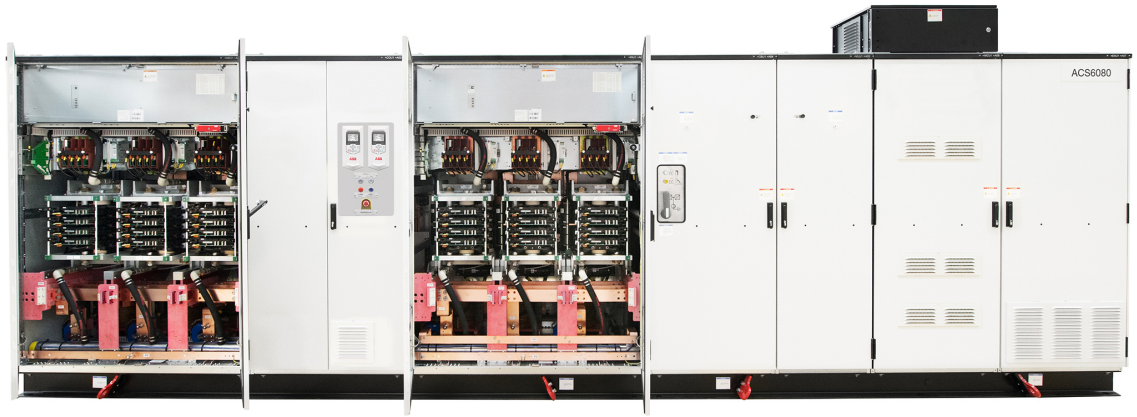
The right choice for high performance applications

## Modularity and flexibility

- Built to order - every drive is tailored to fulfill your needs
- 2 or 4 quadrant, single or multi motor, wide range of customer-specific options in a very compact design

## Performance and usability

- New MP$^3$C control technology
- Part of the ABB drives all-compatible portfolio
- Smooth integration and easier operation throughout your entire installation




## Highest level of safety

- Arc resistant design with fast arc elimination
- Integrated DC grounding switch
- Electromechanically interlocked doors
- Certified functional safety

## Reliability and availability

- ABB Ability™ condition monitoring for drives to monitor your drive condition every time, every where.
- Low parts count and fuseless design - ABB IGCT technology confirmed to be the best choice for high power applications

# ACS6080 drives

Benefits that add value to your operations

## Benefits and features

**Tailor-made solutions**

- Configurable for single-, multi-motor and redundant configurations
- The modules can be arranged according to the required output power, motor configuration and process needs
- Very compact and standardized design for reduced footprint
- Flexible layout can be straight in line or fitted into the installation room with U, L or back-to-back setups

**Highest level of personal safety**

- Arc resistant design (certified by 3rd party) with fast arc elimination
- Integrated DC grounding switch
- Electromechanically interlocked doors to all MV compartments
- Certified functional safety features (E-off, E-stop, Safe Stop 1, STO, POUS)

**High reliability and availability**

- Each configuration consists of very well-proven components and simple power circuit
- Low part count
- Fuseless design
- Self healing capacitors
- Redundant configurations
- ABB Ability and cloud connection for remote condition monitoring and remote assistance

**Increase productivity**

- Part of ABB drives All-compatible family
- Smoother integration and easier operation throughout your entire installation
- Best-in-class control in terms of dynamic performance and power quality
- Precise process control
- Dynamic performances

# Modularity and flexibility

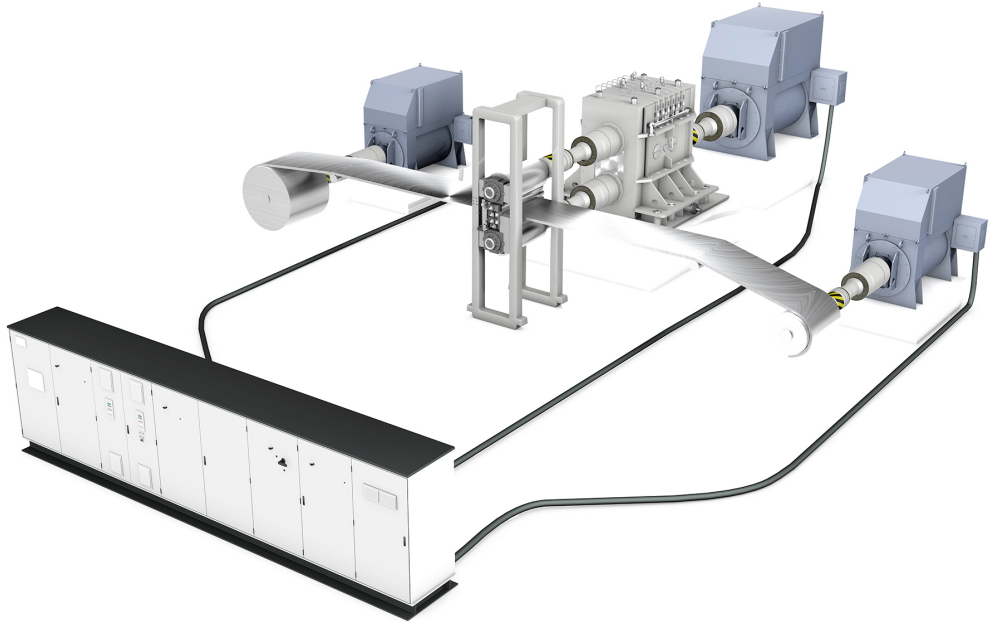
ACS6080 drives

# Customized solutions based on a modular design

Taking your business forward with everything working like clockwork

## Engineered and designed to meet your specific needs

- Build from a set of standardized modules
- Easy integration into any industrial environment
- High constant power factor
- Reactive power compensation to avoid reactive power penalties
- Low network harmonics
- Wide range of industry-specific options
- Compliant with various industry-specific certifications
- Easy and smooth power ugrades to minimize your CAPEX



# Modular drive system

Arranged according to your process needs

## Mini ACS6080

- ~5 MVA
- <5 meters long
- Delivered as one unit

## Maxi ACS6080

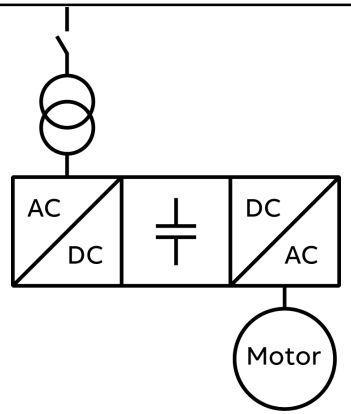
- >30 MVA power
- >30 meters long
- Delivered in up to 10 transport units

**Easier than you think thanks to “building block” system**

# Basic types of configurations

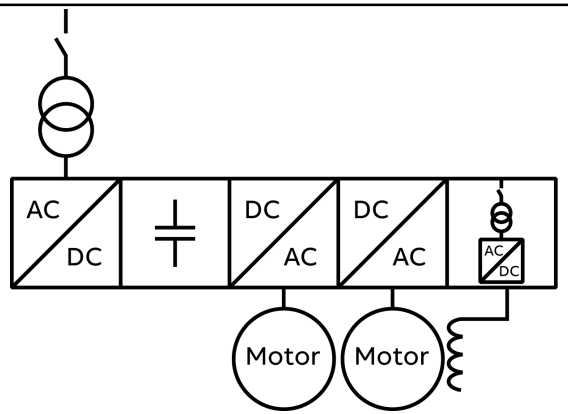
## Maximum flexibility

### Single-motor drive



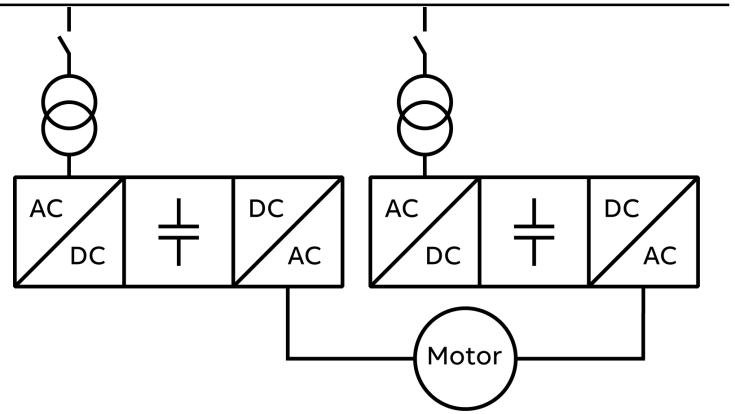

- For synchronous, induction and permanent magnet motors
- Commonly used in applications which require large, independent and decentralized drives

### Multi-motor drive




- For multiple synchronous, induction or permanent magnet motors or a combination of any types
- Up to eight motors can be linked to a common DC bus in order to provide the optimum configuration

### Redundant drive




- For motors with two winding systems
- Single drives can be configured to allow various schemes for redundancy offering greater availability of the drive system

# Highest level of safety

ACS6080 drives

# Highest safety for your people and equipment

## Arc resistant design with fast arc elimination

### Description

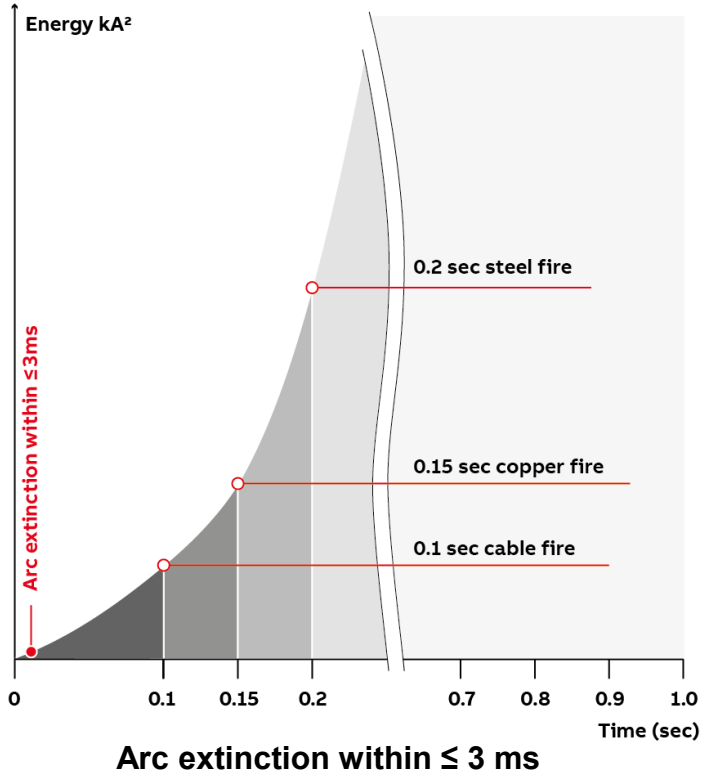
Electric arcs represent a hazard source for people and equipment

ACS6080 offers the highest possible level of personnel safety by detecting the arc and eliminating before it even occurs.

ACS6080 drive come with an arc proof design and is certified according to IAC (internal arc classification).

ACS6080 can be equipped with ABB's Arc Guard System™ for even a superior protection function.

**No compromises**




Arc extinction within ≤ 3 ms


PEHLA

Test Confirmation

# Arc proof classes

## Personnel safety & equipment availability

| | Non-ABB Medium Voltage Drives | | | ACS6080 |
|---|---|---|---|---|
| | CERTIFIED SAFE FOR PERSONNEL ACC. TO IEC 62271-200:IAC AFLR | | | |
| ARC PROOF CLASS | **CLASS I** | **CLASS II** | **CLASS III** | **CLASS IV** |
| PERSONNEL SAFETY BASED ON | **ARC PREVENTION** | **ARC PREVENTION + PROTECTION** | **ARC PREVENTION + ELIMINATION** | **ARC PREVENTION + FAST ELIMINATION** |
| | BASED ON DESIGN ACC. TO IEC 60146-1-1 IEC 61800-4 | BASED ON ARC RESISTANT ENCLOSURE | BASED ON HV-FUSES | BASED ON PROTECTION FIRING AND/OR FAST DETECTION |
| EQUIPMENT DAMAGE IN CASE OF ARC | SEVERE | SEVERE | MODERATE | NEGLIGIBLE |

# Arc Fault Safety

## ABB's approach - the 4 safety classes

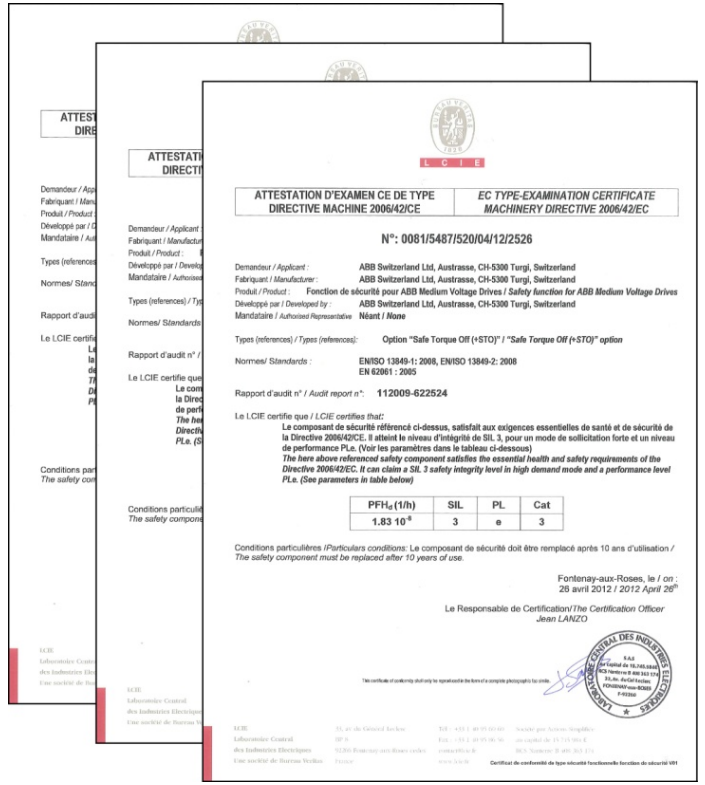
| | Non-ABB Medium Voltage Drives | | ACS6080 |
|---|---|---|---|
| **CLASS I** | **CLASS II** | **CLASS III** | **CLASS IV** |
| **protection based on arc prevention** | **protection based on arc resistant cabinet structure** | **protection based on external arc fault limitation and elimination** | **fast arc elimination** |
| • Design of insulation systems in accordance with relevant IEC and NEMA standards to prevent arcs and provide personnel safety<br>• Class I is not a certified arc resistant design, it is mainly focusing of arc fault prevention | • The **cabinet is designed** to withstand the pressure of an arc flash<br>• Arc fault is contained in the cabinet or guided through pressure relief vents<br>• The drive will be face severe damage after an event | • **HV Fuses** are applied externally to the drive in order to limit the arc fault current to less than half cycle of the fundamental AC frequency (< 10ms in case of 50Hz supply)<br>• This method is only used to reach arc resistant designs for MV drives connected without external drive transformer to the mains (integrated transformer solutions and DTL solutions) | • This is a ABB patented method, ABB MV drives **"protection firing"** system. The arc fault is detected and converted into a non severe bolted short circuit<br>• For an even faster detection and elimination an optical ABB **arc fault detection system** is available<br>• Provides highest level of personal safety and the equipment remains undamaged and can be immediately restarted after inspection and elimination of the arc ignition cause |
| | **Arc resistant design<br>IAC Certified according IEC62271-200** | | |

# Certified functional safety features

For a safe and reliable system integration into your process

The ACS6080 is equipped with safety integrity level 3 (SIL3) and performance level e (PL e) and provides the following safety functions:

- **Emergency off** - stop category 0 according to IEC 60204-1
- **Emergency stop** - stop category 1 according to IEC 60204-1
- **Safe torque-off (STO)** - according to IEC 61800-5-2



ATTESTATION D'EXAMEN CE DE TYPE
DIRECTIVE MACHINE 2006/42/CE

EC TYPE-EXAMINATION CERTIFICATE
MACHINERY DIRECTIVE 2006/42/EC

N°: 0081/5487/520/04/12/2526

Demandeur / Applicant : ABB Switzerland Ltd, Austrasse, CH-5300 Turgi, Switzerland
Fabriquant / Manufacturer : ABB Switzerland Ltd, Austrasse, CH-5300 Turgi, Switzerland
Produit / Product : Fonction de sécurité pour ABB Medium Voltage Drives / Safety function for ABB Medium Voltage Drives
Développé par / Developed by : ABB Switzerland Ltd, Austrasse, CH-5300 Turgi, Switzerland
Mandataire / Authorised Representative Néant / None

Types (references) / Types (references): Option "Safe Torque Off (+STO)" / "Safe Torque Off (+STO)" option

Normes/ Standards : EN/ISO 13849-1: 2008, EN/ISO 13849-2: 2008
EN 62061 : 2005

Rapport d'audit n° / Audit report n°: 112009-622524

Le LCIE certifie que / LCIE certifies that:
Le composant de sécurité référencé ci-dessus, satisfait aux exigences essentielles de santé et de sécurité de la Directive 2006/42/CE. Il atteint le niveau d'intégrité de SIL 3, pour un mode de sollicitation forte et un niveau de performance PLe. (Voir les paramètres dans le tableau ci-dessous)
The here above referenced safety component satisfies the essential health and safety requirements of the Directive 2006/42/EC. It can claim a SIL 3 safety integrity level in high demand mode and a performance level PLe. (See parameters in table below)

| $PFH_d$ (1/h) | SIL | PL | Cat |
|---|---|---|---|
| $1.83\ 10^{-8}$ | 3 | e | 3 |

Conditions particulières /Particulars conditions: Le composant de sécurité doit être remplacé après 10 ans d'utilisation / The safety component must be replaced after 10 years of use.

Fontenay-aux-Roses, le / on :
26 avril 2012 / 2012 April 26th

Le Responsable de Certification/The Certification Officer
Jean LANZO

# Door interlocking system

## Integrated DC grounding switch and door interlock

The grounding switch is a safety switch to ground the DC bus of the drive. When the Drive is grounded the door safety switches of the medium voltage units are released and the doors can be opened.

It is electromechanically interlocked with a discharge monitoring circuit that prevents the switch from closing when the DC-link capacitors are still charged.

Grounding the drive is only possible after main power supply is disconnected and the DC link has been discharged.

# High performance and usability

ACS6080 drives

# Part of ABB`s all-compatible drives portfolio

Learn it once – use it everywhere

**Same control interface**

- Easy navigation and monitoring
- Harmonized parameters and common shared functions
- Built-in USB connection to the PC tool

**Free entry level PC tool**

- Quick and harmonized access to drive settings
- Flexible monitoring capabilities
- Diagnostics support with one mouse click
- Additional settings in Pro version

**Universal connectivity**

- Same fieldbus options
- Same customer interface

**Technical and commercial documentation**

- Same FW manual layout
- Same controller development system

# MP³C control technology

## Best in class motor control

### Your benefits

Reduced CAPEX

Lower initial investment costs

System cost optimization (Drive / motor / gearbox)

Reduced OPEX

Lower running costs

Lower maintenance costs

### Thru drive train optimization

Exceptionally motor friendly – high impact on motor temperature, vibration, noise and ultimately on lifetime

Smaller motor frame for same power

Decrease gearbox ratio for suitable applications

Higher system efficiency by decreased losses in the motor and in the drive

Higher drive output power

Higher drive efficiency

### With the most advanced control

Up to **50%** reduction of current distortion

Up to **50%** reduction of switching frequency

Up to **50%** increase of output speed

Up to **10%** increase in output power

**Lowest CAPEX and OPEX for your drive system**

# Powerful performance

**Network robustness**

Operation in unbalanced network (up to 25% asymmetry) possible without loss of performance

**Power loss ride through**

Ride through capability for supply voltage dips down to zero

**Automatic restart and flying start**

Automatic restart after a power loss possible (programmable)

Catches a spinning load and smoothly takes it back to set speed

# Smooth and simple system integration

**Start up and Commissioning**

Easy commissioning and start up with newest Drive Composer PC Tool

ACS6080 in multidrive configuration for a faster installation than equivalent number of single drives

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**Plug-and-Play in your automation system**

Variety of networks can be connected – industry's best support with wide range of fieldbus adapters

The fieldbus adapter modules can be easily plugged-in and authomatically installed

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**Applicable standards**

Compliance with the most stringent requirements for current and voltage harmonic distortion

- EN, IEEE, IEC
- Marine standards optional

# Minimize operational and maintenance costs

## Drive Composer PC tool

### Harmonized setup, commissioning and monitoring

Offers harmonized services for the whole drives portfolio

All drive information as parameter loggers, faults, backups and event lists are gathered with a single mouse click

Provides very fast fault tracking, shortens downtime and minimizes operational and maintenance costs

Free version for startup and maintenance capability

Pro version with custom advanced features, control diagram of the drive's configuration and safety settings

Adaptive programming can be used to customize further the operation of your drive

# Reliability and availability

ACS6080 drives

# Reliability and availability at the core of your application

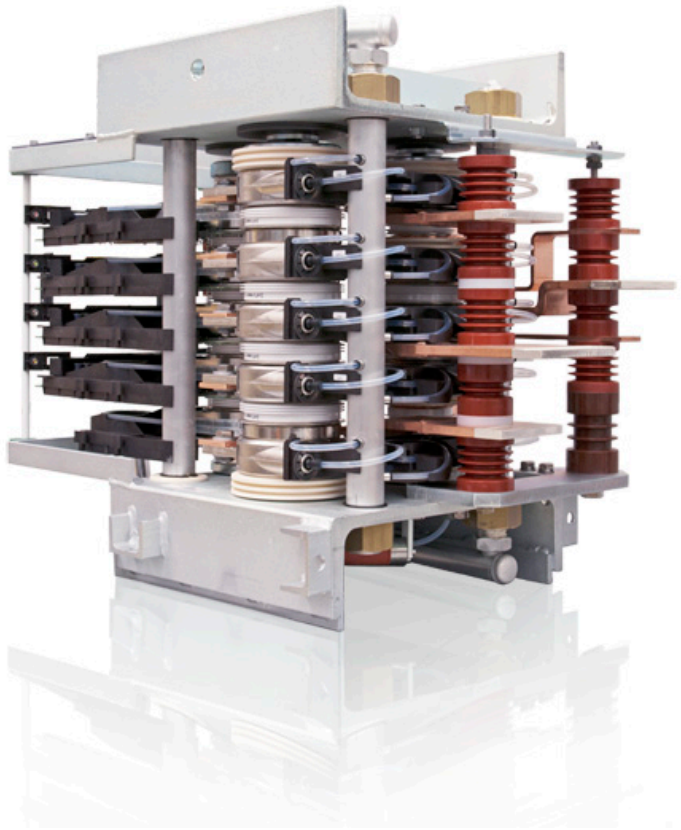
## Well-proven ABB IGCT-technology

### Low parts count and best-in-quality components

The main modules of the drive are the active rectifier (ARU) and inverter (INU) modules. In order to maximize reliability each ARU and INU have identical layout and equipment.

Their core are the very compact and well proven power modules based on ABB IGCT-semiconductors.

IGCT semiconductors provide high efficency and reliability, they are the ideal switch for high power application, still proven to be the most robust devices on the market.



# Reliability and availability at the core of your application

## Easy service and maintenance

### Low parts count and best-in-quality components

Fuseless design for better overall reliability and fast startups after safety interruptions

Lower lifetime costs and higher reliability is assured by advanced, environmental friendly, oil-filled foil capacitors which have a substantially longer lifetime than electrolytic capacitor (10 vs 3 years)

Redundant design: the cooling equipment is available with redundant pumps for increased availability

Easy exchangeable power modules: you can replace the new stack in less than half an hour

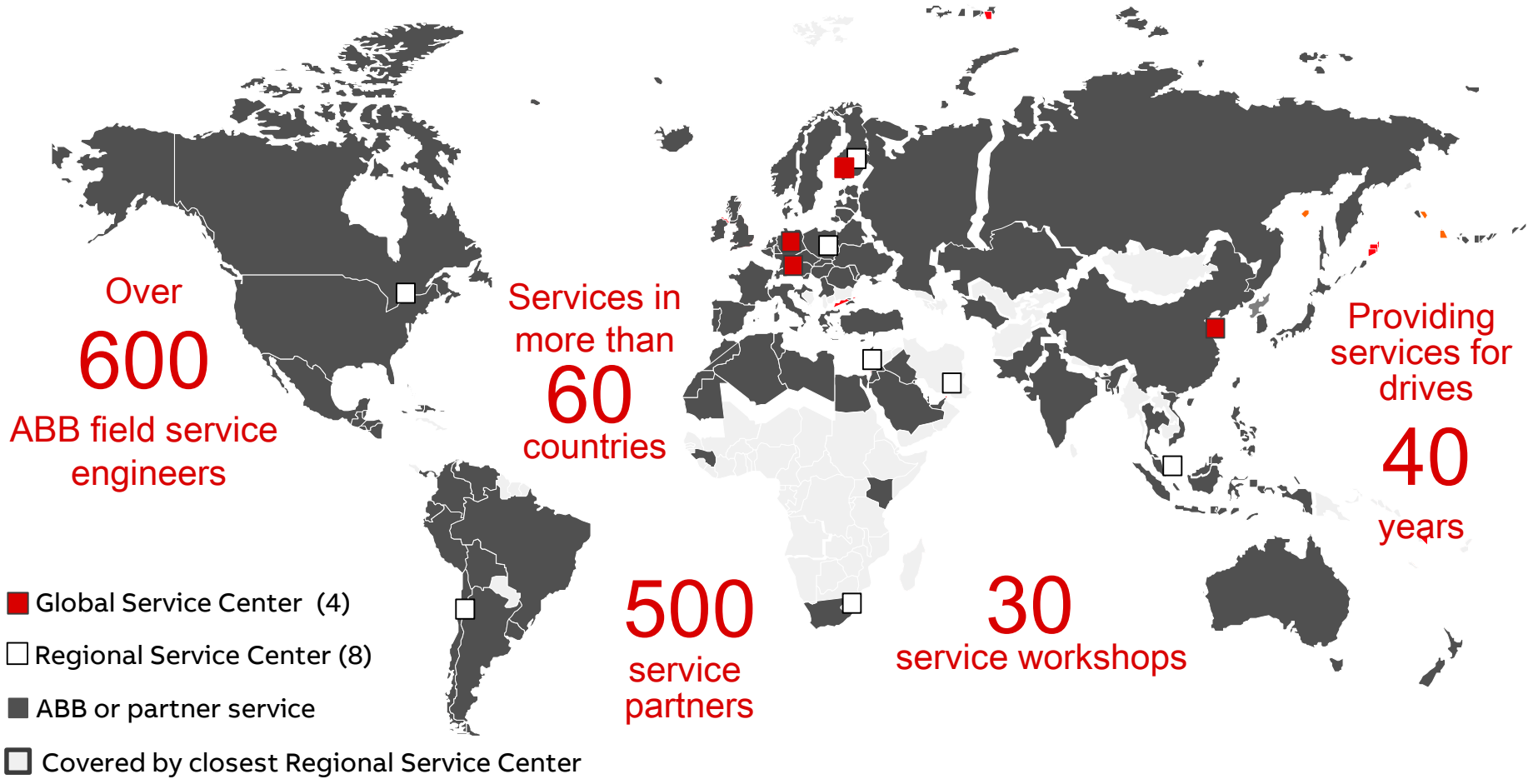
Front access to all components - easy of service and possibility to place against the wall

# ABB Drives Services

Long-term commitment to maintain your assets

# You choose, we respond. Globally and locally.

ABB is a reliable service partner



# ABB Drives service portfolio

Services matching your needs

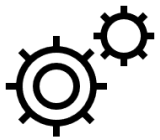
## Your needs

### Rapid response

We promise fast and flexible service response to restore your production or process to full working order within the agreed timeframe.

### Lifecycle management

We provide you powerful tools and our knowledge base to analyze, optimize and extend the lifecycle of your drives.



### Performance improvements

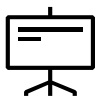
We help you optimize the availability and efficiency of your equipment and improve the profitability of your assets.

### Operational excellence

We offer you a strategic partnership in improving productivity, safety, cost and energy efficiency of your equipment.

## Our services

**Service Agreements -** ABB Drive Care



**Training**

**Installation and Commissioning**

**Spares and Consumables**

**Maintenance**

**Repairs**

**Engineering and Consulting**

**Advanced Services**

**Extensions, Upgrades and Retrofits**

**End-of-Life Services**

**Replacements**

# A lifetime of peak performance

## Lifecycle management

### Our approach to lifecycle management

#### Being committed

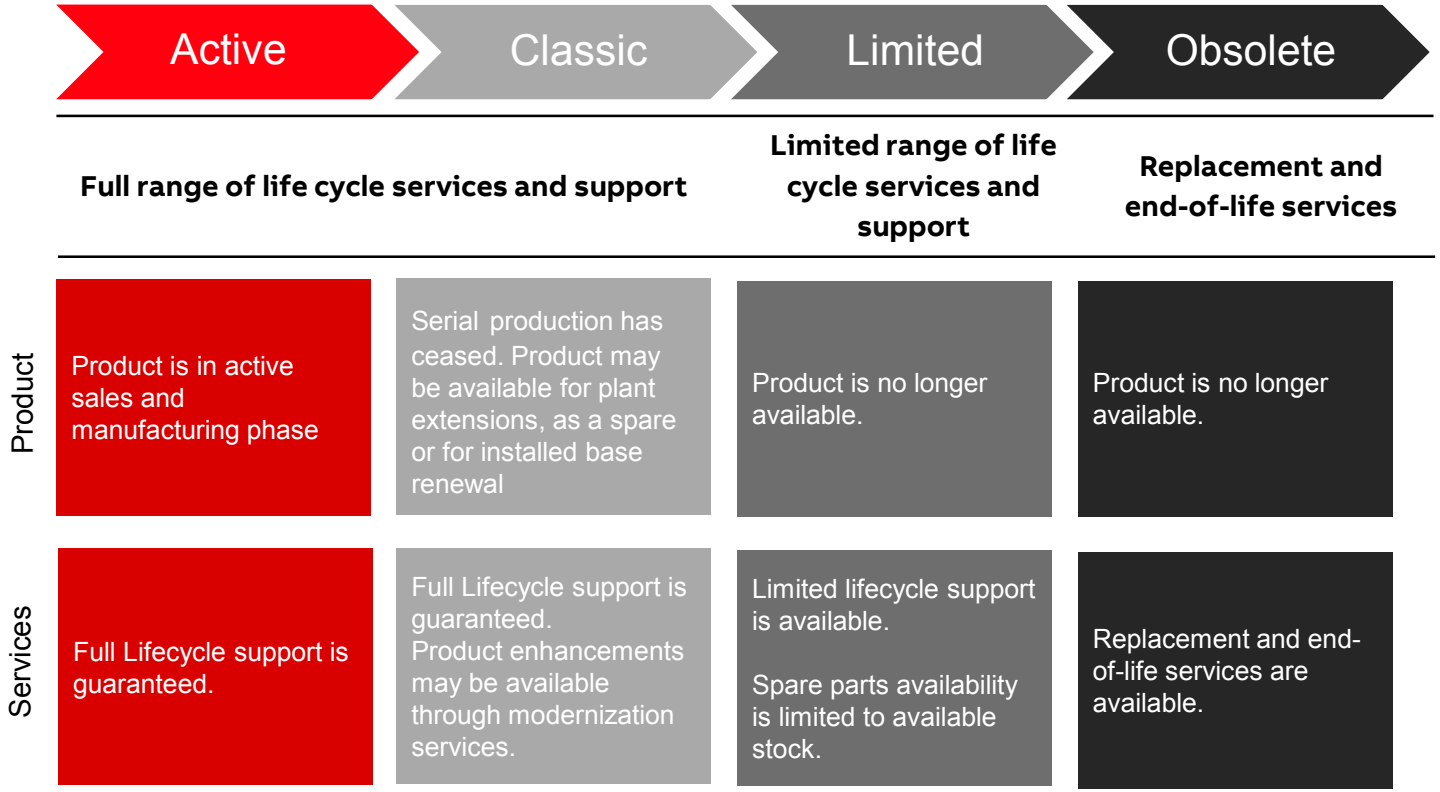
We are committed to serve customers throughout the entire lifecycle of the drive.

At the heart of drive services is a four-phase product lifecycle management model. This model defines the availability of the product and the availability of lifecycle support throughout the product lifespan.

#### Keeping you informed

We notify you every step of the way using life cycle status statements and announcements.

Your benefit is clear information about your drives' status and precise services available. It helps you plan the preferred service actions ahead of time and make sure that continuous support is always available.



# Base services

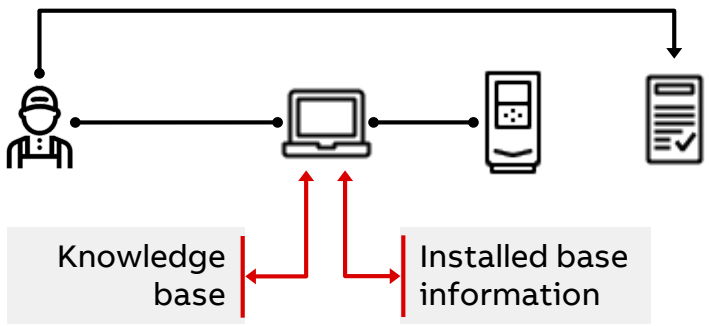
## Highlights

### Digital-aided on-site services

ABB Drives' digital-aided on-site services makes sure that your drive is serviced efficiently and effectively.

Our service engineers have always latest equipment information at hand, including:

- Service history
- Service instructions
- Recommended services



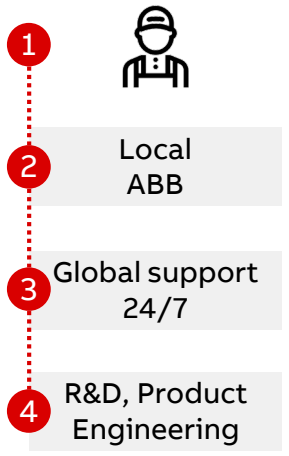

### Customer support - Follow the sun

ABB Drives' customer support is close to customer site, provided in local language and guarantees quick response time.

Regional sales and technical customer support hubs located around the world are offering service around the clock and every day of the year.

Our follow-the sun concept ensures

- Unified high-quality support for all countries
- Quick response time as service is provided in the same time zone
- Effective escalation of issues
- Seamless flow of support
- Possibility to purchase 24x7 remote assistance



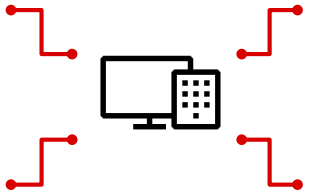

### myABB – Your gateway to services

**Find the right information, saving time & money**

- Installed base information
- Quick and easy access to expert contacts
- One-stop-shop for drive-specific parts

**Optimize capital outlays & operational budgets**

- Identify upgrades and replacement
- Set maintenance and make end of life decisions



**Plan maintenance operations and minimize downtime**

- Review recommended service options Explore service history
- Access product and technical documentation

**Make the right operational decisions**

- Identify relevant training offerings
- Retrieve latest maintenance information and updates
- Review your equipment criticality

# Modernization & consultancy

Highlights

## Upgrade to latest technology

Benefit from technology improvements and incorporate our latest innovation. ABB Drives has defined a well-conceived modernization & migration path for the entire product portfolio. Choose from various options in order to…

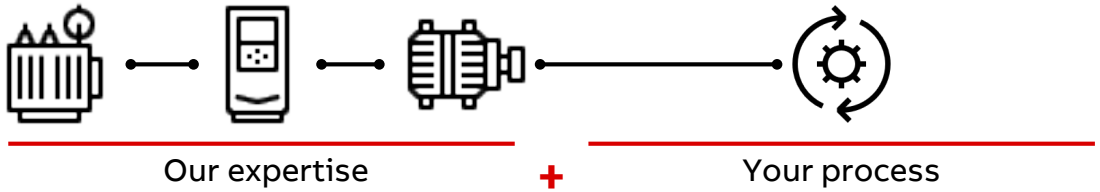
- Manage component obsolescence
- Minimize operational risks
- Secure reliability and improve performance
- Improve usability & safety
- Ensure lifecycle support and services
- Extend the lifetime of your drive system

### Control Upgrade service

ABB offers the possibility to migrate your ACS6000 drives to the ACS6080 all-compatible platform. Thus upgraded your drive system will benefit of all latest features and services.

## Drive system consulting

ABB provides consultation with leading-edge drive system expertise to help you develop customized solutions to optimize your drive system assets.




### Failure mode and effect analysis

FMEA is a specific method to measure and evaluate the robustness of a drive system, design or process for potential failure mechanisms.

### Electromechanical system interaction study

With this expert analysis electromechanical interaction of drive-train is studied in order to provide guideance for system design.

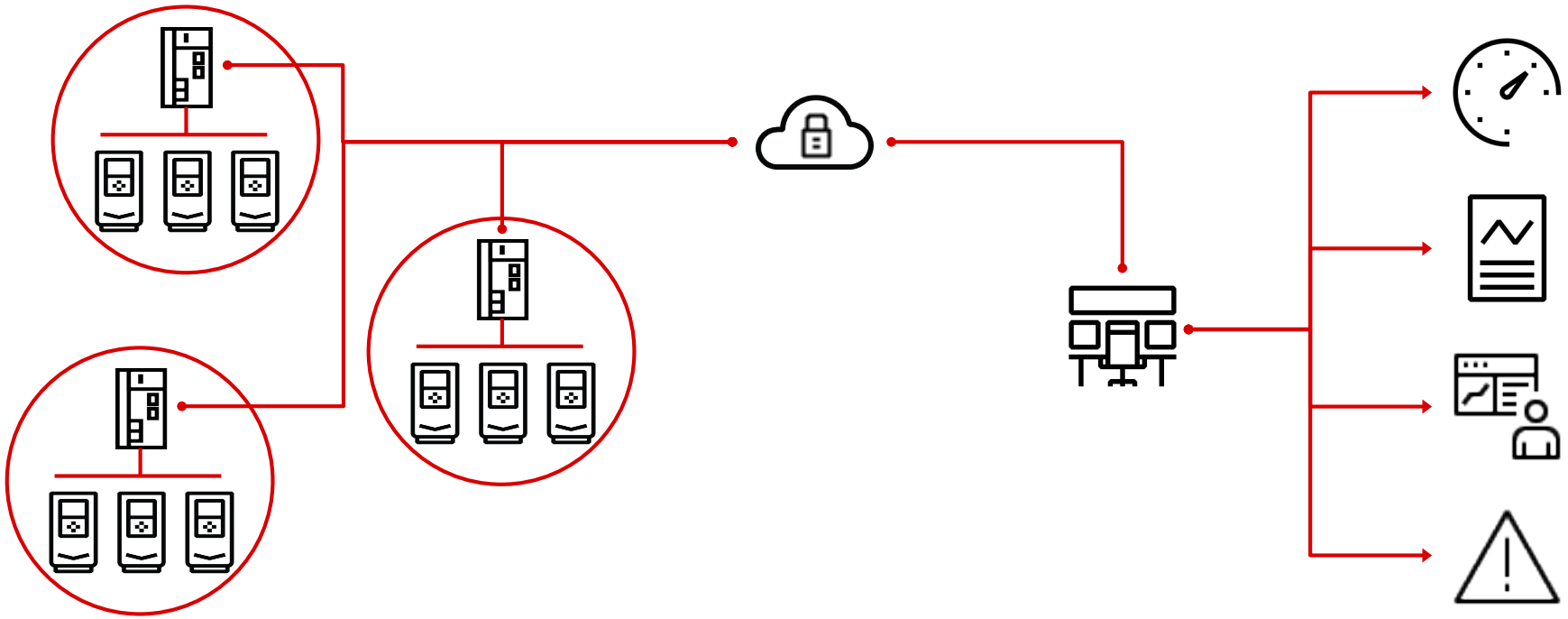
# ABB Ability™ for Drives

Digitalization opens new opportunities

**Smart, connected drives…**

**…send data to secure cloud…**

**…where analysis turns data into knowledge…**



**Knowledge turns into predictive actions**

Key performance indicators show where to focus the actions.

Detailed report gives more information on the issue.

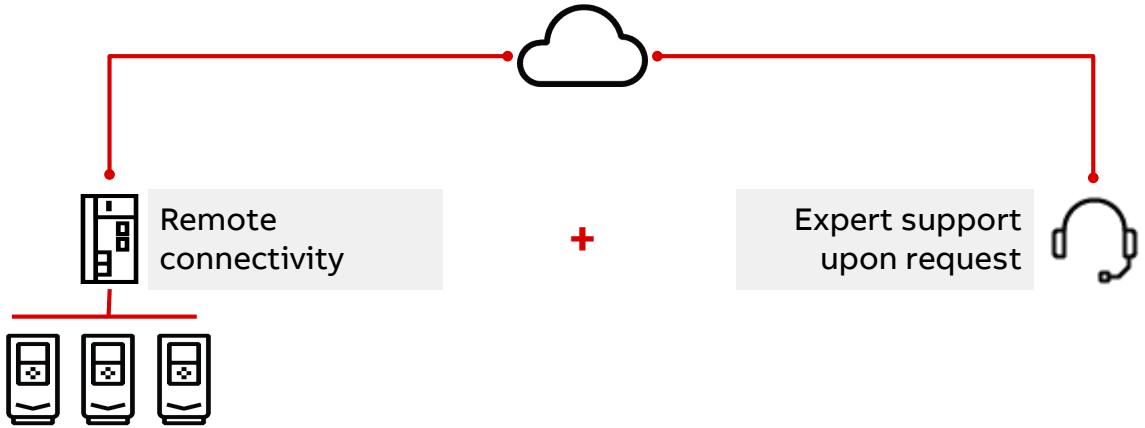
Expert can recommend and support the actions needed.

Condition based predictive alerts ease follow up.

# ABB Ability™ for Drives

Highlights

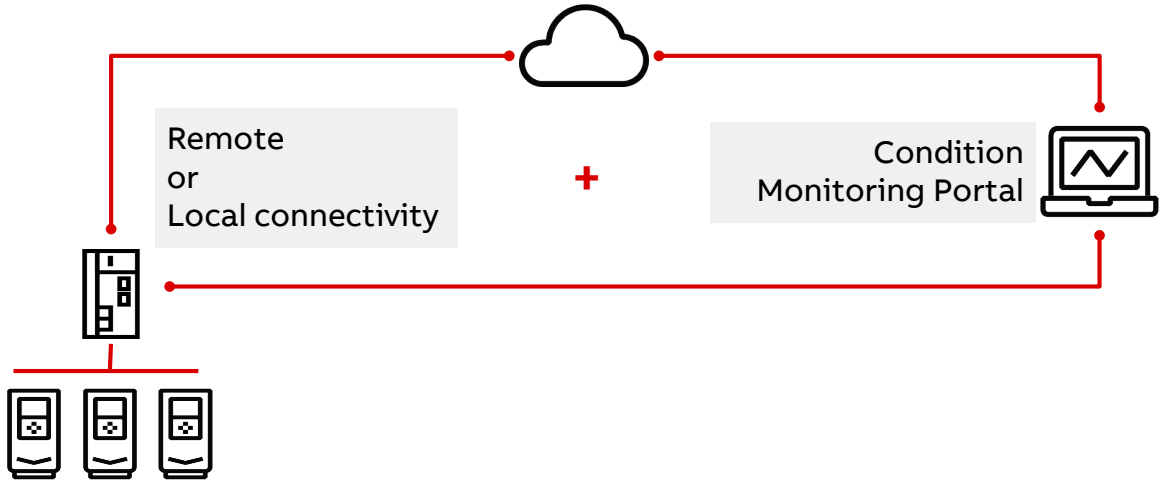
## ABB Ability™ Remote Assistance for Drives




### Rapid solution in case of problems

Should a fault be detected within a drive, ABB specialist provides rapid support by using the drive's data which is stored remotely.

## ABB Ability™ Condition Monitoring for Drives




### Alerts and information, for customer to react

ABB Ability Condition Monitoring for Drives is a service that delivers you accurate, real-time information about drive condition and events to ensure your equipment is available, reliable and maintainable.

# ABB Drive Care Agreements

Highlights

## Initial Care – More than warranty

Initial Care is a free of charge service available to a newly purchased ABB Medium Voltage Drive during the first year of the warranty period.

It complements the warranty support with ABB Ability™ for Drives, including…

- ABB Ability™ Remote Assistance for Drives
- ABB Ability™ Remote Condition Monitoring for Drives

Explore ABB's digital offering free of charge for a limited time of one year and decide afterwards, whether you want to enter the ABB Ability™ contract.

ABB Drives Warranty Condition + ABB Ability™ for Drives

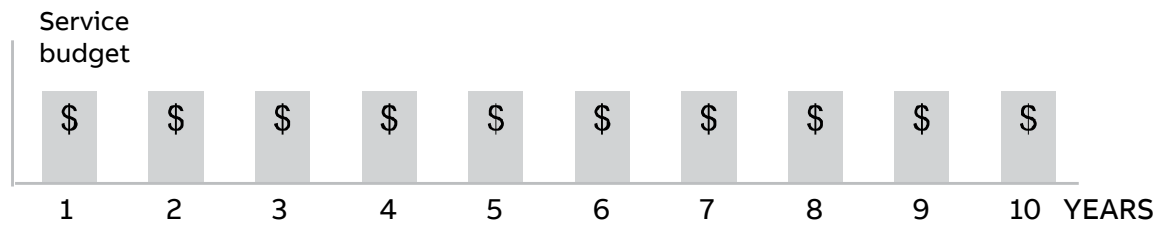
Initial Care

## Complete Care – Long-term lifecycle agreement

ABB Drive Care agreement is designed to let you focus on your core business. With a fixed-price lifecycle agreement matching your needs you gain efficiency in handling routine and emergency maintenance and have improved cost control.

ABB Drives Complete Care contract includes:

- Maintenance & repair parts
- Labor for on-site service actions
- Biennial on-site inspection
- ABB Ability™ Remote Assistance for Drives

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