

MEDIUM VOLTAGE AC DRIVES

**ABB drives**

MEGADRIVE-LCI

2 to 150 MW



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**The experience you require.  
The reliability you expect.**

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# Table of contents

<b>04</b>	<b>The MEGADRIVE-LCI medium voltage drive</b>
<b>06–07</b>	<b>Benefits that add value</b>
<b>08</b>	<b>Controlling your large synchronous motors in all industries</b>
<b>10</b>	<b>Flexible drive system integration</b>
<b>11</b>	<b>More efficiency with drive packages</b>
<b>12–15</b>	<b>Well-proven solution with unique features</b>
<b>16</b>	<b>Air-cooled MEGADRIVE-LCI</b>
<b>17</b>	<b>Liquid-cooled MEGADRIVE-LCI</b>
<b>18</b>	<b>Technical data</b>
<b>20–21</b>	<b>Ratings, types and voltages</b>
<b>22</b>	<b>Our service expertise, your advantage</b>
<b>23</b>	<b>ABB Ability™ Condition Monitoring for drives</b>
<b>24</b>	<b>A lifetime of peak performance</b>
<b>25</b>	<b>Notes</b>
<b>26</b>	<b>Notes</b>

# The MEGADRIVE-LCI medium voltage drive

## Large synchronous motor variable speed control

The top performer for 40 years improves your industrial operations by using variable speed control and soft starting of your large synchronous machines.

The MEGADRIVE-LCI medium voltage drives are engineered drives specifically suitable for high power applications such as large pumps, fans and compressors.

Industry-specific functions and unique features ensure reliable performance of your processes and systems, even in demanding environmental conditions.

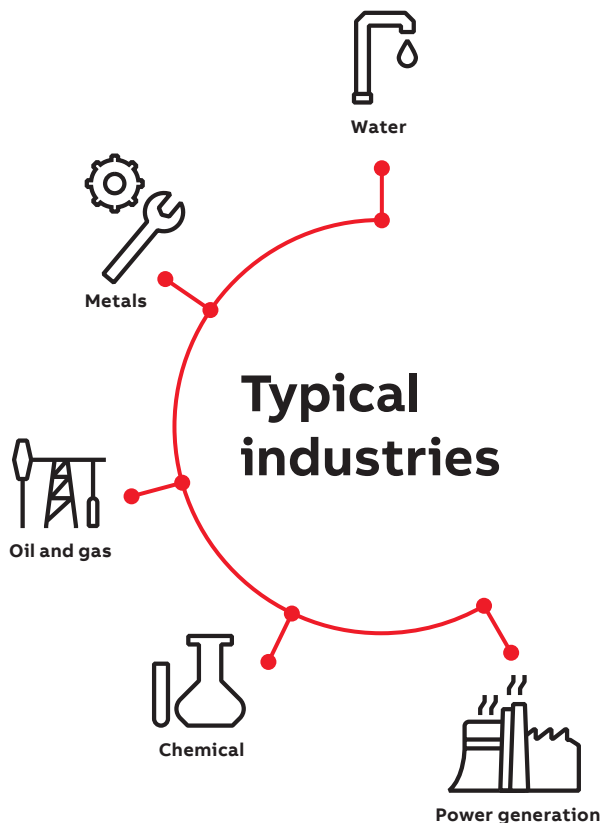
### Well-proven and reliable

The well-proven technology offered in the MEGADRIVE-LCI controls your high power applications and provides soft starting of large synchronous motors, reducing the impact on your network and machinery.

The larger the process and the higher the performance demands, the greater your benefits from electronic speed control. The energy savings will offset your costs of the drive system in a short time and reduced maintenance needs will help you to save additional money and time.

Thanks to many years of successful performance, the MEGADRIVE-LCI is renowned for its high availability and reliability. The drive's simple design and proven components enable trouble-free use and maximized uptime of your processes.

Get a drive solution that gives you peace of mind by ensuring efficient operation you can count on day after day, and year after year.





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# Benefits that add value

Get a drive solution that meets the requirements of your application and ensures high productivity and the optimum performance of your operations. Benefit from the built-in expertise of our medium voltage drives and take your business forward with everything working like clockwork.

## Energy efficiency

Our medium voltage drives run your motors based on the demands of your process rather than running them at full speed and ensure optimized power consumption and process efficiency. In this way you can save energy and reduce CO<sub>2</sub> emissions.

## Well-proven technology

For more than 40 years, MEGADRIVE-LCI drives and soft starters have proven their maximum reliability and availability in a wide range of industries and applications where both high power and high voltage are required.

## High reliability through simple design

The MEGADRIVE-LCI features a simple, well-proven, fuseless drive design and robust thyristor components ensuring high reliability. Benefit from the drive's easy voltage scalability, minimized harmonic influence on the supply system and a converter efficiency of more than 99 percent.

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Over 40 years of experience

## Industry-specific solutions for individual needs

Tailored to your specific requirements, the MEGADRIVE-LCI is designed to perfectly fit your application. Use the drive to control large synchronous motors, for soft starting of large synchronous machines, or as a gas turbine starter for large synchronous generators.



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## Certified safety features

### **Model Predictive Control ensures high availability**

Highest availability is achieved by using MPTC (Model Predictive Torque Control). MPTC ensures that the variable speed drive system is optimized online, and partial torque can be provided during grid disturbances.

### **High personnel safety**

Your workforce and goods are protected from dangerous electric arcs with the arc-resistant design of the MEGADRIVE-LCI. The drive is equipped with certified functional safety features making your systems safe and reliable.

### **Serviceability**

Easy access to all components ensures that service and maintenance for the MEGADRIVE-LCI is simple and smooth. Maintenance needs are minimized with maintenance free pumps. In addition to powerful diagnostic tools, you can profit by convenient remote monitoring.



# Controlling your large synchronous motors in all industries

The MEGADRIVE-LCI allows variable speed control and soft starting of your large synchronous machines for many industrial applications.



## Applications

### Chemical, oil and gas

Compressors and extruders

### Power generation

Starters for gas turbines and hydro pumped storage power plants, boiler feed-water pumps

### Water

Pumps

### Metals

Blast furnace blowers and wire rod mills

### Other applications

Test stands and wind tunnels



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# Flexible drive system integration

To design your drive system, we consider all conditions ensuring an optimized solution for you.

## **Mechanical system interface**

Variable speed drive systems are usually operated over a wide speed control range. They are generally subjected to torque pulsations, which occur in a broad band of frequencies. Aspects that concern the transfer of the torque between motor and driven machine have to be carefully considered when designing the mechanical system interface. A torsional study can clarify whether the shaft design is acceptable.

## **Power supply interface**

The power system interface ensures that the converter withstands disturbances from the power system and that the harmonics from the converter do not cause distortions in the network that are non-compliant with the standards.

## **Automation and operator interface**

The automation and operator interface is the integration of the drive system controls at the plant control level. The communication with the control room can be designed with conventional wiring using analog and binary input/output modules or with communication interfaces for serial data exchange.

## **Environment**

Country and plant-specific characteristics have to be taken into account when designing a drive system. Equipment dimensions and weight, installation restrictions, the cooling medium and the power network have to be clarified. In addition, demands on environmental compliance, protection classes, electromagnetic compatibility (EMC) and noise emission need to be considered.

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Optimized solution for your requirements



# More efficiency with drive packages

Packaged drive solutions provide you with ultimate efficiency and reliability to optimize your cost of ownership.

## All-in-one package

Committed to supporting you in your business, we offer packaged drive solutions for applications in various industries. Customer-specific drive packages including medium voltage converters, motors and transformers can be developed as turnkey solutions meeting your individual requirements.

## Matched performance

To ensure design integrity and an optimum match of equipment, ABB products have undergone combined tests ensuring performance predictability for your application.

## Single point of contact

The combined power of the ABB offering is geared to deliver on customer expectations. We deliver motor-drive solutions that support your technical and commercial needs, from quotation, through delivery and service, over the entire product life-cycle.

## Converter motors

With ABB's motors you will benefit from high versatility, reliability and simplicity.

## Converter transformers

ABB offers converter transformers for all ratings, as well as for indoor or outdoor mounting. Particularly designed for operation with variable speed drives, the transformer adapts the converter to the supply network and provides a galvanic isolation between drive and supply network.



# Well-proven solution with unique features

## Reliable and simple design

The MEGADRIVE-LCI uses well-proven components, which are specifically designed for high power and high voltage applications.

## Thyristors

Thyristor power semiconductors are developed for high powers, highest reliability and low losses. They have low on-state and switching losses, which results in a converter efficiency of 99 percent, including the DC reactor. Its redundant power components allow reliability and availability to be further increased.

## Rectifier

The rectifier is line commutated and forms a fully controllable DC current source in conjunction with the reactor in the DC link. 6-, 12- or 24-pulse rectifier configurations are available for minimized harmonic influence of the converter on the supply system. The MEGADRIVE-LCI meets the most stringent requirements for current and voltage harmonic distortion as defined by IEEE, IEC and EN.

## Excitation converter

The excitation of the synchronous motor can be of the brushless or slip ring type. The excitation converter provides the motor field current in the entire speed range and at standstill.

## Inverter

Thyristors in the inverter electronically switch the DC current to produce a 3-phase AC system of variable frequency and voltage for supplying the motor. The motor voltages commute the inverter phase currents. At very low speeds (0–10 percent of rated speed), when the motor voltage is too low to guarantee reliable commutation, an artificial commutation is used. 6- or 12-pulse inverter configurations are available to minimize motor torque ripple.

## Supply voltage dip ride-through

The MEGADRIVE-LCI has the ability to ride through short main and auxiliary supply voltage interruptions so that in most cases the process is not affected.

## Encoderless control

Speed and rotor position encoders at the motor shaft are sensitive instruments in a harsh process environment and known to be susceptible to failures. ABB's MEGADRIVE-LCI operates without encoders, thereby ensuring a high level of availability and reducing maintenance costs.

## User-friendly control terminal

An LCD touch screen provides the operator with a range of selectable displays showing information on the current status of the system in graphical and numerical form.

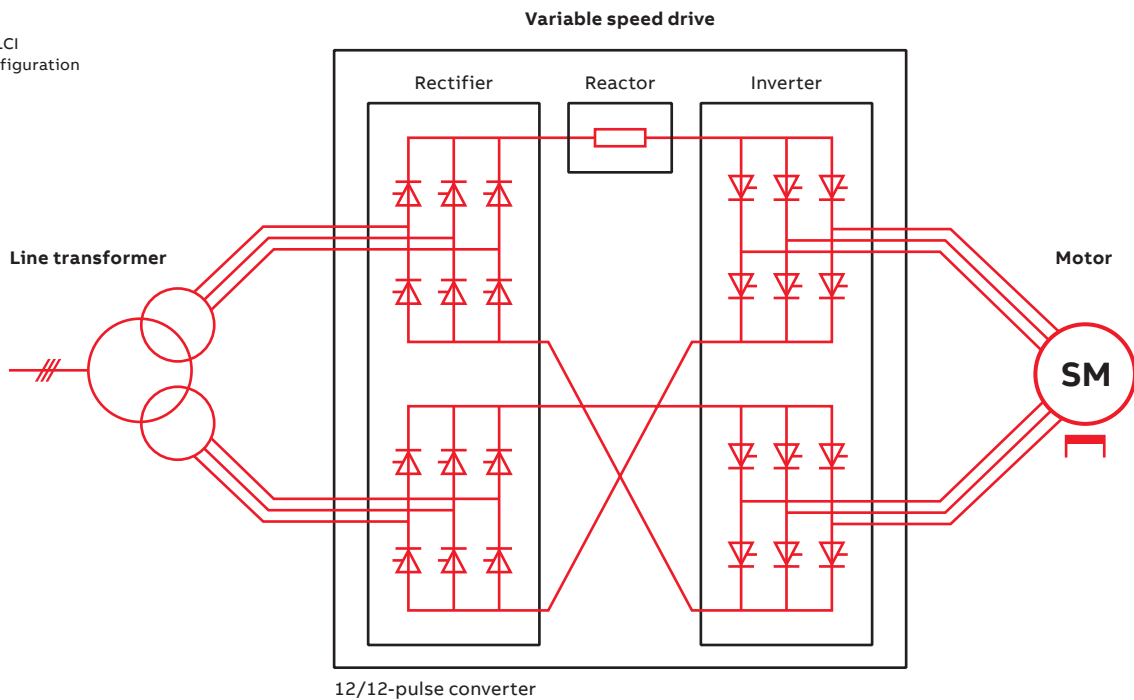
**Energy efficient thanks to motor and generator operation**

A synchronous motor, driven by a MEGADRIVE-LCI, can also be operated as a generator without additional power components. If required, the MEGADRIVE-LCI reverses the power flow and feeds the generated power back into the supply network. Regenerative operation is a cost efficient way to decelerate the motor.

**Well-proven technology**

As an undisputed performer offering reliable operation in even the harshest environments, the MEGADRIVE-LCI is available in power ratings up to 100 MW and beyond. Since its market introduction in 1974, the MEGADRIVE-LCI is the preferred choice when it comes to reliable and efficient operation of applications that require high power and high voltage.

Example of MEGADRIVE-LCI converter configuration



**Soft starting of large synchronous motors and generators**

Direct-on-line starting of large synchronous machines causes starting currents of up to six times the nominal current and imposes large electrical stress on the supply network, thermal stress on the motor and mechanical stress on the shaft string.

These problems can be overcome with the use of a MEGADRIVE-LCI soft starter. It smoothly accelerates the motor and the load from zero to nominal speed, then the motor is automatically synchronized to the power system and the circuit breaker for fixed-speed operation is closed.

There are various starter configurations available that will reduce the starting impact on your network and machinery, and increase the lifetime of your equipment. With a single MEGADRIVE-LCI soft starter the sequential starting of several machines, even of different power ratings, is possible, to reduce your investment costs.

**Gas turbine starters**

Gas turbines often have to be started and run up quickly at short notice. MEGADRIVE-LCI gas turbine starters use the generator as motor and run it up to a speed that is above the ignition speed of the gas turbine. The gas turbine can then accelerate the generator independently to rated speed and synchronize it to the power system.

**Drive robustness**

The MEGADRIVE-LCI features a robust drive design combined with a state-of-the-art control method.

**MPTC (Model Predictive Torque Control)**

Installed in the MEGADRIVE-LCI, MPTC uses a control algorithm based on Model Predictive Control that ensures that the drive continues to operate during power and grid disturbances. MPTC enables advanced services like power factor optimization or even advanced process control and protection.

**Fuseless design**

The high, non-repetitive surge current capability of today's thyristors allows the design of fuseless converters, resulting in less spare parts and higher reliability. In case of a failure, a fast overcurrent protection immediately blocks the thyristor firing and initiates the opening of the main breaker.

**Series connection for higher voltage and redundancy**

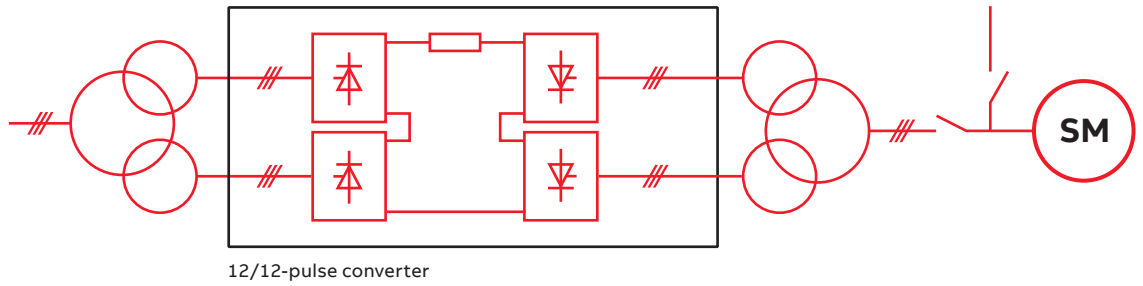
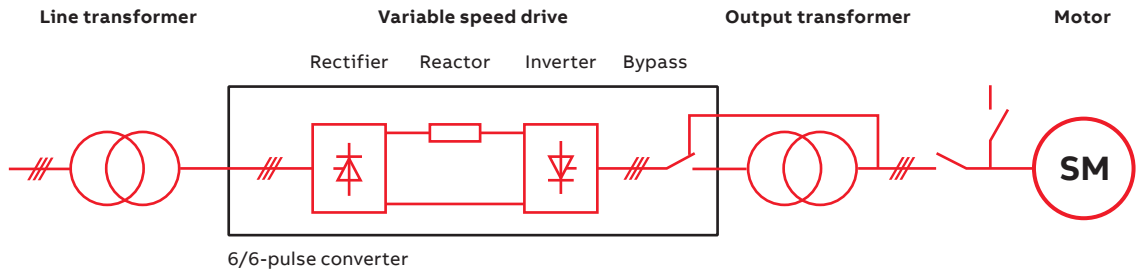
Increasing the voltage by using thyristors in series connection, scales the MEGADRIVE-LCI up to very high powers. In addition, series connection allows the implementation of thyristor redundancy (n+1).

**High level of personal and equipment safety**

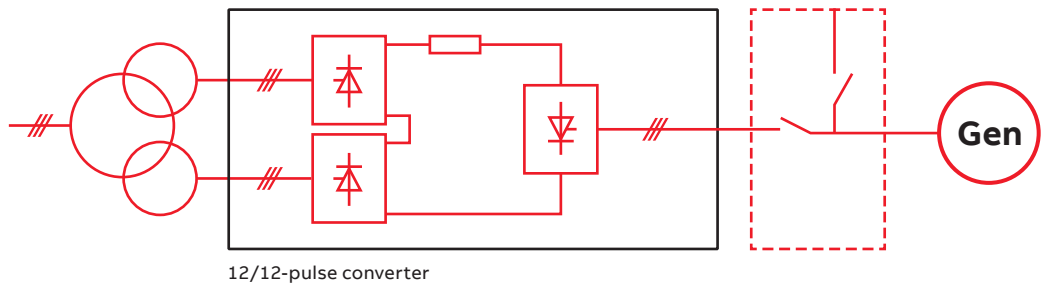
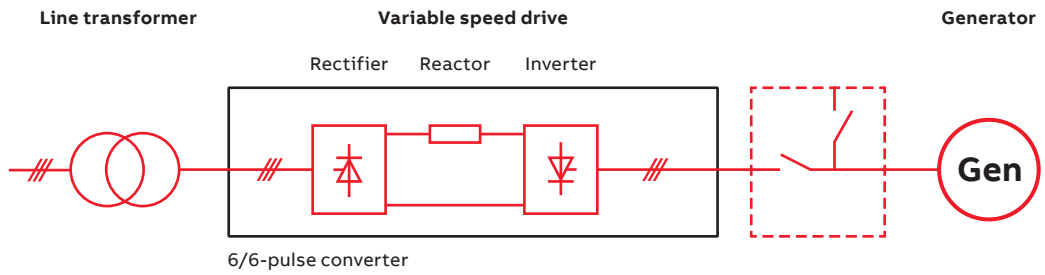
Electric arcs represent a hazard source for people and goods. For systems where large and dangerous arc fault currents can occur, special attention is required. Therefore, the MEGADRIVE-LCI features an arc resistant design to protect people and equipment and eliminate unnecessary production stops.

The MEGADRIVE-LCI is equipped with SIL (safety integrity level) and PL (performance level) certified functional safety features making your systems even safer and more reliable.

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Examples of  
MEGADRIVE-LCI  
soft starter  
configurations

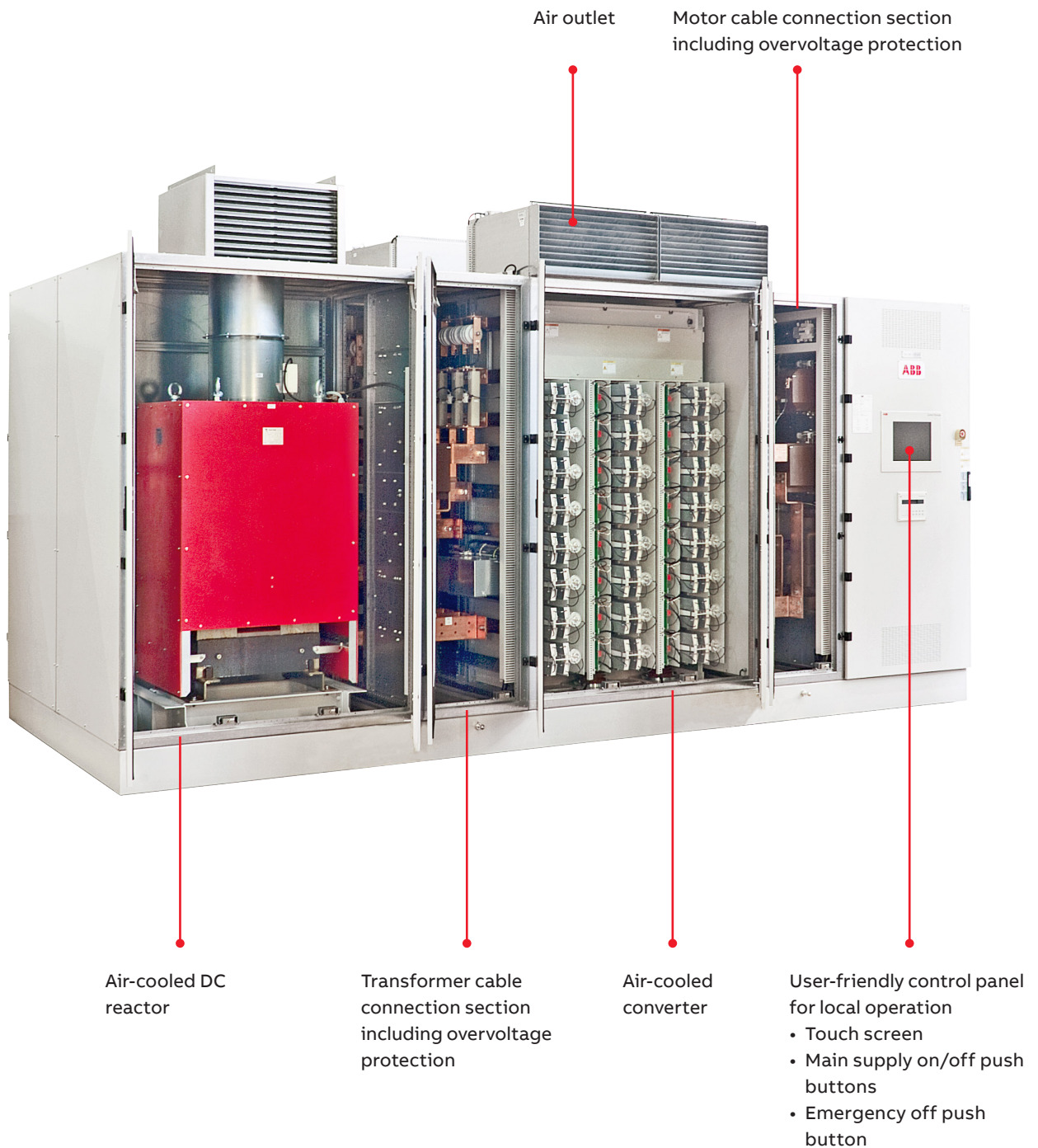


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Examples of  
MEGADRIVE-LCI  
gas turbine starter  
configurations



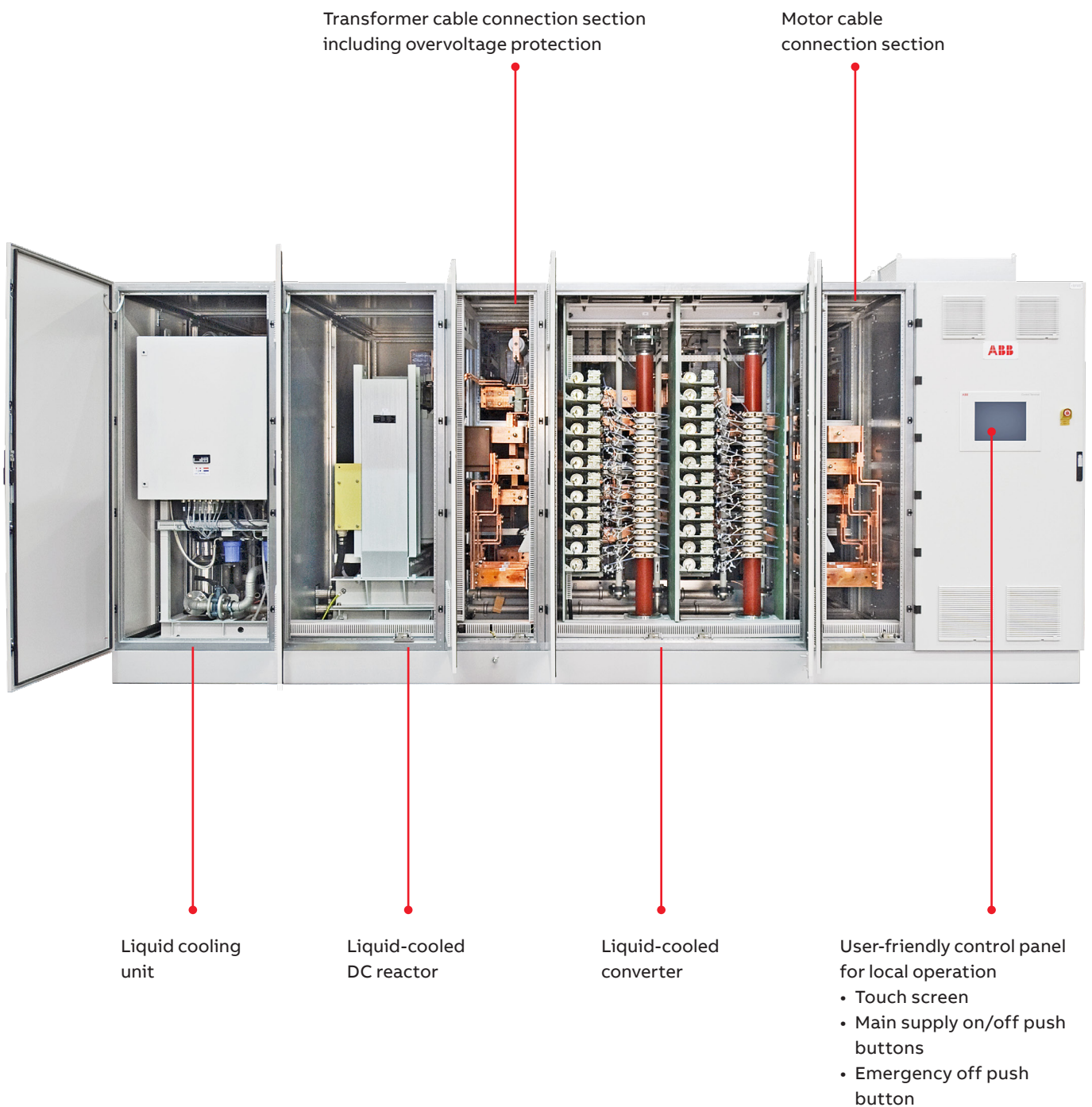
# Air-cooled MEGADRIVE-LCI

The air-cooled MEGADRIVE-LCI is used as soft starter and for driving your applications in the lower power range.



# Liquid-cooled MEGADRIVE-LCI

Increase efficiency with a liquid-cooled drive resulting in minimized losses into the equipment room and resistance to dusty and aggressive atmospheres.



# Technical data

Input	
<b>Input configuration</b>	6-, 12- or 24-pulse thyristor rectifier
<b>Input voltage</b>	Any voltage level can be applied to the appropriate primary side of the MEGADRIVE-LCI input transformer.
<b>Input voltage variation</b>	± 10% without derating +20/-50% with derating using MPTC (ride-through below -50%)
<b>Input frequency</b>	50/60 Hz
<b>Input frequency variation</b>	± 5%
<b>Input power factor</b>	Approximately 0.85 inductive at rated speed/load
<b>Input harmonics</b>	IEC 61000-2-4, IEEE 519, GB/T 14549-93 compliance possible
<b>Auxiliary voltage</b>	380 to 690 V AC 50/60 Hz, 3-phase, ±10%
<b>Control voltage</b>	90 to 300 V DC or 90 to 265 V AC 50/60 Hz, ±10%
Output	
<b>Output power</b>	2000 to 150000 kW (higher on request)
<b>Output voltage</b>	2 to 2 x 10 kV (2 x 25 kV)
<b>Output frequency</b>	0 to 120 Hz
<b>Motor type</b>	Synchronous
<b>Efficiency of converter</b>	>99%
Mechanical	
<b>Enclosure</b>	Standard: IP30 Optional air-cooled: IP31, IP41 Optional liquid-cooled: IP31, IP41
<b>Cable entry</b>	Bottom (optional from top)
Environmental	
<b>Altitude</b>	1000 m.a.s.l. (higher with derating)
<b>Ambient air temperature</b>	+5 to +40 °C (higher with derating)
<b>External cooling liquid temperature</b>	+2 to +32 °C (lower and higher with derating)
<b>Noise</b>	Liquid-cooled: ≤ 75 dB(A) Air-cooled: ≤ 85 dB(A)
<b>Cooling type</b>	Air, liquid
<b>Standards</b>	EN, IEC, CE, (optional CSA)



# Ratings, types and voltages

## MEGADRIVE-LCI drives

Motor data			Converter data			
Nominal ratings			Type code	Power (kVA)	Length (mm)	Weight (kg)
(kW)	(hp)	(A)				
<b>Liquid-cooled, 12/12-pulse</b>						
14000	19040	2350	W1212-211N465	15000	5350	8500
24000	32640	2350	W1212-372N465	26000	6250	10000
36000	48960	2350	W1212-563N465	40000	6450	11500
46000	62560	2350	W1212-714N465	50000	8050	17000
48000	65280	2350	W1212-774N465	53000	10050	19000
55000	74800	2350	W1212-855N465	60000	13850 <sup>1)</sup>	22000
64000	87040	2350	W1212-986N465	70000	13850 <sup>1)</sup>	23000
72000	97920	2350	W1212-1107N465	80000	13850 <sup>1)</sup>	24000
<b>Liquid-cooled, 12/12-pulse, with n+1 thyristor redundancy</b>						
14000	19040	2350	W1212-212R465	15000	6050	9000
24000	32640	2350	W1212-373R465	26000	6250	11500
36000	48960	2350	W1212-564R465	40000	8050	14500
46000	62560	2350	W1212-715R465	50000	8050	18000
48000	65280	2350	W1212-775R465	53000	10050	20000
55000	74800	2350	W1212-856R465	60000	13850	23000
64000	87040	2350	W1212-987R465	70000	13850	24000
72000	97920	2350	W1212-1108R465	80000	13850	25000
<b>Air-cooled, 12/12-pulse</b>						
9100	12376	1600	A1212-211N465	10000	7250 <sup>2)</sup>	7000
15800	21488	2000	A1212-302N452	17000	4950	8000
23900	32504	2000	A1212-453N452	26000	6750	11500

Indicative information only

LCI depth in back to back configuration: 2250 mm

<sup>1)</sup> Increased depth to 2450 mm

<sup>2)</sup> No back to back configuration, depth: 1125 mm

# Ratings, types and voltages

## MEGADRIVE-LCI soft starters

Nominal ratings			Converter data			
(kW)	(hp)	(A)	Type code	Power (kVA)	Length (mm)	Weight (kg)
<b>Air-cooled, 6/6-pulse</b>						
4600	6256	1800	A0606-211N465	6000	5250 <sup>1)</sup>	6000
8700	11832	1800	A0606-372N465	11000	5950 <sup>1)</sup>	7000
13100	17816	1800	A0606-553N465	17000	5250	9500
16700	22712	2200	A0606-594N452	22000	5250	10500
20500	27880	2200	A0606-715N452	27000	6750	14000
<b>Air-cooled, 12/12-pulse</b>						
9200	12512	1800	A1212-211N465	12000	7450 <sup>1)</sup>	7000
17400	23664	1800	A1212-372N465	23000	5250	9000
26200	35632	1800	A1212-553N465	34000	6750	12000
33400	45424	2200	A1212-594N452	44000	6750	13000
41000	55760	2200	A1212-715N452	54000	11950	18000
<b>Air-cooled, 12/6-pulse</b>						
6300	8568	1800	A1206-131/1N465	7000	7250 <sup>1)</sup>	7000
9200	12512	1800	A1206-171/2N465	11000	7650 <sup>1)</sup>	8500
16000	21760	1800	A1206-332/3N465	18000	5250	10000
17400	23664	1800	A1206-372/4N465	20000	5250	11000
23800	32368	2200	A1206-413/5N452	27000	6750	14000

Indicative information only

LCI depth in back to back configuration: 2250 mm

<sup>1)</sup> No back to back configuration, depth: 1125 mm

# Ratings, types and voltages

## MEGADRIVE-LCI gas turbine starters

Nominal ratings			Converter data			
(kW)	(hp)	(A)	Type code	Power (kVA)	Length (mm)	Weight (kg)
<b>Air-cooled, 6/6-pulse</b>						
4500	6120	1600	A0606-211N465	5000	3850 <sup>1)</sup>	4500
9000	12240	2000	A0606-302N452	10000	4550 <sup>1)</sup>	7000
11800	16048	2000	A0606-453N452	13000	6250	8500
15500	21080	2000	A0606-604N452	18000	6250	8500
<b>Air-cooled, 12/6-pulse</b>						
5300	7208	1800	A1206-111/1N465	6000	5850 <sup>1)</sup>	5800
9000	12240	1800	A1206-171/2N452	10000	6250 <sup>1)</sup>	9000
11800	16048	2000	A1206-232/3N452	13000	7450	10000
15500	21080	2000	A1206-302/4N452	18000	7450	10000

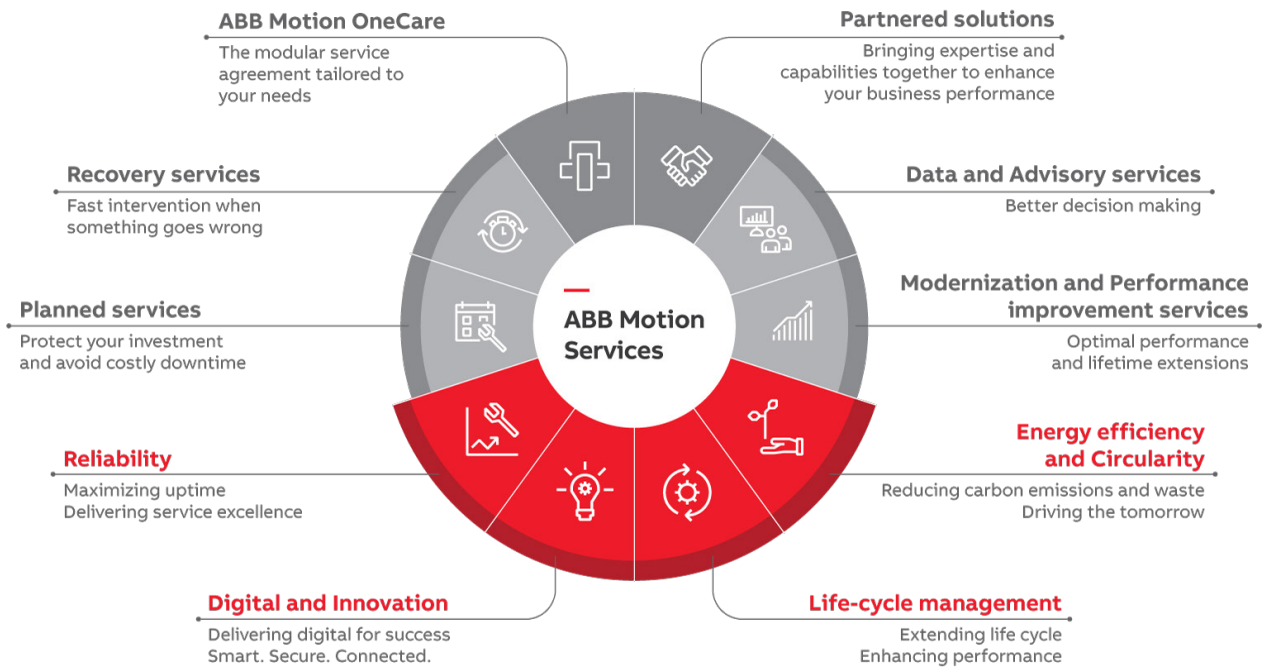
Indicative information only

LCI depth in back to back configuration: 2250 mm

<sup>1)</sup> No back to back configuration, depth: 1125 mm

# ABB Motion Services

ABB Motion Services helps customers around the globe by maximizing uptime, extending product life-cycle, and enhancing the performance and energy efficiency of electrical motion solutions. We enable innovation and success through digitalization by securely connecting and monitoring our customers' motors and drives, increasing operational uptime, and improving efficiency. We make the difference for our customers and partners every day by keeping their operations running profitably, safely and reliably.



**OUR EXPERTISE**  
**YOUR ADVANTAGE**

# ABB Ability™ Digital Powertrain

## Condition monitoring for powertrains



Accurate, real-time information about powertrain events. When you have the facts, you can make the right decisions.

ABB Ability™ Condition Monitoring for powertrains gives you self-service access to the ABB Ability™ Digital Powertrain portal. It provides real-time, fact-based insight into your powertrain assets, such as drives and motors, via KPIs and signal data, to identify irregularities before they become problems. This helps you make proactive decisions, built on real-time information – and saves you money!

### The service can be tailored to fit your needs

Our standard package gives you industry leading monitoring capabilities – whether you want to view the drive status through ABB's Internet portal or integrate this data with your existing monitoring systems.

### The standard package includes the following services:

- Self-service condition monitoring
- Alarm Management
- Asset Health
- Team Support
- Backup Management

### The standard package can be supplemented with optional services:

- Offline Data Collection
- Expert Reports
- Remote Assistance
- Plug & Play Connectivity
- Monitoring Service



### Solid fact-based decision making

Get the facts, and the history, to help run your operations better and more safely.



### Always stay one step ahead of problems

Recognize early signs of possible failures and assess the risks, before they turn into serious operational issues.



### Find the root cause of process issues

Remotely access data from ABB drives built-in sensors to track the cause of problems. Get back to smooth operation quickly with data back-ups.



### Remotely analyze and optimize drives

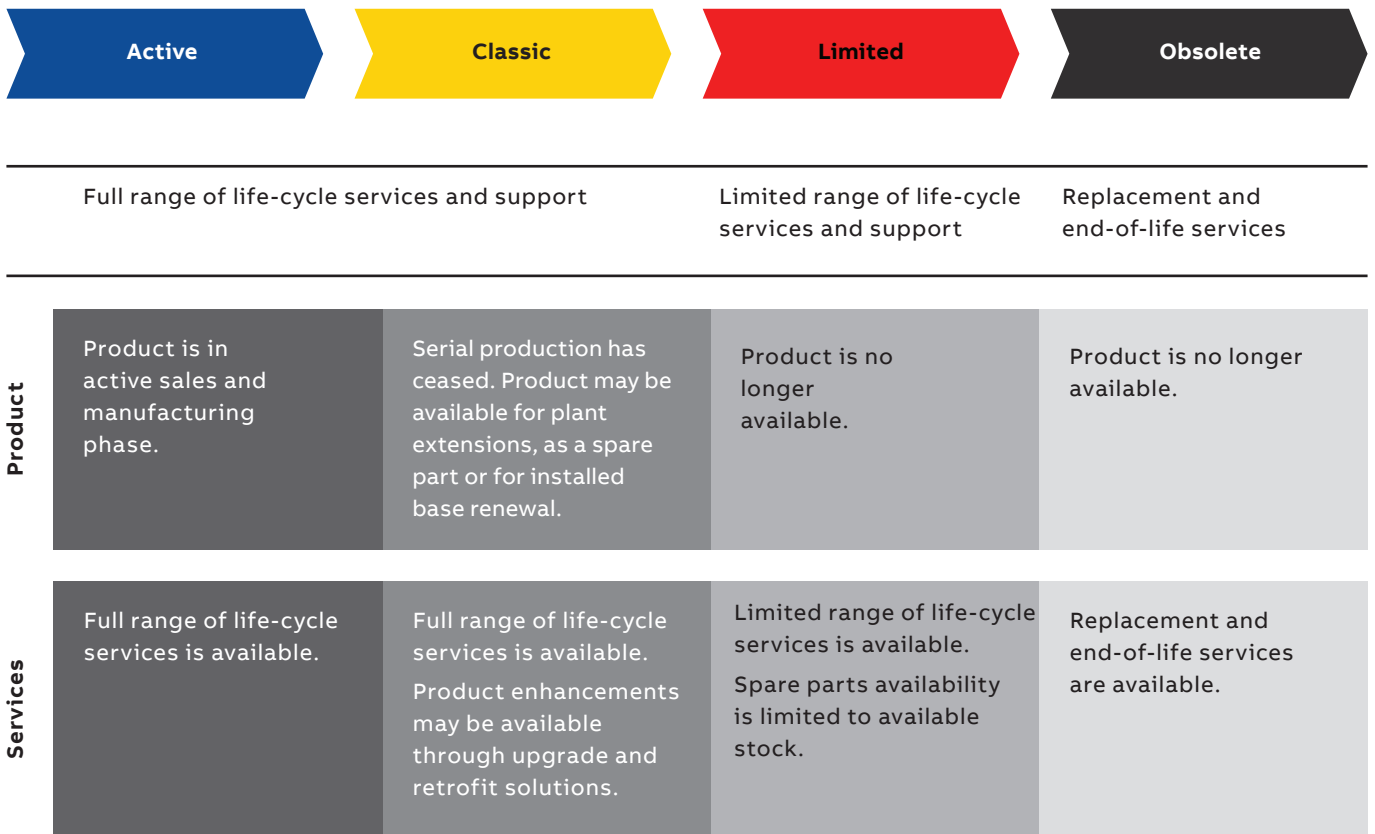
Get critical drive information anywhere anytime – even in difficult to access sites, or when a site visit is impossible.

# A lifetime of peak performance

You're in control of every phase of the life of your drive. At the heart of drive services is a four-phase product life-cycle management model. This model defines the services recommended and available throughout your drive's lifespan.

Now it's easy for you to see the exact service and maintenance available for your drives.

**ABB drives life-cycle phases explained:**



**Keeping you informed**

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

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

**Step 1**

**Life-cycle Status Announcement**

Provides early information about the upcoming life-cycle phase change and how it affects the availability of services.

**Step 2**

**Life-cycle Status Statement**

Provides information about the drive's current life-cycle status, the availability of product and services, the life-cycle plan, and recommended actions.









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For more information, please contact  
your local ABB representative or visit

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