Service information

Original Service
Wellness for your wallet
As a market and technology leader, ABB Turbocharging is committed to delivering high quality turbocharger products and services for engines with outputs over 500 kW.

This commitment takes two complementary forms:

- Building the best turbochargers in the business
- Assisting customers to maintain those turbochargers in peak condition and at optimum performance throughout their entire life cycle

Only in this way can ABB Turbocharging enable consistently high levels of engine performance, fuel efficiency and emissions at economic maintenance costs.

Original Service from the source
Fulfilling these goals requires us to be as versatile as a Swiss army knife. Starting at the product development stage for all ABB turbochargers, long service life and ease of maintenance, repair and overhaul share equal priority with performance criteria like efficiency and pressure ratio.

Out in the field, the reliability, robustness and low wear rates designed into every turbocharger are matched by ABB Turbocharging’s dedication to ensuring that all the expertise and experience available only to the original equipment manufacturer, or OEM, are incorporated into:

- Original Parts in the highest quality
- The highest levels of Original Service in all maintenance, repair and overhaul work

Global Original Service
All ABB Turbocharging Service facilities are part of a wholly ABB-owned network of outlets under the direct control of the Swiss Service Center. They have direct access to the technology and know-how of the global manufacturing network and are:

- Equipped to the same high standards
- Use the same, frequently updated Original Service practices
- Employ service staff trained and qualified in-house at the Swiss Training Center

Customer proximity
With over 100 Service Stations, strategically located at major centers of engine activity, ABB Original Service is at hand wherever you are in the world.

First class logistics
Our sophisticated spares stocking and transport arrangements at our Swiss Service Center run like a Swiss watch. They underpin a 24 hour order-to-dispatch system which makes every Original Parts order a fast track order.

ATURB spares tracking
Backing the central inventory of Original Parts in Switzerland are stocks held by the regional Service Stations. Details and locations of all Original Parts are saved in the ATURB Original Parts management system at headquarters in Switzerland. All ABB Turbocharging Service Stations have full access to ATURB to facilitate optimum sourcing of spares.

ATURB product documentation
The ATURB database also contains full details of every component fitted to every new ABB turbocharger and tracks the service history of every turbocharger, including the components renewed over its total lifespan.
Our proactive Original Service solutions center on our:
- OPAC Operation Performance Package
- MMA Maintenance Management Agreements
- AMA Auxiliary Engine Maintenance Agreements

These offerings provide simplified scheduling and monitoring of work and Original Parts procurement, while allowing servicing to be coordinated with engine operating schedules.

**OPAC**
With OPAC, engine operators delegate maintenance, repair and planned overhauls of turbochargers entirely to the global ABB Turbocharging Service network. Eligible for OPAC delegated servicing are 2- and 4-stroke diesel engines in both marine and stationary applications.

For a fixed price per operating hour and an agreed number of operating hours – for example 20,000 or 60,000 – ABB Turbocharging Service takes over responsibility for the reliable, economic operation of the turbocharger. The benefits are less administrative work for the end user and prompt, well planned servicing and preventive maintenance. All Original Service work is carried out by ABB Turbocharging’s highly qualified technicians using only ABB Turbocharging Original Parts.

OPAC agreements can also be customized to specific service requirements based on detailed assessment of the turbocharger operating profile.

**MMA, AMA**
MMAs and AMAs target turbocharger end users wanting close support of servicing rather than complete delegation. ABB Turbocharging proactively informs the turbocharger user of an approaching service event well in advance and prepares a quotation in the form of standardized, predefined packages, including negotiated fixed labor rates. MMAs and AMAs give the turbocharger end user the benefits of early ordering while allowing ABB Turbocharging to support the management of the equipment.

**Local response**
When you need us, our qualified specialists at all our Service Stations around the world work to identical standards to ensure professional repairs at the best geographically located Service Station. All you do is contact your local ABB Service Station, who will arrange everything with the Service Station nearest to your turbocharger. Your staff will benefit from working with an identifiable, familiar contact person in the same language and same time zone; you can pay in your local currency and do business under your local legal system.

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<th>Features</th>
<th>Benefits</th>
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<td>Original Parts direct from the OEM</td>
<td>Sure to perform</td>
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<td>Original Service direct from the OEM</td>
<td>Optimum performance, right first time</td>
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<td>OEM technicians highly trained in Original Service at over 100 Service Stations around the globe</td>
<td>Ready access to professional application consulting</td>
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<td>ATURB product and service database</td>
<td>Minimized downtime, maximized availability</td>
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<td>Worldwide ABB Turbocharging Service network</td>
<td>Rapid response based on close knowledge of your turbocharger/application</td>
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<td>Technical consulting: 24 hour, all-year round service</td>
<td>Direct, local access to ABB Turbocharging</td>
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<tr>
<td>Extensive stocks of Original Parts for all current turbochargers</td>
<td>Original technology and know-how</td>
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<td>Fast problem solving from the most reliable source</td>
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<td>Extensive stocks of Original Parts for all current turbochargers</td>
<td>24 hour availability of 98% of all Original Parts ABB turbochargers</td>
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Emphasizing our promise of 98% Original Parts availability, the following case study illustrates the smooth working of ABB spares logistics even where Original Parts are not currently in stock and must be manufactured.

**Dateline Panama/Switzerland, time difference 7 hours, fast track delivery of rotor parts to ABB Service Station Panama**

- Tuesday, a.m. Panama: customer accepts ABB offer for repair of two rotors. Parts order placed with Switzerland Service Center. Delivery required Friday, p.m. Panama.
- Tuesday, 16:30 Switzerland, 09:30 Panama: impeller not in stock, can be manufactured immediately.
- Tuesday, 17:00 Switzerland, 10:00 Panama: logistics organized.
- Tuesday, 22:00 Switzerland, 15:00 Panama: complete consignment collected by forwarding agent’s vehicle.
- Wednesday: air freight transportation of consignment from Switzerland to Panama. Arrives p.m. Panama.
- Thursday, a.m. Panama: Import formalities finalized.
- Thursday, 14:00 Panama: parts reach ABB Service Station. Work starts on rotor.
- Thursday, 20:00 Panama: impeller fitted, rotor rebalanced, reground, rebalanced.
- Friday, Panama: rotor delivered to customer.

Our sophisticated Original Parts stocking, transport and forwarding arrangements at our Swiss Service Center underpin a 24 hour order-to-dispatch commitment.

Located close to our Swiss turbocharger works, complete machines, components and assemblies not available from our extensive stocks can be obtained at short notice and rapidly prepared for shipment.

*case documented in the ABB Turbocharging Turbo Magazine*
ABB Turbocharging Original Parts
The cornerstone of turbocharger reliability, efficiency and availability.

1, 2, 3 The accuracy of the complex aerodynamic shapes of turbine and impeller blades is crucial to turbocharger efficiency.
4, 5, 6 The surface quality of air and gas path parts is vital in preventing aerodynamic losses.
7, 8, 9 Before and after. The strength and ductility of turbocharger housings are central to preventing disintegrated rotor parts breaking out and putting life and property at risk.

9 Badly distorted, this original ABB housing nonetheless passed its "containment test".
By choosing only ABB Turbocharging Original Parts, your turbocharger will be restored as close as possible to its day one condition. The result is the power, emissions, fuel consumption, availability and life cycle costs you expect from your engine.

As well as producing parts for service on the same high technology machine tools as parts for new turbochargers, and according to original works drawings, the composition and properties of their materials must all conform to ABB’s own stringent specifications. Indeed, many of the materials are either patented or were developed specifically for ABB to ensure low rates of wear for long effective life and high operational safety.

**Component geometry – the shape of efficiency**

As in all turbomachinery, the dimensional accuracy of turbocharger components is critical in attaining thermodynamic and aero-dynamic efficiency.

Consider: inaccurate parts geometry can cause a major deterioration in your engine’s performance and fuel efficiency. Likewise, steps at joints and rough surface quality on gas and air path parts can affect aerodynamic efficiency by causing turbulence.

For these reasons, accurate component geometry and excellent surface condition is paramount in the production of both new Original Parts and our CPEX guaranteed reconditioned parts. Moreover, during a repair or overhaul, our service engineers take great care to get the best match of tolerances between turbine and compressor wheels and the casings they run in.

**Material specifications – the stuff of longevity, durability and safety**

The chemical composition, heat treatment and surface condition of all ABB turbocharger materials are closely controlled to ensure that each part performs to your satisfaction over its assigned SIKO lifetime. For components like turbines, compressor impellers, shafts and casings, the materials of these vital rotating and gas and air path parts are chosen to withstand extreme heat and abrasive particles as well as the highest mechanical stresses.

**Containment**

In the case of compressor and turbine housings, this includes the selection and testing of materials with the strength and ductility to withstand intense shock loading.

In the worst-case “containment” scenario, this involves making certain that casings hit by fragments of compressor impellers and turbine wheels and blades distort but do not break. In this way, fragments remain within the turbocharger structure and are prevented from flying under great force into the engine or engine room where they can endanger property and human life and limb.

**Facts and figures**

To get an idea of the forces at play in a turbocharger: the blade tips of the rotor can turn at up to around 600 meters per second, i.e. almost 2100 km/h; the centrifugal force exerted by a turbine blade on its fixation can be almost 100 tons per blade, i.e. the weight of a locomotive; the centrifugal force of all blades can amount to 3200 tons, which is around the maximum take-off weight of ten jumbo jets.

The high quality of ABB Turbocharging Original Parts is the bedrock of their performance. They incorporate all the technology, knowledge and experience of turbocharger design and operation available only to the OEM.
Non original parts and non original service – worth the money?

Rectifying turbocharger faults arising from non original parts and non original service has become a core competence at ABB Turbocharging Service Stations.

**Geometry**
The efficiency of turbochargers depends on tight tolerances between their moving parts and casings. Turbocharger rotor to housing clearances are precisely calculated to maximize efficiency. They are in the region of 0.66 millimeter – the thickness of about 5 human hairs. Nonetheless, in a logarithmic progression, an increase of only 0.1 millimeter would mean the loss of over 1 % turbocharger efficiency. Similarly, aerodynamic efficiency can be severely affected by turbulences caused by rough internal surfaces and steps at joints.

**Double trouble**
These potentials apply to both the turbine and compressor. Their cumulative effect can lead to an appreciable deterioration in fuel consumption. A leading engine builder has indicated that a 1 % reduction in turbocharger efficiency translates into over ½ gram per kilowatt hour (g/kWh) higher specific fuel consumption. Hence, a medium-sized low-speed engine rated 50 MW with a turbocharger 2 % below its design efficiency will use more than 200 tons of extra fuel in a 6000 hour operating year. This equates to 100,000 US dollars at a fuel price of 500 USD per ton.

**Engine operation**
ABB Turbocharging has documented cases where the use of non original parts prevented steady-state turbocharger operation (surging) or meant steady-state operation was only achievable at reduced engine power and fuel efficiency. This led to:
- Enforced slow steaming and slippage in vessel schedule
- Financial penalties in baseload electrical power generation applications
- Reduced transient engine response
- Excessive vibration leading to accelerated wear and reduced safety

**Safety**
The failure of turbocharger casings to contain rotor fragments could lead to consequential losses, including personal injuries. Turbocharger failure leading to complete loss of engine power could leave a vessel “dead-in-the-water” on the high seas or a town without electrical power.

**Operating economics**
Rectifying problems due to non original parts and non original service leads to:
- Duplication of repair costs
- Delayed departure/extra harbor dues as high as USD 15,000 * per day
- Possible cost of additional sea trials
- Possible cost of new turbocharger

**Environmental impact**
Higher fuel consumption leads to higher emissions of greenhouse gases. Increased harmful emissions – especially NOx and visible particulates – can lead to:
- Loss of incentives, e.g. Norway
- Prohibition from port entry
- Fines
- Unpleasant environment for cruise or ferry passengers

* 70,000 GT container ship overstaying 5 day fee period, Hamburg.

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<th>Deviation from ABB specification</th>
<th>Efficiency</th>
<th>Stability</th>
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<th>Safe operation interval</th>
<th>Containment</th>
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<tr>
<td>Turbine and compressor geometry</td>
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<td>Turbine and compressor material quality</td>
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<td>Rotor hub geometry</td>
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<td>Shroud thickness</td>
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<td>Shroud gap</td>
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The table shows major areas where inaccurate machining, out-of-specification materials and poor surface finish on non original gas and air path components can affect turbocharger performance.
Network standards

Global uniformity
To ensure a uniform, rapid response to the needs of turbocharger end users and consistent standards of workmanship, all ABB Turbocharging Service Stations:
- Are equipped to the same high technical standards
- Use the same, frequently updated turbocharger servicing practices

The human element
Having Original Parts and the best OEM equipment is only part of the equation. The benefits of OEM know-how that derive from ABB Turbocharging Original Parts apply equally to the high level of workmanship our service engineers and technicians put into Original Service from ABB Turbocharging.

ABB Turbocharging ensures the highest quality in a finished Original Service using Original Parts via the continuous qualification of our service engineers.

Siting our Training Center next to our main producing works in Switzerland ensures ready access to the latest turbocharger technology and the immediate transfer of works know-how.

Minimized downtime
This ensures minimal downtime, while the quality of OEM components and workmanship result in maximized long term turbocharger efficiency and reliability, translating into dependable operation between scheduled overhauls.

Right first time
A very tangible benefit of using Original Parts with our official warranty, fitted by ABB Turbocharging’s OEM qualified technicians during Original Service work, is the extremely high probability that maintenance, repairs and overhauls will be right at the first time of asking.
Customer proximity

Where engines are built, used and maintained
Typical ABB Turbocharging sites include major seagoing and inland waterway ports; centers of shipbuilding; areas of oil and gas exploration and production; clusters of diesel and gas engined power and cogeneration plants; mineral rich regions with open cast mining; major locomotive builders and rail maintenance depots; and, naturally, centers of engine building.

Direct access to Original Service and OEM technology
As well as being readily accessible geographically, the fact that all ABB Turbocharging Service facilities are wholly ABB-owned and under the direct control of the Swiss Service Center means that service customers have direct access to all the product know-how and application experience of a market and technology leading OEM of turbochargers for large 2- and 4-stroke diesel and gas engines. This is a major aspect of our “OEM Advantage”.

Our mission
We see it as our mission to make available to end users of ABB turbochargers the full benefit of our unique fund of expertise in turbocharger manufacturing and service.

In the past five years ABB Turbocharging has invested heavily in its network of wholly owned turbocharger Service Stations. The current count is over 100 Service Stations, strategically located at major centers of large engine activity.
Your turbocharger is a bundle of energy. With the SIKO Safety Design Concept, ABB Turbocharging has a potent tool for proactively managing and controlling this source of power.

**Original Parts and SIKO**

The ideal counterpart to ABB Original Parts, the SIKO Safety Design Concept is ABB Turbocharging’s central tool for establishing maximum running time parameters for vital turbocharger components. It involves the definition of the optimum number of running hours for a given component before its replacement. It results in the assignment of an effective lifetime for that component as the basis for the planning of turbocharger inspection, maintenance and overhaul.

In combination with original ABB new or reconditioned CPEX parts, SIKO allows you to restore your turbocharger to peak performance and safety at every ABB Turbocharging Original Service event, whether maintenance repair or overhaul.

**A firm basis**

SIKO effective lifetimes are based on a powerful combination of extensive turbocharger testing, wide operating experience and precise statistical and fatigue analysis. Operating experience includes dedicated turbocharger and component trials and tests at the ABB Turbocharging Technical Center in Switzerland as well as on engines on test stands at leading engine builders and under commercial operation in the field.

The major statistical input derives from our comprehensive ATURB turbocharging documentation database. ATURB tracks the operating and complete service histories of all the 190,000 plus population of ABB turbochargers in use worldwide. Crucially, it also tracks their components, including the condition of used parts on replacement.

SIKO and Original Parts from ABB Turbocharging are your best route to:
- High engine power
- High fuel economy
- High reliability
- High availability
- High operational safety
ABB Turbocharging Service network

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