Purpose
The assembly instructions explain how the ABB turbocharger is fitted to the engine correctly and without any health and safety risks.

Target group
The assembly instructions are intended for engineers and mechanics responsible for fitting the turbocharger on the engine.

VTR turbocharger
More power, less fuel
# Assembly Instructions

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1 Introduction

1.1 Purpose of the assembly instructions

The assembly instructions explain how the ABB turbocharger is fitted to the engine correctly and without any health and safety risks. This element of the documentation is supplied with the product, as is required for partly completed machinery in accordance with machinery directive 2006/42EC.

The assembly instructions are a complement to and expansion of existing national regulations for occupational safety, accident prevention and environmental protection.

1.2 Definition of target group

The assembly instructions are intended for engineers and mechanics responsible for fitting the turbocharger on the engine. Basic mechanical training is a prerequisite.

All persons who are involved in the transportation and installation of the turbocharger have read and understood the assembly instructions.

1.3 Symbols and definitions

The following symbols are used in the documents:

- Prerequisite
- Work step
  - Enumeration, first level
  - Enumeration, second level
  → Refers to a page number

The trademarks of outside companies are used in this document. These are marked with the ® symbol.

Design variants

This document is valid for different design variants of turbochargers. There may be sections and descriptions of components that are not relevant for a specific turbocharger variant.

ABB Turbocharging Service Stations will be happy to provide information on questions regarding a design variant (see Contact information at www.abb.com/turbocharging).

Accuracy of illustrations

The illustrations in this document are general in nature and intended for ease of understanding. Differences in detail are therefore possible.
ABB Turbocharging

ABB Switzerland Ltd, Turbocharging is identified as ABB Turbocharging in this document.

Official service stations of ABB Turbocharging

Official service stations are regularly audited and certified by ABB Turbocharging. See also chapter Contact address and after-sales service.

1.4 Definition of warning, caution, note

WARNING

Definition of warning
Serious personal injuries and even accidents with fatal consequences may occur if work and operating instructions marked with this symbol and the word WARNING are either not followed or not followed precisely.

〢 Warning signs must be observed at all times.

CAUTION

Definition of caution
Serious machine or property damage may occur if work and operating instructions marked with this symbol and the word CAUTION are either not followed or not followed precisely.

〢 Caution signs must be observed at all times.

NOTICE

Note
A note provides suggestions which facilitate the work on the product.
1.5 Definition of mandatory signs

**To be worn at all times**

| Protective clothing | Safety footwear to protect against mechanical hazard and risk of falling |

Table 1

**To be worn according to the specific work**

| Safety glasses | Safety goggles |
| Safety gloves against - Mechanical hazard - Chemical hazard - Thermal hazard | Respiratory mask against - Dusts - Gases |
| Safety helmet | Ear protection |

Table 2

1.6 Definition of pictograms

The following pictograms can occur in this document. These point out actions that must be taken in accordance with the meaning of the relevant pictogram.

<table>
<thead>
<tr>
<th>Pictogram</th>
<th>Meaning</th>
<th>Pictogram</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Tighten with specified torque</td>
<td>Oil free, grease free and dry</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tighten over specified tightening angle</td>
<td>Affix</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hand-tight, tighten without tools</td>
<td>Measure</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Oil</td>
<td>Note</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Apply screw locking paste (e.g. Loctite)</td>
<td>Visually inspect</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Apply high-temperature grease</td>
<td>See document</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Apply other paste in accordance with specifications</td>
<td>Dispose of in an environmentally compatible, professional way and in compliance with locally applicable regulations.</td>
<td></td>
</tr>
</tbody>
</table>

Table 3: Pictograms
2 Safety

2.1 Introduction

State of the art
Turbochargers manufactured by ABB Turbocharging are state of the art and comply with the pertinent safety and health-protection requirements that applied when the turbocharger was manufactured. Consequently, the turbocharger is safe to operate.

CE conformity information
ABB turbochargers fulfil machinery directive 2006/42/EC and are considered partly completed machinery as defined by Article 2 g.

Residual risks
Nevertheless, during turbocharger operation and when working on the turbocharger, residual risks can exist which:

- Are caused by the turbocharger itself or its accessories.
- Are caused by the operating and auxiliary materials used.
- Are a consequence of insufficient compliance with safety instructions.

All instructions contained in this chapter must be observed during all work on the turbocharger.

Responsibility of the operating company
In awareness of its responsibility, the operating company must ensure that only authorised personnel work on the turbocharger, who:

- Correspond to the target group (see Definition of target group →2).
- Are versed in the general and locally applicable regulations for occupational safety and accident prevention
- Are equipped with the prescribed personal protective equipment
- Have been instructed in the use of the turbocharger.

The safety-conscious work of the personnel and adherence to the assembly instructions must be checked periodically.

Suitable working materials and personal protective equipment must be kept in a perfect condition.
2.2 Lifting loads

**WARNING**

Suspended loads

 Loads not suspended in compliance with regulations may lead to personal injury or accidents with fatal consequences.

- Loads must always be fastened to technically perfect lifting gear with sufficient loading capacity.
- Make sure the load is suspended properly on the crane hook.
- Do not let anyone stand beneath a suspended load.

Wear safety gloves to protect against mechanical hazards.

Wear safety helmet.

If there are two or more suspension points, the attachment angle of 45° must not be exceeded. This prevents excessive loading due to diagonal pull.

- Use a suitable edge guard if there are sharp edges.
- The assembly devices must be completely screwed in and must not unscrew during use.
- Use assembly devices only for the described applications.
2.3 Occupational safety

General

⚠️ WARNING
Injuries to persons
Severe injuries to personnel or fatal accidents can be caused by mechanical influences as a consequence of hazardous and inadequate operational procedures or non-compliance with safety and health standards.

- When working on the turbocharger always wear safety footwear and protective clothing to protect against mechanical hazards.
- Keep personal protective equipment in perfect condition.
- Obey mandatory signs.
- Observe the general rules for occupational safety and prevention of accidents.
- Only perform operations that are described in this chapter.
- Only perform operations for which you have received instruction or training.

Wear safety footwear to protect against mechanical hazard and risk of falling.

Wear protective clothing.

⚠️ WARNING
Risk of falling
When working on the turbocharger, there is a risk of falling.

- Do not climb onto the turbocharger or onto attached parts and do not use them as climbing aids.
- Use suitable climbing aids and working platforms for work above body height.

- Only perform work on the turbocharger when you are in a physically and psychologically stable condition.
- Only work with suitable tools, equipment and appliances that function properly.
- Keep the workplace clean; clear away any loose objects and obstacles on the floor.
- Keep the floor, equipment, and turbocharger clean.
- Have oil binding agents ready and provide or keep oil pans at hand.

Welding work close to the turbocharger
- If welding work is being carried out in the vicinity of the turbocharger, cover the filter silencer so that the filter mat is not damaged.
Remove combustible objects and substances out of the range of flying sparks.
Cover all connections on the turbocharger so that no foreign objects can get into the turbocharger.
Wear personal protective equipment (PPE) for welding operations.

**Mechanical hazards when working on the turbocharger**

<table>
<thead>
<tr>
<th>WARNING</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mechanical hazard</strong></td>
</tr>
<tr>
<td>Severe injuries to personnel or fatal accidents can be caused by mechanical influences as a consequence of hazardous and inadequate operational procedures.</td>
</tr>
<tr>
<td>▶ Observe the general rules for occupational safety and prevention of accidents.</td>
</tr>
<tr>
<td>▶ Ensure workplace safety.</td>
</tr>
<tr>
<td>▶ Only perform operations that are described in this chapter.</td>
</tr>
<tr>
<td>▶ Only perform operations for which you have previously received instruction or training.</td>
</tr>
</tbody>
</table>

**Hazards due to operating materials and supplies**

Operating materials and supplies can include: Oils, greases, coolants, cleaning agents and solvents, acids or similar substances.

<table>
<thead>
<tr>
<th>WARNING</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Handling operating materials and supplies</strong></td>
</tr>
<tr>
<td>Swallowing or inhaling vapours of operating materials and supplies or contact with them may be harmful to health. Flammable and combustible operating materials and supplies can catch fire or resulting vapours can lead to an explosion.</td>
</tr>
<tr>
<td>▶ Do not breathe in these substances and avoid contact with the skin.</td>
</tr>
<tr>
<td>▶ Ensure proper ventilation.</td>
</tr>
<tr>
<td>▶ Observe the information in the material safety data sheet for the operating materials and supplies.</td>
</tr>
<tr>
<td>▶ Comply with local legislation.</td>
</tr>
</tbody>
</table>

Wear safety goggles.
Wear safety gloves to protect against chemical hazards.
Wear a respiratory mask to protect against gases.
3 Weight and transportation of the turbocharger

Lifting gear with a sufficient load limit must be used for installing the turbocharger. The following weight specification applies to the heaviest variant possible. Depending on the specification, the weight specified on the rating plate may be lower than the standard value specified here.

Weights of the complete turbocharger

<table>
<thead>
<tr>
<th>Product</th>
<th>Weight [kg]</th>
</tr>
</thead>
<tbody>
<tr>
<td>VTR 160</td>
<td>140</td>
</tr>
<tr>
<td>VTR 161</td>
<td>263</td>
</tr>
<tr>
<td>VTR 200</td>
<td>190</td>
</tr>
<tr>
<td>VTR 201</td>
<td>250</td>
</tr>
<tr>
<td>VTR 250</td>
<td>360</td>
</tr>
<tr>
<td>VTR 251</td>
<td>432</td>
</tr>
<tr>
<td>VTR 320</td>
<td>770</td>
</tr>
<tr>
<td>VTR 321</td>
<td>870</td>
</tr>
<tr>
<td>VTR 400</td>
<td>1180</td>
</tr>
<tr>
<td>VTR 401</td>
<td>1420</td>
</tr>
</tbody>
</table>

Table 4
4 Installing the turbocharger

NOTICE

Strength classes of foot fixing screws
For installation of the turbocharger, foot fixing screws in accordance with strength class 10.9 or 12.9 have to be used.

- Attach lifting gear to the turbocharger.
- Align turbocharger on bracket and place it.
- Tighten foot fixing screws with the admissible tightening torque.
- Remove the lifting gear.

4.1 Completion work, if required

- Attach all gas, air, water and oil pipes in accordance with the enginebuilder's instructions.
- Fit speed sensor and plug in cable connector.
5  Storage of new turbochargers and spare parts

Storage of new turbochargers and spare parts up to 6 months

New turbochargers and spare parts from ABB Turbocharging can be stored in sealed packaging without additional mothballing measures for up to 6 months from the date of delivery (marked by the VCI label on the package).

Volatile Corrosion Inhibitor (VCI)

Only dry rooms in which the relative humidity is between 40…70 % and no condensation can form are suitable for storage.

Storage of new turbochargers and spare parts for more than 6 months (VCI)

**WARNING**

Protection of health when handling VCIs

VCI products are not hazardous in the sense of the Hazardous Substances Ordinance. Nevertheless, the following points are to be observed when handling VCIs:

- Ensure good room ventilation.
- Do not eat, drink or keep food at the workplace while working with VCIs.
- Wear safety gloves.
- Clean hands and face after working with VCIs.
- For further information refer to www.branopac.com.

Wear safety gloves to protect against chemical hazards.

The following mothballing measures are required every 6 months:

- Open the package.
- Remove the VCI corrosion protection emitter from the package and replace it with a new, identical VCI corrosion protection emitter. New VCI corrosion protection emitters can be obtained at www.branopac.com.
- Dispose of the old VCI corrosion protection emitter in an environmentally compatible manner, professionally and in accordance with local regulations.
- Seal the package. The better the external seal is designed, the more permanent the protection.
Long-term storage of turbochargers

The turbochargers will be prepared for prolonged storage by ABB Turbocharging on request. The package is equipped with a hygrometer (see illustration).

The following measures are required every 6 months:
- Check the hygrometer (02) in the sight-glass. There is an opening (01) in the wooden crate which allows this check to be carried out. When the display field has changed colour at the 70% level, the maximum permissible humidity has been exceeded. In this case, the turbocharger must be inspected by an ABB Turbocharging Service Station and repacked.
- Inspect the package for damage. If the package is damaged, the turbocharger must be inspected by an ABB Turbocharging Service Station and repacked.

After every 3 years the following work steps must be performed by an ABB Turbocharging Service Station:
- Inspect the component
- Replace the desiccant agent
- Repackage the component.

**NOTICE**

**Turbocharger ready for operation**

If the 70% field of the hygrometer (02) has not changed colour and the package is undamaged, the turbocharger can be put into operation without any prior inspection by an ABB Turbocharging Service Station.

Unpacking the turbochargers

The corrosion protection effect ends after the material is unpacked from the VCI package.

To avoid the formation of condensation, the surroundings and the content of the package must have the same temperature during unpacking.
5 Storage of new turbochargers and spare parts /
5 Storage of new turbochargers and spare parts /
6 Further information

The Operation Manual must be observed with regard to commissioning, operation, maintenance and ordering spare parts.

Operation Manual

The Operation Manual for the turbocharger with the relevant serial number is available online on our website www.abb.com/turbocharging.

The rating plate (01) is attached on the core hole cover of the turbocharger.

1. Read the serial number (02) on the rating plate (01) of the turbocharger.

The Operation Manual can be found online in accordance with the details on the following page.
2A.  
www.abb.com/turbocharging

2B.  
www.abb.com/turbocharging

3.  
ABB Turbocharging
ABB Turbocharging is a technology and market leader in the manufacture and maintenance of turbochargers for 500 kW to 80+ MW diesel and gas engines. With 100+ ABB-owned Service Stations worldwide and 200,000+ ABB turbochargers in operation across the globe on ships, power stations, gensets, diesel locomotives and large, off-highway vehicles, ABB Turbocharging is

4. Follow the instructions on the website.
Further information

Find your nearest Service Station on our website (see "Find your nearest Service Station").

Find and download the Operation Manual of your product on our website (see "Operation Manuals").

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Visit our website by scanning the QR code.