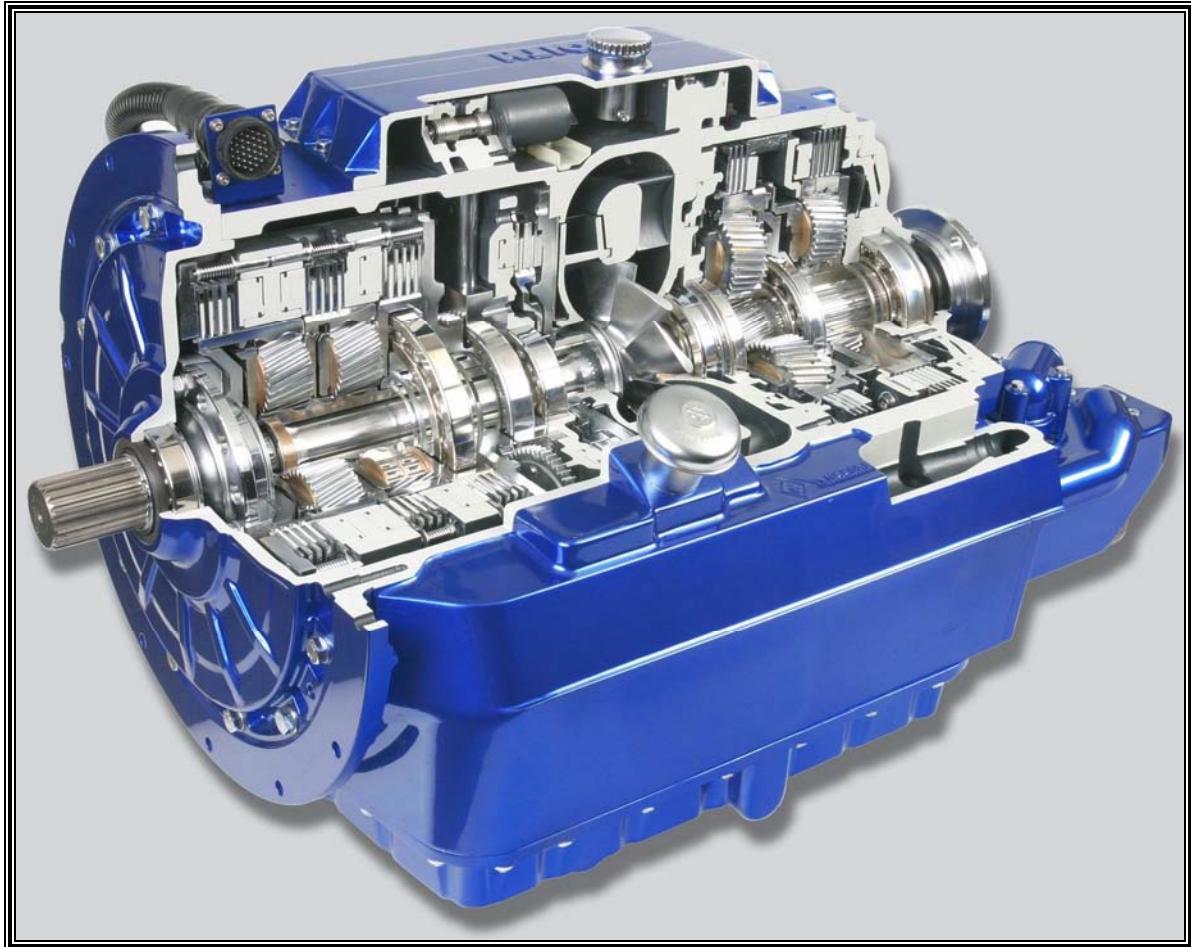


VOITH

X-Change Program Factory Remanufactured Transmissions



VOITH DIWA® - TRANSMISSIONS FOR TRANSIT BUSES

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SECTION 1.0 - INTRODUCTION

Thank you for using Voith's X-Change Program. This program is designed to provide our partners with transmissions that are rebuilt to a "like new" condition. This manual has been developed to provide you with important information to successfully purchase, install and operate factory reconditioned transmissions.

If at any time you have questions concerning participation and or use of this program please refer to this manual. If you have questions or concerns that require further information, or require warranty services please contact your local Voith Service Provider (VSP). If you are not sure who your VSP is, please contact your regional Voith Sales Manager.

Please reference the following phone numbers if you require assistance:

- X-Change Program questions please call 717-767-3268 or 717-767-3252
- Warranty questions and issues please call: 717-767-3254.
- Service or Technical questions and problems please call: 717-767-3286 or 717-767-3276.

Thank you.

Voith Turbo Inc.

SECTION 2.0 - ORDERING INSTRUCTIONS AND ON-LINE SERVICES

Thank you for using Voith's X-Change Program. This program is designed to provide our partners with transmissions that are rebuilt to "like new" condition. The Online ordering system has been developed to help the customer relay important information to place an order for Voith's X-Change rebuild program. This program is designed to save time and increase the efficiency of the ordering process for our customers.

Voith's Online Order Form:

1. Use the following link to access the X-Change Online Order Form: http://www.voithusa.com/road/e_vti.php
2. Fill out the form in its entirety. ALL required fields noted with a red asterisk must be filled in.
3. You must click **SUBMIT** at the bottom of the page. You will receive an Order Confirmation if the fields were filled out properly. If there are errors, please correct those errors and re-submit.

PLEASE NOTE: The clarity of the information you provide will assist us in completing the rebuild in a timely fashion. You will receive shipping papers and instructions to ship your unit to Voith within 24 hours (Monday - Friday) after placing your order. An example of the Online form is shown below.

X-Change On-Line Order Form

Note Please refer to the X-Change Handbook 2006 for instructions on completing this form and preparing your transmission for shipment. Items marked with * are mandatory.

Customer Information:

*First Name:

*Last Name:

*Phone #

*Fax #

*Email address:

***Company Billing Address:**

Company:

Street:

City:

Country:

State/Province:

Zip/Post code:

***Company Ship-to Address: same as billing**

Company:

Street:

City:

Country:

State/Province:

Zip/Post code:

Transmission Information # 1

*Serial #

*Model#

*Pattern#

*Type:

Order Information

*Purchase order #

Pricing as understood by customer

USD CDN

Requested Delivery Date

Note:
All transmissions must be returned with their oil cooler. All DIWA.2 transmissions must be returned with an ECU that has a serial number matching the transmission.

*Optional 6 Month Extended Warranty requested? Yes No

*Is this a "bus down" situation? Yes No

*Do you require the return of the same Serial # Transmission? Yes No

Has this transmission been rebuilt by VOITH before? Yes No Unknown

ATF Oil Type & Manufacturer:

Approx Mileage on transmission:

Description of failure and/or special instructions:

SECTION 2.1 - Placing An X-Change Order Via Fax

The preferred method to place your X-Change Order is to use the On-Line System. However, if you experience any problems with placing your order On-Line, you have the option to Fax your order to Voith.

To order an X-Change transmission via Fax.

1. Fax a detailed purchase order to **717-767-3210 (Attn: DIWA X-Change Program)**
2. Order acknowledgement will be sent in the form of your Bill of Lading (BOL) and shipping instructions.
3. You can confirm your facsimile by calling Voith directly at 1-877-374-1339 and ask for the DIWA X-Change Manager.

Please Note: When using Voith's X-Change program to place an order for a reconditioned transmission it is critical to provide the following information, which can be found on your unit's transmission tag:

- SERIAL NUMBER
- TYPE
- MODEL NUMBER
- PATTERN NUMBER

In addition, please note the following guidelines:

- It is essential that the transmission is properly prepared or "groomed" as outlined in the instructions in this handout. Failure to properly groom the unit could cause delays in processing and result in additional charges.
- You should have a return goods authorization number (RGA #) from Voith prior to shipping the transmission to the specified location.
- Please follow Voith's requirement for warranty registration.

On behalf of Voith, we thank you for using Voith's X-Change Remanufactured transmission program. Your transmission will be rebuilt to "like new" condition.

SECTION 3.0 - COMPLETE X-CHANGE TRANSMISSIONS

CORE ACCEPTANCE STANDARDS

1. The transmission core must be the same TYPE, MODEL and DESIGN as the unit purchased!

NOTE: The Transmission Type, Design Pattern Number, Model Number, and Serial Number must be supplied when placing an order for an X-Change unit. This information can be found on the transmission tag. Please reference Figure 2.3.

[Preparing Your Transmission For Shipment to Voith - Grooming Checklist](#)

The only items to be returned are:

DIWA .2 Transmission, Heat Exchanger and ECU.

DIWA .3 & .3E . . . Transmission and Heat Exchanger (For .3 and .3E, do not send the ECU).

2. Transmission Cores shall be prepared in accordance with the following steps:
 - a. Remove and save all oil hose lines.
 - b. Remove and save any external oil filter assemblies and mounting brackets.
 - c. Remove the heat exchange (Heat Exchanger is to be returned to Voith).
 - d. Remove and save any heat exchanger brackets and any oil or water fittings.
 - e. Remove and save any oil temperature switches and or fittings from the oil pan.
 - f. Remove and save the low oil level sensor.
 - g. Remove and save the Spring Coupling and/or the Hydrodamp (this is bolted to the engine flywheel).
 - h. Remove and save the transmission Bell Housing (Mounting / Connection Flange).
 - i. Any Special Fittings or Hardware Provided by the Customer or Bus Manufacture (Non Standard Voith Components)
 - j. Properly plug any holes for shipping so oil does not leak out while in-transit

NOTE: Transmission cores should be returned without the above listed components. Removed items should be reinstalled on the new rebuilt transmission shipped on the order. This applies to all transmissions unless prior arrangements are made with Voith in advance.

NOTE: Transmissions shipped with any of the above components, without special prior arrangements, will incur additional charges. If the Heat Exchanger is not returned with your shipment you will incur a charge for the Heat Exchanger.

NOTE: Please ship your core within 3 business days after placement of the order with Voith. After your transmission has been prepared for shipment to Voith, it is your responsibility to contact the carrier to arrange a pick-up.

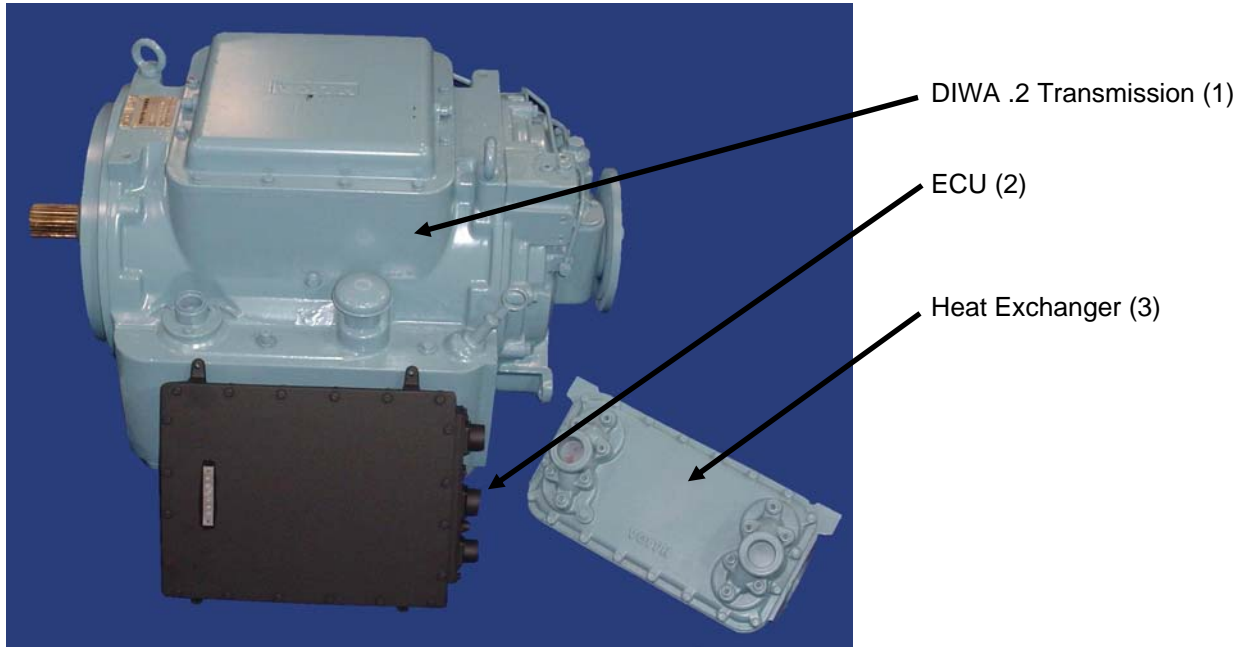
NOTE: Please do not disassemble the transmission prior to shipment to Voith.

IMPORTANT NOTE REGARDING DIWA .2 TRANSMISSIONS

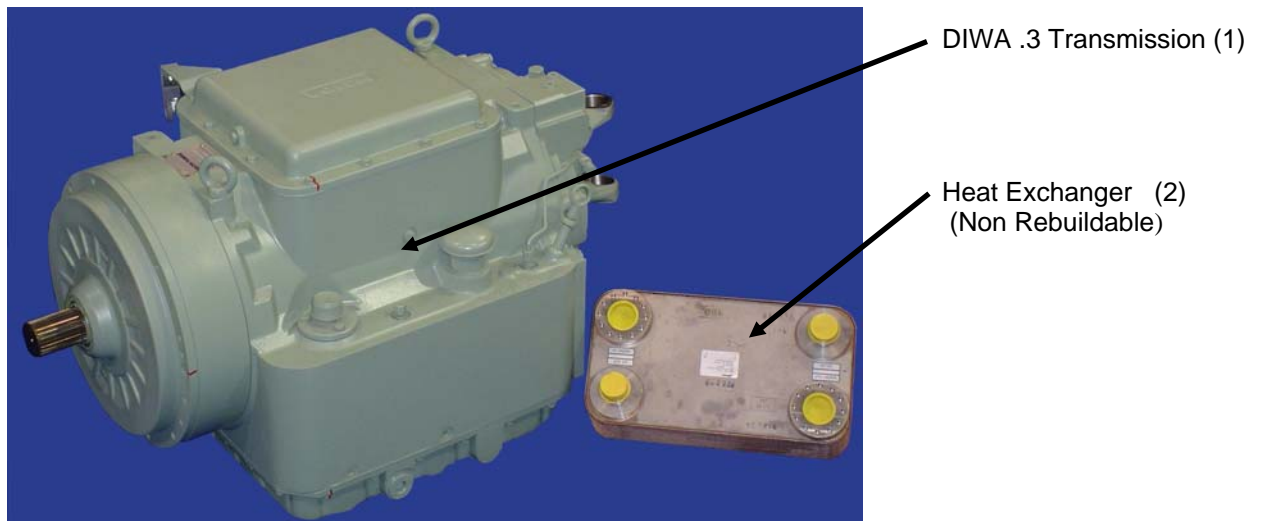
Due to decreasing populations of DIWA .2 transmissions worldwide and the long lead time for obtaining spare parts, a lead time of 8 to 10 weeks can be expected. Please adjust your maintenance schedules accordingly to accommodate the availability of DIWA .2 product.

3. Transmission cores are to be shipped with the following items:

DIWA .2 Transmission (1), ECU (2), Heat Exchanger (3).



DIWA .3 & .3E: . . . Transmission (1), Heat Exchanger (2), (No ECU).



NOTES:

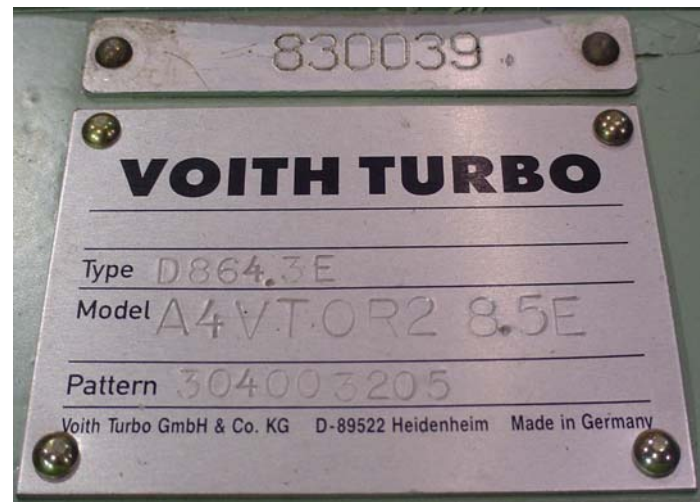
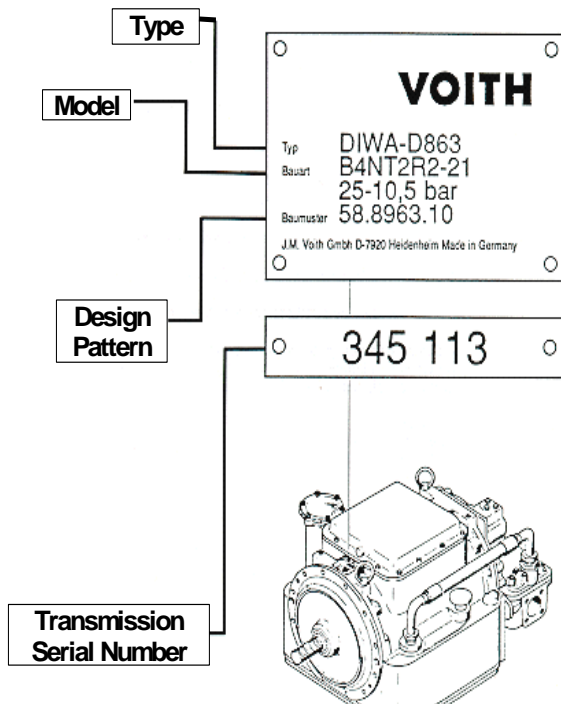
- (1) Missing or damaged components will be replaced at cost. Major cost adders are noted in Voith's price list.
- (2) For the DIWA .2, the ECU serial number must match the transmission serial number. Transmissions shipped without ECU's or mismatched ECU's will incur additional charges. Cost adders are identified in Voith's price list.

4. Housing must not be cracked or repaired. See Voith's price list for possible price adders.

These housings include:

- a. Main Transmission Case
- b. Transfer Case Assembly
- c. Pinion Assembly

5. Transmissions must be free of non-operational damages or customer modifications.



Example: A4S-18W7-18-8.5 BAR (CPR Transmission would be -8.5W)

- A** Input Drive Cover Style
- 4** Differential – Input Drive
- S** Pump Impeller
- 18** Converter Drain Valve
- W7** Angle Drive (output)
- 18** Pressure Reduction
- 8.5 BAR** Operating Pressure (**BAR** denotes transmission without Converter Pressure Retention [**CPR**])
- 8.5 W** Operating Pressure (**W** denotes transmission with **CPR**)

Transmission Tag Example

Top Tag - Serial #
(NOTE: Separate from Information Tag)

Bottom Tag- Transmission information
Top - Type
Middle - Model
Bottom - Pattern

SECTION 4.0 - PACKAGING & IDENTIFICATION

Due to recent developments in environmental laws it is requested that the transmission be reasonably cleaned prior to packaging and shipment to Voith.

The X-Change Core is a major investment. The improper packaging of your investment may result in:

1. Damage to your Core
2. Core credit being reduced or denied for a particular component or group of components.
3. Injury to an employee or associate.

IMPROPER PACKAGING ACCOUNTS FOR THE MAJORITY OF CORE REJECTS DUE TO ROUGH HANDLING.

Please review these guidelines when packaging your core for shipment to Voith Transmissions, Inc.

4.1 - PACKAGING REQUIREMENTS FOR COMPLETE X-CHANGE TRANSMISSIONS

1. Open Pallet (Skid):

An open pallet may be used to ship the transmission. If used, the following must be observed:

- a. The Pallet must be of sufficient length and width to provide enough coverage for the transmission so there is NO over-hang. An insufficient surface could result in damage to the unit during transportation. The transmission should be secured using banding (preferably metal) designed for that purpose.
- b. All fluids have been drained and the transmission is firmly secured to the pallet.
- c. All peripheral components (heat exchanger, lifting rings, ECU) are securely wrapped, boxed, and secured to the pallet.

NOTE: Package heavier items on the bottom of the box and lighter items on the top. Each individual item should be separately wrapped in bubble plastic.

- d. Identify the transmission appropriately and please indicate the Return Goods Authorization (RGA) number. The RGA Number is typically the Serial Number of the Unit you are shipping to Voith. The RGA number should be written on any additional boxes used for the peripheral components. Failure to properly identify your core could result in lost core credit(s).

2. Box/Pallet (Skid) Combination:

A box/pallet combination can be used to ship the transmission. If used, the following must be observed:

- a. The transmission is firmly secured inside the box.
- b. All peripheral components (heat exchanger, lifting rings, ECU) are securely wrapped, individually boxed or separated in the transmission box by packing material (such as corrugated sheet or bubble plastic).
- c. The box is securely fastened to the pallet using either plastic or metal banding material designed for this purpose.
- d. Identify each transmission appropriately and please indicate the Return Goods Authorization (RGA) number. The RGA Number is typically the Serial Number of the Unit you are shipping to Voith. Failure to properly identify your core could result in lost core credit.

3. Do not use wrap-around boxes. This is defined as a box that has a completely removable top and bottom, allowing only the material around the sides of the box to contain the components inside. This type of packaging has resulted in injuries in the past, and will no longer be accepted.

SECTION 5.0 - WARRANTY FOR X-CHANGE PROGRAM (TRANSMISSIONS AND SPARE PARTS COVERAGE)

Products Warranted

This warranty applies to all Voith X-Change Transmissions marketed by Voith, sold to their dealers, and delivered to the first user on or after June 1, 1992, that are used in bus applications in the United States and Canada.

Base Transmission Warranty

The Base Transmission Warranty covers any failures of the transmission that result under normal use and service, from defects in workmanship, or material.

The X-Change unit warranty for a DIWA .3 or .3E transmission is 18 months from the date of installation and shall not exceed 24 months from the date of sale.

Warranty coverage for the DIWA .2 is 12 months from the date of installation, and shall not exceed 18 months from the date of sale.

The Warranty Certificate must be filed online at: http://www.voithusa.com/road/e_vti.php

Completion of the Warranty Certificate should occur no later than 14 days after installation and filing of the same at Voith Turbo, Inc. through the Voith dealer within 30 days of installation is required to validate any warranty. DIWA .2 customers are responsible for the installation of the replacement Cable One Assembly. This is required to qualify for full warranty coverage.

The Base Transmission Warranty purchased by the first user covers only those failures that result from defects in workmanship or material.

VOITH RESPONSIBILITIES

During the Base Transmission Warranty

Voith will pay for all parts and labor needed to repair the damage to the transmission resulting from a failure covered by Voith's warranty. All labor costs will be paid in accordance with published Voith Repair Order Guidelines.

Voith will pay for the lubrication oil, filter elements, and other transmission maintenance items that are damaged or not reusable due to the warrantable failure.

Voith will pay reasonable labor costs for transmission removal and reinstallation when necessary to make the warranty repair as outlined in the standard repair order times published by Voith. Voith will pay the Voith distributors' billable labor rates.

OWNER RESPONSIBILITIES

During the Base Warranty Period

Owner is responsible for the cost of non-transmission repairs and the cost of ATF's, filter elements, hoses, and other maintenance items replaced during warranty repairs unless such items are not reusable due to warrantable failure.

Owner is responsible for the operation and maintenance of the transmission as specified in the Voith Servicing Schedule for Service Exchange transmissions. In addition the owner must have software 18.27.1 or higher loaded into the Voith electronic control unit (ECU). Faults or failures arising from non-compliance are not covered under warranty.

In the event of a fault or failure before the expiration of the applicable warranty, the Owner must notify a Voith distributor, authorized dealer, or other authorized dealer or other repair location approved by Voith, of any warrantable fault or failure. **The Voith repair representative must be able to evaluate the transmission in the bus where the fault or failure occurred prior to removal of the transmission. If the transmission is removed from the bus prior to evaluation by a Voith representative, warranty coverage may be limited or void.**

Owner is responsible for communication expenses, meals, lodging, and incidental costs incurred by Owner or employees of Owner as a result of warrantable failure.

Limitations

The provisions of Voith's base transmission warranty and Service Exchange spare parts warranty do not apply, and warranty coverage is not provided, with respect to failures which have been caused or contributed to by improper use, maintenance or storage; failure to comply with operating, maintenance, or service instructions; use of inadequate, improper or incompatible coolants or lubricants; accident, other casualty or negligence; modification so as to substantially alter the operating characteristics of the equipment or its components; improper repair or repair with parts not approved or supplied by Voith; improper installation; or other circumstances beyond Voith's control. Not covered is repair and replacement of: electronic parts including electronic cables, the ECU and pushbutton selectors, or towing.

The owner is required to notify Voith of any failures which may be covered by this Warranty immediately after such failure is discovered or by reasonable care could have been discovered. Voith is not responsible for damages resulting from a delay in notifying Voith, or for damages which could have been prevented by a timely notification.

No Consequential Damages

Voith's liability with respect to breaches of warranty shall be limited to repair or replacement as provided in Voith's warranty, and in no event shall Voith's liability, whether for breach of contract or warranty or otherwise, exceed the purchase price of the warranted product or component involved. Voith shall not be subject to any other obligations or liabilities, whether arising out of breach of contract, warranty, tort (including negligence), strict liability or other theories of law, with respect to transmissions or component parts sold by Voith or any undertaking, acts, or omissions relating thereto. Without limiting the generality of the foregoing, Voith specifically disclaims any liability for property damages, penalties, special or punitive damages, damages for lost profits or revenues, loss of use of products or any associated equipment, cost of capital, facilities or services, down-time, shut-down or slow-down costs, spoilage of material or for any other types of economic losses. VOITH SHALL NOT BE LIABLE FOR AND SPECIFICALLY DISCLAIMS ALL CONSEQUENTIAL, INCIDENTAL AND CONTINGENT DAMAGES WHATSOEVER.

No Implied Warranties

VOITH'S WARRANTIES AS STATED ABOVE ARE EXCLUSIVE AND IN LIEU OF ALL OTHER EXPRESS AND IMPLIED WARRANTIES WHATSOEVER, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. The exclusive remedy of repair or replacement shall not be deemed to have failed its essential purpose so long as Voith is willing and able to repair or replace a defective part or component within a reasonable time after owner establishes to Voith's satisfaction that a defect covered by Voith's warranty is involved.

VOITH X-CHANGE PROGRAM WARRANTY ADMINISTRATION SECTION

The provisions for warranty administration for the Voith X-Change Program, be it parts or transmissions, are the same as those outlined in Section 2 of the Voith Administration Manual for original Voith spare parts and new DIWA transmissions with the following exceptions:

- The warranty claim form should be clearly marked to be for the X-Change Program. It should also be clearly marked as to whether it is for parts or transmissions.
- Please be aware of the limitations on components covered, especially on X-Change Program transmissions. Be sure that the warranty repairs that you are performing are on components which are part of the service exchange transmission scope of supply.
- Your handling fee on parts for warranty repairs covered under the X-Change Program will be 12.5% percent. However, Voith Turbo, Inc reserves the right to supply a replacement unit (be it spare parts or complete transmission) on a free of charge basis. No handling charge permitted.
- All parts or transmissions removed as a result of warranty repair must be returned to Voith Turbo , Inc. with your claim and clearly marked with the warranty material tags supplied.
- **X-Change Program transmissions repairs which any distributors estimates to be in excess of \$3,000.00 must have a repair authorization from Voith Turbo, Inc., Attention: DIWA Service Department. Or on the web at: http://www.voithusa.com/road/e_vti.php**
- All warranty repairs are subject to restrictions and provisions outlined in the Voith Warranty for X-Change Program supplied with this program.

NOTE: All inquiries for warranty administration for the Voith X-Change Program must be directed to:

Voith Turbo, Inc.
Attn: DIWA Service Department
25 Winship Road
York, PA 17406-8419

Or call Toll Free: 1-877-374-1339 and ask for the DIWA Service Department

WARRANTY ACTIVATION

The Voith X-Change Warranty Certificate is now Online and can be accessed using the following link: http://www.voithusa.com/road/e_vti.php

1. The On-Line Warranty
 - a. serves as an installation check list, and
 - b. warranty activation record
2. Service Schedule for the transmission,
3. Approved Oil List.
4. Service bulletin (# 92A Oil & Filter Change Intervals for New Transmissions)
5. A new Cable One assembly is provided for DIWA .2 Units only

The [**Warranty Certificate Activation and Check Sheet**](#) must be completed and submitted on-line to activate your warranty. Filing is the responsibility of the customer or Voith Distributor. The customer must install the new Cable One assembly for DIWA .2 transmissions to receive full credit for claims under warranty.

Please be sure to include the VTI Order Number when you fill out your warranty information. The Order Number can be found on the Packing List of the unit shipped to you. It typically begins with an S and has 6 digits.

If you encounter any problems or have any questions regarding your warranty certificate and activation please call: 1-877-374-1339 and ask for the DIWA Service Department.