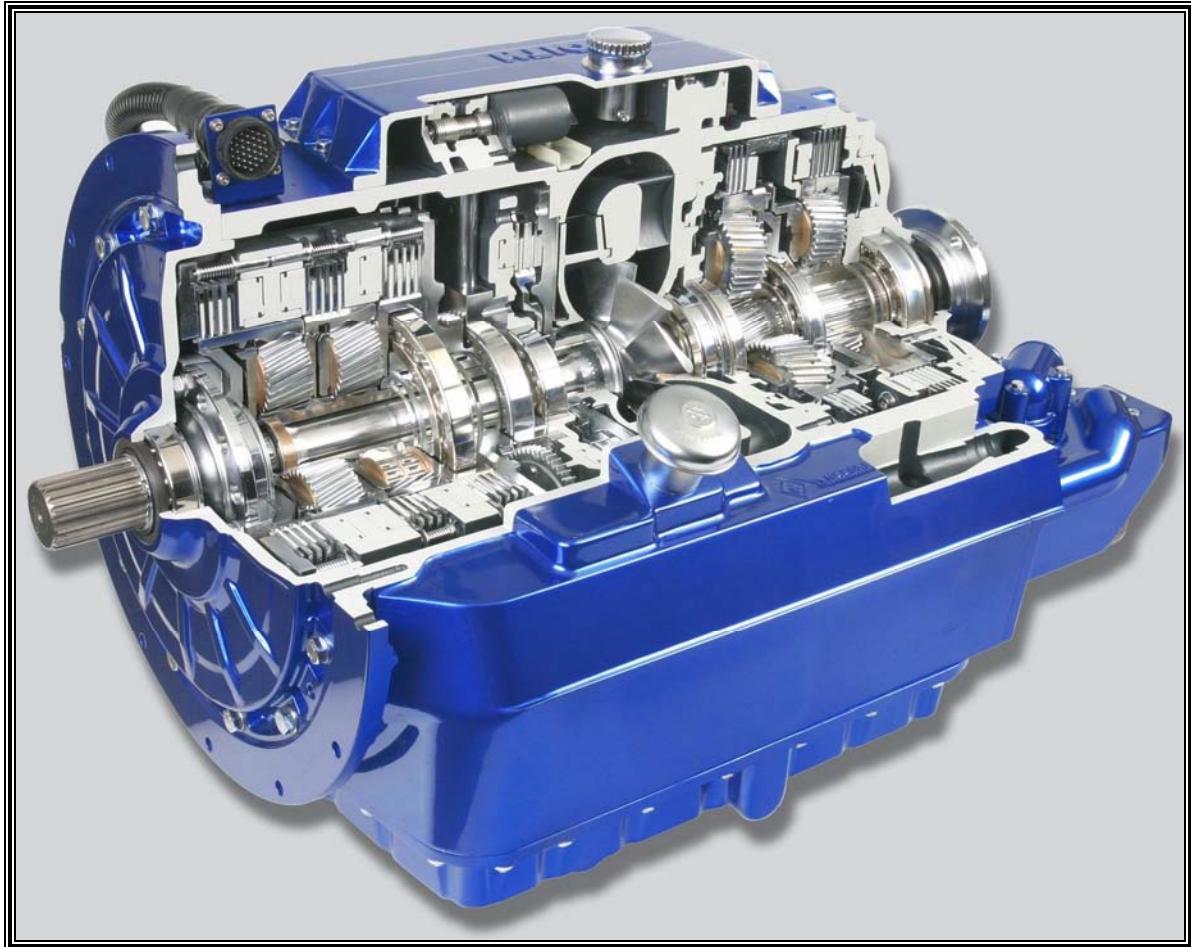


VOITH

X-Change Program Factory Remanufactured Transmissions



VOITH DIWA® - TRANSMISSIONS FOR TRANSIT BUSES

TABLE OF CONTENTS

SECTION 1

1.0 - Introduction Page 1

SECTION 2

2.0 - Ordering instructions and On-Line services Page 2-3

SECTION 3

3.0 - Complete X-Change Transmissions Page 4- 6

Models Available
Core Acceptance Policy
Warranty Activation

SECTION 4

4.0 - Packaging & Identification Details..... Page 7-10

SECTION 5

5.0 - Inspection And Receiving Page 11

SECTION 6

6.0 – Warranty Page 11-14

APPENDIX A

Transmission Inspection Form

APPENDIX B

Service Schedule

APPENDIX C

Additional Charges (Adders and Non Standard Work)

APPENDIX D

Pricing

APPENDIX E

Certificate of Warranty
DIWA Transmission Service Exchange Program

APPENDIX F

Sample Warranty Clam

SECTION 1.0 - INTRODUCTION

Thank you for using Voith's X-Change Program. This program is designed to provide our partners with factory reconditioned transmissions. This manual has been developed to provide you with important information to successfully purchase, install and operate factory recondition parts and 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 service please contact your local Voith Service Provider (VSP). If you are not sure who your VSP is, please contact Voith X Change Program Coordinator @ 717-767-3213 or your regional sales manager.

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 factory reconditioned transmissions. The On-Line ordering system has been developed to help the customer relay important information to successfully purchase X-Change transmissions. This program is also designed to save time in the ordering process for the Voith Partner.

To utilize our On-Line ordering service.

1. Log onto www.usa.voithturbo.com
2. Click on VTI Customer Service.
3. Click on Voith Turbo Web Services. Under the VTI Customer Service description on the right.
4. Under VTI Web Services column on the left you will find X-Change On-Line Order Form.
5. Fill out the form in its entirety and click SUBMIT at the bottom of the page.

NOTE: The more information you can provide us in advance can help us perform your transmission rebuild in a much more timely fashion.

Once you have submitted the On-Line order form you will receive an order confirmation and will receive shipping papers and instructions within 24 hours (Monday - Friday). Reference the example 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:

<p>*Company Billing Address:</p> <p>Company: <input type="text"/></p> <p>Street: <input type="text"/></p> <p>City: <input type="text"/></p> <p>Country: <input type="text" value="select country"/></p> <p>State/Province: <input type="text" value="select state/province"/></p> <p>Zip/Post code: <input type="text"/></p> <p>Transmission Information # 1</p> <p>*Serial # <input type="text"/></p> <p>*Model# <input type="text"/></p> <p>*Pattern# <input type="text"/></p> <p>*Type: <input type="text"/></p> <p>*Optional 6 Month Extended Warranty requested? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>*Is this a "bus down" situation? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>*Do you require the return of the same Serial # Transmission? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Has this transmission been rebuilt by VOITH before? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown</p> <p>ATF Oil Type & Manufacturer: <input type="text"/></p> <p>Approx Mileage on transmission: <input type="text"/></p> <p>Description of failure and/or special instructions: <input style="width: 100%; height: 40px;" type="text"/></p>	<p>*Company Ship-to Address: same as billing <input type="checkbox"/></p> <p>Company: <input type="text"/></p> <p>Street: <input type="text"/></p> <p>City: <input type="text"/></p> <p>Country: <input type="text" value="select country"/></p> <p>State/Province: <input type="text" value="select state/province"/></p> <p>Zip/Post code: <input type="text"/></p> <p>Order Information</p> <p>*Purchase order # <input type="text"/></p> <p>Pricing as understood by customer <input type="text"/></p> <p><input type="checkbox"/> USD <input type="checkbox"/> CDN</p> <p>Requested Delivery Date <input type="text" value="MM/DD/YY"/></p> <p style="color: red; font-size: small;">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.</p>
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SECTION 2.1 - X-Change Manual Ordering

To order an X-Change transmission manually.

1. Fax a detailed purchase order to 1-717-767-3210
2. Order acknowledgement will be sent in the form of your shipping papers and instructions on handling
3. You may want to confirm your facsimile by calling Voith directly at 1-877-374-1339.

Please Note: When using Voith's X-Change program to purchase a reconditioned transmission it's important to identify a few key points:

- What transmission type and model do you want to exchange?
- Have you properly prepared the return of your core unit.?
- Do you have a return goods authorization number (RGA#)?
- Have you followed Voith's requirement for warranty registration?

Again; we thank you for your interest in purchasing Voith X-Change Remanufactured transmissions.

SECTION 3.0 - COMPLETE X-CHANGE TRANSMISSIONS

MODELS AVAILABLE

- Consult Voith's Price List.

CORE ACCEPTANCE STANDARDS

1. The transmission core must be the same type model and design as the unit purchased!

NOTE: Transmission design pattern, model, and designation must be supplied when ordering an exchange unit (See Figure 2.3 on how to identify this information on the transmission)

How to return a Transmission to Voith

The only items to be returned are:

DIWA.2 Transmission, heat exchanger and ECU.

DIWA.3&.3E: . . . Transmission, heat exchanger (no ECU).

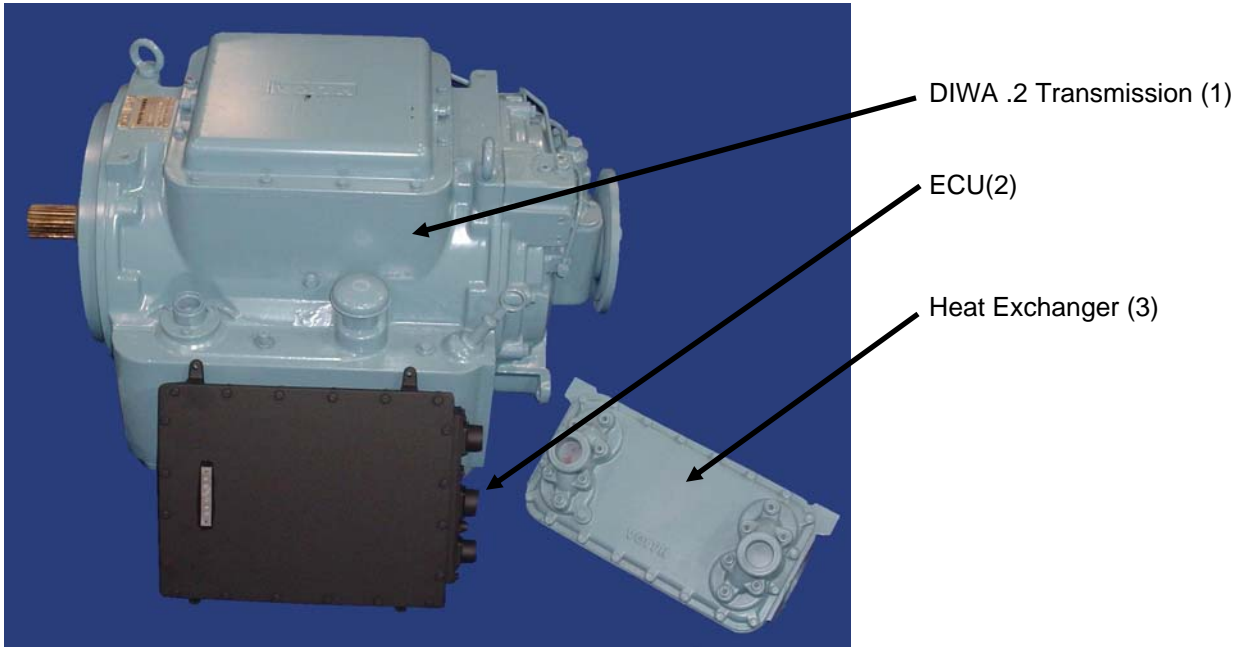
2. Transmission Cores shall be prepared in accordance with the following steps:
 - a. Remove and save all oil hose lines.
 - b. Remove and save any external oil filter assemblies and mounting brackets.
 - c. Remove the heat exchange (Heat Exchanger is to be returned to Voith).
 - d. Remove and save any 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 (this is bolted to the engine flywheel).
 - h. Remove and save the transmission bell housing (Mounting Flange).
 - i. Any Special Fittings or Hardware Provided by the Customer or Bus Manufacture (Non Standard Voith Components)

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.

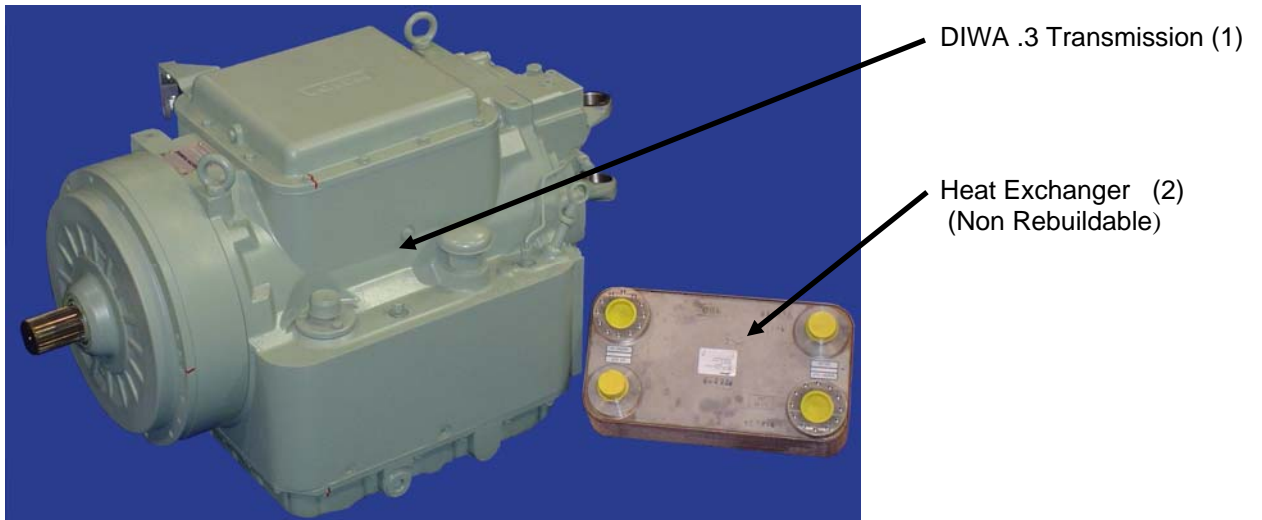
NOTE: Transmissions shipped with any of the above components, without special prior arrangements, will incur additional charges.

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

DIWA. 2 Transmission (1), heat exchanger(2) and ECU (3).



DIWA.3&.3E: . . . Transmission (1), heat exchanger (2) (no ECU).

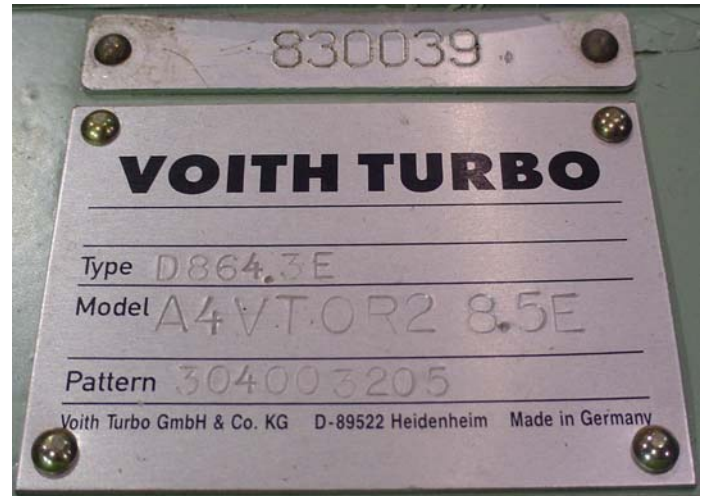
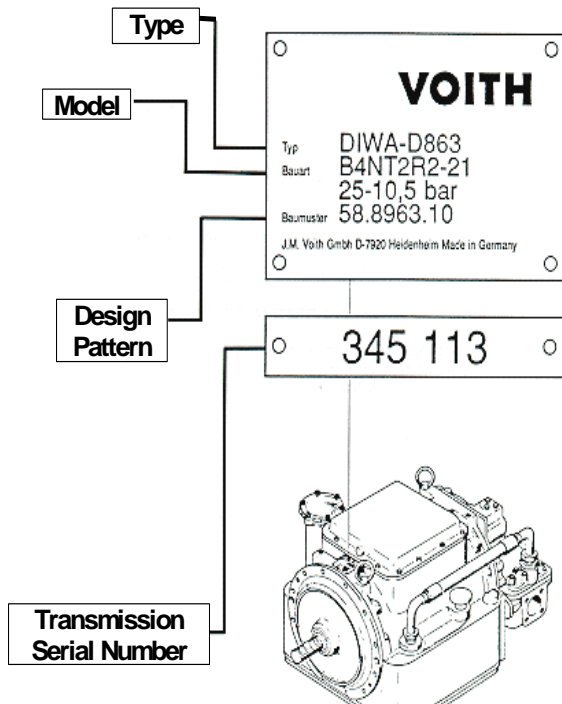


NOTES:

- (1) Missing or damaged components will be replaced at cost. Major cost adders are noted in Voith's price list.
- (2) For a DIWA.2 ECU the serial number must match 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: A 4 S-18 W7 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

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

1. Core credit being reduced or denied for a particular component or group of components.
2. 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. All fluids have been drained and the transmission is firmly secured to the pallet.
- b. 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 items should separately wrapped in bubble plastic.

- c. Identify the transmission using the X-Change Program tag with the VSP's name, location, Voith Job # or Return Goods Authorization (RGA) number. Write the Voith job # or RGA number on any additional boxes used for the peripheral components. Failure to properly identify your core could result in lost core credit(s).
- d. Be sure to include a completed copy of the transmission inspection form with the return transmission.

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 box using the Service Exchange Program tag with the VSP'S name, location, Voith Job # or Return Goods Authorization (RGA) number. Failure to properly identify your core could result in lost core credit.
 - e. Be sure to include a completed copy of the transmission inspection form with the return transmission.
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.

4.3 - Identification (TAGGING CORE FOR PROPER CREDIT)

IMPORTANT! To ensure proper core identification, you must use the Voith Return Core tags when making ALL core returns. There are 3 types of Core Return Tags:

1. **“DIWA X-CHANGE CORE RETURN/COMPLETE TRANSMISSION”** Tag

- a. Two Part Card (White Copy for VSP, Red Card Tag on Core)
- b. See Figure 3.3.1

2. **“DIWA WARRANTY RETURN”** Tag

- a. Two Part Card (White Copy for VSP, Light Blue Card Tag on Core)
- b. See Figure 3.3.2

ALL RETURN CORES SHOULD HAVE ONE OF THESE CARDS ATTACHED.

Contact Voith for Additional Return Core Forms

**DIWA SERVICE EXCHANGE
CORE RETURN/COMPLETE TRANSMISSIONS**

Distributor Name: _____	CORE INFORMATION:
Address: _____	Trans. Type: _____
City, State, Zip: _____	Trans. Model #: _____
Transit Authority: _____	Des. Pattern #: _____
CORE CREDIT INFORMATION:	Serial #: _____
Original Sales Order #: VOITH	Replacement Unit
_____	Serial #: _____
Original Distributor P.O. #: _____	Signature: _____

Return to: Voith Transmissions, Inc.
25 Winship Rd.
York, PA 17402
ATTN: Service Exchange Administrator
CORE CREDIT DUE

Figure 3.3.1 - Transmission Core Return Tag

**DIWA SERVICE EXCHANGE PROGRAM
WARRANTY RETURN**

Distributor Name: _____	Claim #: _____
Address: _____	R.O. #: _____
Transit Authority: _____	Mileage: _____
Mileage at installation: _____	Date of failure: _____
Date of installation: _____	Check one:
Reason for failure: _____	Part Unit
_____	If part,
_____	Part #: _____
_____	Transmission S/N: _____
_____	Signature

**Ship to: Voith Transmissions, Inc.
25 Winship Rd.
York, PA 17402
ATTN: Warranty Department
Service Exchange Program**

Figure 3.3.2 - Warranty Core Return Tag

SECTION 5.0 - INSPECTION AND RECEIVING INSTRUCTIONS

INSPECTION AND RECEIVING - COMPLETE CORE TRANSMISSION

Cores must be inspected in accordance with the Voith inspection Form 19.1-11 “**INSPECTION SHEET FOR VOITH X-CHANGE DIWA TRANSMISSIONS**” shown in Appendix A. Failure to fill out the inspection form and return it with the core will delay core charge crediting. (Appendix C)

VOITH TURBO, INC. upon receipt of the transmission and review and verification of the inspection sheet will determine core charges for the unit returned.

A copy of the inspection sheet must be shipped with the return core for proper crediting.

SECTION 6.0 - 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 warranty period shall be 6 months from date of installation but no longer than 18 months from delivery from VTI to the first purchaser. Completion of the Certificate of Warranty (See Appendix E) no later than 14 days after installation and filing of same at Voith Transmissions, Inc. through the Voith dealer within 30 days of installation is required to validate any warranty. The customer is responsible for installation of the replacement Cable One Assembly. This is required to qualify for full warranty coverage.

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

Extended Warranty

Voith Turbo, Inc. offers an extended warranty coverage. Validity of extended warranty coverage is dependent upon adherence to the conditions outlined in the Service Exchange Program and must be purchased at the time of order placement. All responsibilities and limitations for any of the parties are the same as for the base coverage.

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. 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, extended 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.

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 see sample copy which is supplied.
- 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 25 percent. However, Voith transmissions, 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 X-Change Program 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: Service Department. www.voithusa.com/BasicSvcs.htm**
- 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 regarding warranty administration for the Voith X-Change Program must be directed to the Service Department at Voith Turbo, Inc. in York, Pennsylvania. 717-767-3200

WARRANTY ACTIVATION

Each Voith X-Change Transmission is shipped with:

1. Warranty Certificate (Form 19.1-05, See Appendix E)
 - 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. Dyno Test Sheet from the Rebuild.
6. New Cable One assembly . **(must be installed to validate warranty)**

The Warranty Card **MUST BE** completed and returned to Voith Turbo, Inc. York to activate warranty. Filing is the responsibility of the Voith Distributor (See Appendix E). The customer must install the new Cable One assemble to receive full credit for claims under warranty.