



TRANSMISSION MOUNTING DESIGN USING THE TRANSMISSION SIDE PADS

ALLISON ON-HIGHWAY TRANSMISSIONS

APPLICABLE MODELS: 1000 Product Family
2000 Product Family
2900 Product Family
3000 Product Family
4000 Product Family

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TRANSMISSION MOUNTING DESIGN – USING THE TRANSMISSION SIDE PADS

1.0 INTRODUCTION

The purpose of this document is to summarize design considerations for mounting arrangements where the transmission is mounted directly to the engine and the transmission side pads are used. The transmission side pads may be used in one of two ways:

- As the rear mount locations for the powerpack
- As part of a cradle mount that provides the rear mount locations for the powerpack

NOTE: For mounting requirements that apply to all mounting arrangements, including this one, refer to [Transmission Mounting – General Requirements](#).

2.0 REFERENCED DOCUMENTS

Unless otherwise noted, all documents referenced in this document may be found in the Allison HUB website at <https://hub.allisontransmission.com/login>. To locate the referenced documents look for Tech Data under the Engineering heading on the Allison HUB home page. In this document, these references are identified by italic font. Contact your Allison Transmission representative if you do not have access to the Allison HUB. A list of all items referenced in this document can be found at the end of this document.

3.0 MOUNTING ARRANGEMENT USING THE CONVERTER HOUSING SIDE PADS

The most common mounting arrangement is for the transmission to be overhung from the engine flywheel housing as described in [Transmission Mounting – Overhung](#). If the overhung arrangement is undesirable or unacceptable, the pads on each side the converter housing may be used in the powerpack mounting arrangement. Refer to Figure 1. The following transmissions have side mounting pads on the converter housing:

- 1000/2000 Product Family models with the SAE No. 3 converter housing
- 2900 Product Family models with the SAE No. 3 converter housing
- 3000 Product Family models with the Top/Side PTO converter housing
- All 4000 Product Family models

For assistance in determining if this provision is available for your transmission, refer to [Features and Options](#) for the various transmission families.

When this arrangement is used, a rear transmission support will generally not be required. However, it is advisable to recheck the bending moment at the engine/transmission interface to confirm that it does not exceed the allowable limit for either the engine or transmission housing.

Care must be taken to insure that the moments imparted to the side pads through the mounting brackets do not damage the transmission converter housing. The significant loads on the mounting pads and bolts include weight, reaction torque and inertial loading. The following calculations are required:

- Bolt shear loads and limits for the side mounting pads
- Inertial fatigue loads and limits for the side mounting pads
- Static bending moment at the flywheel housing to converter housing split-line
- Reaction loads at the transmission side mounting pads – weight plus load induced by achieving maximum transmission output torque

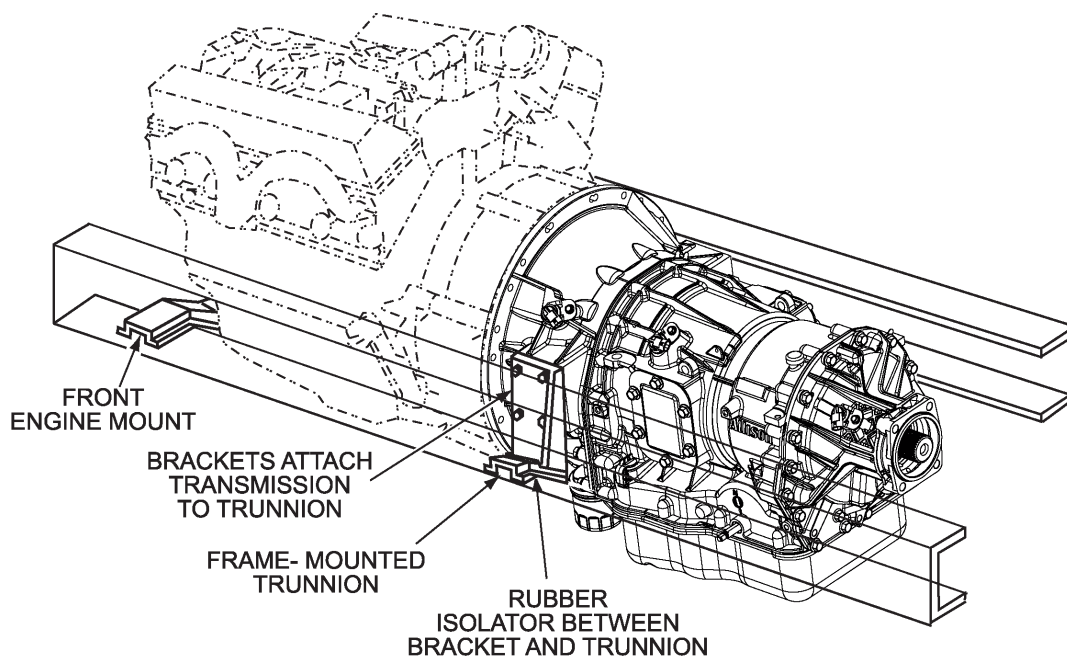


Figure 1: Typical Mounting Arrangement Using Transmission Side Pads – 1000/2000 Product Family Models with SAE No. 3 Converter Housing is shown

A general discussion regarding reaction torques may be found in [TD-179, Mounting Calculations for the 4000 Product Family](#). Although specific values in this document refer to the 4000 Product Family of transmissions, the discussion and requirements are generally applicable to all transmission models:

If the converter side pads are used in a three-point engine/transmission mounting arrangement:

- The attachment to the mounting pads must not exceed the maximum allowable bolt clamping coefficient per [TD-179, Mounting Calculations](#).
- Bending moments on the transmission side pads must be within acceptable limits.
- The design must provide for proper isolation of the transmission from the frame through use of isolation pads, biscuits, or bushings. This isolation will reduce shock loads and reduce the transmittal of vibration and noise between the powerpack and the frame.
- The mounts must provide stability of the powerpack within the frame. If mounts permit excessive motion, the engine or transmission could be damaged by interference with other frame-mounted components.

NOTE for 1000/2000/2900 Models: The maximum torque which the transmission can react back to the frame may be limited by the torque capacity of the engine-to-transmission interface, and/or the capacity of the transmission side pads. Maximum values for reaction torques are tabulated in the Mounting Design Data table in [1000/2000 Transmission Data](#) or [2900 Transmission Data](#).

NOTE for 4000 Seven-Speed Models: A powerpack mount design which uses a front engine mount and rear powerpack mounts attached to the side pads on the seven-speed adapter housing is not permitted. This arrangement creates excessive loads at the flywheel housing to converter housing split line.

4.0 CRADLE MOUNTING

An alternate powerpack mounting arrangement is the cradle mount. A cradle mount design can be used if it is not desirable to use a rear support to control the bending moment at the engine/transmission interface.

In a cradle mount, the powerpack is mounted at three points. One point is at the front of the engine. The cradle mount provides the two rear mounting locations for the powerpack. In basic designs, each cradle subframe spans the engine flywheel pad and the transmission converter housing pad on each side of the powerpack (Figure 2). Alternatively, for seven-speed models in the 4000 Product Family or for transmissions equipped with a non-Allison transfer case, the side mounting pads at the rear of the transmission or on the transfer case may be used. Refer to Figures 3 and 4.

Ideally, the cradle mount isolation point, R_c , should be selected to establish zero bending moment at the flywheel housing to transmission converter housing split line (Figure 2). In any case, the bending moment must not exceed the transmission bending moment limit. Contact the engine manufacturer regarding the engine's bending moment limits. Refer to [TD-179, Mounting Calculations](#) for the required calculations.

The cradle subframes must be isolated from the vehicle frame with isolation pads, biscuits, or bushings. This isolation reduces shock loads and reduces the transmittal of vibration and noise between the powerpack and the frame.

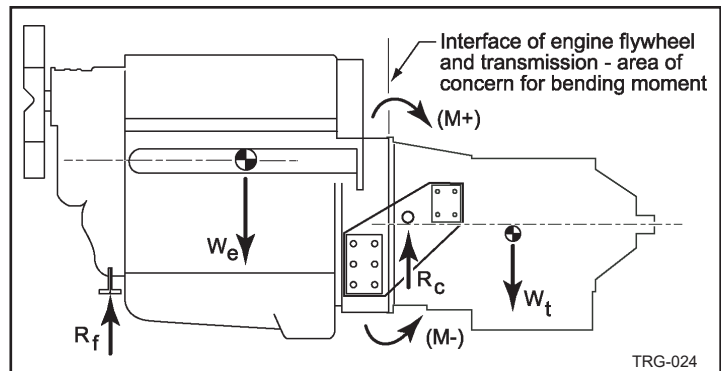


Figure 2: Typical Cradle Mount Using Engine Flywheel Housing and Transmission Side Pads

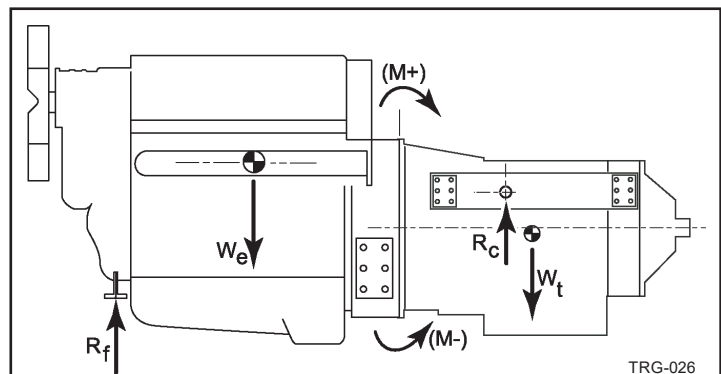


Figure 3: Typical Cradle Mount for 4000 Product Family 7-Speed Transmission Models

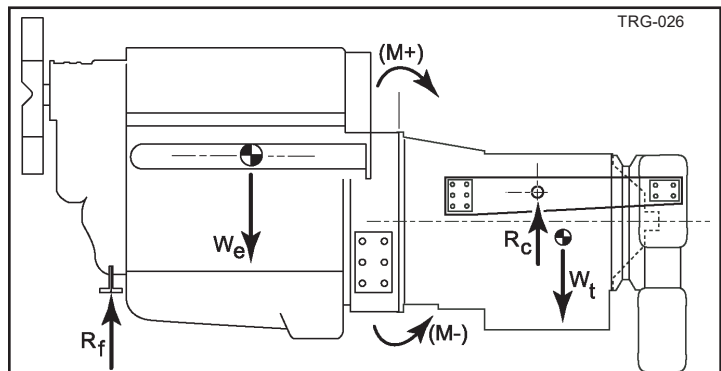


Figure 4: Typical Cradle Mount for Transmissions with Non-Allison Transfer Case

LIST OF REFERENCED DOCUMENTS

- Transmission Features and Options for:
 - 1000/2000 Product Families
 - 2900 Product Families
 - 3000 Product Family
 - 4000 Product Family
- Transmission Mounting – General Requirements
- Transmission Mounting – Overhung
- Transmission Data for 1000/2000 Product Families
- Transmission Data for 2900 Product Families

Installation Drawings for the 1000/2000 Product Families

- AS64-401, Basic Installation Drawing, with SAE No. 3 Converter Housing

Installation Drawings for the 2900 Product Families

- AS64-903, Basic Installation Drawing, with SAE No. 3 Converter Housing

Installation Drawings for the 3000 Product Family

- AS66-485, PTO Provisions

Installation Drawings for the 4000 Product Family

- Basic Installation Drawings
- AS67-485, PTO Provisions

Technical Documents (TDs)

- TD-179, Mounting Calculations for the 4000 Product Family

REVISION HISTORY

April 11, 2022

- Added 2900 Product Family

November 7, 2016

- Updated List of Referenced Documents to reflect the new consolidated 3000 and 4000 Installation Drawings; AS67-485 added to 4000 referenced drawings. This side pads for the PTO converter housing are now defined on this drawing.

February 6, 2014

- In 3.0, changed "the bending moment at the engine/transmission interface must be rechecked..." to "it is advisable to recheck the bending moment at the engine/transmission interface..." to confirm that a rear support is not required.

July 17, 2008

- Prepared document for Extranet publication.

June 19, 2008

- Created new document, Transmission Mounting Design – Using the Transmission Side Pads.
- In 4.0, Cradle Mounting, changed "the cradle mount isolation point must be selected to establish zero bending moment at the flywheel housing to converter housing split line" to "ideally, the cradle mount isolation point should be selected to establish zero bending moment at the flywheel housing to converter housing split line. In any case, the bending moment must not exceed the transmission bending moment limit. Contact the engine manufacturer regarding the engine's bending moment limits."