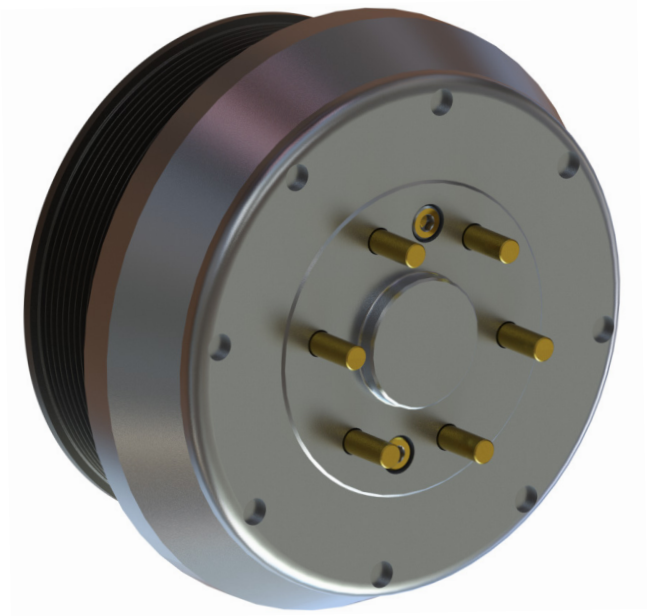
TERMINATOR Fan Clutch

TERMINATOR T1



TERMINATOR T2

Terminator Service Manual: TI-012

Terminator T1 & T2
Fan Clutches

- Advanced Design – high torque, steel-on-steel cone drive
- Field Proven - extensively tested in Australian conditions
- One and Two Speed models
- Long Service Life
- Low Maintenance

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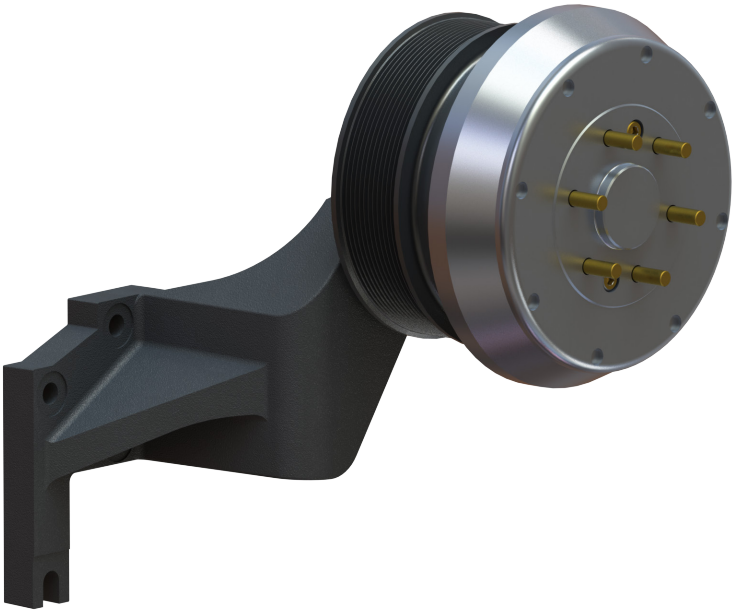
Introduction

The terminator range of clutches is a proven fan drive technology for use in heavy duty trucks.

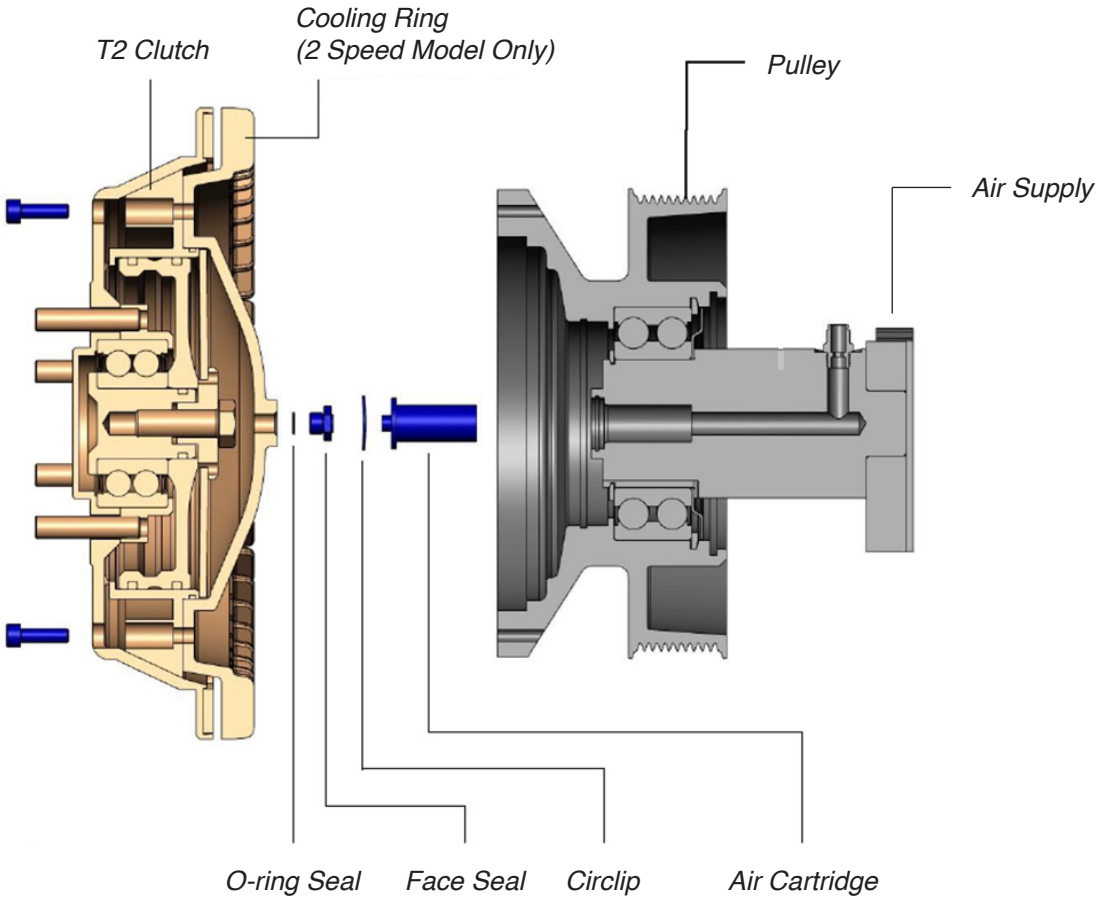
TERMINATOR T1

- Single Speed Fan Clutch – on/off.
- 'Fail-Safe' Design – clutch fails to 'on'.
- Steel-On-Steel Cone Drive – high torque, no slippage, clutch runs cooler.
- Extended Bearing Life – over-sized bearings, bearings run cooler.
- Long Life Air Cartridge – advanced composite material, lower clutch operating temperature extends cartridge life.



TERMINATOR T2

- Two Speed Clutch – eddy current drive (low speed), friction drive (full speed).
- Reduced Fan Cycling – constant air flow stabilises engine cooling system.
- Lower Cab & Under-Bonnet temperatures – less thermal stress on components, reduced thermal load on cab air conditioning system.
- Reduced (significantly) air conditioner triggered 'Fan-On' events.



Terminator Fan Clutch Overview

There are two models of Terminator fan clutch:
T1 – single speed (on-off)
T2 – two speed

Both clutches share the same design architecture and construction.

The T2 model incorporates an array of permanent magnets that create the low-speed (eddy current) drive mode

Clutch Friction Surface

The **T1** and **T2** clutches feature a patented low wearing Alloy Wedge friction material that will last the lifetime of the clutch and does not require replacement or maintenance.

Air Supply

The **T1** and **T2** fan clutches are engaged (on) when there is no air supplied to the clutch – "failsafe feature".

Both clutches disengage (turn off) when air is applied to the clutch. The supply air requirements for Terminator clutches are as follows;

- Supply air pressure 1300 – 1470 kPa (90 - 100 PSI)
- Moisture trap required prior to control solenoid.
- Supply air plumbing must be leak free.

IMPORTANT

- Insufficient air pressure can cause the fan clutch to overheat due to slippage.
- Solenoid exhaust silencers must be kept clean to avoid slow clutch engagement.

Trouble Shooting Guide

Issue 1: Air leaking from clutch **Cause:** 1. Air-line connection to clutch is faulty. 2. Leaking Air cartridge.	**Solution:** 1. Inspect and fittings on hose ends – for air leaks and rectify as required. 2. Remove clutch from the pulley (refer to installation manual) and inspect the seal between the pulley and clutch and inspect the air cartridge. Replace any worn components.
Issue 2: Clutch not engaging / disengaging **Cause:** 1. Faulty electrical wiring. 2. Faulty thermal switch. 3. Faulty solenoid valve.	**Solution:** 1. Confirm wiring is as per OEM specification. 2. Fault check thermal switch, replace as required. 3. Clean solenoid exhaust or replace valve if faulty.
Issue 3: Clutch cycles too frequently **Cause:** 1. Electrical circuit short or incorrectly wired. 2. Temperature control setting is incorrect. 3. Obstruction to air flow through the radiator. 4. Low coolant level. 5. Faulty thermal switch.	**Solution:** 1. Confirm wiring is as per OEM wiring. 2. Clutch engagments occurs at +10°F above full open thermostat. 3. Ensure airside of cooling system is clean. 4. Top up coolant level as required. 5. Fault check thermal switch; replace if required.
Issue 4: Clutch slipping on engagement **Cause:** 1. Low air pressure. 2. Solenoid incompatible.	**Solution:** 1. Check air-line pressure – 90-100 PSI is required. 2. Some solenoids have a ‘slow’ release function, which is not recommended for a Terminator clutch. Replace with ‘quick’ release solenoid.
Issue 5: Clutch face appears scorched / blistered **Cause:** 1. Low air pressure (clutch slipping). 2. Solenoid not suitable (clutch slipping).	**Solution:** 1. Check air-line pressure – 90-100 PSI is required. 2. Some solenoids have a ‘slow’ release function, which is not recommended for a Terminator clutch. Replace with ‘quick’ release solenoid.
Issue 6: Clutch engaged, engine running hot **Cause:** 1. Obstruction to air flow through the radiator. 2. Fan capacity not sufficient. 3. Cooling system problem.	**Solution:** 1. Ensure airside of cooling system is clean. 2. Confirm OEM fan is installed. 3. Refer to OEM vehicle manual.

Upgrade Kits

- Suitable for all Drive Master fan drives - 1 & 2 Speed models that feature a double hub bearings (except MACK).

	Single Bearing	Double Bearing
Two Speed Clutch (T2)	**KT211440**	**KT211441**
On/Off Clutch (T1)	**KT211442**	**KT211443**

Complete Fan Drive Units

- InnoTherm offers a range of complete fan drive units (clutch, pulley and journal bracket) for a complete 'plug & play' installation.
- Contact InnoTherm for more information on available truck models.

Service Kits

Air Cartridge Service Kit - EB0230

- To ensure the fan drive is receiving clean, consistent air pressure, it is recommended the air cartridge is replaced every 300,000km.
- Kit available from InnoTherm – which include the following components:

Air Cartridge	x 1
Circlip	x 1
Face Seal	x 1
Mounting Bolts	x 8

Bearing Service Kit

KT211437: Suitable for InnoTherm pulleys
KT211438: Suitable for pulleys using single large bearing
KT211439: Suitable for pulleys using two single row bearings.

- Fan drive pulleys should be replaced as part of a complete overhaul at 500,000km.
- If unsure, contact InnoTherm for further assistance identifying the correct bearing service KIT for your fan drive.

Service Kits

Air Cartridge Service Kit

- The air cartridge is designed to function as a wearing component and will need to be replaced once the plunger length is less than 4mm from the air cartridge face.
- Air cartridge life is influenced by the quality of the air supply (pressure and purity)
- It is recommended the air cartridge be checked at 300,000km and replace as required.
- The mating face seal must be replaced at the same time as a air cartridge.
- Air Cartridge Service Kit part number: **EB0230** (incl. air cartridge, face seal, circlip and o-ring)
- Refer to air cartridge service bulletin **TI-010** for further details.

Terminator Service Kit

- This kit provides the components to undertake a major refurbishment of a Terminator fan clutch
- This service kit includes; pulley bearings, air cartridge and seals.
- Refer to InnoTherm for further details.

Recommended Maintenance

Weekly Interval (or more frequently)

- Drain the air filter water trap.
- Check for air leaks within the entire air supply circuit and rectify as necessary.
- Ensure air exhaust silencer is clean.

Monthly Interval (or more frequently)

- Check the air supply line for any sign of leaks.
- Check fan for damage. Out of balance fans will reduce fan clutch and pulley bearing life.

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