



# Allison Transmission 101

**BELFOR** (●)  
FRANCHISE GROUP

**redbox+**

# Allison Transmission



**Rick Taylor**

Regional Customer Support Manager

# NA Regional Customer Support

## 1 WEST REGION

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## 6 Open - Regional CSR, Northeast Region

## SOUTHEAST REGION

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## NA DIRECTOR CSCD

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## NATIONAL ACCOUNT CSM

### Anthony Geraghty

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# Key Topics

- About Allison Transmission
- Product Overview
- Electrical/Controls
- Driveline
- Allison DOC
- Fluids
- Prognostics



# In 1915...

## James A. Allison

Established the Speedway Team Company –  
the forerunner to what eventually would  
become Allison Transmission.

*“Whatever leaves this shop over my name  
must be of the finest work possible.”*



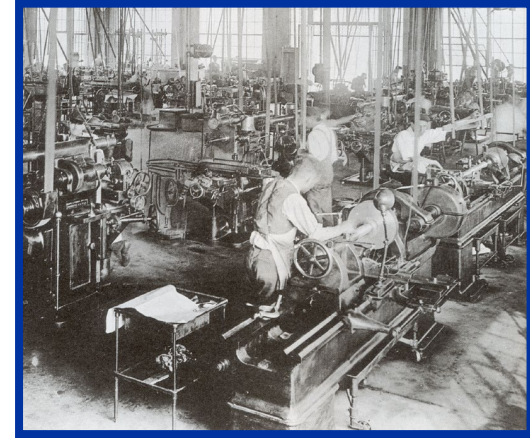
James Allison  
1872 - 1928



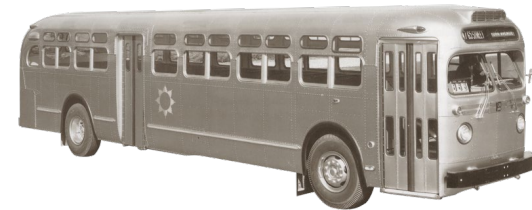
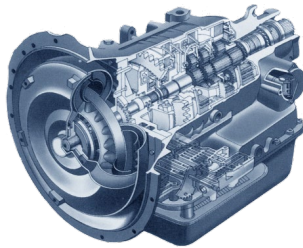
1904 - 1917



Allison Engineering  
1915



1929 - 2007



**Indianapolis Motor Speedway – Construction 1909 – First Race 1911**  
**3.5 million Bricks was laid down in 63 days to create the racetrack.**



**Bird's Eye View of the Indianapolis Motor Speedway Which Will Be Completed July 15, and Formally Opened August 19-21**

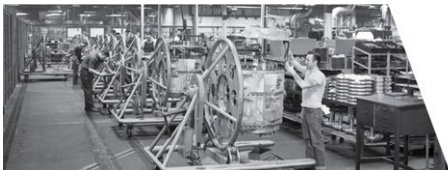
# A History Of Reliability



500 Miles: James Allison's race team won the Indy 500 just four years after his company was founded



V1710 Aircraft Engine takes flight – 69,305

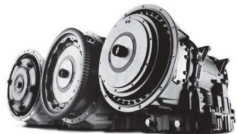


Fully automatic transmission revolutionized commercial and military vehicle industries



Over 1200 Patents

# A History Of Success



Over 6,000,000 transmissions delivered



Over 150,000 Fleets trust Allison



4000 Employees



110 Years of Excellence





# Global Headquarters

Speedway, IN USA

Headquartered in the heart of the Midwest, Allison has established deep roots in the Indianapolis community over the past 100 years. As we've grown into a leading propulsion solutions provider, Speedway has remained our home and primary manufacturing base.

Allison is proud of our established reputation as an employer of choice, and we're dedicated to attracting and retaining top talent by providing our employees with the tools they need to drive innovation.

# Allison Propulsion Solutions





# Conventional Transmissions



1000 Series™  
2000 Series™



2900 Series™



3000 Series™



4000 Series™



TerraTran™



6000 Series™



8000 Series™



9000 Series™



FracTran®

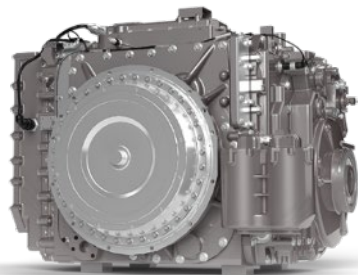


# Defense

## Tracked Solutions



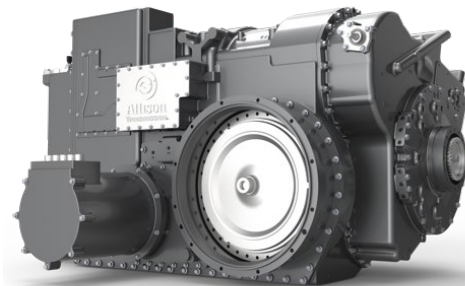
X200 Series™



3040 MX™



X1100 Series™



eGen Force™

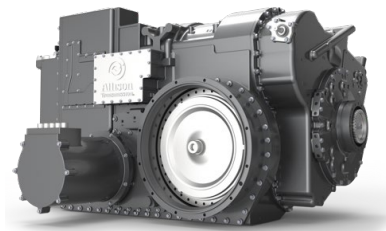


# Hybrid + Electric

## Propulsion Solutions



**eGEN Flex<sup>®</sup>**

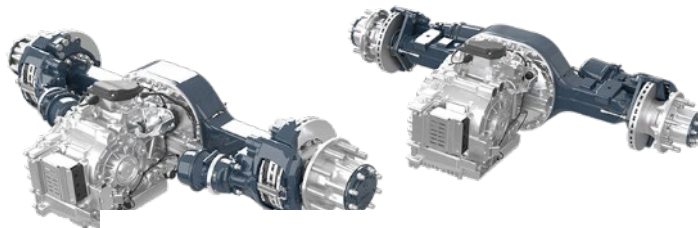


**eGEN Force<sup>™</sup>**



**eGEN Power<sup>®</sup>**

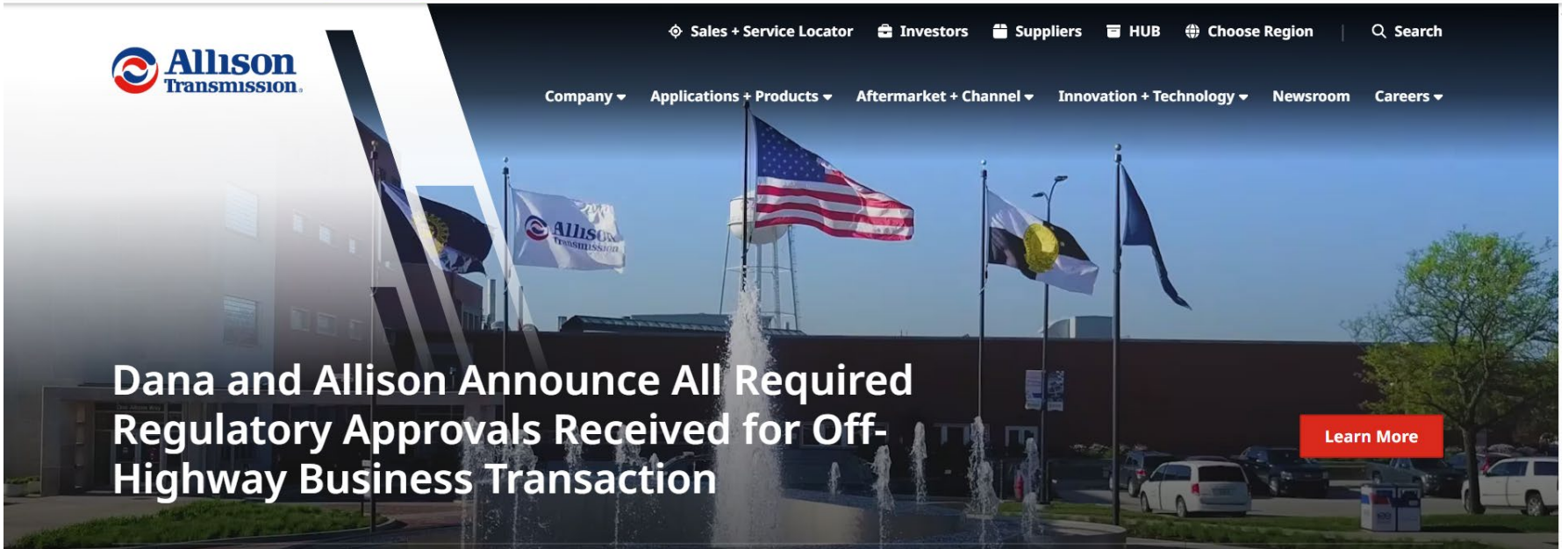
100D e-Axle  
130D e-Axle



**eGEN Power<sup>®</sup>**

85S e-Axle  
100S e-Axle  
130S e-Axle





**Allison Transmission**

Sales + Service Locator Investors Suppliers HUB Choose Region Search

Company ▾ Applications + Products ▾ Aftermarket + Channel ▾ Innovation + Technology ▾ Newsroom Careers ▾

**Dana and Allison Announce All Required Regulatory Approvals Received for Off-Highway Business Transaction**

[Learn More](#)

## Sales + Service Locator

To find an Allison Authorized facility near you, use the Sales + Service Locator below. Not all locations are authorized on every Allison product. Please use the filter function or click on the selected location's Details button to ensure your location is qualified for your model.

Select Location Type(s) (0)

Select Service(s) (0)

Select Product (0)

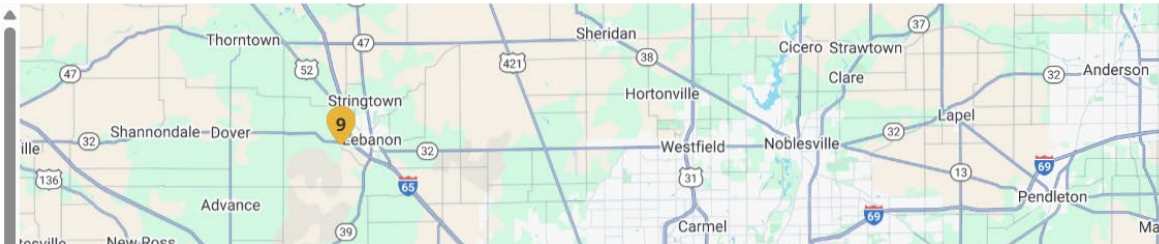
Miles ☒ Kilometers ☐

ALLISON DEALER

**Rudd Equipment Company**

2655 Kentucky Avenue  
Indianapolis, IN 46221  
[371-247-9125](tel:371-247-9125)

[Directions](#) [Details](#)



3.97 mi



SALES + SERVICE LOCATORSAPHELPPROFILELOGOUT (WHITNEY ROBERTSON)

CHANNELENGINEERINGPARTSPUBLICATIONSSERVICEWARRANTY

MY TRANSMISSION

ALLISON ELEARN™

ALLISON TOTAL ADVANTAGE™ CALCULATOR

APPROVED FLUIDS

DOC SNAPSHOT TRANSFER UTILITY

FLUID + FILTER CALCULATOR

FUELSENSE® 2.0

SERVICE TOOLS

TECHNICAL ASSISTANCE CENTER (TAC)

TCM REFLASH

ALLISON DOC®



CHANNELENGINEERINGPARTSPUBLICATIONSSERVICEWARRANTY

🏠 / SERVICE / ALLISON DOC®

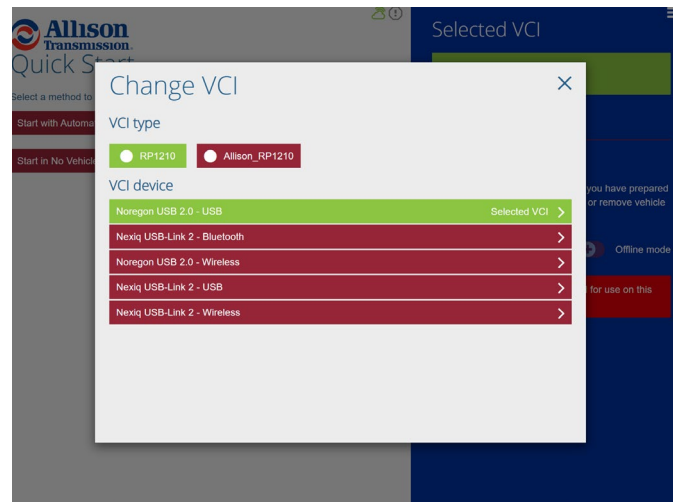
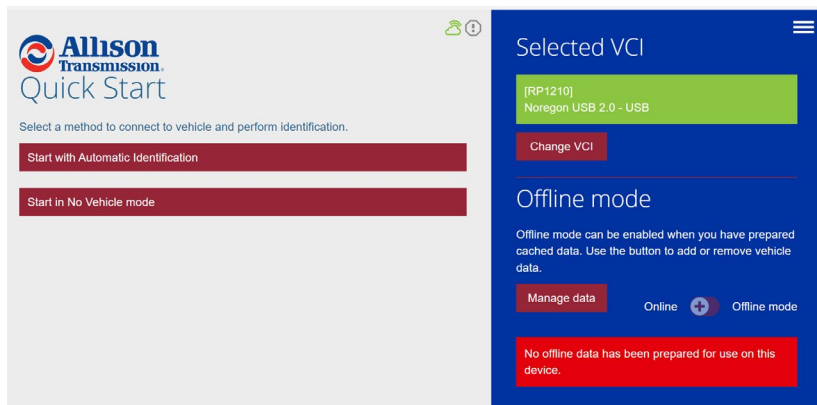


We are excited to introduce the updated Allison DOC, launching January 1st, 2025. This page is designed to support that transition. All current active subscriptions will be honored in the new Allison DOC tool. PLEASE NOTE: Allison DOC is the only Allison Authorized tool for diagnosing and troubleshooting Allison propulsion systems. Using any other diagnostic tool on Allison products runs the risk of inaccurate diagnosis of problems due to obsolete and incomplete information.

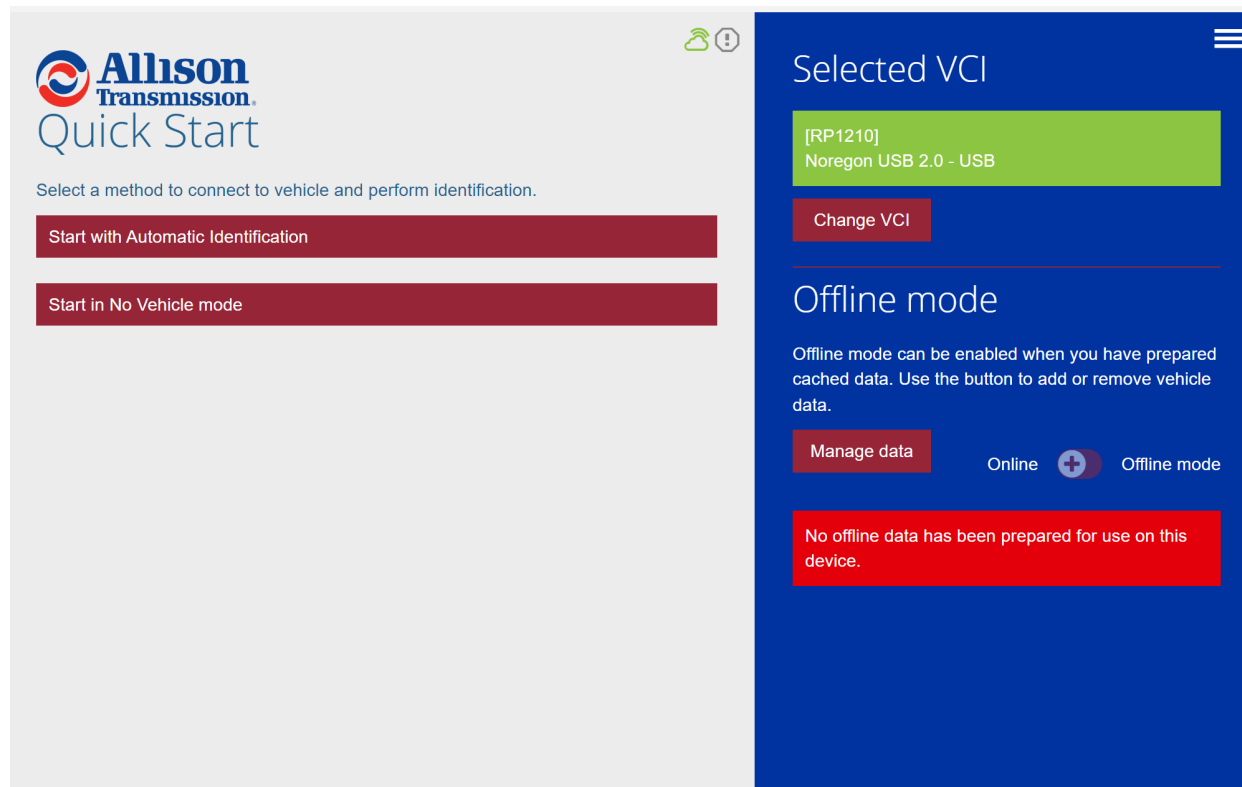
To Purchase the new Allison DOC or reassign DOC subscriptions: [Click Here](#)

To reactivate or transfer your current Allison DOC subscriptions: [Click Here](#)





# Allison DOC



The image shows a software interface for Allison Transmission. It is divided into two main panels. The left panel, titled 'Allison Transmission Quick Start', has a light gray background and contains two red buttons: 'Start with Automatic Identification' and 'Start in No Vehicle mode'. The right panel, titled 'Selected VCI', has a dark blue background and shows a green box with '[RP1210] Noregon USB 2.0 - USB' and a 'Change VCI' button. Below this is an 'Offline mode' section with a description, a 'Manage data' button, and a toggle switch currently set to 'Offline mode'. A red box at the bottom of the right panel states 'No offline data has been prepared for use on this device.'.

**Allison Transmission Quick Start**

Select a method to connect to vehicle and perform identification.

Start with Automatic Identification

Start in No Vehicle mode

**Selected VCI**

[RP1210]  
Noregon USB 2.0 - USB

Change VCI

**Offline mode**

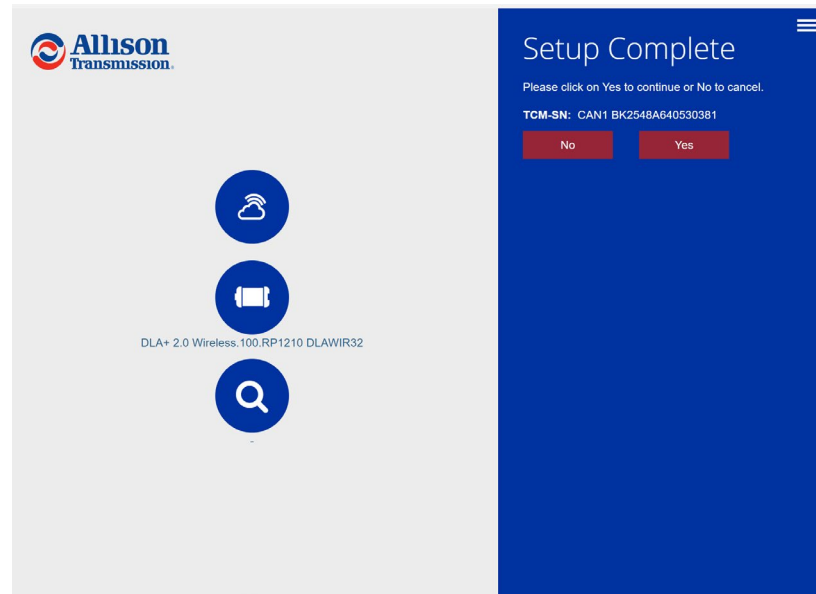
Offline mode can be enabled when you have prepared cached data. Use the button to add or remove vehicle data.

Manage data

Online ☒ Offline mode

No offline data has been prepared for use on this device.



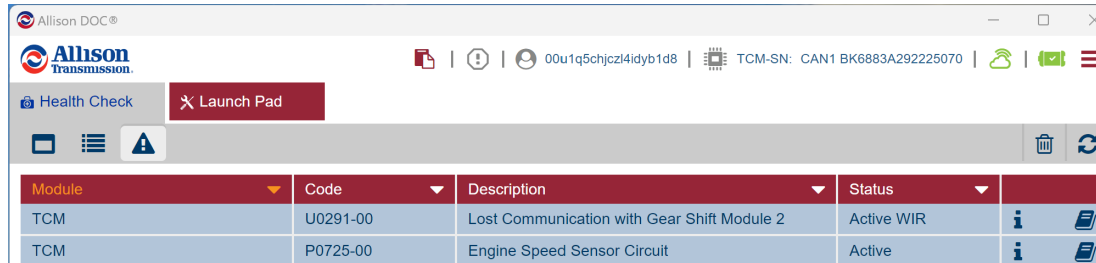




Health Check Launch Pad

Discovery 33 %

No DTCs to display



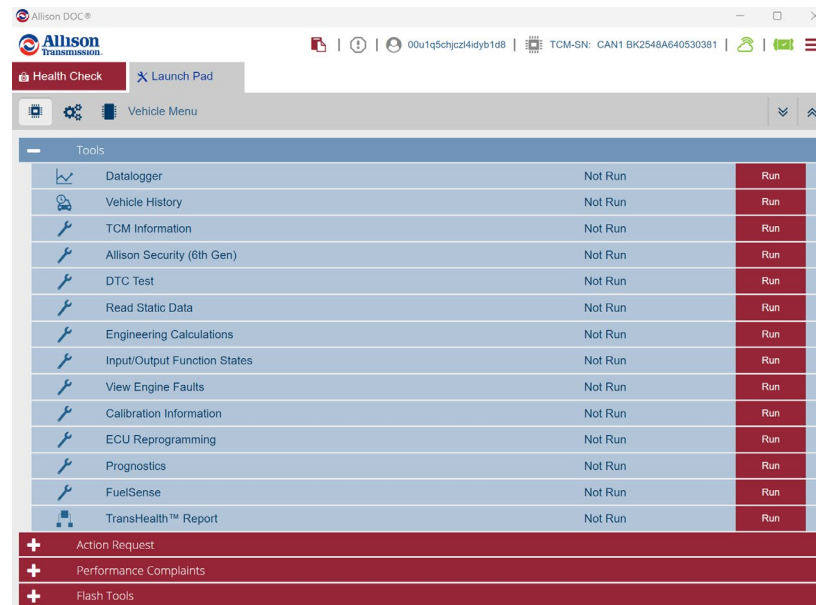
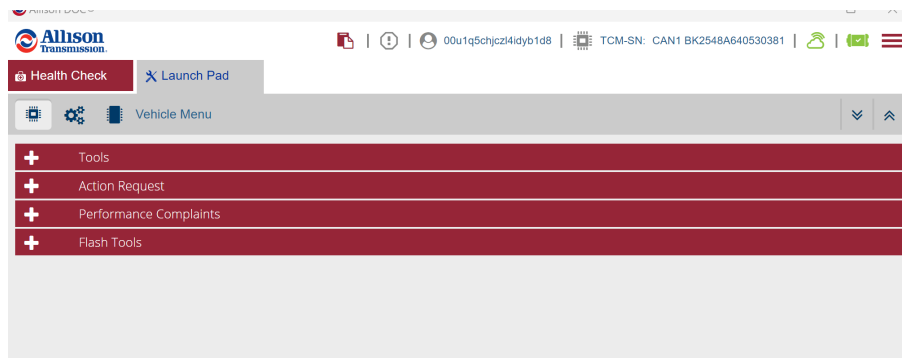
Allison DOC®

Allison Transmission

00u1q5chjczl4idyb1d8 | TCM-SN: CAN1 BK6883A292225070

Health Check Launch Pad

Module	Code	Description	Status	
TCM	U0291-00	Lost Communication with Gear Shift Module 2	Active WIR	i
TCM	P0725-00	Engine Speed Sensor Circuit	Active	i



# Calibration Information

Allison DOC®

Allison Transmission

00u1q5chjcz4idyb1d8 | TCM-SN: CAN1 BK2548A640530381

Health Check Launch Pad Calibration Inf... X

### Calibration Information

Customer Modifiable Constant	Value
AUTOMATIC NEUTRAL - SINGLE INPUT	J1939 CCVS1 Parking Brake Switch or PT-CAN
AUTOMATIC NEUTRAL: Maximum Output Speed for Dual Input Functions	60 RPM
AUTOMATIC NEUTRAL: Brake-Based Automatic Neutral (BBAN) Preselect Range	6TH RANGE
AUTOMATIC NEUTRAL: Maximum Output Speed for PTO	60 RPM
AUTOMATIC NEUTRAL - SINGLE INPUT WITH SELECTOR OVERRIDE	DISABLED
AUTOMATIC NEUTRAL - DUAL INPUT	DISABLED
AUTOMATIC NEUTRAL - DUAL INPUT WITH AUTOMATIC RETURN-TO-RANGE	DISABLED
AUTOMATIC NEUTRAL - DUAL INPUT WITH SERVICE BRAKE STATUS	DISABLED
PTO DRIVE INTERFACE 1	DISABLED
PTO DRIVE INTERFACE 2	J1939 PTO DRIVE INTERFACE Transmission Input Shaft PTO #2
PTO DRIVE INTERFACE 2: Max Engine Speed Engagement	900 RPM
PTO DRIVE INTERFACE 2: Max Engine	

Auto-Neutral Idle Start/Stop Input	DISABLED
ANTI-LOCK BRAKE SYSTEM (ABS) INPUT	EITHER GPI V OR PRIMARY ON-VEHICLE PROTOCOL
AUX BOX TRANSITION INPUT	DISABLED
TRANSMISSION SERVICE INDICATOR	BOTH GPO O AND J1939 ETC7 Transmission Service Indicator

SEM/LRTP & Engine Torque Information	Value
SEM/LRTP Compatibility	Compatible
SEM Validated	Compatible
LRTP Validated	Compatible
SEM Enabled Status	Enabled
LRTP Enabled Status	Enabled
SEM Torque Reduction Status	Correct resp to TCM reduction
LRTP Torque Reduction Status	Correct resp to TCM reduction
Source Address of Unapproved SEM Torque Reducing Device	All/Any (info not valid)
Source Address of Unapproved LRTP Torque Reducing Device	All/Any (info not valid)
Maximum Engine Torque Allowed during loss of J1939 ECM/TCM communication	914.57 ft-lb
Peak Torque from Advertised Engine Torque Curve (AETC) message	619.55 ft-lb

Additional Calibration Information Exit

Allison DOC®

Allison Transmission

00u1q5chjcz4idyb1d8 | TCM-SN: CAN1 BK2548A640530381

Health Check Launch Pad Calibration Inf... X

### Calibration Information

Additional Calibration Information

Read-Only Calibration Information/Constants	Value
ENGINE MAKE AND MODEL	CUMMINS X12 2018/2021/2024
NUMBER OF ENGINE CYLINDERS	OTHER
NEUTRAL-TO-RANGE ASSIST (NRA)	DISABLED
LOW SPEED GRADE ASSIST (LSGA)	ENABLED
PRIMARY MODE: Shift Schedule	S5 PERFORMANCE LIMITING
PRIMARY MODE: Shift Speed	1950
SECONDARY MODE: Shift Schedule	S5 PERFORMANCE LIMITING
SECONDARY MODE: Shift Speed	1950
SECONDARY MODE: Starting Range Override	NA
THROTTLE AND LOAD SOURCE	PRIMARY ON-VEHICLE PROTOCOL
ENGINE COOLANT TEMPERATURE (ECT) SOURCE	PRIMARY ON-VEHICLE PROTOCOL
ENGINE GOVERNED SPEED	2000
OUTPUT TORQUE LIMITING: Default Turbine Torque with Loss of Comm	4425.37 ft-lb / 6000 NM
OUTPUT TORQUE LIMITING: T-Case Low Output Torque Limit	24167.69 ft-lb / 32767 NM
OUTPUT TORQUE LIMITING: Reverse Output Torque Limit	24167.69 ft-lb / 32767 NM
OUTPUT TORQUE LIMITING: General Output Torque Limit	24167.69 ft-lb / 32767 NM
TORQUE CONVERTER	521
RANGE INHIBIT INDICATOR: Enable Bulb Check on GPO AD	YES
J1939 SA: AETC	0
J1939 SA: CCVS1 Brake Switch	33
J1939 SA: CCVS1 Cruise Control Active	0
J1939 SA: CCVS1 Cruise Control States	254

Exit

# FuelSense Settings

Allison DOC®

Allison Transmission

Health Check Launch Pad FuelSense

### FuelSense

Parameter	Current value	Read	Desired value	Range	Updated
				From To	
Primary Mode: DynActive Flat Ground Economy Bias	35.00 %	✓	35.00	0.00 100.00	
Primary Mode: DynActive Grade Ground Economy Bias	15.00 %	✓	15.00	0.00 100.00	
Secondary Mode: DynActive Flat Ground Economy Bias	45.00 %	✓	45.00	0.00 100.00	
Secondary Mode: DynActive Grade Ground Economy Bias	20.00 %	✓	20.00	0.00 100.00	
Neutral At Stop(NAS) : Coast Mode	Disable	✓	Disable		
Acceleration Rate Management	High	✓	High		

Next

Allison DOC®

Allison Transmission

Health Check Launch Pad FuelSense

### FuelSense

Parameter	Current value	Read	Desired value	Range	Updated
				From To	
Primary Mode: DynActive Flat Ground Economy Bias	35.00 %	✓	35.00	0.00 100.00	
Primary Mode: DynActive Grade Ground Economy Bias	20.00 %	✓	25	0.00 100.00	
Secondary Mode: DynActive Flat Ground Economy Bias	45.00 %	✓	45.00	0.00 100.00	
Secondary Mode: DynActive Grade Ground Economy Bias	20.00 %			0.00 100.00	
Neutral At Stop(NAS) : Coast Mode	Disable				
Acceleration Rate Management	High				

Custom confirmation popup

Are you sure you want to apply these changes?

Next Cancel



# Action Requests

Allison DOC®

**Allison Transmission**














00u1q5chjcz4idyb1d8 | TCM-SN: CAN1 BK2548A640530381

Health Check Launch Pad

Vehicle Menu

**Tools**

**Action Request**

	Solenoid Test	Not Run	Run
	Clutch Test	Not Run	Run
	Lamp Tests	Not Run	Run
	Output tests	Not Run	Run
	Reset Prognostics Information	Not Run	Run
	Reset Accelerometer Learning Information	Not Run	Run
	Reset Throttle Calibration (TPS only)	Not Run	Run
	Accelerometer Learning	Not Run	Run
	Reset Auto-Detect Oil Level Sensor	Not Run	Run
	Reset Shift Adaptive Parameters	Not Run	Run
	Clear All Shift Adaptive Parameters	Not Run	Run
	Reset SAE J1939 Source Address Information	Not Run	Run
	Upload Current TCM Information	Not Run	Run

**Performance Complaints**

**Flash Tools**

# Performance Complaints

Allison DOC®

00u1q5chjczl4idyb1d8 | TCM-SN: CAN1 BK2548A640530381

Health Check Launch Pad

Vehicle Menu

Tools

Action Request

Performance Complaints

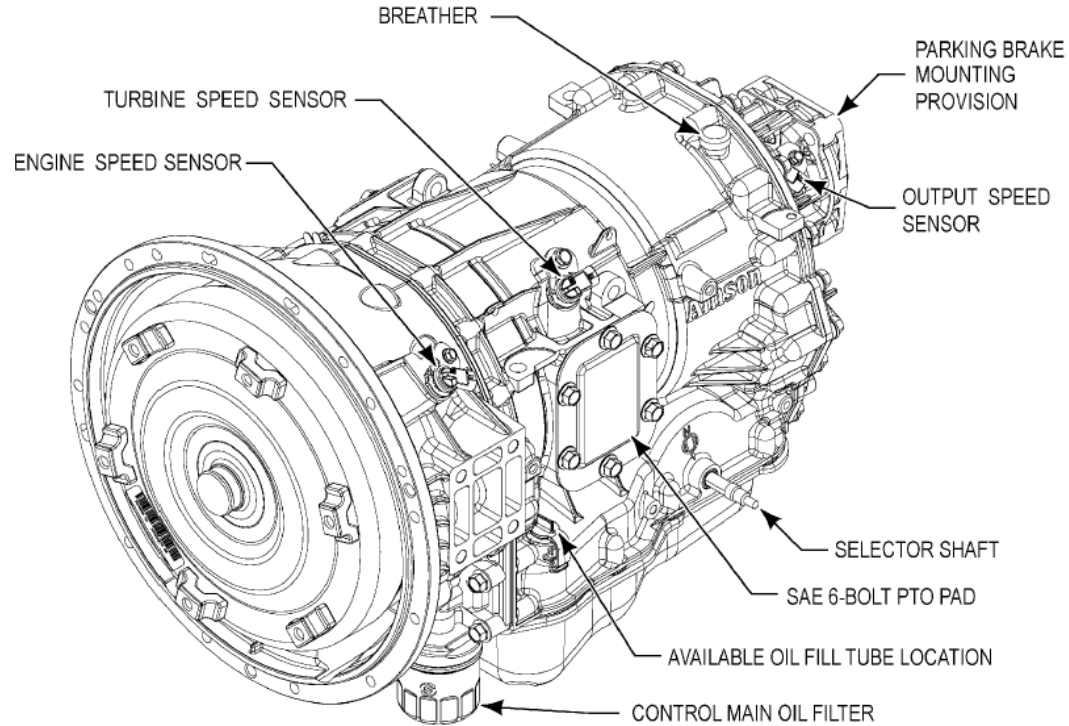
BATTERIES RUNNING DOWN. WITH IGNITION OFF, SHIFT SELECTOR DISPLAY IS STAYING ILLUMINATED	Not opened	Open
BATTERIES RUNNING DOWN. SHIFT SELECTOR DISPLAYS ARE NOT ILLUMINATED WITH IGNITION OFF	Not opened	Open
ENGINE STARTS TO CRANK BUT STOPS	Not opened	Open
ENGINE WILL NOT CRANK	Not opened	Open
ENGINE STARTS AND DIES IN N (NEUTRAL)	Not opened	Open
ENGINE STARTS AND DIES AFTER A RANGE IS SELECTED	Not opened	Open
ENGINE CRANKS BUT DOES NOT STARTS	Not opened	Open
CHECK TRANS LIGHT WILL NOT GO OUT AFTER ENGINE STARTS, TRANSMISSION DIAGNOSTIC RESPONSE OCCURS	Not opened	Open
CHECK TRANS LIGHT WILL NOT GO OUT AFTER ENGINE STARTS, TRANSMISSION DIAGNOSTIC RESPONSE DOES NOT OCCUR	Not opened	Open
CHECK TRANS LIGHT FLASHES INTERMITTENTLY	Not opened	Open
NO BULB CHECK FOR CHECK TRANS LIGHT AT START-UP	Not opened	Open
STALL SPEED EXCEEDS SPECIFICATION MORE THAN 150 RPM	Not opened	Open
STALL SPEED BELOW SPECIFICATION MORE THAN 150 RPM	Not opened	Open
4th LOCKUP PUMP MODE FUNCTION NOT WORKING	Not opened	Open

## Allison 3000 Series™ and 4000 Series™

Problem	Probable Cause	Suggested Remedy
ENGINE STARTS TO CRANK BUT STOPS	<p>Loss of Neutral start signal for the following:</p> <p>Battery voltage dipping below 4.75 volts during engine crank</p> <p>Vehicle Neutral start circuit component issue, e.g., starter relays, engine TCM, etc.</p> <p>Ignition switch issue</p>	<p>Resolve battery capacity or battery cable issue</p> <p>Resolve Neutral start circuit component issue e.g., starter, starter relays, cables, etc.</p> <p>Resolve ignition switch circuit issue, e.g., ignition switch, relays, engine TCM, etc.</p>
	Starter issue	Resolve starter issue
ENGINE WILL NOT CRANK	<p>Neutral start signal not present for the following:</p> <p>For lever shift selector, lever not in <b>N</b> (Neutral) position</p> <p>Ignition fuse or unswitched battery fuse(s) open</p> <p>Ignition switch is off, miswired, or open</p> <p>Ignition wiring to TCM or shift selector open or miswired</p> <p>Vehicle's master disconnect switch off or switch issue</p> <p>Unswitched battery power to shift selector or TCM miswired or open</p> <p>Battery voltage below 4.75 volts during engine cranking</p>	<p>Select <b>N</b> (Neutral)</p> <p>Resolve condition causing fuse to blow, then replace fuse</p> <p>Resolve ignition switch or wiring issue</p> <p>Resolve point-to-point wiring issue</p> <p>Turn on master disconnect or resolve switch issue</p> <p>Resolve point-to-point wiring issue</p> <p>Resolve battery capacity issue, or battery cabling, e.g., corrosion, wire gauge, loose powers and grounds, etc.</p>
	Fuse blown in VIM if equipped	Repair cause for blowing fuse and replace fuse
	Neutral start relay issue in VIM, if equipped	Replace neutral start relay in VIM
	TCM issue	Replace TCM

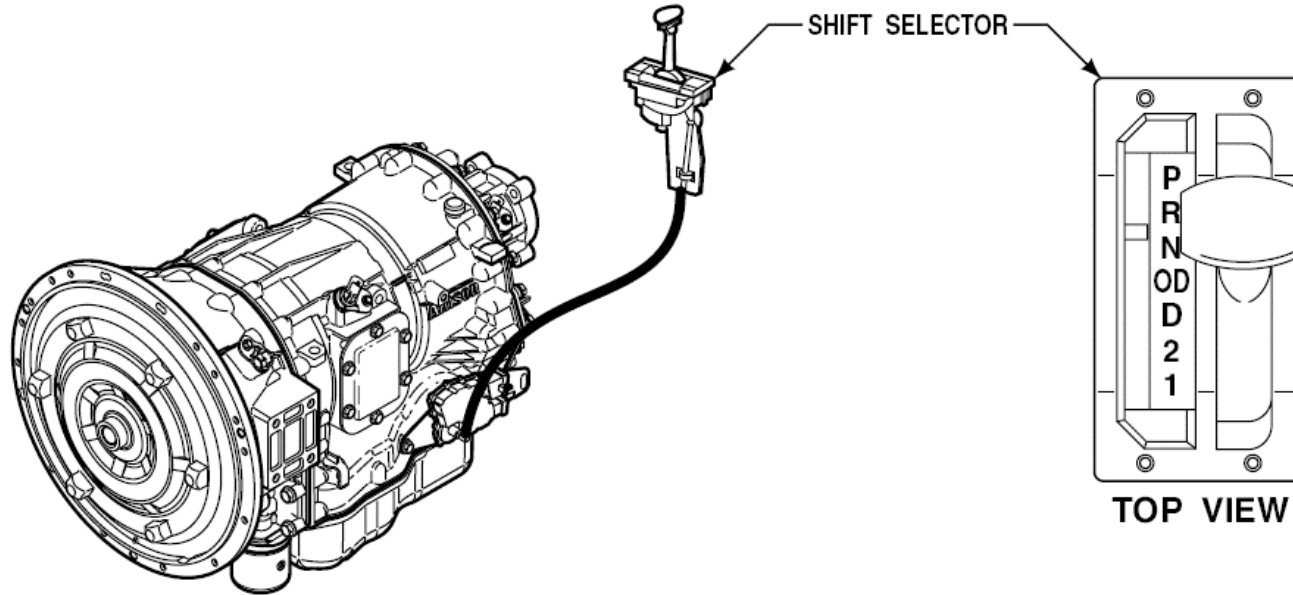
**NOTE:** Install original TCM again

# 1000/2000 Series



# 1000/2000 Components

- Shifter & Shifter Cable are OEM Supplied



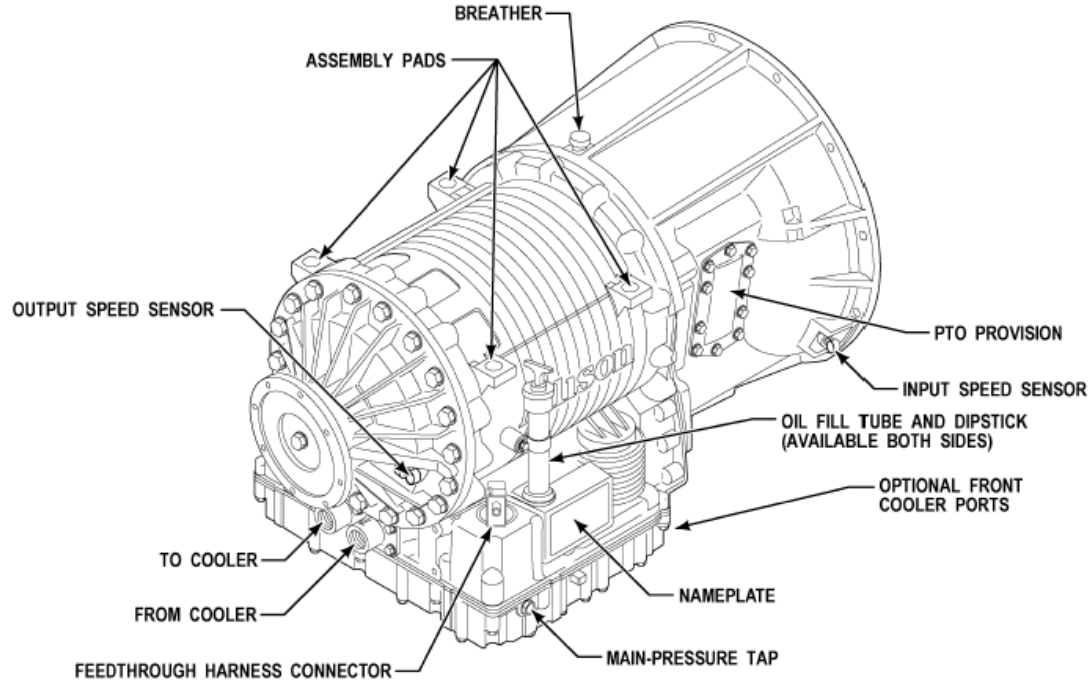
# Curtis Wright Industrial Group

(formally Arens)

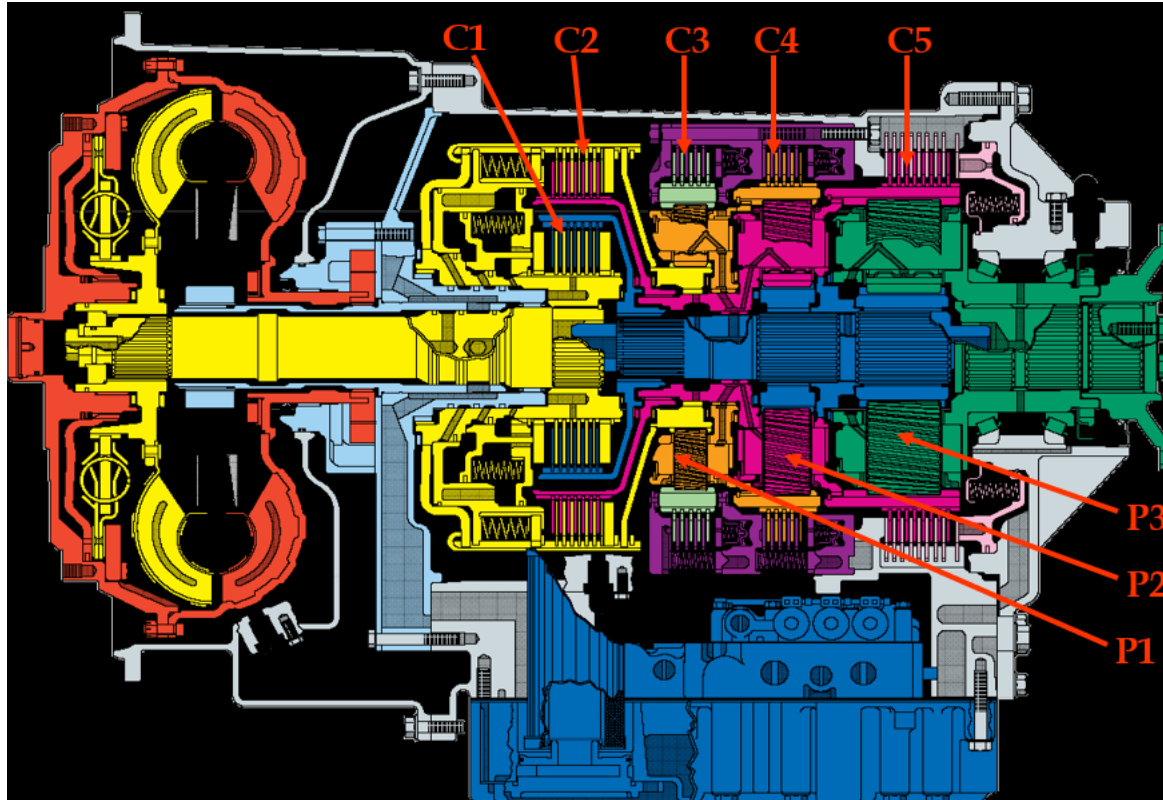




# 3000 Series

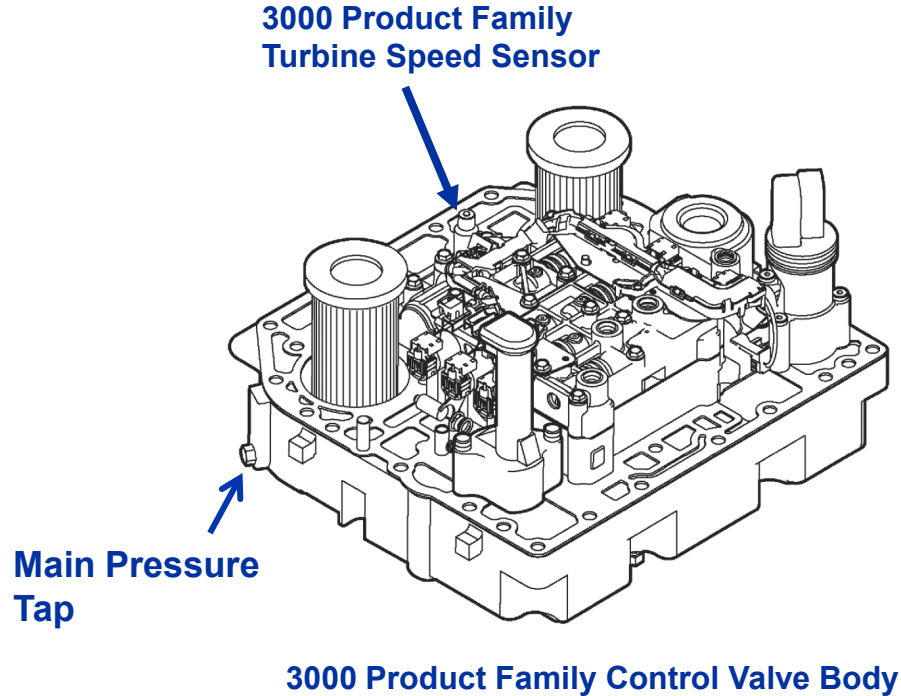


# Gear Pack Configuration



# Valve Body

- Includes valves, springs, solenoids which govern fluid flow to clutches and other internal components
- Also includes a pressure switch which provides signals to the TCM



# Reset Adaptive Shift Parameters

Reset Shift Adaptive Parameters

Test Information

- By selecting "Next" you will return adaptive shift parameters to the factory default settings. This action request should only be performed if a transmission has undergone an overhaul, exchange, or had internal repairs performed. Please refer to the Allison troubleshooting manuals for more information.
- Engine can be On or Off

Select the Desired Option

Reset Shift Adaptive Parameters

\* Required

ALL

Garage

N-1

N-R

R-1

1-R

1-2

2-1

2-3

3-2

3-4

Select the desired option and click the Next button or click Cancel to exit

Reset Shift Adaptive Parameters

Description	Value
Engine Speed	0.00 rpm
Upshift 3-4 Shift Convergence Flag – Pattern 0 Region 0	Not Converged
Upshift 3-4 Shift Convergence Flag – Pattern 0 Region 1	Not Converged
Upshift 3-4 Shift Convergence Flag – Pattern 0 Region 2	Not Converged
Upshift 3-4 Shift Convergence Flag – Pattern 1 Region 0	Not Converged
Upshift 3-4 Shift Convergence Flag – Pattern 1 Region 1	Not Converged
Upshift 3-4 Shift Convergence Flag – Pattern 1 Region 2	Not Converged
Upshift 3-4 Shift Convergence Flag – Pattern 2 Region 0	Not Converged
Upshift 3-4 Shift Convergence Flag – Pattern 2 Region 1	Not Converged
Upshift 3-4 Shift Convergence Flag – Pattern 2 Region 2	Not Converged
Upshift 3-4 Oncoming Clutch Volume – Pattern 0 Region 0	309.44 ml
Upshift 3-4 Oncoming Clutch Volume – Pattern 0 Region 1	309.44 ml
Upshift 3-4 Oncoming Clutch Volume – Pattern 0 Region 2	309.44 ml
Upshift 3-4 Oncoming Clutch Volume – Pattern 1 Region 0	309.44 ml
Upshift 3-4 Oncoming Clutch Volume – Pattern 1 Region 1	309.44 ml
Upshift 3-4 Oncoming Clutch Volume – Pattern 1 Region 2	309.44 ml
Upshift 3-4 Oncoming Clutch Volume – Pattern 2 Region 0	309.44 ml
Upshift 3-4 Oncoming Clutch Volume – Pattern 2 Region 1	309.44 ml
Upshift 3-4 Oncoming Clutch Volume – Pattern 2 Region 2	309.44 ml
Upshift 3-4 Oncoming Clutch Volume for Lockup Shift	309.44 ml
Upshift 3-4 Oncoming Clutch Pressure – Pattern 0 Region 0	1020.00 kPa
Upshift 3-4 Oncoming Clutch Pressure – Pattern 0 Region 1	1043.00 kPa

Click on Reset 3-4 Shift Adaptive Button to Reset

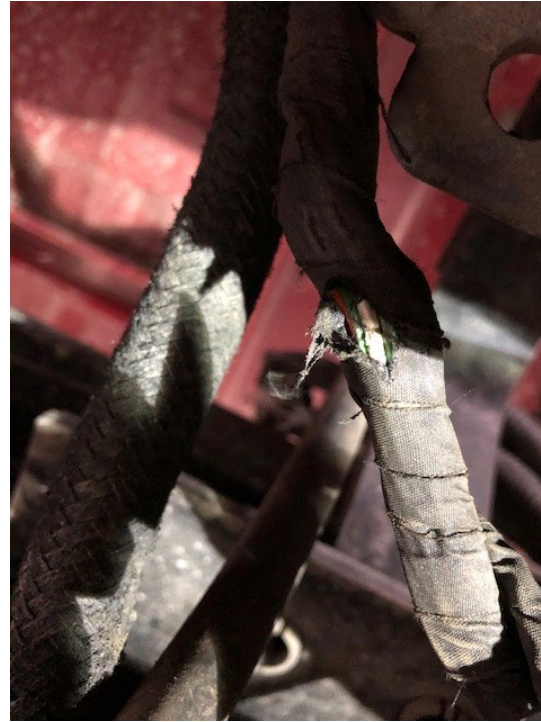
Reset 3-4 Shift Adaptive

- Use after major repair or transmission replacement
  - Resets clutch control back to original factory settings
  - Allows system to re-adapt shifts
  - Individual shifts can be selected

# Engine Repairs affecting Shift Quality

- Unable to make upshifts (hang shifts)
- Shift Flare
- Ratio Codes
- Fuel Pump Replacement
- Injector (s) Replaced
- Sensor (s) Replaced
- Throttle Position Sensor Replaced
- Engine Calibration Updated

# OEM Wiring Concerns





# OEM Wiring Concerns



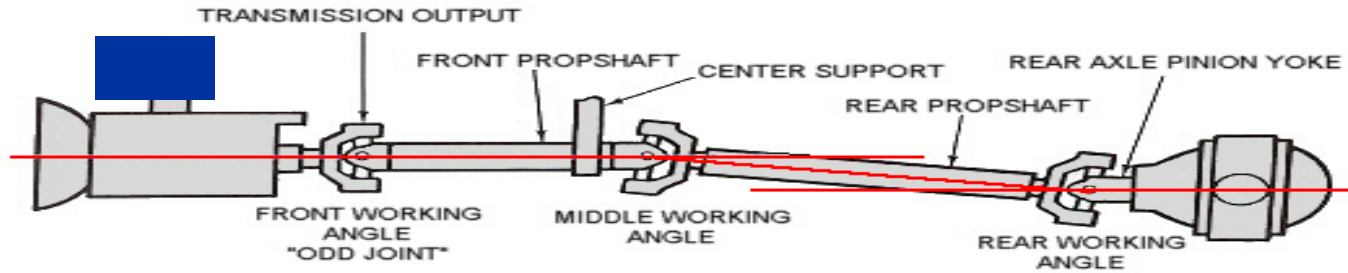
# Engine Brake Operation and Transmission Preselect

- Throttle is closed
- Converter Lockup Clutch is engaged
- TCM will command preselect downshift to 4<sup>th</sup> , 5<sup>th</sup> or 6<sup>th</sup> range based on the range specified.
- Standard Strategy: downshifts occur so the engine speed after the shift is ~300 rpm above engine gov speed
- Low Strategy: downshifts occur so the engine speed after the shift is ~150 rpm above engine gov speed
- If engine governed speed is 1900 rpm ~ 2200 rpm

# Neutral at Stop

- Neutral at Stop - Premium
  - Feature that reduces or eliminates the load on the engine while the vehicle is stopped, reducing fuel usage and emissions.
  - Two Second Delay before activation
  - Starting in 2021 some OEM's have elected to use NAS feature as a Green House Emission Credit.
  - IF an OEM has taken this credit, NAS cannot be Disabled. It's for the life of the vehicle.

# Driveline





# Driveline Awareness

- Visual inspection for missing balance weights or damage to the shaft tube.
- Worn U-Joints or Caps Rotating within the Yoke
- Shaft and Pinion Angle – Is the Pinion Pointing Downward.
- Air Ride Leveling Valve Properly Adjusted.
- Negative Impact on Transmission Durability and Reliability

# Pinion Angle – 2.0°

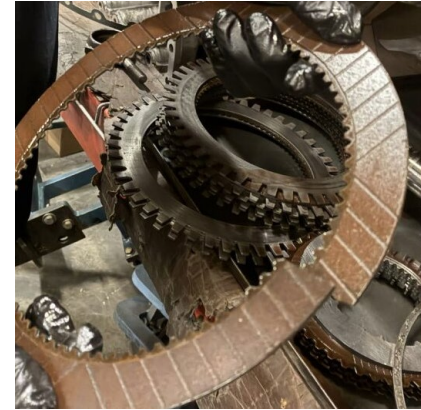
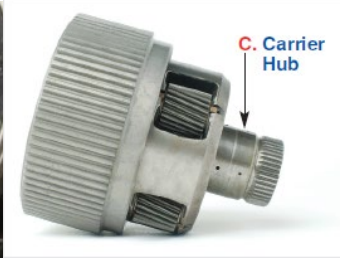




# Air Ride Suspension

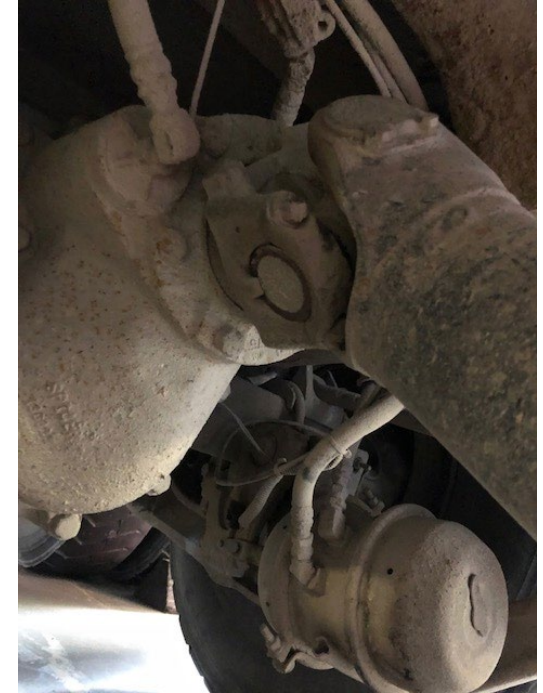
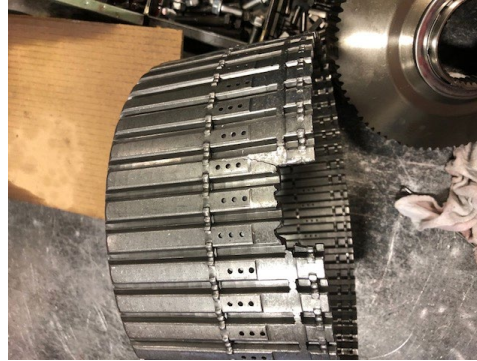
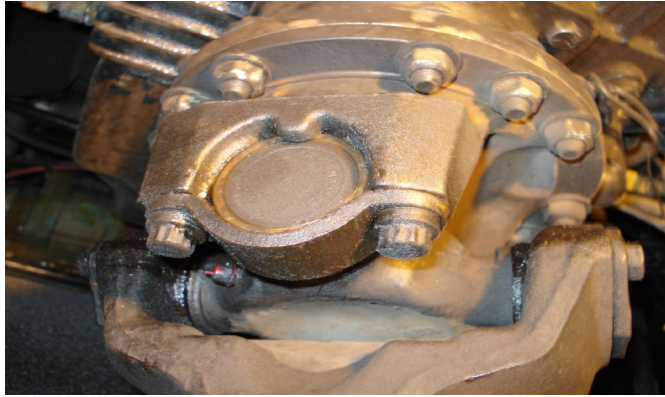


# Air Ride Suspension

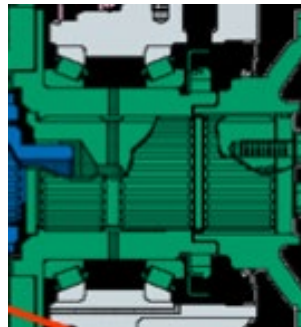




# Caps Rotating within Half Round Yokes



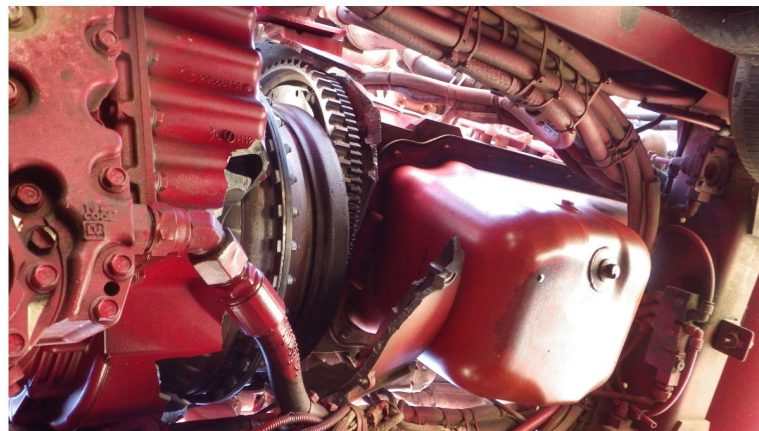
# Driveline Awareness



# Driveline Awareness







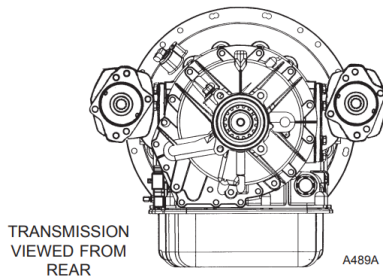


# Temperature @ 72°



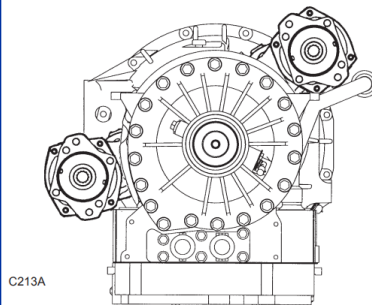
# PTO Mounting Locations

1K/2K

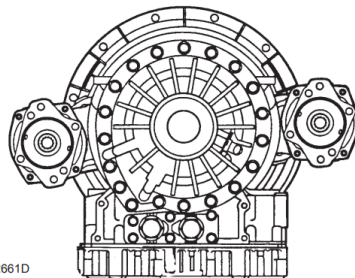


3K

TOP / SIDE PTO MOUNTING LOCATIONS

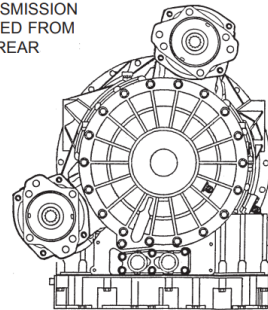


SIDE / SIDE PTO MOUNTING LOCATIONS

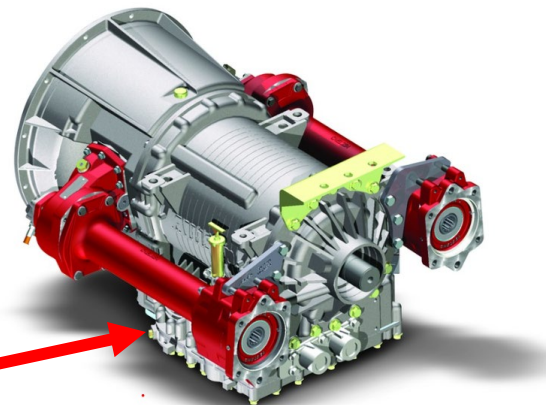
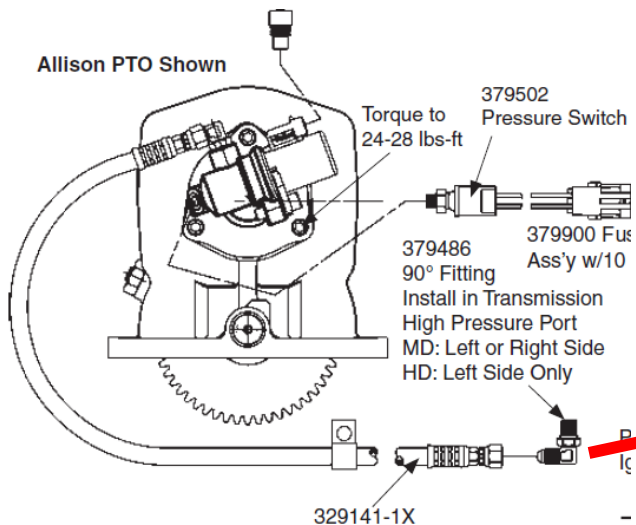


4K

TRANSMISSION  
VIEWED FROM  
REAR

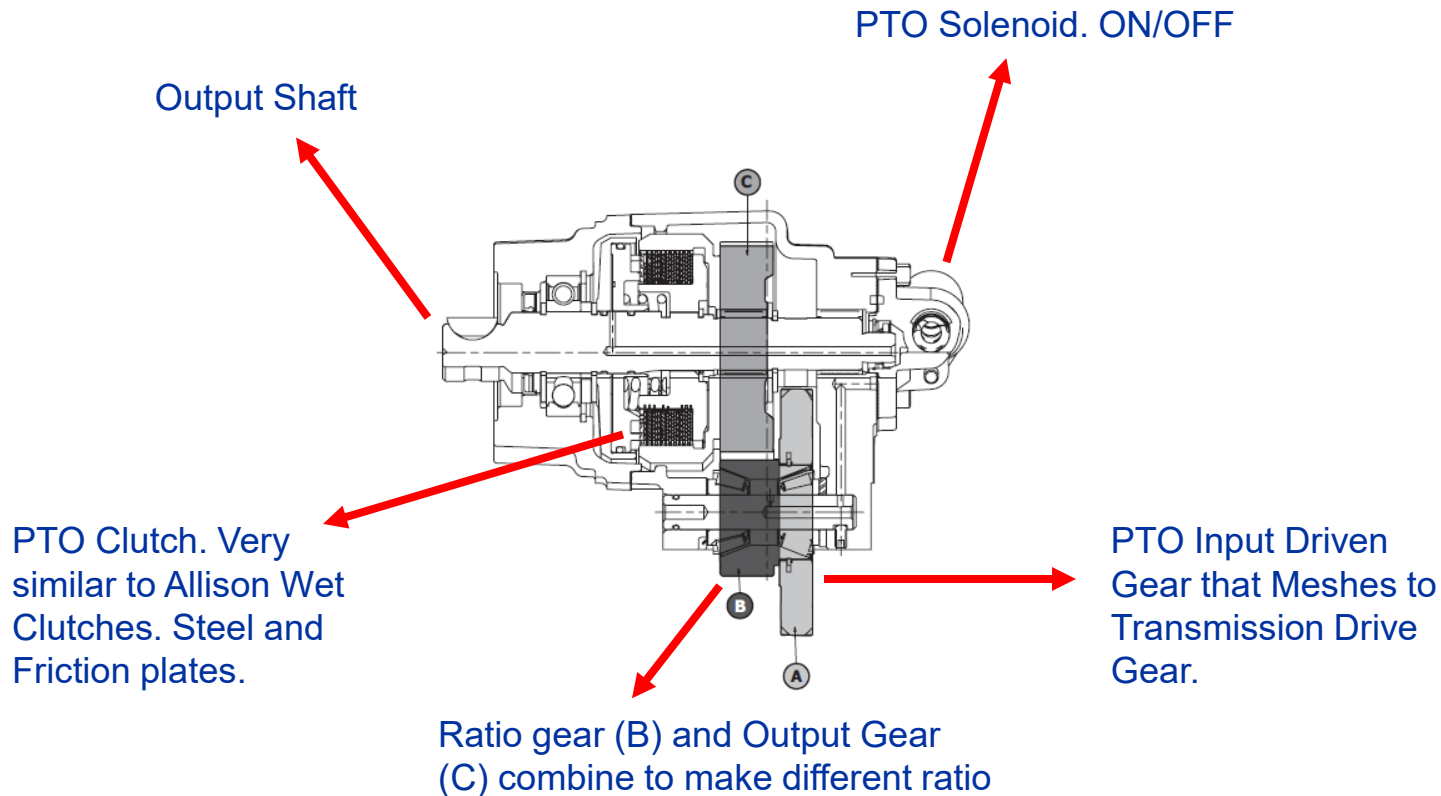


# Basic PTO Power Flow

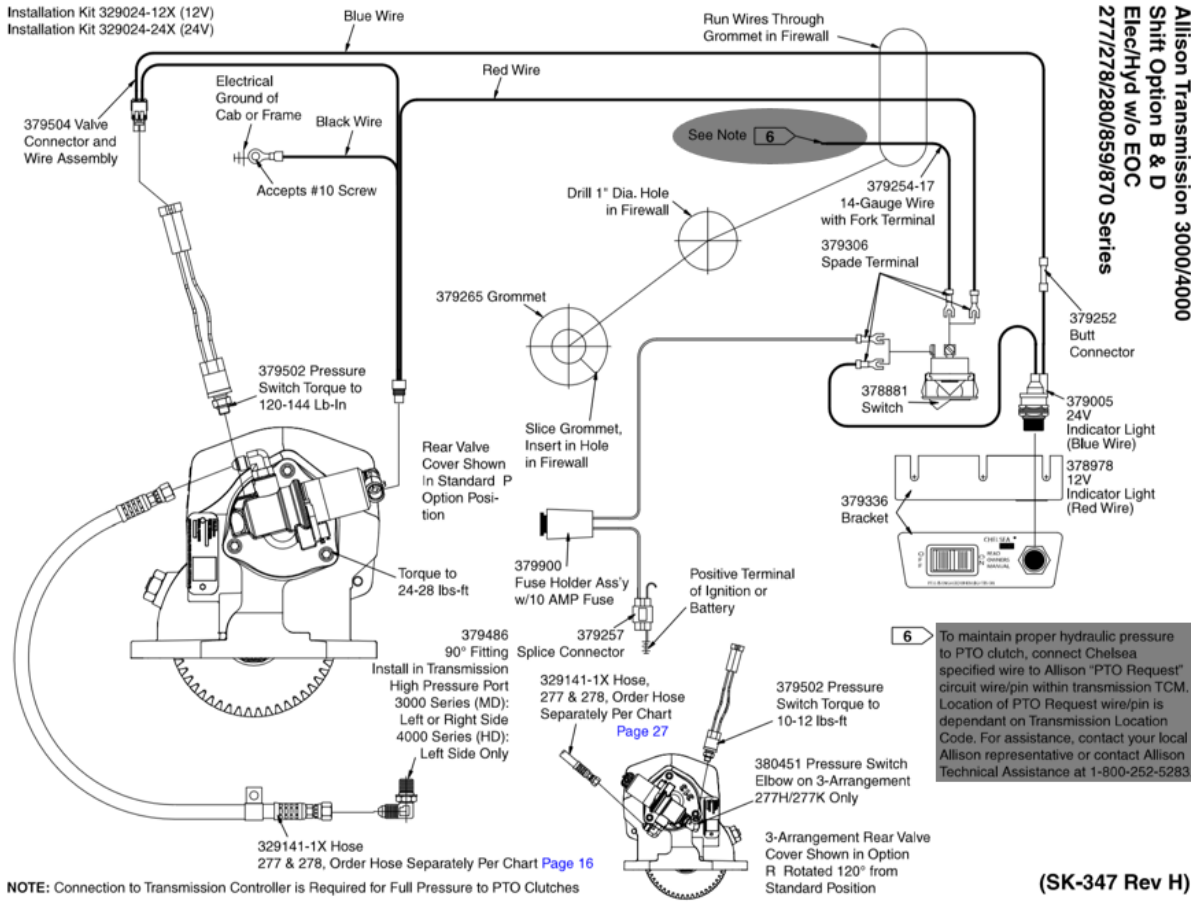


Red Arrow shows where Main Pressure tap is for 3000 series.

# Basic PTO



Installation Kit 329024-12X (12V)  
Installation Kit 329024-24X (24V)



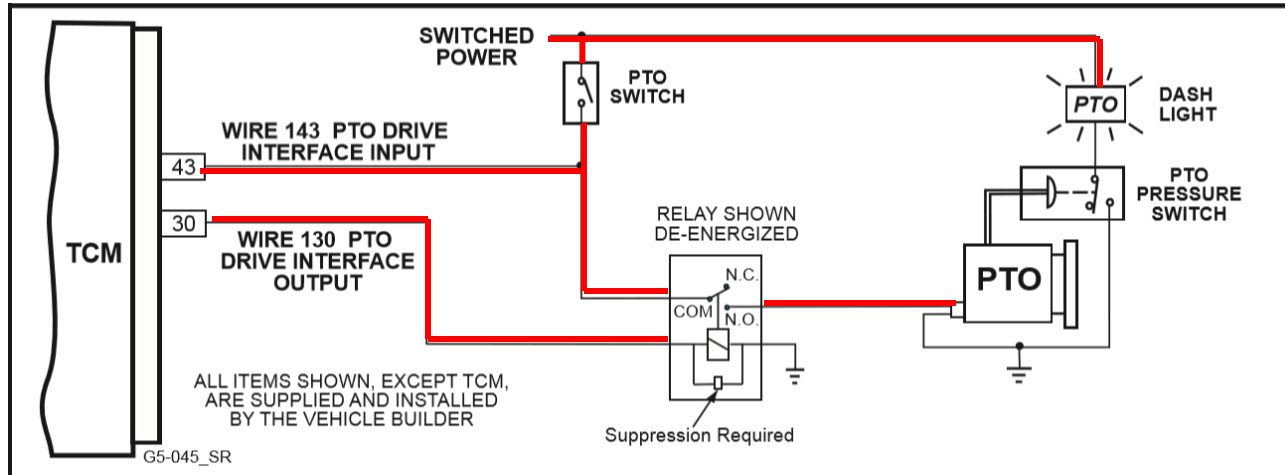
**Allison Transmission 3000/4000**  
**Shift Option B & D**  
**Elec/Hyd w/o EOC**  
**277/278/280/559/870 Series**

Bulletin HY25-1380-M7/U/S  
**Installation Sketches**

**Owners Manual**  
**10-Bolt PowerShift PTOs**

(SK-347 Rev H)

# Allison PTO Schematic

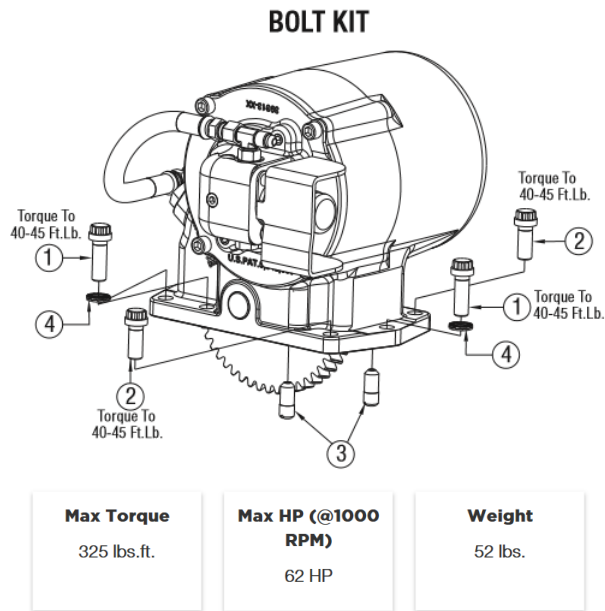


12-volt power —  
Ground —

There are many PTO Input/output options. This is only one possible option for PTO input/output. The calibration package will direct you to the right schematic. With this option, wire 143 is the input wire from the switch in the dash. Wire 130 is only turned on when the CMC parameters are met.

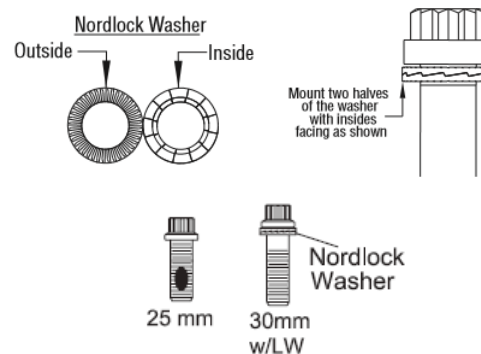


# Muncie CS24 Specs & PTO Kit with Nordlock Washers



## CS24/25 Bolt Kit – 20MK1001

ITEM	QTY	PART NO	DESCRIPTION
1	6	19T40226	12 Pt. Capscrew - 30mm
2	2	19T37727	12 Pt. Capscrew - 25mm
3	2	20T35779	Alignment Stud
4	2	21T40360	Nordlock Washer

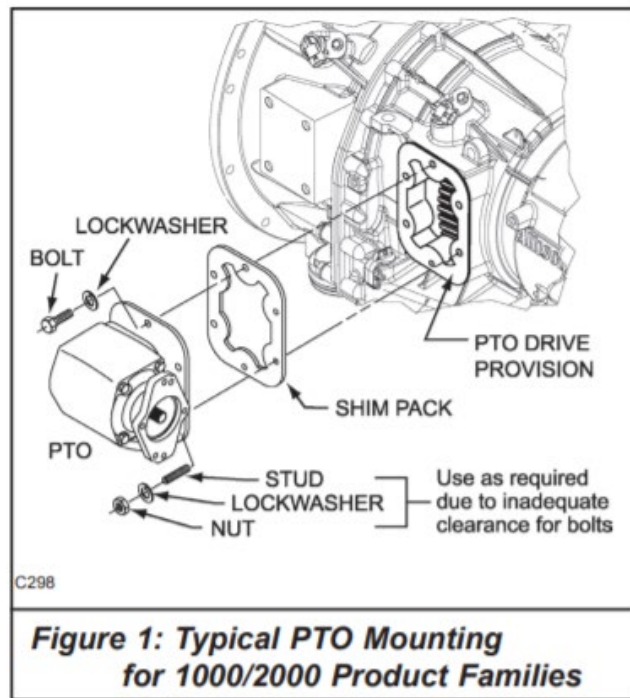


# 3000/4000 PTO Mounting Requirements



# 1000/2000 PTO Mounting Requirements

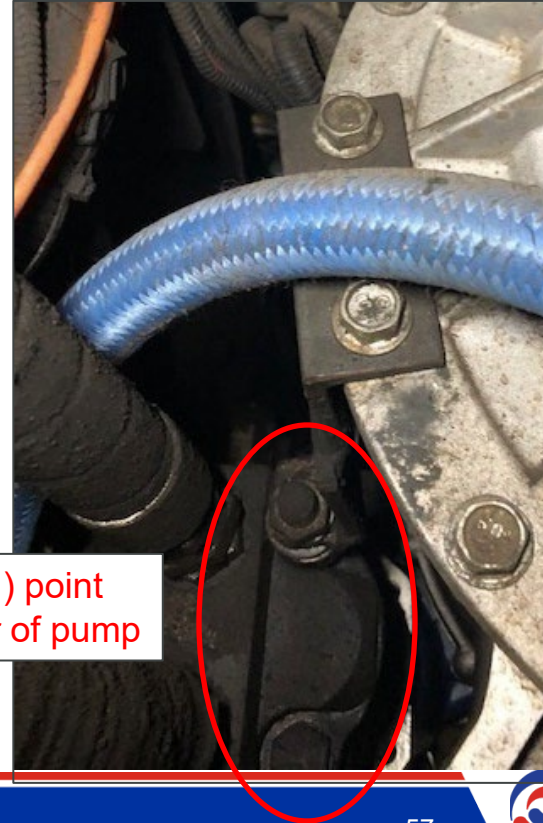
- Sliding Gear PTO's are not ALLOWED
- Only Constant or Clutch Drive Allowed
- Torque - 42 – 50 lb. ft.
- Backlash between PTO drive gear and driven gear - .006 - .029 inch
- Pump weight > 25lbs Requires Support Bracket



# Chelsea Installation Instructions

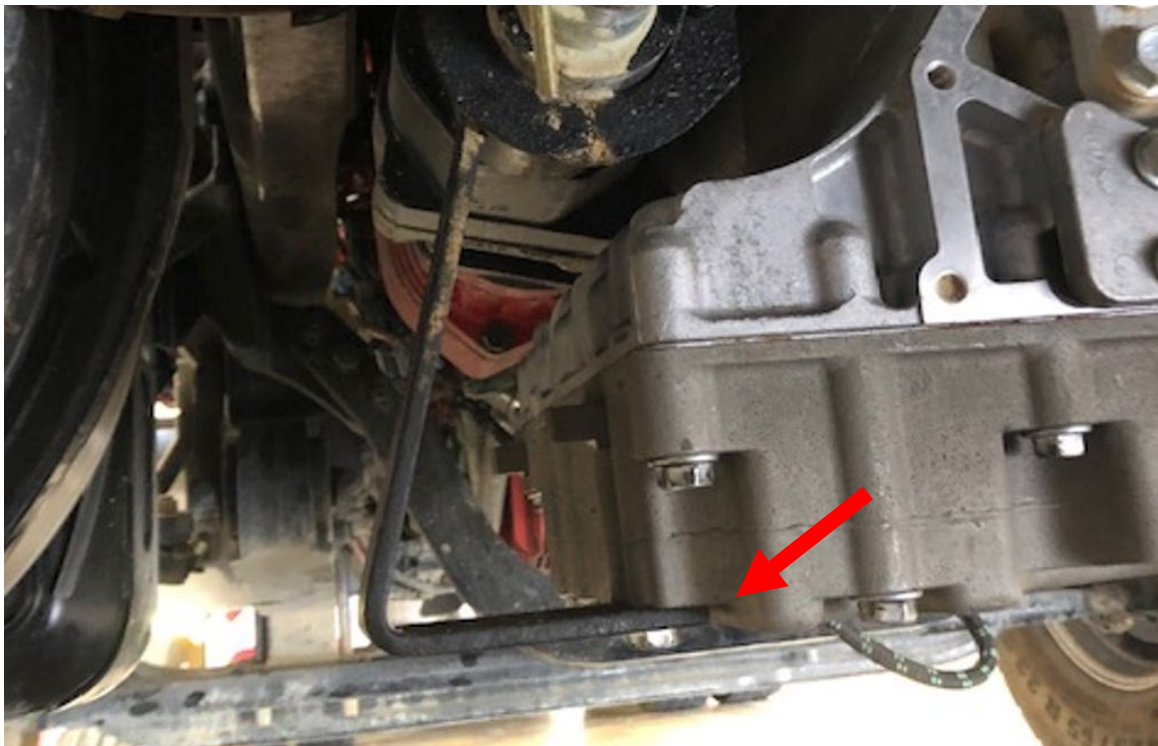
**NOTICE:**

Direct mount pumps exceeding 40 lbs. or dump pumps and multiple section pumps must be supported with a heavy duty bracket attached with two bolts on the rear of the transmission and two points on the rear of the pump.



Only (1) point  
on rear of pump

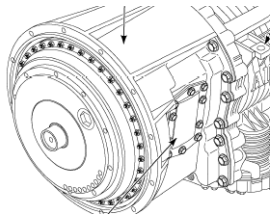
**CAUTION:** Do NOT attach PTO support brackets to the transmission control module, the retarder control module, or to the fill tube bosses on the side of the transmission.



# Differences Live vs Turbine

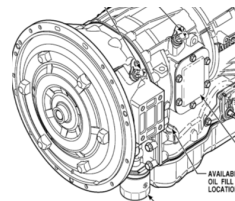
## Live 3K, 4K

- Rotates at Engine speed
  - Will work in gear and vehicle stationary.
- No TC slip
- No shimming needed. PTO metal gasket only. If installed with cover plate gasket, PTO will sound like a chain saw!



## Turbine 1K, 2K

- Turbine = Input shaft
- Gear stops when in gear and vehicle stationary
- TC slip will apply if Lockup is not applied.
- Shimming is required (.006 - .029)





# Importance of TCM Integration

- Full Main Pressure Schedule.
  - If Allison TCM is not aware that the PTO is on, Variable main pressure will apply. (See Chart)
- Prevent Driver Abuse
  - We can prevent PTO ENGAGEMENT and OPERATION.
  - 2 Engagement, 2 Operational Parameters

Table B-1. Main Pressure Schedule With SEM

With SEM (use Universal Allison DOC® to verify). All pressures are with Variable Modulated Main active. All pressures should be taken at 80°C (176°F)				
	Main Pressure @ 750-775 rpm Variable Modulated Main Pressure Active Off*	Main Pressure @ 1400 rpm Variable Modulated Main Pressure Active Off*	Main Pressure @ 700-775 rpm (Variable Modulated Main Pressure Active)	Main Pressure @ 1400 rpm (Variable Modulated Main Pressure Active)
Reverse			369-451 kPa (54-65 psi)	720-880 kPa (104-128 psi)
Neutral			414-605 kPa (60-88 psi)	450-550 kPa (65-80 psi)
1 <sup>st</sup> Range	1170-1430 kPa (170-207 psi)	1584-1936 kPa (230-281 psi)	360-440 kPa (52-64 psi)	639-781 kPa (93-113 psi)
2 <sup>nd</sup> Range	792-968 kPa (115-140 psi)	1566-1914 kPa (227-278 psi)	369-451 kPa (54-65 psi)	648-792 kPa (94-115 psi)
3 <sup>rd</sup> Range	801-979 kPa (116-142 psi)	1566-1914 kPa (227-278 psi)	360-440 kPa (52-64 psi)	594-726 kPa (86-105 psi)
4 <sup>th</sup> Range	999-1221 kPa (145-177 psi)	1611-1969 kPa (234-286 psi)	351-429 kPa (51-62 psi)	513-627 kPa (74-91 psi)
5 <sup>th</sup> Range	954-1166 kPa (138-169 psi)	1593-1947 kPa (231-282 psi)	396-484 kPa (57-70 psi)	648-792 kPa (94-115 psi)
6 <sup>th</sup> Range	954-1166 kPa (138-169 psi)	1593-1947 kPa (231-282 psi)	387-473 kPa (56-69 psi)	594-726 kPa (86-105 psi)

\* Pressures recorded with Universal Allison DOC® in Clutch Test Enable with output speed.

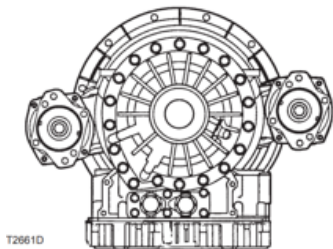
Warning: Our TCM does not have the ability to ramp up engine RPM. This functionality is provided by Engine programming or by Cruise switch.

# 3000 / 4000 Series PTO CMC's

## CUSTOMER MODIFIABLE CONSTANTS:

	<u>Default Value</u>	<u>Allowable Range</u>	<u>Units</u>
• Maximum engine speed for PTO engagement <sup>(1)</sup>	900	500 – 2600	rpm
• Maximum engine speed for PTO operation	4000	375 – 5000	rpm
• Maximum output speed for PTO engagement	250	50 – 6000	rpm
• Maximum output speed for PTO operation	300	60 – 6000	rpm
• PTO Torque Limiting (requires SEM/LRTP)	Disabled	Disabled / Enabled	
• PTO Torque Limit	1084	100 – 1084	Nm
• Drive Ratio (Percentage of Engine Speed)	120	75 – 200	percent (%)

SIDE / SIDE PTO MOUNTING LOCATIONS



## PTO Drive Interface 2 Input

3000 / 4000 – Package # 263

Input – 102

Output - 104



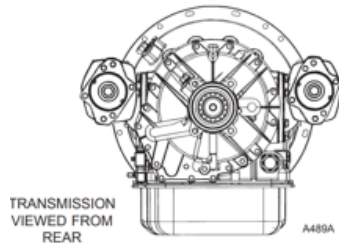
# 1000 / 2000 Series PTO CMC's

## CUSTOMER MODIFIABLE CONSTANTS:

- Maximum Engine Speed for PTO Engagement <sup>(1)</sup>
- Maximum Engine Speed for PTO Operation
- Maximum Output Speed for PTO Engagement
- Maximum Output Speed for PTO Operation
- Lockup Engagement Speed (turbine speed)
- PTO Torque Limiting (requires SEM/LRTP)
- PTO Torque Limit
- Drive Ratio (Percentage of Engine Speed)

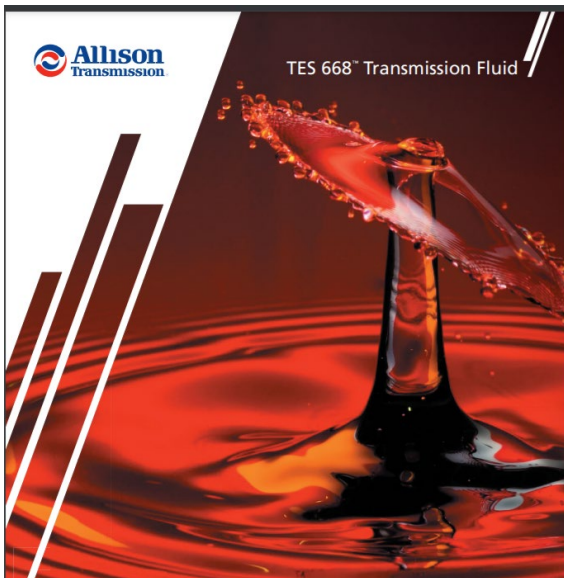
<u>Default Value</u>	<u>Allowable Range</u>	<u>Units</u>
900	500 – 2600	rpm
4000	375 – 5000	rpm
250	50 – 6000	rpm
300	60 – 6000	rpm
1150	900 – 5000	rpm
Disabled	Disabled / Enabled	
881	100 – 881	Nm
120	75 – 200	percent (%)

1K/2K



PTO Drive Interface 2 Input  
1000 / 2000 – Package # 380  
Input – 102  
Output - 104





## is now home to My Transmission and Fluid + Filter Calculator












































My Transmission and Fluid + Filter Calculator pages are now located on the HUB under SERVICE menu.

MY TRANSMISSION  
ALLISON ELEARN™  
ALLISON TOTAL ADVANTAGE™ CALCULATOR  
**APPROVED FLUIDS**  
DOC SNAPSHOT TRANSFER UTILITY  
FLUID + FILTER CALCULATOR  
FUELSENSE® 2.0  
SERVICE TOOLS  
TECHNICAL ASSISTANCE CENTER (TAC)  
TCM REFLASH  
ALLISON DOC®

These fluids offer extended drain intervals and superior thermal and viscosity properties compared to conventional petroleum-based fluids and other synthetics. They are uniquely designed for the specific components of an Allison propulsion solution, ensuring optimal performance. Additionally, a Fluid + Filter Calculator is available on the [Allison HUB™](#) to help users determine the appropriate change intervals.

### The Benefits of TES 668®/295®

- ✓ Extended drain intervals
- ✓ Enhanced transmission performance
- ✓ Lower operating expenses
- ✓ Offers optimum transmission protection
- ✓ Backed by an Allison Factory Warranty
- ✓ Supported by our Allison Authorized Service Network

	<b>DuraDrive® Synthetic HD 668 ATF</b> ✓ GSA-1001000		<b>Archer Lubricants</b> Archer Gold Synthetic HD Next-Gen ATF ✓ GSA-1004004		<b>MAXTRON ATF 558</b> ✓ GSA-1008002		<b>Advantage ATF 668</b> ✓ GSA-1001001
	<b>Tutela ATF 900 HD-AXD</b> ✓ GSA-1003002		<b>FS</b> FS Synthetic HD Next-Gen ATF ✓ GSA-1009001		<b>RAVENOL ATF THS</b> Truck HD Synthetic ✓ GSA-1003002		<b>FUCHS TITAN ATF 5688</b> ✓ GSA-1002001
	<b>PurTrax Heavy Duty Synthetic Automatic Transmission Fluid</b> ✓ GSA-1002002		<b>April Super Flo</b> ATF HD-16 ✓ GSA-1007001		<b>Emgard ATF 7668</b> ✓ GSA-1001002		<b>FLUIDMATIC SYN T668</b> ✓ GSA-1008001
	<b>CAM2 Lubricants</b> ATF XHD NG ✓ GSA-1004004		<b>Torque Glide HD</b> ✓ GSA-1004004		<b>Mobil Delvac 1 ATF 668</b> ✓ GSA-1002001		<b>SK HD 668 Fully Synthetic Automatic Transmission Fluid</b> ✓ GSA-1007001
	<b>United Lubricants</b> United Synthetic HD Next-Gen ATF ✓ GSA-1004001		<b>Synthetic Transmission Oil Ultra</b> ✓ GSA-1004004		<b>Kendall SHP® 668</b> ✓ GSA-1004001		<b>Spirax S6 ATF A668</b> ✓ GSA-1004001
	<b>Q8 Oils</b> Q8 Auto 15 A ✓ GSA-1001002		<b>MOCA Full Synthetic Heavy Duty ATF</b> ✓ GSA-1003003		<b>Phillips 66</b> Triton® 668 ✓ GSA-1008001		<b>CITGO SynDurance® 668</b> Automatic Transmission Fluid ✓ GSA-1003001
	<b>FleetValue</b> Syn HD Transmission Fluid ✓ GSA-1002004		<b>HEAVY DUTY SYN SSE ATF</b> ✓ GSA-1001002		<b>Rugged 668 HD</b> Synthetic Transmission Fluid ✓ GSA-1007001		<b>Delo SYN ATF 668</b> ✓ GSA-1004000
	<b>Vistony</b> Vistony Brilikon HD Synth ATF A8 ✓ GSA-1001001		<b>Elixir Full Synthetic MAX-TORQUE Transmission Fluid</b> ✓ GSA-1002002		<b>AT FLUID HD668</b> ✓ GSA-1004001		<b>Castrol Transynd RD™ 668</b> ✓ GSA-1002000
	<b>D-A Lubricants</b> ProDrive-A ✓ GSA-1002001		<b>Fleetrite ATF All Duty On-Highway Transmission Fluid</b> ✓ GSA-1002002		<b>LubriGuard Heavy Duty Synthetic 668 ATF</b> ✓ GSA-1001001		<b>CHRYSAN SYN 668</b> ✓ GSA-1002001
	<b>Dyna-Flex 21C</b> Syzol Extreme Heavy Duty ATF ✓ GSA-1004001		<b>PACCAR ATF All Duty On-Highway Transmission Fluid</b> ✓ GSA-1002002		<b>Sunoco Duratrans ATF 668</b> ✓ GSA-1001001		<b>Torq-Maxx HD Synthetic ATF</b> ✓ GSA-1002005
			<b>Syn-TS HD</b> ✓ GSA-1002002		<b>Valvoline Syn Gard™ 668</b> Automatic Transmission Fluid ✓ GSA-1001001		
			<b>HD SYN DRIVE Full Synthetic Transmission Fluid</b> ✓ GSA-1002002				

# Approved Fluid





Get Training Today



# Allison Oil Analysis

- 29537805 - Use Polaris only!
- They KNOW Allison Transmission
- Start by sending sample from the barrel
- File reports to establish a trend for each vehicle



# Lubricant Analysis Report

North America: +1-888-456-0120  
Europe: +1-317-808-3752

0	1	2	3	4
NORMAL	ABNORMAL	CRITICAL		

Overall report severity based on comments.

Account Information	Component Information	Sample Information
Account Number: ALLISN-7777-0292 Company Name: POWER GRID Contact: JOHN RANDALL Address: 3535 PARKWAY LANE HILLIARD, OH US Phone Number: 614-527-9400	Component ID: 6511616428 T Secondary ID: VIN: KW5183 Component Type: AUTO/POWERSHIFT TRANSMISSION Manufacturer: ALLISON Model: 3500 RD S-P Application: UNKNOWN Sump Capacity:	Tracking Number: 21163E02318 Lab Number: I-235977 Lab Location: Indianapolis Data Analyst: FLG Sampled: 13-Sep-2021 Received: 14-Sep-2021 Completed: 15-Sep-2021
Filter Information	Miscellaneous Information	Product Information
Filter Type: Information Requested Micron Rating: 0		Product Manufacturer: CASTROL Product Name: TRANSYND Viscosity Grade: CUSTOM GRADE
Comments: Fluid condition parameters are satisfactory. No action required. Continue sampling per established schedule;		

Sample #	Wear Metals (ppm)										Contaminant			Multi-Source Metals (ppm)					Additive Metals (ppm)					
	Iron	Chromium	Nickel	Aluminum	Copper	Lead	Tin	Cadmium	Silver	Vanadium	Silicon	Sodium	Potassium	Titanium	Molybdenum	Antimony	Manganese	Lithium	Boron	Magnesium	Calcium	Barium	Phosphorus	Zinc
1	120	0	1	31	21	5	1	0	0	0	18	7	0	0	1	0	2	0	51	8	66	0	227	34

Sample #	Sample Information							Contaminants			Fluid Properties					
	Date Sampled	Date Received	Lube Time	Unit Time	Lube Change	Lube Added	Filter Change	Fuel Dilution	Soot	Water	Viscosity 40°C	Viscosity 100 °C	Acid Number	Base No. D4739	Oxidation	Nitration
1	13-Sep-2021	14-Sep-2021	36012	36012	Unk	0	Unk	%	%	%	cSt	cSt	mg KOH/g	mg KOH/g	abs / cm	abs / 0.1mm
										<.1 - Hotplate	34.8	6.9	0.68			

Sample #	Particle Count (particles/mL)								Additional Testing	
	ISO Code	> 4	> 6	> 10	> 14	> 21	> 38	> 70	> 100	
1	Based On 4/6/14	particles / mL	particles / mL	particles / mL	particles / mL	particles / mL	particles / mL	particles / mL	particles / mL	Test Method
	/ /									Glycol
										NEG

# Transmission Temperature

Transmission is overheated when the following temperatures are exceeded

Fluid to the COOLER , 300° F



Sump Fluid 250°F

# Kenworth Add-On Remote Cooler





# Allison Shift Selector



# Checking Fluid Level at Shift Selector - Delayed

The TCM delays the fluid level check until the following conditions are met:

- The fluid temperature is above 40°C (104°F) or below 104°C (220°F).
- The transmission is in **N** (Neutral).
- The vehicle has been stationary for approximately two minutes to allow the fluid to settle.
- The engine is at idle.

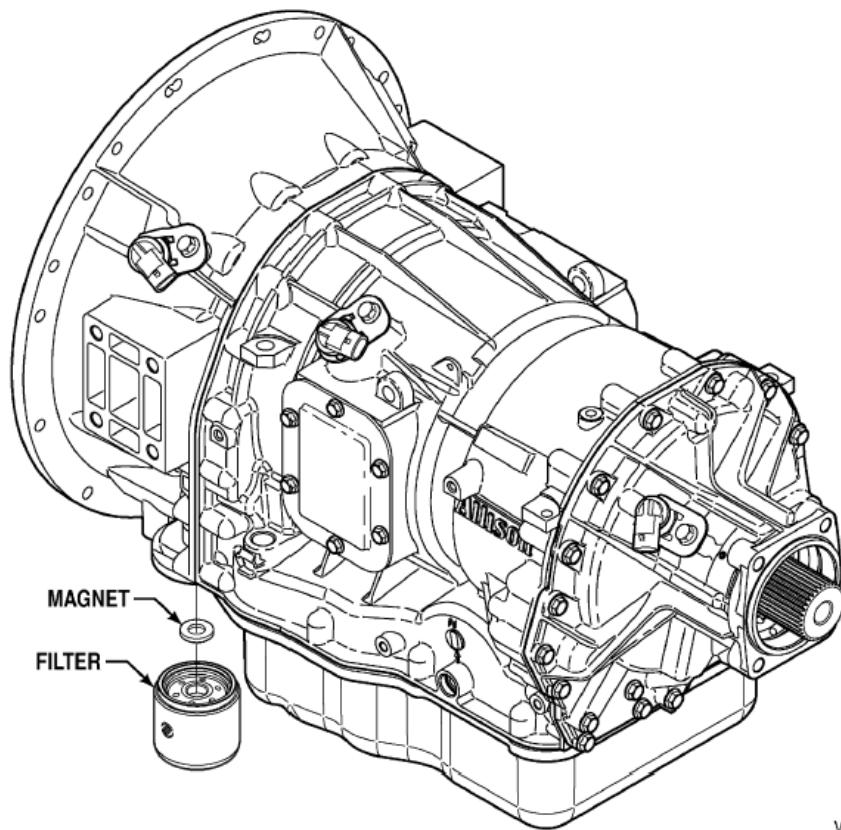
## DELAYED FLUID LEVEL CHECK

If the fluid level check cannot be completed, one of the following Oil Level Display faults will be shown:

SETTLING :62	ENG RPM TOO LO	ENG RPM TOO HI	MUST BE IN NEUTRAL
OIL TEMP TOO LO	OIL TEMP TOO HI	VEH SPD TOO HI	SENSOR ERROR

# 1K/2K Fluid & Filter Service

1000 and 2000 Series Fluid And Filter Change Interval Recommendations						
			Prognostics Turned Off or Not Calibrated in TCM		Prognostics Turned On	
		Duty Cycle	Allison TES 668 and/or TES 295 Approved Fluid(s)	Allison TES 389 Approved Fluid(s)	Allison TES 668 and/or TES 295 Approved Fluid(s)	Allison TES 389 Approved Fluid(s)
Fluid		General*	150,000 Miles (240,000 km) 4,000 Hours 48 Months	50,000 Miles (80,000 km) 2,000 Hours 24 Months	When indicated by controller or 48 months, whichever occurs first	When indicated by controller or 24 months, whichever occurs first (MY2010)
		Severe**	75,000 Miles (120,000 km) 3,000 Hours 36 Months	12,000 Miles (20,000 km) 500 Hours 6 Months		
Filters	Spin-On Control Main Filter	General*	50,000 Miles (80,000 km) 2,000 Hours 24 Months	50,000 Miles (80,000 km) 2,000 Hours 24 Months	When indicated by controller or 48 months, whichever occurs first	When indicated by controller or 24 months, whichever occurs first (MY2010)
		Severe**	50,000 Miles (80,000 km) 2,000 Hours 24 Months	12,000 Miles (20,000 km) 500 Hours 6 Months		
	Internal Filter	All	Overhaul	Overhaul	Overhaul	Overhaul



V05805

# 1000 / 2000 Control Main Filter





# 3K/4K Prognostic's ON - TES295/668 Fluid

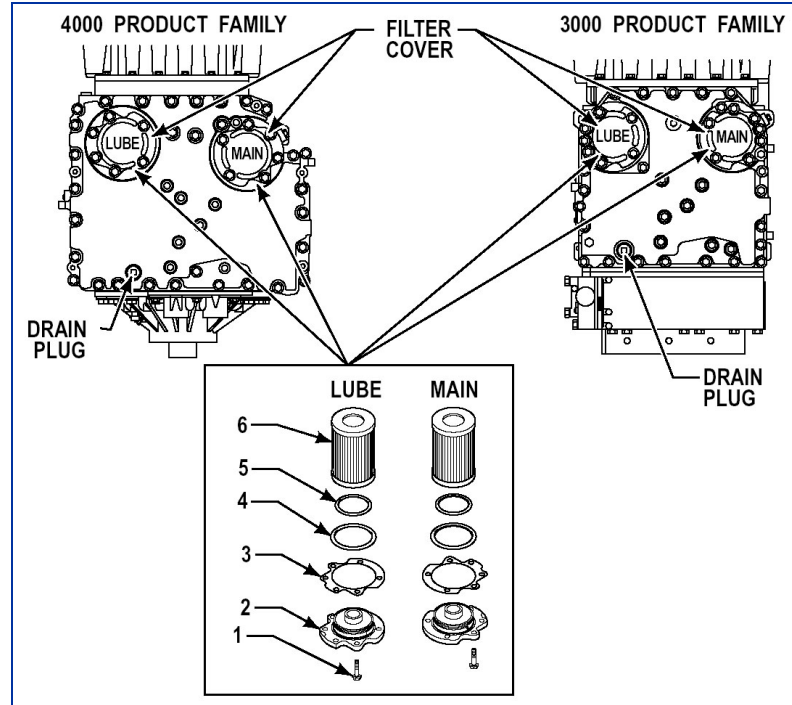
Filter Change Intervals, 100 Percent Concentration Allison Approved TES 295 or TES 468 Fluids, Prognostics "ON" *		
<b>REQUIRED **100 Percent Concentration Allison Approved TES 295 or TES 468 Fluids and Allison High Capacity Filters** REQUIRED</b>		
General or Severe		
Main Filter	Internal Filter	Lube Filter
Change filters when indicated by controller between fluid changes or 60 months, whichever occurs first.	Overhaul	Change filters when indicated by controller between fluid changes or 60 months, whichever occurs first.
Fluid Change Intervals, 100 Percent Concentration Allison Approved TES 295 or TES 468 Fluids, Prognostics "ON" *		
<b>REQUIRED **100 Percent Concentration Allison Approved TES 295 or TES 468 Fluids and Allison High Capacity Filters** REQUIRED</b>		
General or Severe		
Change fluid when indicated by controller or 60 months, whichever occurs first. Replace filters with fluid.		
<p>* If prognostics is turned "OFF " or Not Calibrated in TCM after serial numbers listed above, refer to <a href="#">Table 11</a> for fluid change intervals.</p> <p>** Less than 100 percent concentration of TES 295 or TES 468 Allison Approved fluids is considered a mixture and shall not be used with Prognostics or this change schedule. Refer to <a href="#">Table 11</a> for utilization of Allison Approved Non-TES 295 or Non-TES 468 fluids change intervals.</p>		

# 3K/4K Fluid & Filter Service

Filter Change Intervals, No Prognostics or when Prognostics is NOT Enabled/Turned OFF							
100 Percent Concentration Allison Approved TES 295 or TES 468 Fluids*			Allison Approved Non-TES 295 or Non-TES 468 Fluids*				
Main Filter	Internal Filter	Lube Filter	Main Filter		Internal Filter	Lube Filter	
<b>General** or Severe***</b> 75,000 Miles (120 000 km) 3000 Hours 36 Months	Overhaul	<b>General** or Severe***</b> 75,000 Miles (120 000 km) 3000 Hours 36 Months	<b>General**</b> 25,000 Miles (40 000 km) 1000 Hours 12 Months	<b>Severe***</b> 12,000 Miles (20 000 km) 500 Hours 6 Months	Overhaul	<b>General**</b> 25,000 Miles (40 000 km) 1000 Hours 12 Months	<b>Severe***</b> 12,000 Miles (20 000 km) 500 Hours 6 Months
Fluid Change Intervals, No Prognostics or when Prognostics is NOT Enabled/Turned OFF							
100 Percent Concentration Allison Approved TES 295 or TES 468 Fluids*				Allison Approved Non-TES 295 or Non-TES 468 Fluids*			
<b>General**</b> 300,000 Miles (480 000 km) 6000 Hours 48 Months		<b>Severe***</b> 150,000 Miles (240 000 km) 6000 Hours 48 Months		<b>General**</b> 25,000 Miles (40 000 km) 1000 Hours 12 Months		<b>Severe***</b> 12,000 Miles (20 000 km) 500 Hours 6 Months	
* Less than 100 percent concentration Allison Approved TES 295 or TES 468 fluid is considered a mixture and should utilize Allison Approved Non-TES 295 or Non-TES 468 fluids change intervals. ** General Vocation: Intercity Coach with duty cycle less than or equal to one (1) stop per mile and all other vocations not listed in severe vocation. *** Severe Vocation: All Retarders, On/Off Highway, Refuse, Transit, and Intercity Coach with duty cycle greater than one (1) stop per mile.							

# Fluid & Filter Service

- Replace main and lube filters during regular service intervals
- Recommend using Allison High-Capacity Filters
- Replace sump filter only at overhaul
- Factory filled with TranSynd™
- **Bolt Torque is 38 – 45 lb. ft.**



# Resetting Prognostic's

- Oil Life Monitor

Display the OM information and press and hold the **DISPLAY MODE/DIAGNOSTIC** (DMD) button for 10 seconds.

With the ignition on and the engine off, shift between **NDNDNRN** to reset the value displayed to 99, pausing no more than 3 seconds between consecutive



# Resetting Prognostic's

- Filter Life Monitor

The FM automatically resets once the new filters have been installed and the Filter Life Indicator (FLI) pressure switch no longer detects low pressure at the filter.

The FM can also be reset manually by either of these methods:

- Press and hold the **MODE** button for 10 seconds while in FM mode.
- With ignition on, engine off, and brakes applied, shift between **NRNRNDN** pausing less than 3 seconds between each selector movement.



# Questions?