

# BODY BUILDER INSTRUCTIONS

Mack Trucks



Transmission  
PI / CHU, AN / CXU, GR / GU, TD  
LR, TE / MRU  
Section 4

## Transmission

This information provides specifications for Transmissions on MACK vehicles.

**Note:** We have attempted to cover as much information as possible. However, this information does not cover all the unique variations that a vehicle chassis may present. Note that illustrations are typical but may not reflect all the variations of assembly.

All data provided is based on information that was current at time of release. However, **this information is subject to change without notice.**

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## mDrive Transmission

### mDrive Lubrication Capacity

Transmission	Oil Type	Capacity Including Cooler
<b>mDrive – MACK</b>		
<b>TmD12</b>	<b>Refer to the approved oils list (SB 175–61)</b>	<b>17.9 quarts</b>
<b>TmD13 / TmD14</b>	<b>Refer to the approved oils list (SB 175–61)</b>	<b>20.5 quarts</b>

## Allison Transmission

### Lubrication capacity

Transmission	Oil Type	Capacity excluding external circuits
4500 RDS	TES 295 and TES 389	With PTO with shallow oil sump: 47.5 quarts (45 litres)
		Without PTO with shallow oil sump: 40 quarts (38 litres)
3000 Series		With PTO with shallow Oil Sump: 26.4 quarts (25 liters)
		With PTO with Deep Oil Sump: 29.5 quarts (28 liters)



#### CAUTION

Only use Mack approved synthetic transmission oil in the I-Shift transmission. Using non-approved transmission oil can result in damage to transmission components.

**Note:** Radiator mounted oil coolers should use lower viscosity oil 75/80 (Do not use 75/90 HD Fluid for this application).

# Transmission Cautions



## CAUTION

The driveshaft must be removed before towing the vehicle. Failure to remove the driveshaft may result in damage to the transmission.

**Note:** The final stage manufacturer has the responsibility to certify that the completed vehicle conforms to all applicable motor vehicle safety standards, as referenced in the Incomplete Vehicle Document. The following installation precautions must be followed to the extent that they apply to the intended design of the incomplete vehicle.

**Note:** For additional Dangers, Warnings and Cautions refer to the “General Safety Practices, Transmission” bulletin. Failure to adhere to all safety practices can lead to the voiding of all applicable component warranties, component damage, personal injury or death.

- 1 Adequate tool clearance and suitable access openings for transmission adjustments must be provided. Transmission removal provisions must also be considered.
- 2 Transmission cooler lines must not be kinked, bent, or restricted. All cooler lines must be properly retained with adequate clips.
- 3 Before using transmission bolts, e.g., rear cover bolts or mounting bolts, contact your local MACK dealer for specific bolt length requirements, torque values and other constraints.
- 4 Transmission service identification tags must not be removed or destroyed. If the transmission is reworked or replaced, tag should be attached to the new transmission.
- 5 When painting the transmission, careful consideration should be given to keeping paint away from the breather and transmission output seal.
- 6 Transmission filler plugs should not be obstructed. Easy access for checking of lube level or filling is necessary.

## Notes

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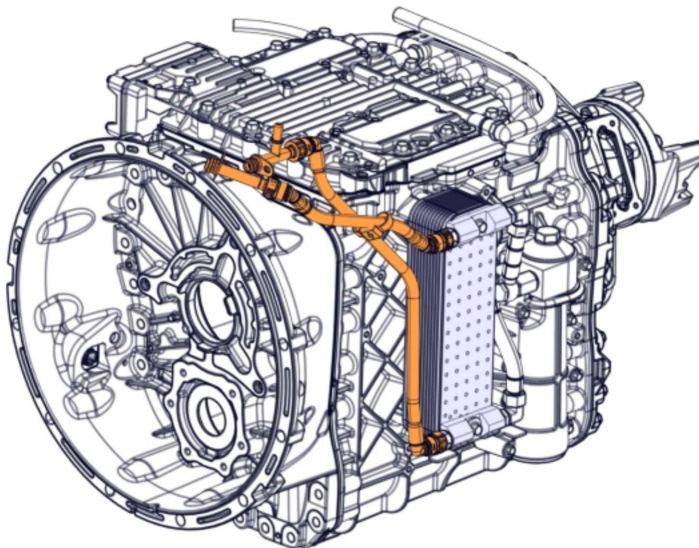
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# Transmission Oil Cooler

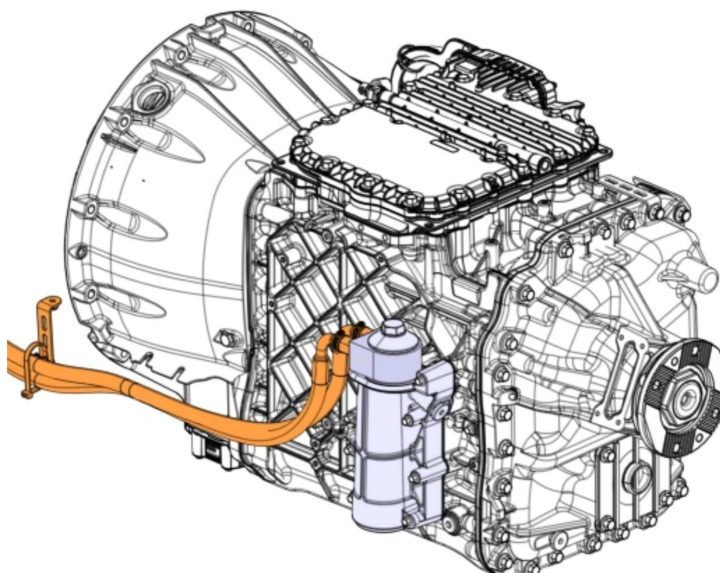
Some variants of the transmission feature an oil cooler that is mounted directly to the transmission. It uses an engine thermostat controlled coolant circuit. Coolant is pulled from the engine block to supply coolant to the oil plate heat exchanger. Oil is exchanged between the plate cooler and oil filter. The coolant piping runs over the flywheel housing.

If the battery cables need to be disconnected for service, they should be clipped and properly rerouted over the flywheel housing. The battery cables should not touch the transmission oil coolant lines or the coolant lines could abrade and fail.



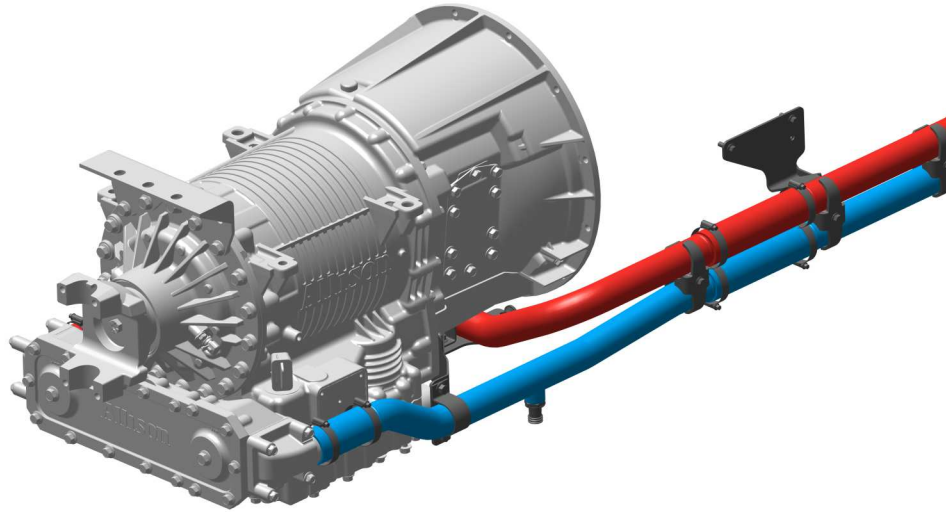
W4094207

Other variants of the transmission use the vehicle's radiator to cool transmission fluid. The coolant lines do not run over the top of the flywheel housing.



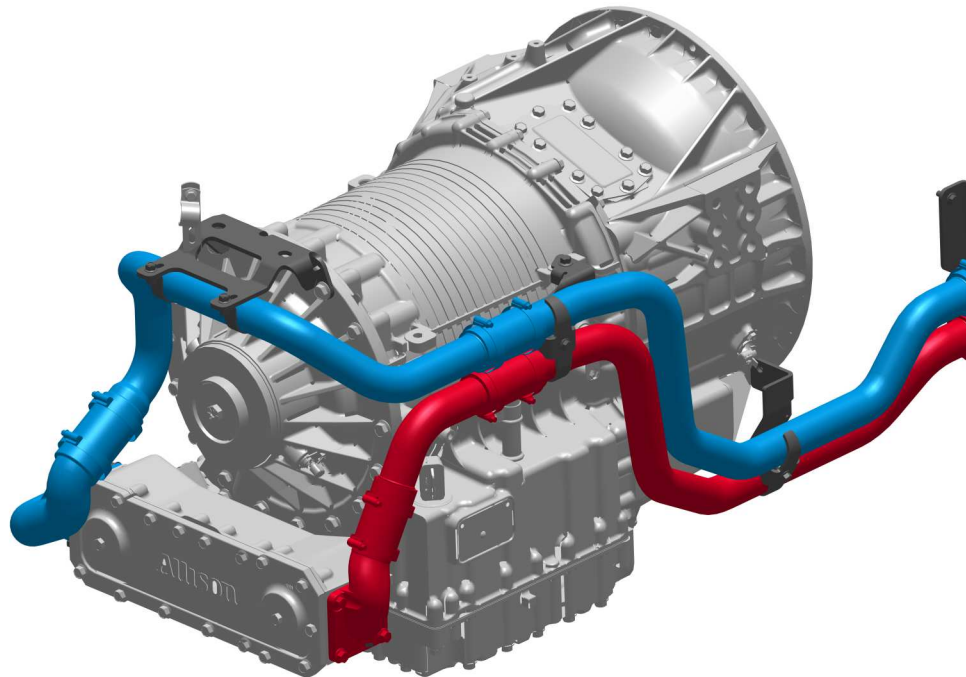
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## Transmission oil cooler (Allison - 3000 Series)



T4202606

## Transmission oil cooler (Allison - 4500 RDS)



T4196110

Some transmission variants has an oil cooler that is mounted directly to the transmission. It uses an engine thermostat-controlled coolant circuit. Coolant is drawn from the engine block to supply coolant to the oil cooler.

Other transmission variants use the vehicle radiator to cool the transmission fluid. The coolant lines do not run over the top of the flywheel housing.

# Transmission Literature

Printed copies of Allison and Eaton transmission literature are no longer available from Allison and Eaton Transmission. Therefore, MACK Trucks is unable to supply this literature to its dealers.

However, service manuals and other literature for Allison and Eaton transmissions can now be accessed directly from the official internet site of this supplier.

To review or order Allison and Eaton transmission literature, please visit:

<http://www.allisontransmission.com>

<http://www.eaton.com>

## Adding Neutral Switch to T300 Series Transmission

If a Neutral switch is required on a MACK T300 Series Transmission, some of the parts required for the Neutral switch are not available through the MACK Trucks Parts System but they can be fabricated by any reputable Machine Shop by supplying them a copy of pages 6, 7, and 8.

The items requiring fabrication are: See the "Range Shift Valve for Mack T200 and T300 Series Transmissions", page 7 .

- Item 4 "Spacer Block", page 9
- Item 7 "Detent Pin ", page 8
- Item 5 "Sleeve", page 10

The following parts are reused: See the "Range Shift Valve for Mack T200 and T300 Series Transmissions", page 7 .

- Item 1 Range Shift Valve
- Item 3 Sleeve
- Item 6 Spring

The following parts will need to be purchased at your local Mack Dealer: See the "Range Shift Valve for Mack T200 and T300 Series Transmissions", page 7 .

- Item 2 O-Rings 25107777 Qty. of 2
- Item 8 Switch 25157099 Qty. of 1
- Item 9 Pin 25499636 Qty. of 1

New mounting bolts will be required.

Hex screw 1/4 X 20 X 3.5" in length (Qty of 2) and cap screw flat countersink hex socket 1/4 X 20 X 2" in length (Qty of 2).

### Notes

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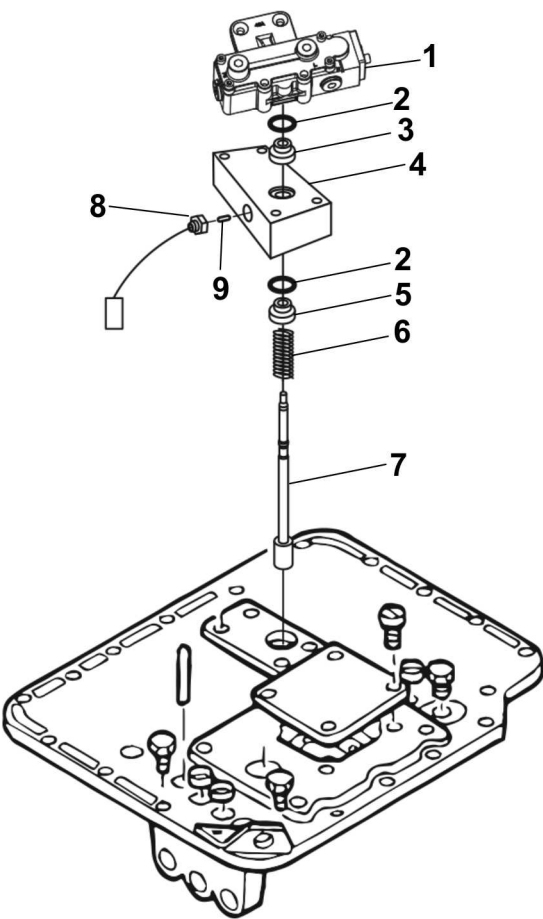
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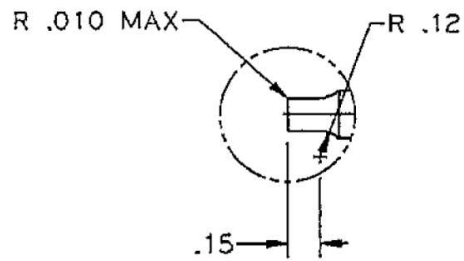
# Range Shift Valve for Mack T200 and T300 Series Transmissions



W4114412

Item	Description	Part Number	Quantity	Note
1	Range Shift Valve	25501490	1	Existing Part
2	O-Ring	25107777	2	Existing Part
3	Sleeve	25089624	1	Existing Part
4	Spacer Block	Fabricated	1	New Part
5	Sleeve	Fabricated	1	New Part
6	Spring	25101188	1	Existing Part
7	Detent Pin	Fabricated	1	New Part
8	Switch	25157099	1	Existing Part
9	Pin	25499636	1	Existing Part

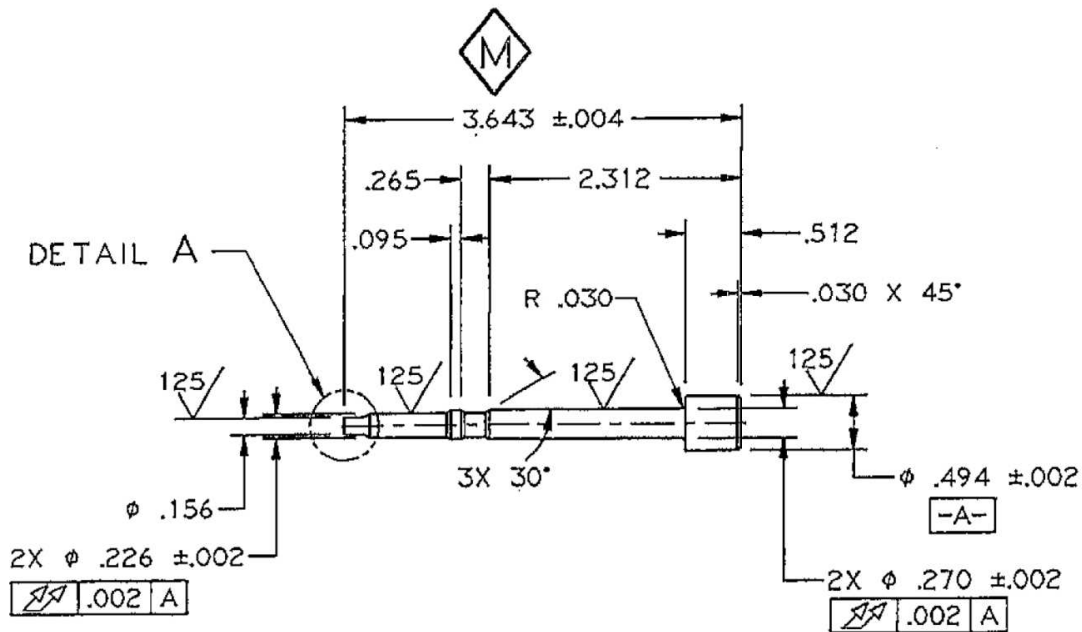
## Detent Pin



DETAIL A  
2 X SIZE

NOTES

1. MATERIAL:  
CARBON STEEL SAE J403  
NO.1018

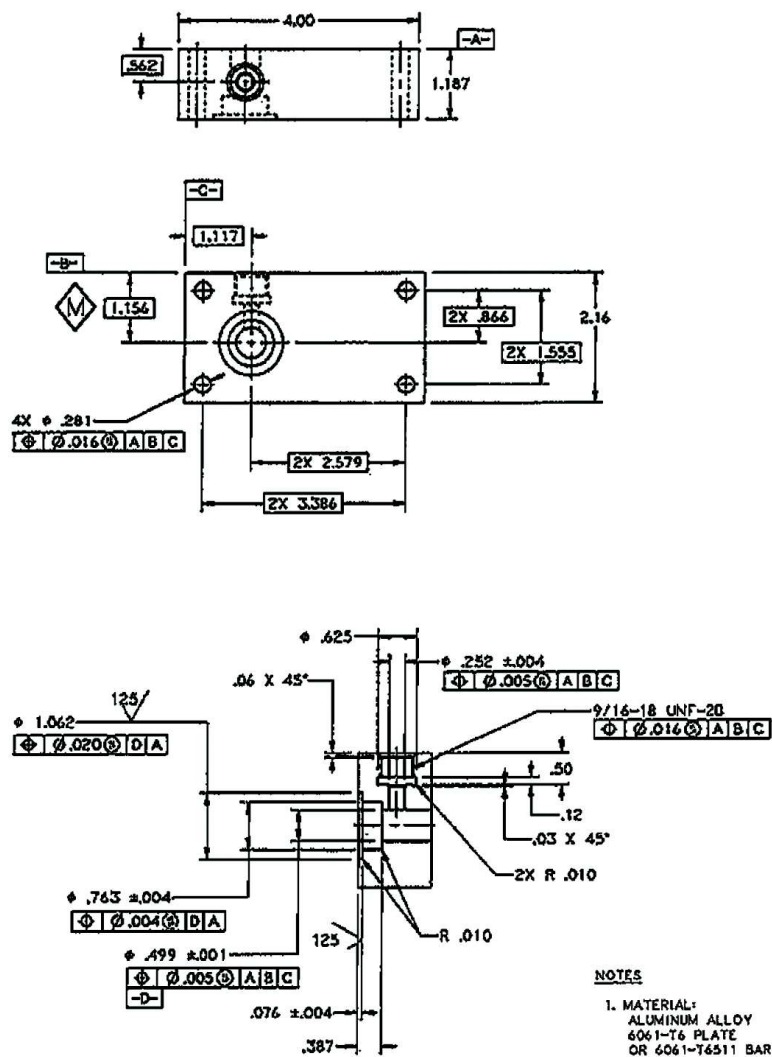


W4114279

**Note:** Dimensions and Materials required to machine Detent Pin.



## Spacer Block

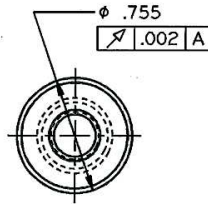


W4114936

**Note:** Material and Dimensions to machine Spacer Block housing.

Technical drawing of a mechanical part with the following dimensions and tolerances:

- Overall width:  $.650$
- Inner width:  $.367$
- Top surface texture:  $3X .030 \times 45^\circ$
- Left hole diameter:  $\phi .494 \pm .002$
- Left hole tolerance zone:  $\sqrt{\text{.002 A}}$
- Left hole depth:  $.125$
- Right hole diameter:  $\phi .276 \pm .001$
- Right hole tolerance zone:  $\sqrt{\text{.001 A}}$
- Right hole depth:  $.125$
- Bottom surface texture:  $R .005 \pm .005$
- Bottom hole diameter:  $\phi .312$
- Bottom hole tolerance zone:  $\sqrt{\text{.010 A}}$
- Bottom hole depth:  $.47$



1. MATERIAL:  
CARBON STEEL SAE J403  
1018 OR (11L17 OPT)
2. FINISH ALL OVER.

## Notes

# T300 Series Transmission Gear Ratios

Transmission Models													
Gear	T306 & T306- G	T308 & T308- M	T- M308 & T- M308- M	T309	T309- LR	T- M309 & T- M309- M	T310	T310- M & ME & ME21	T310- MLR	T313 & T313- 21	T313L & LR & LR21	T318 & T318- 21	T318- L21 & T318- LR
1st	7.5	20.08	17.77	11.24	13.74	25.21	13.81	17.35	27.3	13.44	16.42	13.44	16.42
2nd	4.08	11.68	10.94	7.35	7.35	15.52	10.05	11.4	13.9	8.78	8.78	11.4	13.93
3rd	2.41	6.63	6.57	5.25	5.25	9.73	7.18	7.45	7.45	6.28	6.28	8.78	8.78
4th	1.5	5.24	4.05	3.78	3.78	6.57	5.17	5.33	5.33	4.52	4.52	7.45	7.45
5th	1.00	3.05	2.54	2.69	2.69	4.05	3.75	3.83	3.83	3.22	3.22	6.28	6.28
6th	0.71	1.73	1.57	1.94	1.94	2.54	2.67	2.78	2.73	2.29	2.29	5.33	5.33
7th		1.00	1.00	1.39	1.39	1.57	1.94	1.94	1.94	1.94	1.94	4.52	4.52
8th		0.6	0.71	1.00	1.00	1.00	1.39	1.39	1.39	1.64	1.64	3.83	3.83
9th				0.71	0.71	0.71	1.00	1.00	1.00	1.39	1.39	3.22	3.22
10th							0.73	0.73	0.71	1.18	1.18	2.73	2.73
11th										1.00	1.00	2.29	2.29
12th										0.84	0.84	1.94	1.94
13th										0.71	0.71	1.64	1.64
14th												1.39	1.39
15th												1.18	1.18
16th												1.00	1.00
17th												0.84	0.84
18th												0.71	0.71

mDrive Transmission Gear Ratios

	Transmission Models				
Gear	TMD12AD	TMD12AO	TMD13AD	TMD13AO	TMD14AO
Crawler 1				17.54	32.04
Crawler 2					19.38
1st	14.94	11.73	14.94	11.73	11.73
2nd	11.73	9.21	11.73	9.21	9.21
3rd	9.04	7.09	9.04	7.09	7.09
4th	7.09	5.57	7.09	5.57	5.57
5th	5.54	4.35	5.54	4.35	4.35
6th	4.35	3.41	4.35	3.41	3.41
7th	3.44	2.70	3.44	2.70	2.70
8th	2.70	2.12	2.70	2.12	2.12
9th	2.08	1.63	2.08	1.63	1.63
10th	1.63	1.28	1.63	1.28	1.28
11th	1.27	1.00	1.27	1.00	1.00
12th	1.00	0.78	1.00	0.78	0.78

Allison transmission gear ratios

	Transmission model	
Gear	3000 Series	4500 RDS
1st	3.49	4.70
2nd	1.86	2.21
3rd	1.41	1.53
4th	1.00	1.00
5th	0.75	0.76
6th	0.65	0.67
Reverse	-5.03	-5.55

Notes

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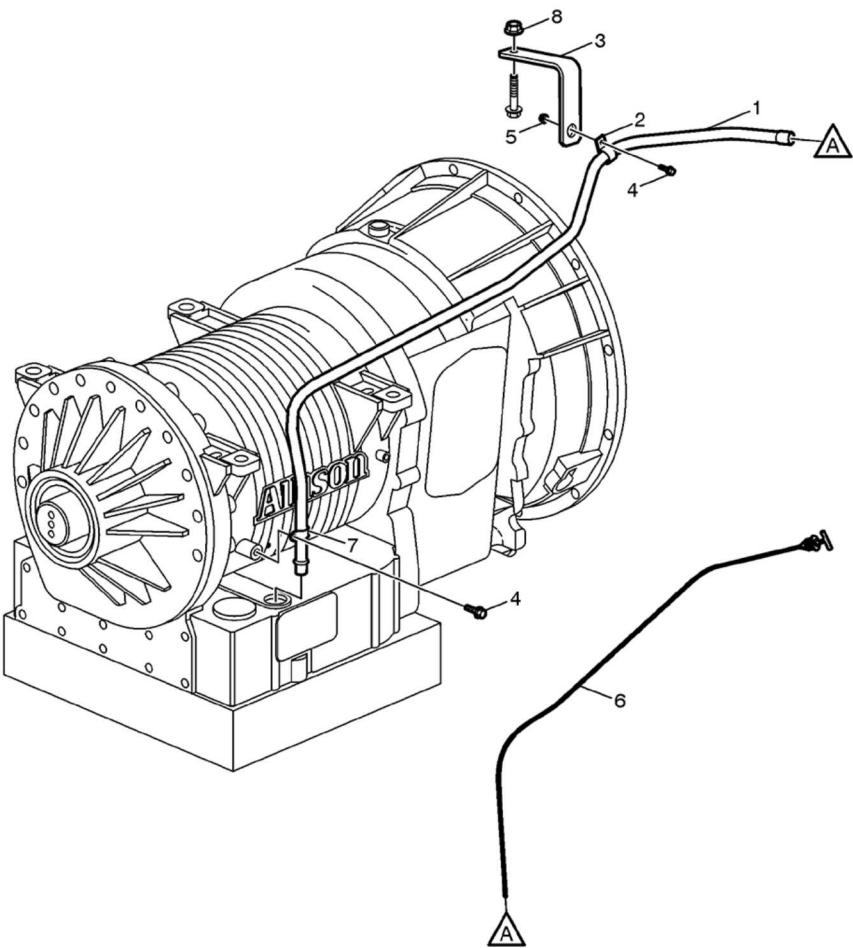
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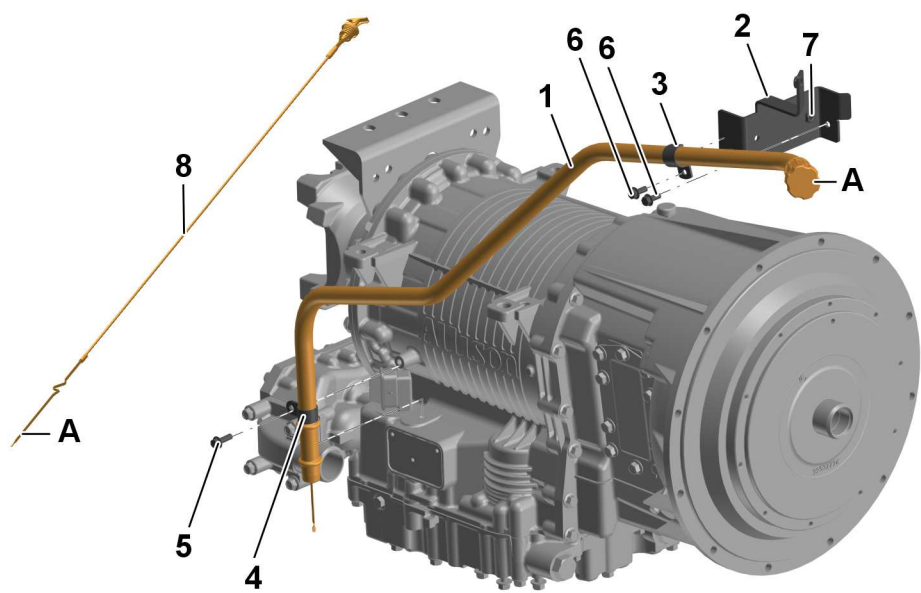
# GR / GU Model Under-hood Allison Dipstick



W4126865

Item	Part Number	Description	Qty.
1	22101981	Dipstick Tube	1
2	190397	Clamp	1
3	22555679	Bracket	1
4	995462	Flange Screw	2
5	990939	Flange Nut	1
6	22027929	Dipstick	1
7	25161716	Clamp	1
8	990940	Flange Nut	1

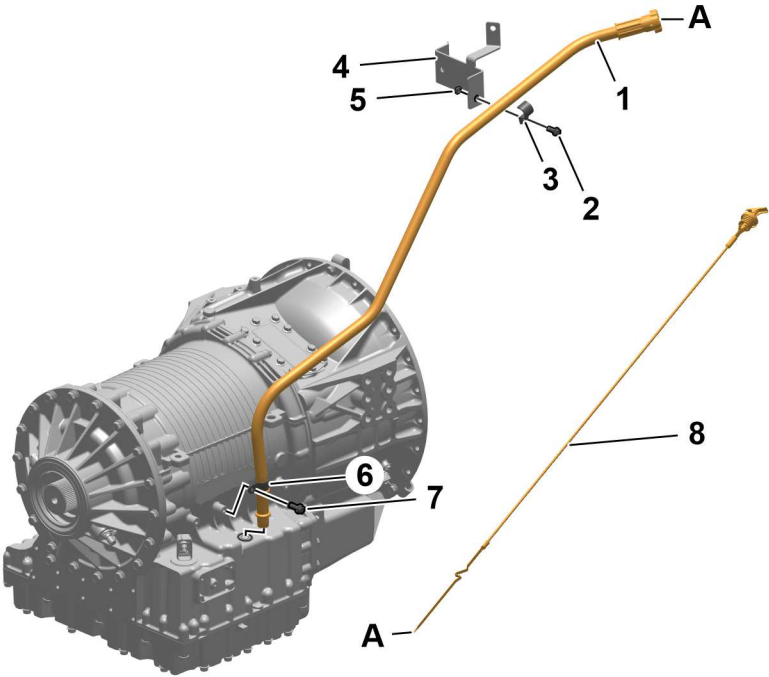
# Allison Dipstick (3000 Series)



T4202607

Item	Part Number	Description	Qty.
1	24621721	Dipstick Tube	1
2	24501306	Bracket	1
3	190397	Clamp	1
4	25161716	Attaching clamp	1
5	3968658	Hexagon screw	1
6	995462	Flange screw	1
7	963093	Weld nut	1
8	22027929	Dipstick	1

# Allison Dipstick (4500 RDS)



T4196111

Item	Part Number	Description	Qty.
1	23171580	Dipstick Tube	1
2	190397	Clamp	1
3	995462	Flange screw	1
4	24501311	Bracket	1
5	963093	Weld nut	1
6	25161716	Attaching clamp	1
7	3968658	Hexagon screw	1
8	22027929	Dipstick	1