

2021 TRANSMISSION

Automatic Transmission - 8L45 (M5T) - Specifications - Canyon, Colorado

SPECIFICATIONS

TEMPERATURE VERSUS RESISTANCE

Temperature Versus Resistance - B13 Automatic Transmission Fluid Temperature Sensor

Temperature	Resistance
140B°C (284B°F)	69 to 73 ohms
130B°C (266B°F)	86 to 90 ohms
120B°C (248B°F)	110 to 114 ohms
110B°C (230B°F)	140 to 144 ohms
100B°C (212B°F)	182 to 186 ohms
95B°C (203B°F)	211 to 215 ohms
90B°C (194B°F)	239 to 243 ohms
85B°C (185B°F)	279 to 283 ohms
80B°C (176B°F)	318 to 322 ohms
75B°C (167B°F)	374 to 378 ohms
70B°C (158B°F)	430 to 434 ohms
65B°C (149B°F)	509 to 513 ohms
60B°C (140B°F)	589 to 593 ohms
55B°C (131B°F)	705 to 709 ohms
50B°C (122B°F)	821 to 825 ohms
45B°C (113B°F)	994 to 998 ohms
40B°C (104B°F)	1.166 k to 1.170 kohms
35B°C (95B°F)	1.427 k to 1.431 kohms
30B°C (86B°F)	1.688 k to 1.692 kohms
25B°C (77B°F)	2.093 k to 2.097 kohms
20B°C (68B°F)	2.498 k to 2.502 kohms
15B°C (59B°F)	3.141 k to 3.145 kohms
10B°C (50B°F)	3.784 k to 3.788 kohms
5B°C (23B°F)	4.835 k to 4.839 kohms
0B°C (32B°F)	5.886 k to 5.890 kohms
-5B°C (23B°F)	7.652 k to 7.656 kohms
-10B°C (14B°F)	9.418 k to 9.422 kohms
-15B°C (5B°F)	12.463 k to 12.467 kohms
-20B°C (-4B°F)	15.509 k to 15.513 kohms
-25B°C (-13B°F)	20.941 k to 20.945 kohms
-30B°C (-22B°F)	26.374 k to 26.378 kohms
-35B°C (-31B°F)	36.431 k to 36.435 kohms
-40B°C (-40B°F)	46.489 k to 46.493 kohms

FASTENER SPECIFICATIONS (ON VEHICLE)

Single Use Non-Threaded Fasteners/Components

NOTE:

All fasteners/components listed in this table MUST BE DISCARDED and replaced with NEW after removal.

Application

Automatic Transmission Control Wiring Harness Clip

Automatic Transmission Fluid Pump Gasket

Automatic Transmission Fluid Pump Seal

Control Valve Body Spacer Plate

Control Valve Body Spacer Plate Retainer

Control Valve Channel Plate Spacer Plate

Manual Shift Shaft Pin

Manual Shift Shaft Detent Lever Hub Pin

Propeller Shaft Transmission Flange Fluid Seal

Wiring Harness Clip

Single Use Threaded Fastener/Component Tightening Specifications

NOTE:

All fasteners/components listed in this table MUST BE DISCARDED and replaced with NEW after removal.

Application

Specification

Metric (English)

Input Speed Sensor Wiring Harness Bolt

- First Pass:

4 N.m (35 lb in)

- Final Pass:

45 degrees

Output Speed Sensor Wiring Harness Bolt

- First Pass:

4 N.m (35 lb in)

- Final Pass:

45 degrees

Torque Converter Bolt

63 N.m (46 lb ft)

Transmission Fluid Baffle Bolt

- First Pass:

4 N.m (35 lb in)

- Final Pass:

45 degrees

Reusable Threaded Fastener Tightening Specifications

NOTE:

All fasteners listed in this table can be reused after removal.

Application	Specification
	Metric (English)
Automatic Transmission Fluid Pressure Test Plug	11 N.m (97 lb in)
Automatic Transmission Range Selector Lever	25 N.m (18 lb ft)
Catalytic Converter Brace Bracket Nuts	22 N.m (16 lb ft)
Control Valve Body Bolts	9 N.m (80 lb in)
Flywheel Inspection Cover/Converter Cover Fasteners	10 N.m (89 lb in)
Fuel Feed and Return Pipe Clip Bracket Bolt to the Right Side of the Transmission	22 N.m (16 lb ft)
Fuel Feed and Return Pipe Clip Bracket Nut to the Transmission to Engine Stud	7 N.m (62 lb in)
Manual Shaft Detent Lever Spring Retaining Bolt	12 N.m (106 lb in)
Range Selector Lever Cable Bracket	25 N.m (18 lb ft)
Transmission Control Module Bracket Fastener	9 N.m (80 lb in)
Transmission Control Bolts	25 N.m (18 lb ft)
Transmission Fluid Pan Bolts	10 N.m (89 lb in)
Transmission Mount Bolt-Two Wheel Drive	100 N.m (74 lb ft)
Transmission Mount Bolt-Four Wheel Drive	58 N.m (43 lb ft)
Range Selector Lever Cable Bracket Bolts	25 N.m (18 lb ft)
Transmission Range Selector Cable Lever Nut	25 N.m (18 lb ft)
Transmission to Engine Bolts	58 N.m (43 lb ft)

FASTENER SPECIFICATIONS (OFF VEHICLE)

Single Use Non-Threaded Fasteners/Components

NOTE:

All fasteners/components listed in this table MUST BE DISCARDED and replaced with NEW after removal.

Application
1-2-3-4-5-Reverse Clutch Piston Dam Inner Seal
1-2-3-4-5-Reverse Clutch Piston Dam Retaining Ring
1-2-3-4-5-Reverse Clutch Piston Dam Seal
1-2-3-4-5-Reverse Clutch Piston Inner Seal
1-2-3-4-5-Reverse Clutch Piston O-Ring Seal
1-2-3-4-5-Reverse Clutch Piston Outer Seal
1-3-5-6-7 Clutch Piston Dam Retaining Ring
1-3-5-6-7 Clutch Piston Dam Seal
1-3-5-6-7 Clutch Piston Seal- Inner
1-3-5-6-7 Clutch Piston Seal- Outer

NOTE:

All fasteners/components listed in this table MUST BE DISCARDED and replaced with NEW after removal.

Application

2-3-4-6-8 Clutch Piston Dam Retaining Ring

2-3-4-6-8 Clutch Piston Dam Seal- Inner

2-3-4-6-8 Clutch Piston Dam Seal- Outer

2-3-4-6-8 Clutch Piston Seal

4-5-6-7-8-Reverse Clutch Piston Dam Retaining Ring

4-5-6-7-8-Reverse Clutch Piston Seal

4-5-6-7-8-Reverse Clutch Piston Stop Seal

Automatic Transmission Control Wiring Harness Clip

Automatic Transmission Fluid Pump Gasket

Automatic Transmission Fluid Pump Seal

Automatic Transmission Case Front Cover Seal

Automatic Transmission Front Support Cover Gasket

Clutch Housing Fluid Passage Seal

Control Valve Body Spacer Plate

Control Valve Body Spacer Plate Retainer

Control Valve Channel Plate Spacer Plate

Input Sun Gear Retaining Ring

Propeller Shaft Transmission Flange Fluid Seal

Turbine Shaft Fluid Seal Ring [7x]

Turbine Shaft Fluid Seal Ring

Turbine Shaft Retaining Ring

Wiring Harness Clip

Single Use Threaded Fastener/Component Tightening Specifications**NOTE:**

All fasteners/components listed in this table MUST BE DISCARDED and replaced with NEW after removal.

Application	Ref No.*	Quantity	Size	Specification
				Metric (English)
Automatic Transmission Case Front Cover Bolt Refer to procedure for tightening sequence and torque values.	3	11	M6 x 30	Transmission Case Front Cover and Drive Link Installation
Automatic Transmission Fluid Baffle Bolt				
• First Pass:	12	2	M6 x 25	4 N.m (35 lb in)

NOTE:

All fasteners/components listed in this table MUST BE DISCARDED and replaced with NEW after removal.

Application	Ref No.*	Quantity	Size	Specification
				Metric (English)
• Final Pass:				45 degrees
Automatic Transmission Case Front Cover Bolt @ Output Speed Sensor				
• First Pass:	38	3	M6 x 25	4 N.m (35 lb in)
• Final Pass:				45 degrees
Park Pawl Actuator Bracket Bolt	606	2	M8 x 35	31 N.m (23 lb ft)
Propeller Shaft Transmission Flange Nut	25	1	-	105 N.m (77 lb ft)
*Reference number refers to the component callout number in Disassembled Views				

Reusable Threaded Fastener Tightening Specifications**NOTE:**

All fasteners listed in this table can be reused after removal.

Application	Ref No.*	Quantity	Size	Specification
				Metric (English)
Automatic Transmission Auxiliary Fluid Accumulator Bleeder Valve	399	1	-	11 N.m (97 lb in)
Automatic Transmission Auxiliary Fluid Accumulator Bolt	398	2	M4 x 15	3 N.m (27 lb in)
Automatic Transmission Case Extension Bolt Refer to procedure for tightening sequence and torque values.	23	6	M10 x 40	<u>Case Extension Assembly Installation</u>
Automatic Transmission Case Extension Hole Plug	407	2	-	11 N.m (97 lb in)
Automatic Transmission Case Extension Stud	412	2	-	15 N.m (11 lb ft)
Automatic Transmission Fluid Pan Bolt Refer to procedure for tightening sequence and torque values.	51	15	M6 x 20	<u>Transmission Fluid Pan and Filter Assembly Installation</u>

NOTE:

All fasteners listed in this table can be reused after removal.

Application	Ref No.*	Quantity	Size	Specification
				Metric (English)
Automatic Transmission Fluid Pump Bolt Refer to procedure for tightening sequence and torque values.	300	5	M6 x 28	Control Valve Body Assembly Assemble
Automatic Transmission Wiring Harness Bracket Bolt	356	1	M6 x 20	9 N.m (80 lb in)
Control Valve Channel Plate Bolt Refer to procedure for tightening sequence and torque values.	314	19	M5 x 55	Control Valve Body Assembly Assemble
Control Valve Channel Plate Bolt Refer to procedure for tightening sequence and torque values.	321	8	M5 x 45	Control Valve Body Assembly Assemble
Control Valve Lower Body Bolt Refer to procedure for tightening sequence and torque values.	321	3	M5 x 45	Control Valve Body Assembly Assemble
Control Valve Solenoid Body Bolt Refer to procedure for tightening sequence and torque values.	44	4	M6 x 45	Control Valve Assembly and Transmission Wiring Harness Installation
Control Valve Solenoid Body Bolt Refer to procedure for tightening sequence and torque values.	43	7	M6 x 68	Control Valve Assembly and Transmission Wiring Harness Installation
Manual Shift Detent Lever Spring Bolt	42	1	M6 x 25	12 N.m (106 lb in)
Stator Shaft Support Bolt Refer to procedure for tightening sequence and torque values.	17	9	M8 x 33	Stator Shaft Support Installation
Automatic Transmission Fluid Pan Drain Plug	50	1	-	9 N.m (80 lb in)
*Reference number refers to the component callout number in Disassembled Views				

TRANSMISSION GENERAL SPECIFICATIONS

Name	8L45	8L90	8L90
RPO Codes	M5N, M5T	M5U, M5X	MQE

Name	8L45	8L90	8L90
Production Location	Toledo, OH (USA) Silao (Mexico)	Toledo, OH (USA)	Toledo, OH (USA)
Transmission Drive	Rear Wheel Drive	Rear Wheel Drive	Rear Wheel Drive
1st Gear Ratio	4.62	4.560	4.560
2nd Gear Ratio	3.04	2.971	2.971
3rd Gear Ratio	2.07	2.075	2.075
4th Gear Ratio	1.66	1.688	1.688
5th Gear Ratio	1.26	1.270	1.270
6th Gear Ratio	1.000	1.000	1.000
7th Gear Ratio	0.85	0.845	0.845
8th Gear Ratio	0.66	0.652	0.652
Reverse	3.93	3.818	3.818
Torque Converter Size - Diameter of Torque Converter Turbine	238 mm	258 mm	237 mm 262 mm
Pressure Taps	Line Pressure	Line Pressure	Line Pressure
Transmission Fluid Type	DEXRONB® HP	DEXRONB® HP	DEXRONB® HP
Transmission Type: 8	Eight Forward Gears	Eight Forward Gears	Eight Forward Gears
Transmission Type: L	Longitude Mount	Longitude Mount	Longitude Mount
Transmission Type: 45/90	Product Series	Product Series	Product Series
Position Quadrant	P, R, N, D, M	P, R, N, D, M	P, R, N, D, M
Case Material	Die Cast Aluminum	Die Cast Aluminum	Die Cast Aluminum
Transmission Net Weight (Approximate)	80 kg (176 lb)	95 kg (210 lb)	98 kg (216 lb)
Maximum Trailer Towing Capacity	Refer to applicable owner's manual	Refer to applicable owner's manual	Refer to applicable owner's manual

ADHESIVES, FLUIDS, LUBRICANTS, AND SEALERS

Application	Type of Material	GM Part Number	
		United States	Canada
Automatic Transmission Fluid	DEXRONB® HP	19417577	19418066
Propeller Shaft Transmission Flange	Adhesive	89021297	10953488
Propeller Shaft Transmission Flange Nut	Adhesive	89021297	10953488

APPROXIMATE FLUID CAPACITIES

Application	Specification	
	Metric	English
8L45 or 8L90		
Pan Removal and Filter Replacement - Approximate Capacity	7.0 liters	7.4 quarts
Overhaul - Approximate Capacity (Transmission Volume Only)	10.3 liters	10.88 quarts
Complete Trans System - Approximate Capacity (Including Cooler Volume)	10.8 liters	11.41 quarts

CLUTCH BACKING PLATE RETAINING RING SPECIFICATIONS (8L45)

2-3-4-6-8 Clutch Backing Plate Retaining Ring

Clutch Pack Travel Specification - 1.24 - 1.86 mm (0.049 - 0.073 in)		
Retaining Ring Thickness		Ring Identification Color
Metric	English	
NOTE: After measuring clutch pack travel, determine if the measurement is within the specification. If the measurement is not within the specification, measure the thickness of the existing retaining ring, and then choose a thicker or thinner retaining ring that will bring the measurement within specification.		
1.88 - 1.98 mm	0.074 - 0.078 in	Purple
2.20 - 2.30 mm	0.087 - 0.090 in	Yellow
2.53 - 2.63 mm	0.100 - 0.104 in	Light Blue
2.85 - 2.95 mm	0.112 - 0.116 in	No Color
3.17 - 3.27 mm	0.125 - 0.129 in	Orange
3.49 - 3.59 mm	0.137 - 0.141 in	Dark Green
3.82 - 3.92 mm	0.150 - 0.154 in	White

4-5-6-7-8 Reverse Clutch Backing Plate Retaining Ring

Clutch Pack Travel Specification - 1.24 - 1.86 mm (0.049 - 0.073 in)		
Retaining Ring Thickness		Ring Identification Color
Metric	English	
NOTE: After measuring clutch pack travel, determine if the measurement is within the		

Clutch Pack Travel Specification - 1.24 - 1.86 mm (0.049 - 0.073 in)		
Retaining Ring Thickness		Ring Identification Color
Metric	English	
specification. If the measurement is not within the specification, measure the thickness of the existing retaining ring, and then choose a thicker or thinner retaining ring that will bring the measurement within specification.		
1.88 - 1.98 mm	0.074 - 0.078 in	Purple
2.20 - 2.30 mm	0.087 - 0.090 in	Yellow
2.53 - 2.63 mm	0.100 - 0.104 in	Light Blue
2.85 - 2.95 mm	0.112 - 0.116 in	No Color
3.17 - 3.27 mm	0.125 - 0.129 in	Orange
3.49 - 3.59 mm	0.137 - 0.141 in	Dark Green
3.82 - 3.92 mm	0.150 - 0.154 in	White

1-3-5-6-7 Clutch Backing Plate Retaining Ring

Clutch Pack Travel Specification - 1.50 - 2.10 mm (0.059 - 0.083 in)		
Retaining Ring Thickness		Ring Identification Color
Metric	English	
NOTE: After measuring clutch pack travel, determine if the measurement is within the specification. If the measurement is not within the specification, measure the thickness of the existing retaining ring, and		

Clutch Pack Travel Specification - 1.50 - 2.10 mm (0.059 - 0.083 in)		
Retaining Ring Thickness		Ring Identification Color
Metric	English	
then choose a thicker or thinner retaining ring that will bring the measurement within specification.		
2.42 - 2.52 mm	0.095 - 0.099 in	Purple
2.76 - 2.86 mm	0.109 - 0.113 in	Silver
3.10 - 3.20 mm	0.122 - 0.126 in	Yellow
3.44 - 3.54 mm	0.135 - 0.139 in	Light Blue
3.78 - 3.88 mm	0.149 - 0.153 in	Orange

1-2-3-4-5 Reverse Clutch Backing Plate Retaining Ring

Clutch Pack Travel Specification - 0.93 - 1.80 mm (0.037 - 0.071 in)		
Retaining Ring Thickness		Ring Identification Color
Metric	English	
NOTE: After measuring clutch pack travel, determine if the measurement is within the specification. If the measurement is not within the specification, measure the thickness of the existing retaining ring, and then choose a thicker or thinner retaining ring that will bring the measurement within specification.		
3.06 - 3.16 mm	0.120 - 0.124 in	Light Blue
3.39 - 3.49 mm	0.133 - 0.137 in	Orange
3.71 - 3.81 mm	0.146 - 0.150 in	Dark Green

Clutch Pack Travel Specification - 0.93 - 1.80 mm (0.037 - 0.071 in)		
Retaining Ring Thickness		Ring Identification Color
Metric	English	
4.04 - 4.14 mm	0.159 - 0.163 in	Yellow
4.36 - 4.46 mm	0.172 - 0.176 in	Purple

1-3-5-6-7 CLUTCH THRUST BEARING WASHER SPECIFICATIONS

Transmission End Play Specification - 0.20 - 0.79 mm (0.008 - 0.031 in)		
1-3-5-6-7 Clutch Thrust Bearing Washer Thickness		Ring Identification Color
Metric	English	
NOTE: After measuring end play travel, determine if the measurement is within the specification. If the measurement is not within the specification, measure the thickness of the existing washer, and then choose a thicker or thinner washer that will bring the measurement within specification.		
2.277 - 2.377 mm	0.090 - 0.094 in	Brown
2.463 - 2.563 mm	0.097 - 0.101 in	Purple
2.649 - 2.749 mm	0.104 - 1.108 in	Black
2.835 - 2.935 mm	0.112 - 0.116 in	Pink
3.021 - 3.121 mm	0.119 - 0.123 in	Plain
3.207 - 3.307 mm	0.127 - 0.130 in	Dark Blue
3.393 - 3.493 mm	0.134 - 0.138 in	Light Green
3.579 - 3.679 mm	0.141 - 0.145 in	White
3.769 - 3.865 mm	0.148 - 0.152 in	Light Blue

RANGE REFERENCE

Range Reference Table

Range	Gear	1 - 3 - 5 - 6 - 7 Clutch	4 - 5 - 6 - 7 - 8 Reverse Clutch	2 - 3 - 4 - 6 - 8 Clutch	1 - 2 - 7 - 8 Reverse Clutch	1 - 2 - 3 - 4 - 5 Reverse Clutch
Park	P	-	-	-	Applied*	Applied*
Reverse	R	-	Applied	-	Applied	Applied
Neutral	N	-	-	-	Applied*	Applied*
D	1st	Applied	-	-	Applied	Applied
	2nd	-	-	Applied	Applied	Applied
	3rd	Applied	-	Applied	-	Applied
	4th	-	Applied	Applied	-	Applied
	5th	Applied	Applied	-	-	Applied
	6th	Applied	Applied	Applied	-	-
	7th	Applied	Applied	-	Applied	-
	8th	-	Applied	Applied	Applied	-

*Applied with no load.

SHIFT SOLENOID VALVE STATE AND GEAR RATIO

Range Reference Table

Range	Gear	1 - 2 - 7 - 8 Reverse S1 N.H.	1 - 2 - 3 - 4 - 5 Reverse S2 N.L.	1 - 3 - 5 - 6 - 7 S3 N.L.	2 - 3 - 4 - 6 - 8 S4 N.H.	4 - 5 - 6 - 7 - 8 Reverse S5 N.H.	Default Control S8	1 - 2 - 3 - 4 - 5 Rev BST S9
Park	P	Low Current	High Current	Low Current	High Current	High Current	Off	Off
Reverse	R	Low Current	High Current	Low Current	High Current	Low Current	Off	Off
Neutral	N	Low Current	High Current	Low Current	High Current	High Current	Off	Off
D	1st	Low Current	High Current	High Current	High Current	High Current	Off/On	Off
	2nd	Low Current	High Current	Low Current	Low Current	High Current	Off/On	Off
	3rd	High Current	High Current	Low Current	Low Current	High Current	Off*	Off
	4th	High Current	High Current	Low Current	Low Current	Low Current	Off*	Off
	5th	High Current	High Current	High Current	High Current	Low Current	Off*	Off
	6th	High Current	Low Current	High Current	Low Current	Low Current	Off*	On
	7th	Low Current	Low Current	High Current	High Current	Low Current	Off*	On
	8th	Low Current	Low Current	Low Current	Low Current	Low Current	Off*	On

NOTE:

Low current
range = .05
-.08; High
current
range = 1.10
- 1.2 amps

Range	Gear	1 - 2 - 7 - 8 Reverse S1 N.H.	1 - 2 - 3 - 4 - 5 Reverse S2 N.L.	1 - 3 - 5 - 6 - 7 S3 N.L.	2 - 3 - 4 - 6 - 8 S4 N.H.	4 - 5 - 6 - 7 - 8 Reverse S5 N.H.	Default Control S8	1 - 2 - 3 - 4 - 5 Rev BST S9
NOTE: For solenoids S8 and S9, "On" = Solenoid energized (pressurized), "Off" = Solenoid De- energized (no pressure).								

TRANSMISSION RANGE SENSOR DUTY CYCLES

Transmission Range Sensor Duty Cycle

NOTE: Verify the values with a scan tool.

Transmission Range	Transmission Range Sensor 1	Transmission Range Sensor 2
Park	12 to 18%	82 to 88%
Reverse	36 to 42%	58 to 64%
Neutral	48 to 54%	46 to 52%
Drive	60 to 66%	34 to 40%
Manual/Low	82 to 88%	12 to 18%

TRANSMISSION INTERNAL MODE SWITCH VOLTAGE

NOTE: Verify the voltages with a scan tool.

Shift Lever Position	Internal Mode Switch A Circuit	Internal Mode Switch B Circuit	Internal Mode Switch C Circuit	Internal Mode Switch P Circuit	Internal Mode Switch S Circuit
Park	1.68 - 2.38 V	0.70 - 0.96 V	1.68 - 2.38 V	0.70 - 0.96 V	0.70 - 0.96 V
Reverse	0.70 - 0.96 V	1.68 - 2.38 V	1.68 - 2.38 V	0.70 - 0.96 V	1.68 - 2.38 V
Neutral	0.70 - 0.96 V	1.68 - 2.38 V	0.70 - 0.96 V	1.68 - 2.38 V	0.70 - 0.96 V
Drive	1.68 - 2.38 V	0.70 - 0.96 V	0.70 - 0.96 V	1.68 - 2.38 V	1.68 - 2.38 V
Manual Mode	1.68 - 2.38 V	0.70 - 0.96 - V	0.70 - 0.96 V	1.68 - 2.38 V	0.70 - 0.96 V