

## 2010 Transmission

### Automatic Transmission - 6T70/6T75 - Equinox & Terrain

## SPECIFICATIONS

### FASTENER TIGHTENING SPECIFICATIONS

| Application                                          | *Ref No. | Quantity | Size      | Specification |           |
|------------------------------------------------------|----------|----------|-----------|---------------|-----------|
|                                                      |          |          |           | Metric        | English   |
| A/Trans Case Cover Bolt                              | 18       | 10       | M6x1.0x30 | 12 N.m        | 106 lb in |
| A/Trans Fluid Pump Bolt                              | 1        | 3        | M6x1.0x25 | 12 N.m        | 106 lb in |
| A/Trans Fluid Trough Bolt                            | 11       | 1        | M6x1.0x25 | 12 N.m        | 106 lb in |
| Control Valve Body Assembly (Complete) Bolt          | 19, 21   | 3        | M6x1.0x55 | 12 N.m        | 106 lb in |
| Control Valve Body Assembly (Complete) Bolt          | 20       | 3        | M6x1.0x35 | 12 N.m        | 106 lb in |
| Control Valve Body Assembly (Complete) Bolt          | 22       | 5        | M6x1.0x65 | 12 N.m        | 106 lb in |
| Control Valve Body to Case                           | 23       | 2        | M6x1.0x55 | 12 N.m        | 106 lb in |
| Control Valve Body to Case Bolt                      | 24       | 8        | M6x1.0x65 | 12 N.m        | 106 lb in |
| Control Valve Assembly (w/TCM and Body) to Case Bolt | 25       | 1        | M6x1.0x42 | 12 N.m        | 106 lb in |
| Control Valve Assembly (w/TCM and Body) to Case Bolt | 26       | 1        | M6x1.0x55 | 12 N.m        | 106 lb in |
| Control Valve Assembly (w/TCM and Body) to Case Bolt | 27       | 2        | M6x1.0x65 | 12 N.m        | 106 lb in |
| Control Valve Assembly (w/TCM and Body) to Case Bolt | 28       | 4        | M6x1.0x80 | 12 N.m        | 106 lb in |
| Control Valve Assembly (w/TCM and Body) to Case Bolt | 29       | 3        | M6x1.0x95 | 12 N.m        | 106 lb in |
| Control Valve Body Cover Bolt                        | 30       | 12       | M6x1.0x30 | 12 N.m        | 106 lb in |
| Control Valve Body Cover Stud                        | 31       | 2        | M6x1.0x30 | 12 N.m        | 106 lb in |
| Fluid Cooler Fitting at Radiator                     | -        | -        | -         | 38 N.m        | 28 lb ft  |
| Fluid Cooler Outlet Pipe                             | -        | -        | -         | 22 N.m        | 16 lb ft  |

|                                                     |     |    |              |            |           |
|-----------------------------------------------------|-----|----|--------------|------------|-----------|
| Retainer Nut                                        |     |    |              |            |           |
| Fluid Cooler Pipe Nut                               | -   | -  | -            | 228 N.m    | 16 lb ft  |
| Fluid Pressure Test Hole Plug                       | 12  | 1  | 1/8"-27 NPTF | 12 N.m     | 106 lb in |
| Fluid Level Hole Plug                               | 13  | 1  | 1/8"-27 NPTF | 12 N.m     | 106 lb in |
| Front Differential Carrier Baffle Bolt              | 6   | 1  | M6x1.0x25    | 12 N.m     | 106 lb in |
| Front Differential Transfer Drive Gear Support Bolt |     |    |              |            |           |
| • First Pass                                        | 5   | 9  | M8x1.25x25   | 10 N.m     | 89 lb in  |
| • Final Pass                                        | 5   | 9  | M8x1.25x25   | 50 degrees |           |
| Input Shaft Support Bolt (Torx)                     | N/A | 3  | M6x1.0x50    | 12 N.m     | 106 lb in |
| Input Speed Sensor Bolt                             | 17  | 1  | M6x1.0x25    | 9 N.m      | 80 lb in  |
| Output Speed Sensor Bolt                            | 14  | 1  | M6x1.0x25    | 12 N.m     | 106 lb in |
| Park Pawl Actuator Bracket Bolt                     | 10  | 2  | M6x1.0x25    | 12 N.m     | 106 lb in |
| Shift Control Knob Retaining Screw                  | -   | -  | -            | 1.5 N.m    | 13 lb in  |
| Support Fluid Passage Tube (Torx) Bolt              | 2   | 2  | M5x0.8x12    | 7 N.m      | 62 lb in  |
| Support Fluid Passage Tube Bolt                     | 3   | 2  | M6x1.0x15    | 12 N.m     | 106 lb in |
| Torque Converter and Differential Housing Bolt      | 8   | 14 | M8x1.25x35   | 36 N.m     | 27 lb ft  |
| Torque Converter and Differential Housing Bolt      | 9   | 3  | M8x1.25x35   | 30 N.m     | 22 lb ft  |
| Torque Converter to Flywheel Bolt                   | -   | -  | -            | 62 N.m     | 46 lb ft  |
| Transaxle Brace Bolts                               | -   | -  | -            | 50 N.m     | 37 lb ft  |
| Transaxle Mount and Bracket Bolt                    |     |    |              |            |           |
| • Rear                                              | -   | -  | -            | 50 N.m     | 37 lb ft  |
| • Front and Left Side Through Bolt                  | -   | -  | -            | 110 N.m    | 81 lb ft  |
| Transaxle Mount Nuts                                |     |    |              |            |           |
| • Front                                             | -   | -  | -            | 50 N.m     | 37 lb ft  |
| • Left Side                                         | -   | -  | -            | 50 N.m     | 37 lb ft  |
| Transaxle Range Selector Cable Bracket Bolt         | -   | -  | -            | 25 N.m     | 18 lb ft  |
| Transaxle Range Switch Lever Nut                    | -   | -  | -            | 20 N.m     | 15 lb ft  |
| Transaxle Shift Control Nut                         | -   | -  | -            | 25 N.m     | 18 lb ft  |
| Transaxle to Engine Bolt                            | -   | -  | -            | 75 N.m     | 55 lb ft  |
|                                                     |     |    |              |            |           |

|                                                                                |    |   |              |        |           |
|--------------------------------------------------------------------------------|----|---|--------------|--------|-----------|
| Transmission Cooler Pipe (External Torx) Stud                                  | 15 | 2 | M8x1.25x30.5 | 12 N.m | 106 lb in |
| Transmission Fluid Cooler Pipe Quick Connect Fitting                           | -  | - | -            | 38 N.m | 28 lb ft  |
| Transmission Fluid Cooler Pipe Mounting Nuts                                   | -  | - | -            | 22 N.m | 16 lb ft  |
| *Reference number refers to the component callout number in Disassembled Views |    |   |              |        |           |

## TRANSMISSION GENERAL SPECIFICATIONS

| Name                                                         | 6T70/6T75                                               |
|--------------------------------------------------------------|---------------------------------------------------------|
| RPO Codes                                                    | 6T70-MH2 (2WD), MH4 (4WD) 6T75-MY9 (2WD), MH6 (4WD)     |
| Production Location                                          | Warren Michigan (USA), Ramos, Mexico                    |
| Transaxle Drive                                              | Front Wheel Drive, All Wheel Drive                      |
| Reverse Gear Ratio                                           | 2.88                                                    |
| 1st Gear Ratio                                               | 4.484                                                   |
| 2nd Gear Ratio                                               | 2.872                                                   |
| 3rd Gear Ratio                                               | 1.842                                                   |
| 4th Gear Ratio                                               | 1.414                                                   |
| 5th Gear Ratio                                               | 1.000                                                   |
| 6th Gear Ratio                                               | 0.742                                                   |
| Effective Final Drive Gear Ratio                             | 2.77/3.16                                               |
| Torque Converter Size - Diameter of Torque Converter Turbine | 246 mm                                                  |
| Pressure Taps                                                | Line Pressure                                           |
| Transaxle Fluid Type                                         | DEXRON VI®                                              |
| Transaxle Fluid Capacity                                     | 9.0 L/9.5 qts Quarts                                    |
| Transaxle Type: 6                                            | Six Forward Gears                                       |
| Transaxle Type: T                                            | Transverse Mount                                        |
| Transaxle Type: 70/75                                        | Product Series                                          |
| Position Quadrant                                            | P, R, N, D, * *(Refer to the applicable owner's manual) |
| Case Material                                                | Die Cast Aluminum                                       |
| Transaxle Net Weight                                         | 104 kg                                                  |
| Maximum Trailer Towing Capacity                              | N/A                                                     |
| Maximum Gross Vehicle Weight (GVW)                           | 4,000 lbs                                               |

## ADHESIVES, FLUIDS, LUBRICANTS, AND SEALERS

| Application | Type of Material | GM Part Number |        |
|-------------|------------------|----------------|--------|
|             |                  | United States  | Canada |
|             |                  |                |        |

|                    |            |          |          |
|--------------------|------------|----------|----------|
| Input Speed Sensor | Threadlock | 12345382 | 10953489 |
|--------------------|------------|----------|----------|

FLUID CAPACITY SPECIFICATIONS

| Application                                      | Specification  |                 |
|--------------------------------------------------|----------------|-----------------|
|                                                  | Metric         | English         |
| Valve Body Cover Removal - Approximate Capacity  | 5.0-7.0 liters | 5.3-7.4 quarts  |
| Fluid Change - Drain Plug - Approximate Capacity | 4.0-6.0 liters | 4.2- 6.3 quarts |
| Overhaul - Approximate Capacity                  | 7.0-9.0 liters | 7.4-9.5 quarts  |

TAPER BEARING PRELOAD SELECTIVE SPECIFICATIONS

Front Differential Drive Pinion Gear and Differential Thrust Washer Selection Chart

| Thrust Washer O.D. Color Code | Washer Thickness |          |
|-------------------------------|------------------|----------|
|                               | Metric           | English  |
| Brown                         | 0.494 mm         | 0.020 in |
| Purple                        | 0.545 mm         | 0.022 in |
| Black                         | 0.596 mm         | 0.024 in |
| Pink                          | 0.647 mm         | 0.026 in |
| Dark Blue                     | 0.698 mm         | 0.028 in |
| Light Green                   | 0.749 mm         | 0.030 in |
| Plain                         | 0.800 mm         | 0.032 in |
| White                         | 0.851 mm         | 0.034 in |
| Light Blue                    | 0.902 mm         | 0.036 in |
| Orange                        | 0.953 mm         | 0.038 in |
| White/Black                   | 1.004 mm         | 0.040 in |
| White/Orange                  | 1.055 mm         | 0.042 in |
| White/Light Green             | 1.106 mm         | 0.044 in |

RANGE REFERENCE

| Range                  | Park     | Reverse | Neutral  | Drive       |         |         |         |         |         |         |
|------------------------|----------|---------|----------|-------------|---------|---------|---------|---------|---------|---------|
|                        |          |         |          | 1st Braking | 1st     | 2nd     | 3rd     | 4th     | 5th     | 6th     |
| 1-2-3-4 Clutch         | -        | -       | -        | Applied     | Applied | Applied | Applied | Applied | -       | -       |
| 3-5 Reverse Clutch     | -        | Applied | -        | -           | -       | -       | Applied | -       | Applied | -       |
| 4-5-6 Clutch           | -        | -       | -        | -           | -       | -       | -       | Applied | Applied | Applied |
| 2-6 Clutch             | -        | -       | -        | -           | -       | Applied | -       | -       | -       | Applied |
| Low and Reverse Clutch | Applied* | Applied | Applied* | Applied     | -       | -       | -       | -       | -       | -       |

|                           |   |   |   |         |         |   |   |   |   |   |
|---------------------------|---|---|---|---------|---------|---|---|---|---|---|
| Low Clutch Assembly (OWC) | - | - | - | Holding | Holding | - | - | - | - | - |
| * = Applied with NO load  |   |   |   |         |         |   |   |   |   |   |

## SHIFT SOLENOID VALVE STATE AND GEAR RATIO

| Gear                                                                                                              | Shift SOL 1 | Shift SOL 2 | 1-2-3-4 CL PC SOL 5 N.L. | 2-6 CL PC SOL 4 N.L. | 3-5 REV CL PC SOL 2 N.H. | LOW REV 4-5-6 CL PC SOL 3 N.H. | Gear Ratio |
|-------------------------------------------------------------------------------------------------------------------|-------------|-------------|--------------------------|----------------------|--------------------------|--------------------------------|------------|
| Park                                                                                                              | ON          | ON          | OFF                      | OFF                  | OFF                      | ON                             | -          |
| Reverse                                                                                                           | ON          | OFF         | OFF                      | OFF                  | ON                       | ON                             | 2.88       |
| Neutral                                                                                                           | ON          | ON          | OFF                      | OFF                  | OFF                      | ON                             | -          |
| 1st Braking                                                                                                       | ON          | ON          | ON                       | OFF                  | OFF                      | ON                             | 4.484      |
| 1st                                                                                                               | OFF         | ON          | ON                       | OFF                  | OFF                      | OFF                            | 4.484      |
| 2nd                                                                                                               | OFF         | ON          | ON                       | ON                   | OFF                      | OFF                            | 2.872      |
| 3rd                                                                                                               | OFF         | ON          | ON                       | OFF                  | ON                       | OFF                            | 1.842      |
| 4th                                                                                                               | OFF         | ON          | ON                       | OFF                  | OFF                      | ON                             | 1.414      |
| 5th                                                                                                               | OFF         | ON          | OFF                      | OFF                  | ON                       | ON                             | 1.000      |
| 6th                                                                                                               | OFF         | ON          | OFF                      | ON                   | OFF                      | ON                             | 0.742      |
| Effective Final Drive Ratio - 6T70/75 - 2.77/3.16                                                                 |             |             |                          |                      |                          |                                |            |
| For shift solenoids 1 and 2, "ON" = Solenoid Energized (Pressurized) "OFF" = Solenoid De-energized (No Pressure). |             |             |                          |                      |                          |                                |            |
| For pressure control solenoids, "ON" = Pressurized, "OFF" = No Pressure                                           |             |             |                          |                      |                          |                                |            |

## SHIFT SPEED

| Shift @ TP | km/h | mph  | OSS (RPM) |
|------------|------|------|-----------|
| 1-2 @ 12.5 | 16   | 9.9  | 345       |
| 2-3 @ 12.5 | 26   | 16.2 | 561       |
| 3-4 @ 12.5 | 39.5 | 24.5 | 852       |
| 4-5 @ 12.5 | 54   | 33.6 | 1164      |
| 5-6 @ 12.5 | 71   | 44.1 | 1531      |
| 6-5 @ 12.5 | 68.5 | 42.6 | 1477      |
| 5-4 @ 12.5 | 51   | 31.7 | 1100      |
| 4-3 @ 12.5 | 36   | 22.4 | 776       |
| 3-2 @ 12.5 | 23   | 14.3 | 496       |
| 2-1 @ 12.5 | 11   | 6.8  | 237       |
| 1-2 @ 25   | 21.5 | 13.4 | 464       |
| 2-3 @ 25   | 36   | 22.4 | 776       |
| 3-4 @ 25   | 48   | 29.8 | 1035      |

|          |      |      |      |
|----------|------|------|------|
| 4-5 @ 25 | 64   | 39.8 | 1380 |
| 5-6 @ 25 | 115  | 71.5 | 2479 |
| 6-5 @ 25 | 68.5 | 42.6 | 1477 |
| 5-4 @ 25 | 51   | 31.7 | 1100 |
| 4-3 @ 25 | 36   | 22.4 | 776  |
| 3-2 @ 25 | 23   | 14.3 | 496  |
| 2-1 @ 25 | 11   | 6.8  | 237  |

**NOTE:** Shift speed points are affected by many different vehicle and transmission operating conditions. The table above represents shift speed points calibrated at specific throttle angles during normal operating conditions and a temperature range between 0-130°C (32-266°F). These shift speed points are also based on an effective final drive ratio of 3.16, and assume a production-intent tire size. The table below illustrates a number of different variables that influence these shift speed points. Based on a given operating condition, these variables may override the normal shift speed points. To assist in monitoring the different variables, the respective scan tool data parameter is also listed.

#### Shift Speed Variables

| Scan Tool Parameter     | Shift Speed Variables                                                                                                                                                                                                                                      |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Calc. Throttle Position | Calc. Throttle Position (TP) is one of the most important inputs in the transmission shift pattern logic. A very low TP angle will impact the shift pattern by causing upshifts. A very high TP angle will impact the shift pattern by causing downshifts. |
| Commanded Gear          | Based on numerous inputs, the transmission control module (TCM) selects the optimum gear. Once the TCM commands a gear, the pressure control solenoids are activated to hydraulically control engagement of the proper clutch.                             |
| Cruise                  | When cruise control is activated, the shift pattern is altered to reduce excessive shifting.                                                                                                                                                               |
| ECT                     | Shift speed points may be offset to enhance engine coolant temperature (ECT) warm-up. Also, operating the vehicle at higher engine speeds will reduce the time to warm the ECT and the TFT.                                                                |
| Engine Speed            | To protect against an over speed condition, engine speed is monitored. If the engine speed becomes too high, an upshift will occur.                                                                                                                        |
| Engine Torque           | Engine torque is used to predict vehicle operating conditions, in order to determine the optimum gear and provide for a smoother ride.                                                                                                                     |
| IMS                     | The internal mode switch (IMS) indicates the position of the transmission manual valve. The operator controls this valve by moving the gear range selector. Therefore, the possible gears may be limited by this valve position.                           |
| TCC PC Sol. Duty Cycle  | The torque converter clutch (TCC) pressure control (PC) solenoid duty cycle indicates when the TCC has been engaged.                                                                                                                                       |
| TCC Slip Speed          | The TCC Slip Speed indicates the difference between engine speed and transmission input speed. The TCC is locked when slip speed is at or                                                                                                                  |

|                         |                                                                                                                                                                                                                                                                                                              |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                         | near zero, and may be controlling slip when at lower slip speeds.                                                                                                                                                                                                                                            |
| TFP Switch 1, 3, 4 or 5 | The transmission fluid pressure (TFP) switch is used to indicate if fluid pressure to a specific clutch has been applied or released.                                                                                                                                                                        |
| Trans. Fluid Temp.      | A lower TFT will extend shift speeds, a higher TFT, or hot mode condition, will invoke shorter shift speeds in order to establish a shift pattern required to cool the TFT.                                                                                                                                  |
| Transmission Hot Mode   | If the TFT becomes too hot, a hot mode shift pattern is used. The hot mode shift pattern will invoke lower shift speed points to establish a shift pattern necessary to cool the TFT.                                                                                                                        |
| Transmission OSS        | The transmission output speed sensor (OSS) is one of the most important inputs into the transmission shift pattern logic. A very low transmission output speed will impact the shift pattern by causing downshifts. A very high transmission output speed will impact the shift pattern by causing upshifts. |

### TRANSMISSION FLUID PRESSURE SWITCH LOGIC

| Gear                                                                                                                                                                    | TFP Switch States |          |         |         |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|----------|---------|---------|
|                                                                                                                                                                         | TFP SW1           | *TFP SW3 | TFP SW4 | TFP SW5 |
| Park                                                                                                                                                                    | High              | Low      | Low     | Low     |
| Reverse                                                                                                                                                                 | Low               | Low      | Low     | Low     |
| Neutral                                                                                                                                                                 | High              | Low      | Low     | Low     |
| Drive 1st - Engine Braking                                                                                                                                              | High              | High     | Low     | Low     |
| Drive 1st                                                                                                                                                               | High              | High     | Low     | High    |
| Drive 2nd                                                                                                                                                               | High              | Low      | Low     | High    |
| Drive 3rd                                                                                                                                                               | Low               | High     | Low     | High    |
| Drive 4th                                                                                                                                                               | High              | High     | Low     | Low     |
| Drive 5th                                                                                                                                                               | Low               | High     | High    | Low     |
| Drive 6th                                                                                                                                                               | High              | Low      | High    | Low     |
| High = 12 V (Switch Open or Pressurized)<br>Low = 0 V (Switch Closed or No Pressure)<br>Note: All TFP switches are normally closed (NC)<br>*TFP switch 2 does not exist |                   |          |         |         |

### TRANSMISSION INTERNAL MODE SWITCH LOGIC

| Gear Selector Position | Signal A | Signal B | Signal C | Signal P |
|------------------------|----------|----------|----------|----------|
| Park                   | LOW      | HI       | HI       | LOW      |
| Park/Reverse           | LOW      | LOW      | HI       | LOW      |
| Reverse                | LOW      | LOW      | HI       | HI       |
| Reverse/Neutral        | HI       | LOW      | HI       | HI       |
| Neutral                | HI       | LOW      | HI       | LOW      |
| Neutral/Drive 6        | HI       | LOW      | LOW      | LOW      |
|                        |          |          |          |          |

|                                        |     |     |     |     |
|----------------------------------------|-----|-----|-----|-----|
| Drive 6                                | HI  | LOW | LOW | HI  |
| Drive 6/Drive 4                        | LOW | LOW | LOW | HI  |
| Drive 4                                | LOW | LOW | LOW | LOW |
| Drive 4/Drive 3                        | LOW | HI  | LOW | LOW |
| Drive 3                                | LOW | HI  | LOW | HI  |
| Drive 3/Drive 2                        | HI  | HI  | LOW | HI  |
| Drive 2                                | HI  | HI  | LOW | LOW |
| Open                                   | HI  | HI  | HI  | HI  |
| Invalid                                | HI  | HI  | HI  | LOW |
| Invalid                                | LOW | HI  | HI  | HI  |
| HI = Ignition voltage<br>LOW = 0 volts |     |     |     |     |

SOLENOID VALVE PRESSURE

Line PC Solenoid Valve Pressure

| Requested Pressure (kPa) | Actual Pressure |             |
|--------------------------|-----------------|-------------|
|                          | Metric          | English     |
| 0                        | 345-900 kPa     | 50-130 psi  |
| 200                      | 690-900 kPa     | 100-130 psi |
| 400                      | 1100-1310 kPa   | 160-190 psi |
| 600                      | 1520-1725 kPa   | 220-250 psi |
| 800                      | 1860-2070 kPa   | 270-300 psi |
| 1000                     | 1860-2070 kPa   | 270-300 psi |