

## Specifications

| Transaxle type   |         | FF 6th Intellelligent Manual Transaxle (M6CF3-1e) |
|------------------|---------|---------------------------------------------------|
| Engine type      |         | Gasoline 1.6 T-GDI                                |
| Gear ratio       | 1st     | 3.615                                             |
|                  | 2nd     | 1.962                                             |
|                  | 3rd     | 1.257                                             |
|                  | 4th     | 0.951                                             |
|                  | 5th     | 0.778                                             |
|                  | 6th     | 0.674                                             |
|                  | Reverse | 3.583                                             |
| Final gear ratio |         | 3.941                                             |

### IMT system actuator

| Item                                          | Specification |
|-----------------------------------------------|---------------|
| Rated voltage (V)                             | 12            |
| Clutch motor position (Ball screw stroke, mm) | 0 - 27        |
| Clutch motor hall sensor supply voltage (V)   | 8.75 ± 10 %   |
| Clutch motor current (A)                      | 0 - 60        |
| Clutch motor hall count                       | -500 to 0     |

### Gear position sensor

| Item                 | Specification                   |
|----------------------|---------------------------------|
| Gear shift sensor    | 0 - 100 %                       |
| Gear select sensor 1 | 0 - 100 %                       |
| Gear select sensor 2 | 0 - 100 %                       |
| Select lever         | N, 1 - 6, R                     |
|                      | (Combination of output signals) |

### Gear position sensor select lever - signal code table

| Range | Gear shift sensor (%) | Gear select sensor 1 (%) | Gear select sensor 2 (%) |
|-------|-----------------------|--------------------------|--------------------------|
| N     | 44.00 - 56.00         | -                        | -                        |
| 1     | 70.80 - 82.80         | 54.67 - 66.67            | 33.33 - 45.33            |
| 2     | 17.20 - 29.20         | 54.67 - 66.67            | 33.33 - 45.33            |
| 3     | 70.80 - 82.80         | 36.00 - 48.00            | 52.00 - 64.00            |
| 4     | 17.20 - 29.20         | 36.00 - 48.00            | 52.00 - 64.00            |
| 5     | 70.80 - 82.80         | 17.33 - 29.33            | 70.67 - 82.67            |
| 6     | 17.20 - 29.20         | 17.33 - 29.33            | 70.67 - 82.67            |
| R     | 70.80 - 82.80         | 70.67 - 82.67            | 17.33 - 29.33            |

### Speed sensor

| Item                |      | Specification     |
|---------------------|------|-------------------|
| Input Speed (RPM)   |      | -16,000 to 16,000 |
| Output signals (mA) | High | 11.8 - 16.8       |
|                     | Low  | 5.9 - 8.4         |
|                     | Safe | 1.0 - 4.0         |

### IMT system actuator fluid

| Capacity                                                                                   | Recommended                                               |
|--------------------------------------------------------------------------------------------|-----------------------------------------------------------|
| Up to MAX marks<br>(approximately 0.086 ℓ , 0.02 U.S.gal., 0.09 U.S.<br>qt., 0.08 Imp qt.) | - DOT-LV4 (Recommended), DOT-4 or DOT-3                   |
|                                                                                            | • Recommended fluid : SAE J1704 DOT-4 LV, ISO4925 CLASS-6 |
|                                                                                            | • Useable fluid : FMVSS116 DOT-4, FMVSS116 DOT-3          |

### Tightening Torques

| Items           | N.m         | kgf.m     | lb-ft       |
|-----------------|-------------|-----------|-------------|
| Oil drain plug  | 58.9 - 78.5 | 6.0 - 8.0 | 43.4 - 57.8 |
| Oil filler plug | 58.9 - 78.5 | 6.0 - 8.0 | 43.4 - 57.8 |

|                                              |              |            |             |
|----------------------------------------------|--------------|------------|-------------|
| Shift lever assembly bolt                    | 9.8 - 14.7   | 1.0 - 1.5  | 7.2 - 10.8  |
| Control cable retainer mounting nut          | 11.8 - 14.7  | 1.2 - 1.5  | 8.7 - 10.8  |
| Speed sensor mounting bolt                   | 9.8 - 11.8   | 1.0 - 1.2  | 7.2 - 8.7   |
| IMT system actuator mounting bolt            | 19.6 - 26.5  | 2.0 - 2.7  | 14.5 - 19.5 |
| Gear position sensor connector mounting bolt | 19.6 - 26.5  | 2.0 - 2.7  | 14.5 - 19.5 |
| Control shaft complete mounting bolt         | 19.6 - 26.5  | 2.0 - 2.7  | 14.5 - 19.5 |
| Control cable bracket mounting bolt          | 14.7 - 21.6  | 1.5 - 2.2  | 10.9 - 15.9 |
| Transaxle bracket support mounting bolt      | 88.3 - 107.9 | 9.0 - 11.0 | 65.1 - 79.8 |
| Transaxle bracket mounting bolt              | 58.9 - 78.5  | 6.0 - 8.0  | 43.4 - 57.8 |
| Roll rod support bracket bolt                | 49.0 - 68.6  | 5.0 - 7.0  | 36.2 - 50.6 |
| Starter motor mounting bolt                  | 49.0 - 63.7  | 5.0 - 6.5  | 36.2 - 47.0 |
| Transaxle upper mounting bolt (TM=>ENG)      | 42.2 - 53.9  | 4.3 - 5.5  | 31.1 - 39.8 |
| Transaxle lower mounting bolt (ENG=>TM)      | 42.2 - 48.1  | 4.3 - 4.9  | 31.1 - 35.4 |
|                                              | 42.2 - 53.9  | 4.3 - 5.5  | 31.1 - 39.8 |

Lubricants

| Items | Recommmend lubricant | Quantity |
|-------|----------------------|----------|
|       |                      |          |

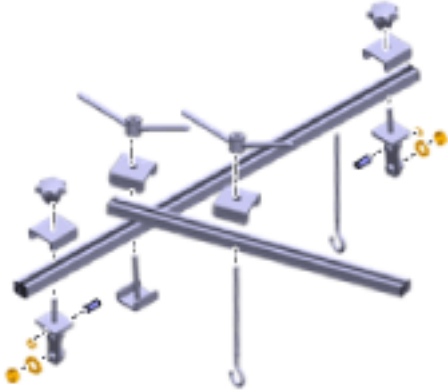
|                    |                                                                                                                                         |                                                                                     |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Transaxle gear oil | API Service GL-4, SAE 70W<br>• Recommended oil<br>–SHELL : SPIRAX S6 GHME 70W MTF<br>–SK : HK SYN MTF 70W<br>–GS CALTEX : GS MTF HD 70W | 1.5 - 1.6 L<br>(0.40 -0.42 U.S.gal., 1.58 -<br>1.69 U.S.qt., 1.32- 1.40<br>lmp qt.) |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|

Sealant

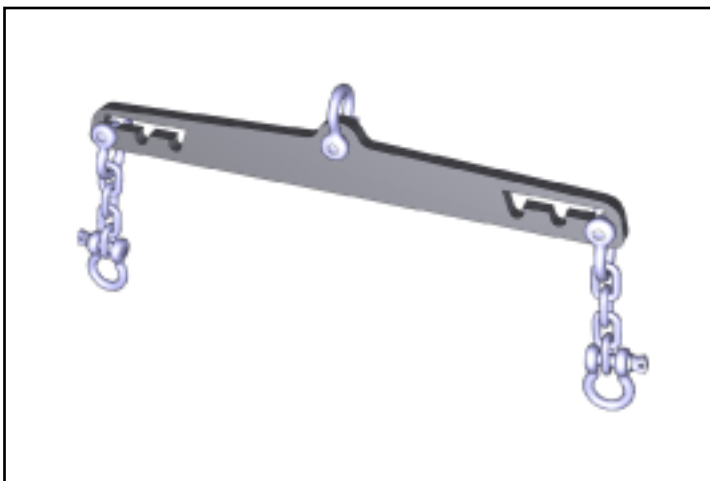
| Items                  | Specified sealant    |
|------------------------|----------------------|
| Control shaft assembly | MS721-40 or MS721-38 |

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Special Service  
Tools

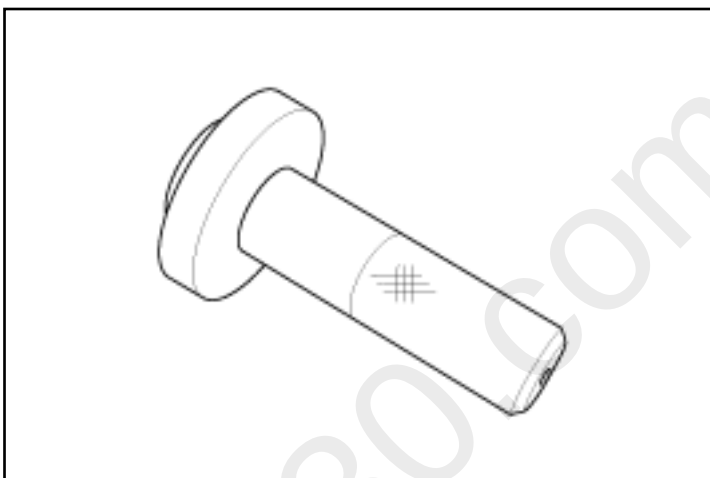
| Tool<br>(Number and<br>Name)                         | Illustration                                                                        | Use                                                                                                                                            |
|------------------------------------------------------|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| 09200-3N000<br>Engine support<br>fixture (Beam)      |    | Removal and installation<br>of the transmission.<br>Use this beam (SST No. :<br>09200-3N000) with the<br>supporter (SST No. :<br>09200-2S200). |
| 09200-2S200<br>Engine support<br>fixture (Supporter) |  | Removal and installation<br>of the transaxle.<br>with the beam (SST No. :<br>09200-3N000).                                                     |
| 09200-L1200<br>Engine support<br>fixture (Front)     |  | Removal and installation<br>of the transaxle.<br>with the beam (SST No. :<br>09200-3N000).                                                     |

09200-4X000  
Engine support  
fixture  
(Adapter)



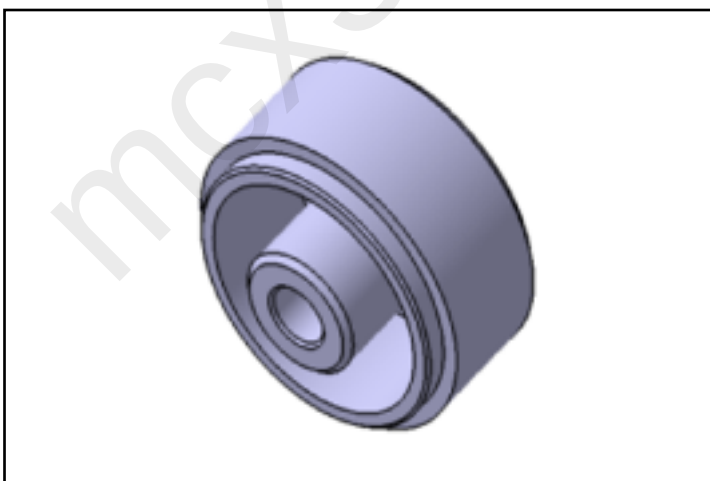
Removal and installation  
of the transaxle.  
Use this beam (SST No. :  
09200-3N000)

09453-2F300  
Oil seal installer



Installation of transaxle  
case oil seal. **[2WD]**

09473-D3500  
Oil seal installer



Installation of transaxle  
case oil seal. **[4WD]**

## Troubleshooting

| Trouble symptom                      | Suspected area                                                                 | Remedy                                                                                                           |
|--------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| Abnormal noise                       | Oil level (Low)                                                                | Add oil after inspecting the parts. (oil seal, drain plug, filler plug)                                          |
|                                      | Oil (Wrong or contaminated)                                                    | Replace the oil.                                                                                                 |
|                                      | Transaxle and engine mounting state (Wrong)                                    | Turn the mounting bolt to specified torque.                                                                      |
|                                      | Shaft end play (Wrong)                                                         | Adjust the end play.                                                                                             |
|                                      | Synchronizer ring (Worn or damaged)                                            | Replace the synchronizer ring.                                                                                   |
|                                      | Gear (Worn or damaged)                                                         | Replace the gear.                                                                                                |
|                                      | Bearing (Worn or damaged)                                                      | Replace the bearing.                                                                                             |
| Oil leak                             | IMT system parts (clutch tube, actuator, CSC)                                  | Inspect the IMT system actuator fluid.                                                                           |
|                                      |                                                                                | Inspect the IMT system clutch tube and line.                                                                     |
|                                      |                                                                                | Replace the IMT system parts.                                                                                    |
|                                      |                                                                                | Replace the IMT system actuator fluid.                                                                           |
|                                      |                                                                                | If the related parts or the fluid are replaced, perform the filling check function by using the diagnostic tool. |
|                                      | Oil level (High)                                                               | Inspect the oil level.                                                                                           |
|                                      | Gasket (Damaged)                                                               | Replace the gasket. (drain plug, filler plug)                                                                    |
|                                      | Oil seal (Worn or damaged)                                                     | Replace the oil seal.                                                                                            |
| Hard shifting or impossible to shift | IMT system actuator fluid (Wrong)                                              | Replace the oil & IMT related parts. (clutch tube, actuator, CSC)                                                |
|                                      | IMT system actuator fluid leak - IMT system parts (clutch tube, actuator, CSC) | Inspect the IMT system actuator fluid.                                                                           |

|                                          |                                     |                                                                                                                  |
|------------------------------------------|-------------------------------------|------------------------------------------------------------------------------------------------------------------|
|                                          |                                     | Inspect the IMT system clutch tube and line.                                                                     |
|                                          |                                     | Replace the IMT related parts.                                                                                   |
|                                          |                                     | Replace the IMT system actuator fluid.                                                                           |
|                                          |                                     | If the related parts or the fluid are replaced, perform the filling check function by using the diagnostic tool. |
|                                          | Shift fork (Worn)                   | Replace the shift fork.                                                                                          |
|                                          | Synchronizer ring (Worn or damaged) | Replace the synchronizer ring.                                                                                   |
|                                          | Gear (Worn or damaged)              | Replace the gear.                                                                                                |
|                                          | Hub sleeve (Worn or damaged)        | Replace the hub sleeve.                                                                                          |
|                                          |                                     |                                                                                                                  |
| Jumps out of gear                        | Shift fork (Worn)                   | Replace the shift fork.                                                                                          |
|                                          | Hub sleeve (Worn or damaged)        | Replace the hub sleeve.                                                                                          |
|                                          | Gear (Worn or damaged)              | Replace the gear.                                                                                                |
|                                          | Bearing (Worn or damaged)           | Replace the bearing.                                                                                             |
| Warning lamp “E” blinking is illuminated | Filling check not performed         | 1. Inspect the vehicle conditions for filling check.                                                             |
|                                          |                                     | - Check the vehicle turning ignition on.                                                                         |
|                                          |                                     | - Check the vehicle speed 0 KPH by using the diagnostic tool.                                                    |
|                                          |                                     | - Check the vehicle battery voltage above 10V by using the diagnostic tool.                                      |
|                                          |                                     | - Check the vehicle DTC of the TCM by using the diagnostic tool.                                                 |
|                                          |                                     | 2. Perform the filling check function by using the diagnostic tool.                                              |

|                                                      |                                                                             |
|------------------------------------------------------|-----------------------------------------------------------------------------|
| Unsatisfied the vehicle conditions for filling check | 1. Inspect the vehicle conditions for filling check.                        |
|                                                      | - Check the vehicle turning ignition on.                                    |
|                                                      | - Check the vehicle speed 0 KPH by using the diagnostic tool.               |
|                                                      | - Check the vehicle battery voltage above 10V by using the diagnostic tool. |
|                                                      | - Check the vehicle DTC of the TCM by using the diagnostic tool.            |
|                                                      | 2. Perform the filling check function by using the diagnostic tool.         |
| Filling check NG                                     | 1. Inspect the vehicle conditions for filling check.                        |
|                                                      | - Check the vehicle turning ignition on.                                    |
|                                                      | - Check the vehicle speed 0 KPH by using the diagnostic tool.               |
|                                                      | - Check the vehicle battery voltage above 10V by using the diagnostic tool. |
|                                                      | - Check the vehicle DTC of the TCM by using the diagnostic tool.            |
|                                                      | 2. Inspect the IMT system clutch tube and line.                             |
|                                                      | 3. Inspect the IMT system actuator fluid.                                   |
|                                                      | 4. Perform the filling check function by using the diagnostic tool.         |

|                                          |                                                             |                                                                        |
|------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------------------|
|                                          | Faulty clutch set                                           | Replace the clutch set and the CSC.                                    |
|                                          | Faulty CSC                                                  | Inspect the CSC in the clutch housing.                                 |
|                                          |                                                             | Replace the CSC.                                                       |
| Warning lamp “E” lighting is illuminated | Touch point learning not performed                          | 1. Inspect the vehicle conditions for touch point learning.            |
|                                          |                                                             | - Check the vehicle turning engine power on.                           |
|                                          |                                                             | - Check the shift lever value ‘N’ by using the diagnostic tool.        |
|                                          |                                                             | - Check the clutch pedal sensor value 0% by using the diagnostic tool. |
|                                          |                                                             | 2. Turn engine power on and wait 10 seconds                            |
|                                          | Unsatisfied the vehicle conditions for touch point learning | 1. Inspect the vehicle conditions for touch point learning             |
|                                          |                                                             | - Check the vehicle turning engine power on.                           |
|                                          |                                                             | - Check the shift lever value ‘N’ by using the diagnostic tool.        |
|                                          |                                                             | - Check the clutch pedal sensor value 0% by using the diagnostic tool. |
|                                          |                                                             | 2. Turn engine power on and wait 10 seconds.                           |
|                                          | Faulty clutch set                                           | Replace the clutch set and CSC.                                        |
|                                          | IMT system parts                                            | Inspect the IMT system actuator fluid.                                 |
|                                          | (clutch tube, actuator, CSC)                                | Inspect the IMT system clutch tube and line.                           |
| Warning lamp                             | Torque - Stroke learning not performed                      | Perform the torque - Stroke learning.                                  |

“N” or “1”-“6” or “R”  
blinking is illuminated

- Drive the vehicle with below  
APS 30% in 3rd gear for about  
20 seconds up to 70KPH.

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