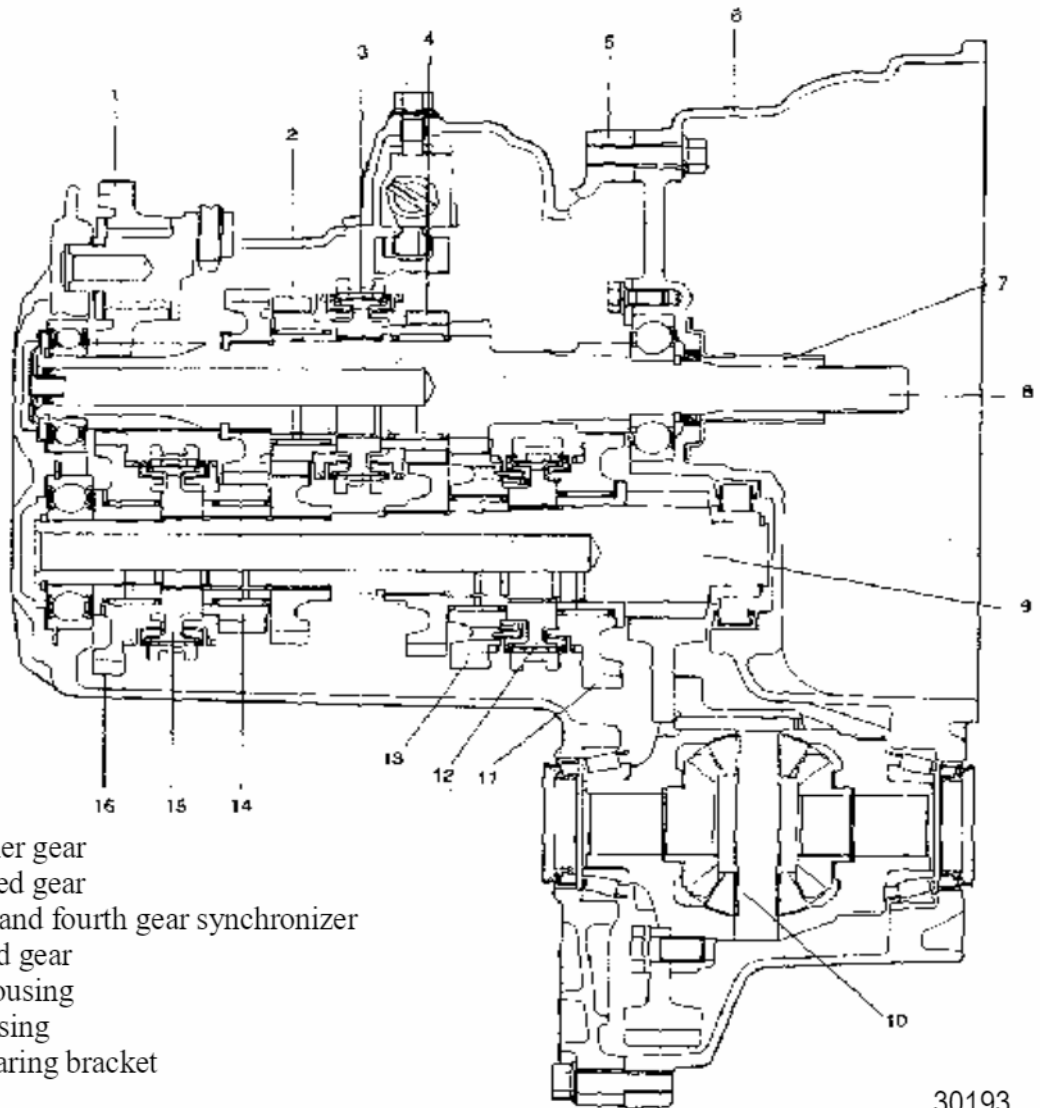


Manual Transmission – B11 7200MT

General Description



30193

1. Reverse idler gear
2. Fourth-speed gear
3. Third gear and fourth gear synchronizer
4. Third-speed gear
5. Gearbox housing
6. Clutch housing
7. Release bearing bracket
8. Input shaft
9. Output shaft
10. Differential
11. First-speed gear
12. First gear and second gear synchronizer
13. Second-speed gear
14. Fifth-speed gear
15. Fifth gear and reverse gear synchronizer
16. Reverse-speed gear

Specifications

Gearbox model

Gearbox model		F5M42
Transmission ratio	First gear	3.583
	Second gear	1.947
	Third gear	1.379
	Fourth gear	1.000
	Fifth gear	0.820
	Reverse gear	3.363
Ultimate transmission ratio		3.722
Speedometer transmission ratio (driven/driving)		29/36

Maintenance specifications

Item	Range	Limit
Axial clearance, input shaft front bearing (mm)	-0.01~0.21	—
Axial clearance, input shaft rear bearing (mm)	-0.01~0.12	—
Axial clearance, input shaft fifth-speed gear (mm)	-0.01~0.09	—
Axial clearance, output shaft front bearing (mm)	-0.01~0.12	—
Axial clearance, output shaft rear bearing (mm)	-0.01~0.09	—
Axial clearance, output shaft third-speed gear (mm)	-0.01~0.09	—
Clearance between pinion and differential cover (mm)	0.025~0.150	—
Preload on differential cover (mm)	0.05~0.11	—
Clearance between synchronizer back and gear (mm)	—	0.05

Remarks: standard clearance=0mm

Sealant and adhesive

Item	Stipulated sealant and adhesive
Engaging surface between clutch cover and gearbox cover	Mitsubishi sealant Part No. MD997740 or equivalent
Engaging cover between control cover and gearbox cover	
Engaging cover between bottom cover and gearbox cover	
Air vent	3M SUPER WEATHERSTRIP NO.8001 or equivalent
Bolts of drive gear of the differential	3M STUD LOCKING NO.4170 or equivalent

Formed-in-place gasket (FIPG) sealant

Many parts of the gearbox are applied with the FIPG sealant. During the application, please pay special attention to the amount of sealant and location and conditions of surface applied to ensure perfect sealing effects. There will be leakage in the case of insufficient sealant and overflowing sealant to clog or narrow the water or oil passage if there is too much sealant applied. Therefore, it is absolutely necessary to apply the correct and appropriate amount of sealant and ensure that there is no crack in the sealing in order to prevent any leakage.

RTV will get hardened once it reacts with the moisture in the atmosphere and therefore most usually be used on metal flanges.

Disassembly

No special method is needed to disassemble parts glued together with the sealant. Under some circumstances, a wooden hammer or similar devices will be used to slightly strike the parts to damage the sealant on the sealing surface, or a thin and smooth razor blade will be needed to gently cut the sealant. But do take care not to damage the sealing surface.

Cleaning of sealing surface

Clear away the sundries on the sealing surface with a sealant razor blade or steel wire brush and ensure that there is no oil or other filth on the sealing surface and that it is smooth and even. Do remember to eliminate the sealants left over in fixing holes and screw holes.

Tips for sealant application

The following shall be noted during assembly of components with FIPG sealant.

Evenly apply the sealant onto the surface of the fixing hole; fix the components into the desired place when the sealant is still wet (within 15 minutes). Apply the sealant where necessary. After fixing the component, wait until the sealant hardens (about 1 hour). Do not apply oil or water or start the engine during the hardening period.

The application steps of FIPG sealant are different depending upon component shapes. Please follow the instructions.

Lubricating grease

Item	Lubricating grease required
Drive shaft oil seal lip	Hyperboloid gear oil SAE75W-85W that complies with API category GL-4 or above
Input shaft oil seal lip	Mitsubishi lubricating grease Part No. 0101011 or equivalent
Gear lever bracket washer	

Adjusting snap ring and washer

Component name	Thickness (mm)	ID mark	Part No.
Snap ring (for the adjustment of axial clearance of the front bearing of input shaft)	2.24	Nil	SMD706537
	2.31	Blue	SMD706538
	2.38	Brown	SMD706539
Snap ring (for the adjustment of axial clearance of the rear bearing of input shaft) (for the adjustment of axial clearance of the rear bearing of output shaft)	2.31	Black (2)	SMD747149
	2.35	Nil	SMD746561
	2.39	Blue	SMD746562
	2.43	Brown	SMD746563
	2.47	Green	SMD746564
	2.51	White	SMD746565
	2.55	Yellow	SMD746566
	2.59	Black	SMD746567
	2.63	Orange	SMD746568
	2.67	Blue	SMD746569
	2.71	Brown	SMD746570
Thrust plate (for the adjustment of axial clearance of fifth-speed gear of input shaft)	2.82	—	SMD748015
	2.86	—	SMD748016
	2.90	—	SMD748017
	2.94	—	SMD748018
	2.98	—	SMD748019
	3.02	—	SMD748020
	3.06	—	SMD748021
	3.10	—	SMD748022
Snap ring (for the adjustment of axial clearance of front bearing of output shaft)	1.43	Green (2)	SMD746708
	1.51	White (2)	SMD746709
	1.59	Yellow (2)	SMD746710

Component name	Thickness (mm)	ID mark	Part No
Snap ring (for the adjustment of axial clearance of third-speed gear of output shaft)	2.81	Green	SMD745799
	2.85	White	SMD745800
	2.89	Yellow	SMD745801
	2.93	Black	SMD745802
	2.97	Orange	SMD745803
	3.01	Red	SMD745804
	3.05	Peachy	SMD745805
	3.09	Blue	SMD745806
Washer (for the adjustment of preload on differential cover)	0.80	80	SMD727661
	0.83	83	SMD720937
	0.86	86	SMD720938
	0.89	89	SMD720939
	0.92	92	SMD720940
	0.95	95	SMD720941
	0.98	98	SMD720942
	1.01	01	SMD720943
	1.04	04	SMD720944
	1.07	07	SMD720945
	1.10	J	SMD710454
	1.13	D	SMD700270
	1.16	K	SMD710455
	1.19	L	SMD710456
	1.22	G	SMD700271
	1.25	M	SMD710457
Washer (for the adjustment of tooth clearance of differential cover)	0.75~0.82	-	SMA180862
	0.83~0.92	-	SMA180861
	0.93~1.00	-	SMA180860
	1.01~1.08	-	SMA180875
	1.09~1.16	-	SMA180876

Tightening torque specifications

Item	Torque N.m (kgf)
Set bolt of bottom cover	6.2~7.6
Bolt of interlocking plate	26.9~33.1
Clutch cover – set bolt of gearbox cover	39.5~48.5
Set bolt of release bearing bracket of the clutch	8.8~10.8
Set bolt of controller cover	16.1~19.9
Set bolt of transmission cable bracket	16.1~19.9
Set bolt of speedometer gear	3.5~4.3
Set bolt of limiter bracket	19.7~24.3
Gear lever set bolt	16.1~19.9
Gear lever set nut	9.8~12.2
Set bolt of differential drive gear	118.5~145.5
Backup light switch	28.7~35.3
Set bolt of front bearing bracket	16.1~19.9
Miter valve spring	28.7~35.3
Set bolt of reverse idler gear	43.1~52.9
Set bolt of tossing limiter bracket	62~76

**Special tools**

Tool	Serial No.	Name	Application
	MB990926	Installer tie-in	Install oil seal of clutch cover input shaft
	MB990927	Installer tie-in	Install sealing cover
	MB990934	Installer tie-in	Install outer ring of roller bearing
	MB990935	Installer tie-in	Install outer ring of roller bearing of differential cover
	MB990938	Handle	To be used with installer tie-in
	MD998325	Differential oil seal installer	Install oil seal of differential
	MD998346	Bearing outer ring puller	Unfix outer ring of ball bearing



Tool	Serial No.	Name	Application
	MD998772	Air vent spring compressor	Unfix outer ring of roller bearing
	MD998801	Bearing puller	Fix/unfix gear, bearing and sleeve
	MD998812	Puller cover	To be used with puller and puller tie-in
	MD998813	Puller (100)	To be used with puller and puller tie-in
	MD998814	Puller tie-in (200)	To be used with puller and puller tie-in
	MD998816	Puller tie-in (30)	Fix front bearing of input shaft
	MD998817	Puller tie-in (34)	Fix rear bearing of output shaft



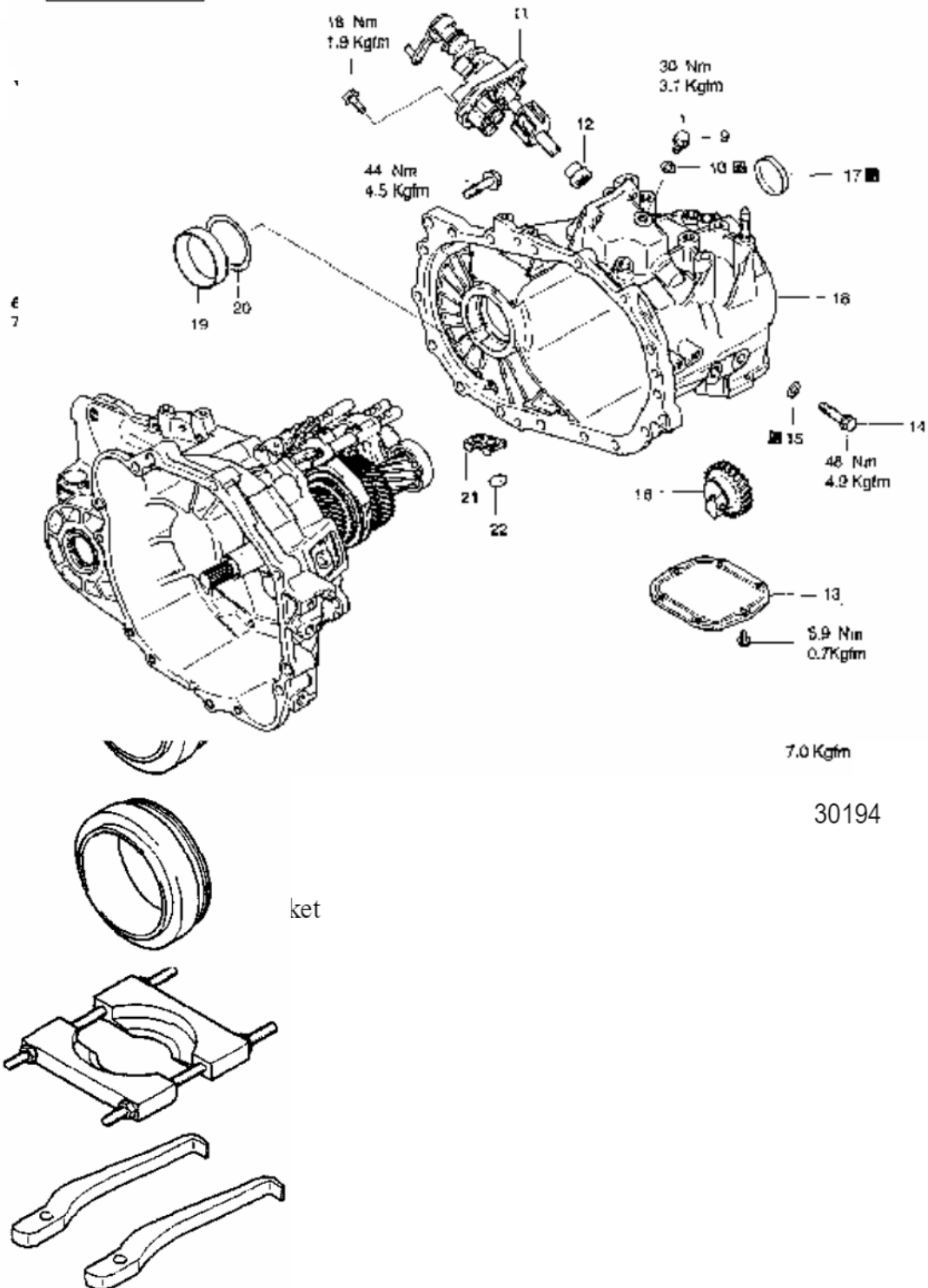
Tool	Serial No.	Name	Application
	MD998818	Puller tie-in (38)	Fix input shaft ball bearing, roller bearing inner ring, reverse gear, needle bearing, reverse gear bearing sleeve
	MD998819	Puller tie-in (40)	Fix fifth-gear and reverse-gear synchronizer shaft housing, differential bearing (F5M42-Z-F6N9), fourth-gear and fifth-gear gear sleeve
	MD998822	Puller tie-in (46)	Fix first-gear sleeve, second-gear sleeve and third-speed gear
	MD998823	Puller tie-in (48)	Fix differential needle bearing inner ring, differential bearing (F5M42-F6N6)
	MD998824	Puller tie-in (50)	Fix fourth-speed gear sleeve and fifth-speed gear
	MD998825	Puller tie-in (52)	Fix first gear and second gear synchronizer shaft housing, third gear and fourth gear synchronizer shaft housing and first-speed gear sleeve
	MD998917	Bering puller	Fix and unfix gear, bearing and sleeve, etc
	MD999566	Hook	Unfix needle roller bearing outer ring

Gearbox

Asser

⚙️ 组装时加注齿轮油
装配所有内部零件

⚙️ 拆下时加注齿轮油
清洗所有内部零件



30194

ket

Lubricate all inner components
with gear oil during assembly

30195

Disassembly steps:

9. Interlocking plate bolts
10. Sealing washer
11. Controller cover
12. Neutral gear return spring
13. Bottom cover
14. Reverse idler gear shaft bolt
15. Sealing washer
16. Reverse idler gear
17. Sealing cover
18. Gearbox cover
19. Outer ring
20. Washer
21. Magnetic bracket
22. Magnet

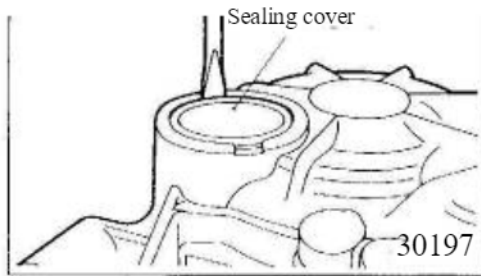


Lubricate all inner components
with gear oil during assembly

30196

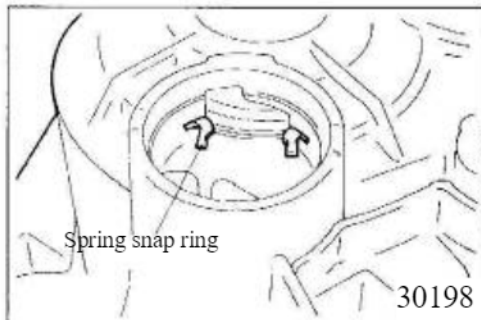
Disassembly steps:

23. Spring pin
24. First gear and second gear shifting fork guide rail
25. First gear and second gear shifting fork
26. Spring pin
27. Spring pin
28. Third gear and fourth gear shifting fork guide rail
29. Third gear and fourth gear shifting fork
30. Fifth gear and reverse gear shifting fork guide rail
31. Fifth gear and reverse gear shifting fork
32. Front bearing bracket
33. Input shaft
34. Output shaft
35. Differential
36. Clutch housing



Notice for disassembly

Unfixing of sealing cover

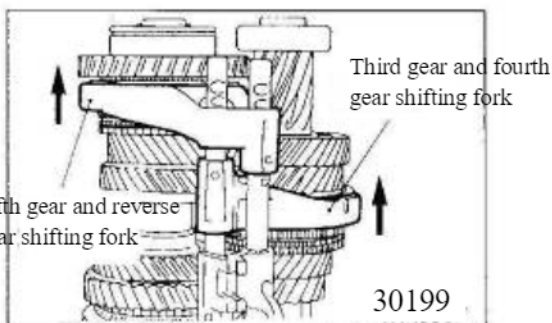


Unfixing of gearbox cover

Expand spring snap ring to unfix snap ring from the groove of ball bearing

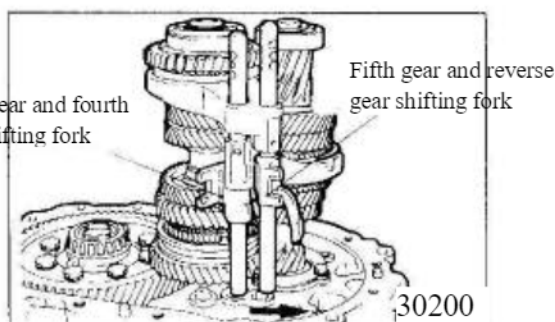
Remarks:

Once the spring snap ring is expanded, it will be detached due to the dead weight of output shaft.

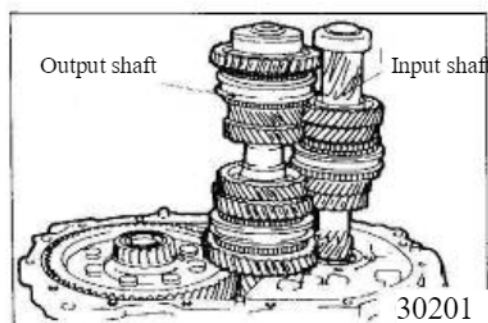


Unfixing of third gear and fourth gear shifting fork guide rail/third gear and fourth gear shifting fork/ Fifth gear and reverse gear shifting fork guide rail/fifth gear and reverse gear shifting fork

(1) Move the third gear and fourth gear shifting fork and fifth gear and reverse gear shifting fork in the direction shown in the figure



(2) Move the third gear and fourth gear shifting fork and fifth gear and reverse gear shifting fork in the direction shown in the figure and unfix the shifting fork



Unfixing of input shaft/output shaft

Unfix the input shaft and output shaft simultaneously.