



Performance Partners International LLC

Tel 562-528-8688 www.ppi-ats.com

E-mail info@performancepartnersintl.com
yasu@performancepartnersintl.com

ATS LSD instruction manual

Warning

Installment has to be performed by an experienced mechanic in a properly equipped garage after he/she understands the product well.

If the product is dropped, damaged, or rusted, please stop using this product. Continuing to use a product that has any of the above problems might result in an accident or serious malfunction.

For a 4WD car, it is extremely difficult to measure the initial torque by jacking up the car and by rotating the wheel. Do not perform this measurement method.

A car with ATS LSD should be driven by a driver who understand the characteristics of mechanical LSD.

Warranty

This is a product designed for racing use. As such, if the installment is impossible due to the broken or damaged parts, the new parts will be supplied. After the installment and the first use, there will not be any warranty.

Also ATS will not cover any damage caused by a human mistake during the installation.

Attention

The performance and durability of ATS LSD is influenced significantly by a choice of LSD oil. ATS strongly recommends ATS genuine LSD oil. Unsuitable oil can cause excessive chattering noise, steering kickback, decreased locking performance and shortening of product life.

Disclaimer

ATS products are manufactured for racing use. The user shall determine the suitability of our products and assume all the risks and responsibility in connection with their use. Regarding the legality of the products, the local laws vary from state to state. Please check with your local law enforcement.





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LSD assembly

Your LSD is set at the optimum at the factory. There is no need to adjust the initial torque at the installment.

In order to perform LSD maintenance, disassembly and reassembly are necessary. Please pay the attention to the following points.

If dust or dirt, however small it is, sticks inside the LSD case, this could cause trouble for the function of the LSD. During reassembly, remove any dirt or dust.

Apply sufficient ATS genuine LSD oil on the surface of internal parts.

Follow the service manual of a car whenever necessary.

Some of the internal parts have directions or top/bottom. The direction of the cam is especially important for a 1.5 way LSD. Please refer to the page 5.

For FR — Adjust the backlash and preload on the ring gear and pinion properly based on the service manual. For FF — adjust the preload of side bearing properly.

Break in

A break in is essential after the installment. A full powered track run without break in might cause early wear and tear and may result in less than 100 % performance.

Right after the installment, the chattering noise is noticeable. The noise should be reduced during the break in. For the silent LSDs and carbon LSDs, the chattering noise should disappear after the break in while some noise might remain for the standard LSDs.

During the break in, a large quantity of metal particles are produced inside the LSD. Please change the LSD oil right after the break in for proper maintenance of performance.

Use 1st or 2nd gear and at 10 to 20 miles/hour and drive figure 8's for 20 minutes to 30 minutes. The chattering noise should subside gradually. A break in could be done by driving the street for around 200 miles but the straight driving on a highway does not provide proper break in.





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Oil change

Right after the installment, you might notice a noise. This is normal. The chattering noise should be reduced during the break in. It is necessary to change the oil after the break in.

With hard driving on a race track, the differential oil temperature tends to go up and hastens the deteriorating process. An early oil change is recommended especially if you race at high temperature environment.

The structure of ATS LSD provides enough locking power with relatively low initial torque. However, as a clutch type racing LSD, it does have a chattering noise. (Silent LSD and carbon LSD do not have the chattering noise).

When turning with a small radius, you will notice a small friction noise of clutch plates. This is totally normal. This noise level is influenced by a choice of oil, outside temperature—the lower the temperature, the noisier it gets, and the age of the oil. Also, the noise tends to be bigger for a FR car.

The noise level is one indicator for oil change.

Initial torque

Initial torque is the necessary torque to rotate the lifted wheel when a car is jacked up with one wheel sitting on the ground. (it is also called as a break away torque)

The initial torque is adjusted to the optimum when the LSD is shipped out from the factory. There is no need for adjustment for the first use.

To check the initial torque, measure it when LSD is not hot. (The initial torque is 1-3kg /m lower when LSD is hot). If the initial torque goes down to 4-6kg /m, it is time to adjust. The optimum initial torque varies depending on the model. However, roughly for a FR car, it should be adjusted to 10 -13 kg/m and for a FF car it is 9 -11 kg/m.

The carbon LSD can function even at a very low initial torque. However, when it becomes close to 1.5 kg / m , it is a time to overhaul.

After the adjustment or overhaul, it is desirable to measure the initial torque twice. First from the LSD itself right after the reassembly and second after LSD is installed to the car. This is because, if the initial torque is different, you can recheck the preload, backlash, or other adjustments during the LSD installment process to the car.

For a 4WD car, rotating one wheel is accompanied by the rotation of other wheels. This prevents the proper measurement of the initial torque with LSD installed in a car. **Do not measure the initial torque of LSD by rotating a wheel for a 4 WD car.**



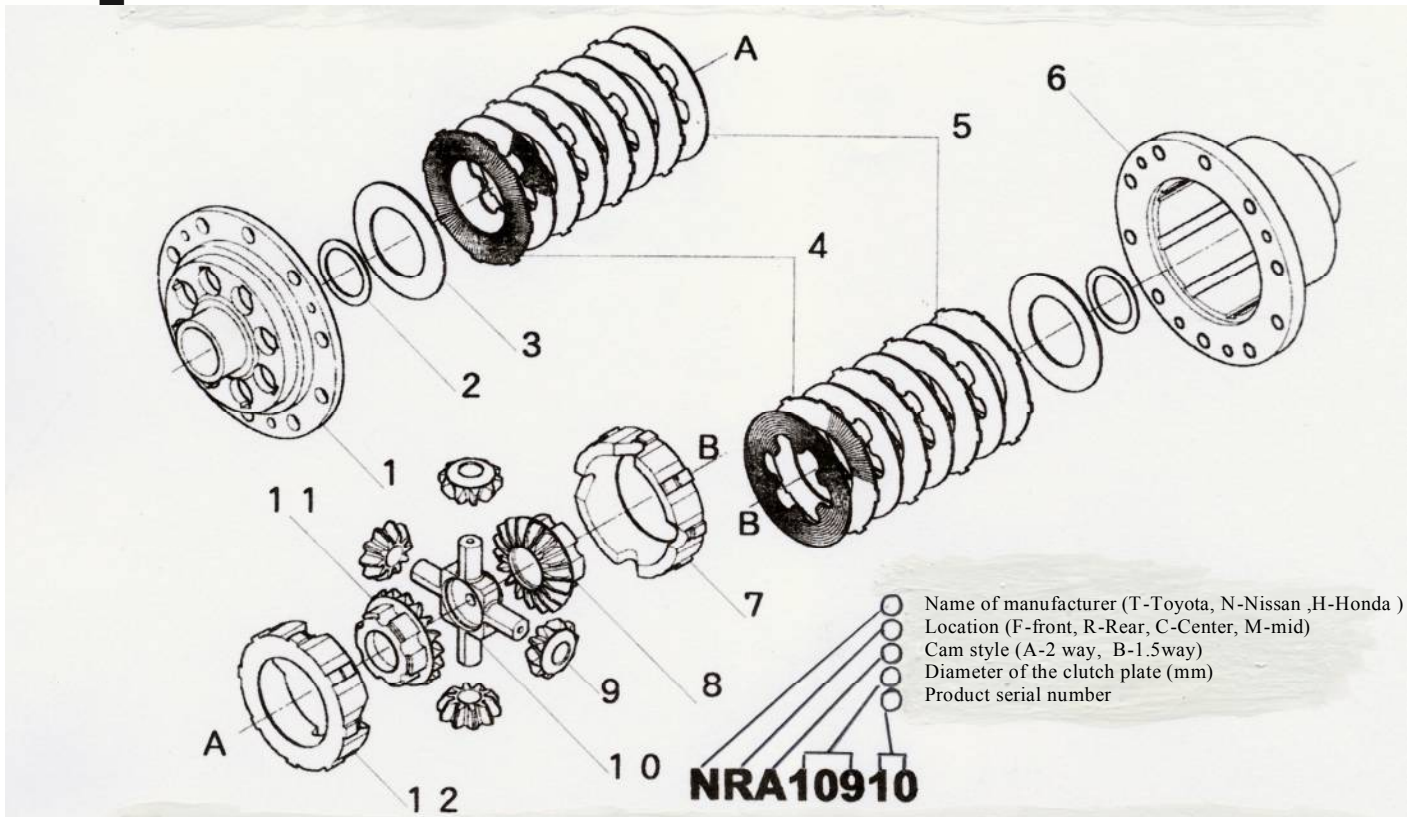


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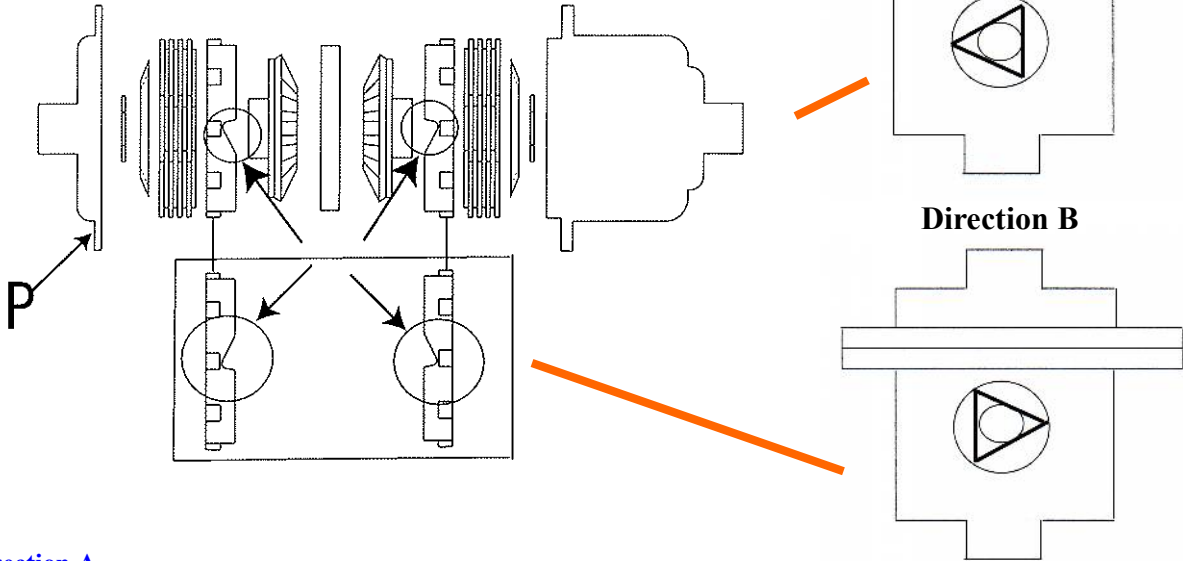


Number	Parts name	LSD model number & Parts Quantity				
		HFB8710	SRB9510	TFB8710	NRB10960	PRB9520
		HFB8720	NRB9510	NRA10910	NRA10941	PRB9521
		HFB8730	TRA10930	NRA10920	NRB10941	BRB9510
		HFB8740	TRB10930	NRA10940	NRA10970	BRB9511
		MFB8710	TRA9510	NRB10910	NRB10970	BRB9520
		MFB8720	TRB9510	NRB10920	NRA10980	BRB9521
		MRB8710	ZRB9510	NRB10940	NRB10980	BRB10910
		MCB8210	NFB8210	ZRB10910	NRA10990	BRB10911
		ZRB8210	NFB9510	TRA10910	NRB10990	
		TMB9510	PRB9510	TRA10920		
		SFB8210	PRB9511	TRB10910		
		SFB9510	PRB9530	TRB10920		
		SRB8210	PRB9531	NRA10960		
1	Differential case A	1			1	1
2	Washer	2			2	2
3	Dishshape spring	2			2	2
4	Clutch plate A (outer)	8			6	10
5	Clutch plate B (inner)	8			6	10
6	Differential case B	1			1	1
7	Cam ring A	1			1	1
8	Side gear A	1			1	1
9	Pinion gear	4			4	4
10	Cross axis	1			1	1
11	Side gear B	1			1	1
12	Cam ring B	1			1	1





There is a direction on 1.5 way and 1 way cam. Depending on the model number, please make sure that you install the cam in a correct direction. The LSD parts numbers are divided into two groups - Direction A and Direction B



Direction A

TFB8710, TFB8720, TMB8720, TRB8710, TRB8711, TRB8720, TRB8721, TRB10910, TRB10911, TRB10920, TRB10921, TRB10930, TMB9510, TRB9510

NFB9510, NRB9510, NRB10910, NRB10911, NRB10920, NRB10940, NRB10941, NRB10942, NRB10943, NRB10950, NRB10960, NRB10970, NRB10971, NRB10972, NRB10973, NRB10974, NRB10980, NRB10990, NRB109100, NRB109101, NRB109110, NRB109111, NRB109120, NRB109121, NRB109130

ZRB8210, ZRB9510, ZRB10910, ZRB10911

SRB8210, SRB8220, SRB9510, SFB9510, SFB9520

MCB8210, MRB8710, MRB8711, MRB8720, MRB8721, MFB8720, MFB8760, MFB8770

PRB9510, PRB9511, PRB9520, PRB9521, PRB9530, PRB9531

BRB8711, BRB8720, BRB8721, BRB8722, BRB9510, BRB9511, BRB9520, BRB9521, BRB10910, BRB10911

HFB8750, HFB8751, HFB8760, HFB8780, HRB9510, HFB8790, HMB10910 (ring gear is attached on the section "P" in the diagram above)

LMB8710, LMB8720, KFB8710

Direction B

HFB8710-8730, HFB8711-8731, HFB8770, HFB8780, MFB8710, MCF958713F, MCF958714F, MFB8750, MFB8750L, MFB8760, MRB8730, MRB8740, NFB8210





ATS LSD model specific instruction

For additional information, please refer to the stock service manual

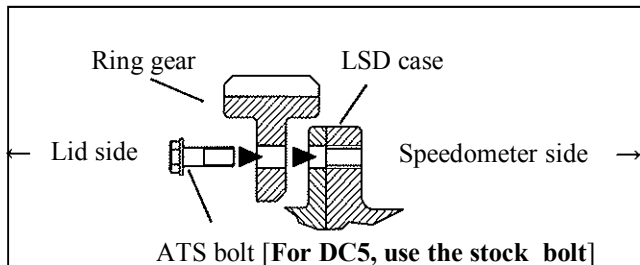
Mitsubishi Lancer Evo 1,2, & 3 (CD9A, CE9A), Mirage CA4A, CJ4A Front LSD

- Use the ATS ring gear bolts which come with the LSD with the tightening torque of 13.5kg-m (97.6 lb-ft)
- The ring gear bolts [hexagonal head bolt] used for MFB8710 and MFB8720 may not have enough height for a wrench. Make sure to apply the correct tightening torque to your box wrench and proceed with care

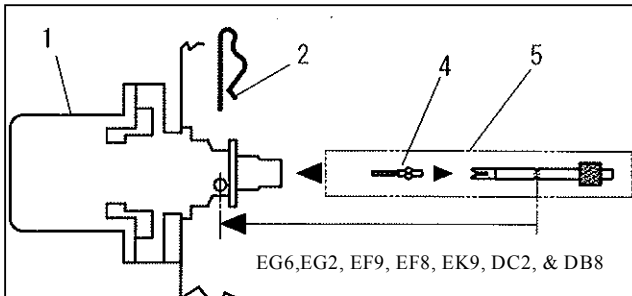
Mitsubishi Lancer Evo 4, 5, 6, 6.5, 7, 8, 8 MR, 9, & 9 MR

The tightening torque for the transfer ring gear bolt is 8.5kg-m (61.5 lb-ft)

For Honda VTEC FF vehicle

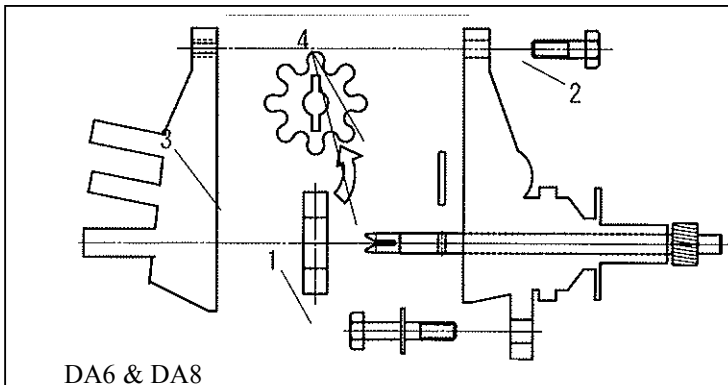


Use the bolts supplied by ATS and fix the ring gear on the flange side of the LSD lid. The tightening torque is 10.3kg-m (74.5 lb-ft) for EF8, EG6, EK4, EK9, DC2. For DC5, use the stock bolt and tighten with 12.3kg-m (89.00 lb-ft)



Speedometer driven gear installment

- 1 Remove the speedometer gear ASSY from the transmission case
- 2 Remove the pin
- 3 Detach the speedometer gear and joint
- 4 Attach the joint to the speedometer gear provided by ATS
- 5 Install 4 to the speedometer gear ASSY
- 6 Install the pin
- 7 Check the movement of the speedometer gear
- 8 Install the speedometer gear ASSY to the transmission case



Speedometer driven gear installment

- 1 Remove the speedometer gear ASSY from the transmission case
- 2 Remove the bolt (two of them) and open the power steering pump
Remove the pump gear
- 3 Remove the pin and exchange the speedometer gear with the one supplied by ATS
- 4 Remove the pin and gear (which is removed in the process 3)
- 5 Install the pin and gear (which is removed in the process 3)
- 6 Close the pump
- 7 Check the movement of the speedometer gear
- 8 Install the speedometer gear ASSY to the transmission
- 9 After the installment of speedometer cable and laying the oil pipe, refill the power steering fluid.

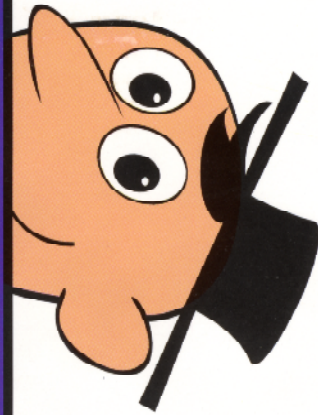
DA6 & DA8



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ATS strongly recommends ATS genuine LSD oil.

Especially for the first use of ATS LSD, please use our genuine LSD oil. An inappropriate LSD oil cause an excessive chattering noise and understeer and for a FF car, it could cause steering kick back. The mismatch of friction materials or additives in the oil and /or mismatch of viscosity are the main reason for those unwanted results. With ATS LSD oil, the chattering noise is reduced to minimum. If you notice the conditions mentioned above with other company's oil, it is better to change the oil to ATS LSD oil as soon as possible. After changing the oil to ATS oil, if the symptoms remain, the unwanted friction material could still remain on the surface of the internal clutch discs. In that case, disassembly is required. Clean the internal discs by a thinner and apply ATS LSD oil then reassemble the LSD.

ATS LSD oil for FF 80w-90 GL-5, for FR 85w-90 GL-5





This section is for ATS carbon LSD.



Carbon disc w/ inner edge



Metal disc w/ out edge

Since December 2007, ATS has been using newly designed internal disks for the ATS Carbon LSD. The new version provides more adaptability to many LSD oils from different manufacturers

ATS has tested the Carbon LSD with over 20 different LSD oils. The following oils are considered to be functioning well with the ATS Carbon LSD. [However we recommend genuine ATS LSD oils for our use.]

The oil clarity remains within a specified range and the LSD functions normally without any chattering noise or any change in the locking characteristics upon the oil temperature change.

The list below does not cover all the oils. It is likely the other brand of LSD oil will function well with ATS carbon LSD.

Brand	Name	Viscosity	Brand	Name	Viscosity
BP	X9140S	80W 140	Wako's	HG250R	80W 250
BP	X9118S	75W 90	Wako's	HG140R	80W 140
Newtech	UW76	75W 140	Omega	690	85W 140
Neo	Hi proof shock	75W 140	Omega	690	75W 250
Neo	RHD	75W 90	Omega	690	75W 90
A.S.H	250R	85W 140	Redline		80W 140
A.S.H	FSE E spec	75W 140	Motul		75W 140
Total	Pro R	75W 140	Motul		75W 90
Respo	Le Mans	80W 140	Sunoco		80W 140
Oberon	F-808	75W 140	Repsol		80W 140
Oberon	F-808 mineral	85W 140	Subaru Stock		90W
Estremo		80W 140			



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ATTENTION

ATS LSD accessory bolts for NISSAN



Choice of the accessory bolts

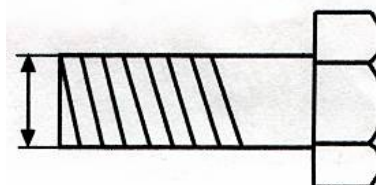
The bolts which are enclosed in the LSD kit do not fit all NISSAN models. For some models, it is necessary to use the stock Nissan bolts.

If the stock bolt to attach the LSD or differential to the final gear is

1) 12mm diameter — use ATS bolts

2) 13mm diameter — use Nissan stock bolts

Bolt diameter



The ATS bolts are to be used for fixing the final gear for S13, R32, A31, and C33 which use M12 bolt.

The enclosed ATS bolt size is M12. With the pitch same as M13 ($p=1.0$), it could be tightened into the tap for M13. However, if it is used for M13 tap, the contact made by the teeth is very shallow and it does not provide enough strength at all. Never apply this ATS bolts to the cars which use M13 bolt. The example for the cars using M13 bolt is S14, R32/33 Type M, and R34 (depending on the model year). When the ATS bolt is used for M13, the tap on the final gear might be damaged and it could be very dangerous since the damage could lead to a separation of the final gear from the differential.

Nissan uses two types of ring bolts (M12 and M13). In order to cope with this situation, ATS LSD NRA(B) 10941 has a tap for M13 to use stock Nissan M13. For a car using M12, ATS provides customized bolts with two stages. Please do not use Nissan M12 bolt for this LSD. A gap between the hole on the LSD and M12 bolt will cause looseness.

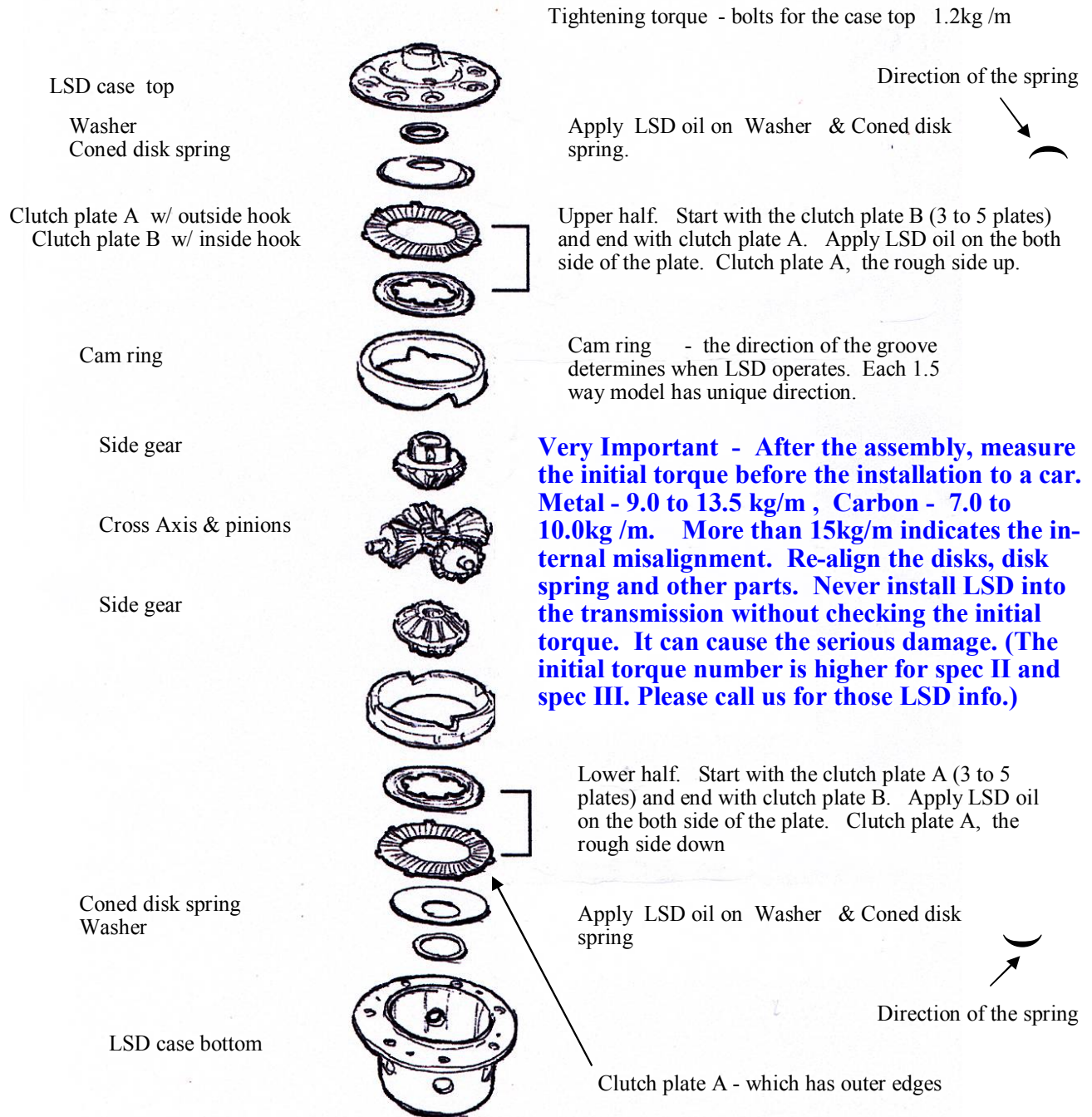
If your car utilizes M12 bolts, make sure to use attached ATS bolts instead of Nissan M12 in order to have the correct fit.





LSD Assembly

Start from the bottom



Use clamps (2 of them) to keep the case top attached to case bottom, when you remove the bolts connecting those two. You also need clamps when tightening the bolts.

