Lancer Evolution Limited Slip Diffs – what Co-ordSport can offer

A question we're regularly asked at Co-ordSport is:

"What LSDs do you recommend to fit a Lancer Evolution?",

Here is our advice:

First, we need answers to some questions;

1. What model Evolution do you have?
2. What is your car used for?
3. What torque/horsepower does the car produce?

Here are the differences and why they are important:

1. **What model:**
   A) Evo4-6/TM cars have a ViscousCouplingUnit controlling the centre diff

   (the VCU is in the transfer and controls the centre diff. which is in the gearbox).

   TM's are slightly different, as some had bigger bearings in their transfer casings, similar to Evo7's)

   The OE front diff. is either an open diff. or a Helical Gear Diff (torsen/worm drive).

   The OE rear diff. is a plated LSD on the RS, or the ActiveYawControl diff. on the GSR.

   B) Evo7-9 cars have an ActiveCentreDiff. in the transfer, controlling the gearbox's centre diff., in place of the VCU.

   The front and rear diffs are basically same options as the E4-6, although the AYC diff. did evolve into "Super AYC", which is a more durable unit.

2. **Used for:**
   A) Road/track days or serious competition?
   B) If competition, is it tarmac or gravel?
   C) Or just outright drag racing (straight line, constant need for traction)

3. **What torque/horsepower?**
   A) Standard (300bhp)
   B) Tuned (350~400bhp)
   C) Seriously modified (450+bhp)

It is not easy to come up with a compromise that caters for all surfaces.

Bear in mind some basic suggestions:

For tarmac, it is an ideal starting point to have strong/tight front and rear diffs, along with a softer centre diff. setting.

For gravel/loose surfaces, you should aim for a tighter/stronger centre diff. whilst still using a strong rear diff., but the front diff. can be adjusted to suit the driver's preferred style. The stronger centre diff. will make the car understeer, and that is the main reason it is not ideal for tarmac.

Evo.4-6/TM, which has OE Viscous Centre Differential (Viscous Coupling Unit – "VCU") we suggest

For gravel we would recommend the KAAZ diffs. Front, Centre and Rear. The KAAZ front unit is a big strong unit, and once fitted it leaves no space in the transfer for the VCU. That would leave the car with an Open centre diff, with no control, so KAAZ produce a Centre LSD to install in the gearbox, to replace the OE open diff.

The KAAZ units are mechanical friction clutch plate type LSDs, with belleville spring washers (also known as cone springs) for initial preload.

All 3 x diffs., Front, Centre and Rear, can be adjusted, but it requires removal of the diff(s) from the car and dismantling, sometimes the purchase and fitment of alternative parts (different preload, different ramp angles, and different friction levels, some plates offset to reduce effect). This is probably not necessary at the rear, so start your fine tuning at the Front and Centre.

The above KAAZ units cannot be used in Group N, as they are not homologated. For FIA Group N you should use the Ralliart or Toth Front LSD, with a standard size VCU (which can be rebuilt to a variety of settings) at the centre, and a standard or Ralliart rear diff.

Cusco also offer a variety of rear LSDs which offer many set-ups for discerning drivers.

For tarmac, the KAAZ centre diff. would need adjusting, to allow a softer setting. Really that is better achieved with a VCU, so we recommend not to use the KAAZ front diff. (as it will not fit with a VCU). We recommend, therefore, the Cusco front diff., with their tarmac setting of Viscous Unit – these come as a set, LSD+VCU. They are available in RS Type, using small coil springs for initial preload, or MZ Type, using Belleville Spring Washers (Cone Springs) for initial preload.

If you need to comply with FIA Group N, it would again be the Ralliart or Toth Front LSD, with a VCU (set to a softer tarmac setting).

E4/6 Diffs available are as follows:

CUSCO

Front	RS Type	LSD147FV1 (1way)	£xxxx+VAT (LSD+VCU) Retail
		LSD147CV1/CV115(1or1.5way)	£xxxx+VAT (LSD+VCU)
		LSD447FV1/CV1/CV115 (TME)	£xxxx+VAT (LSD+VCU)
	MZ Type	LSD147D (1way)	£xxxx+VAT (LSD+VCU)
		LSD147BV1/BV115(1or1.5way)	£xxxx+VAT (LSD+VCU)
		LSD447D/BV1/BV115 (TME)	£xxxx+VAT (LSD+VCU)

RS Rear	RS Type	LSD141F/F2 (1/2way)	£xxx+VAT Retail
		LSD141L15/L2(1.5/2way)	£xxx+VAT
		LSD141FG	£xxx+VAT
		LSD141FR	£xxx+VAT
	MZ type	LSD141A/A2(1or2way)	£xxx+VAT
		LSD141K15/K2(1.5/2way)	£xxx+VAT
AYC Rear(GSR)	RS Type	LSD448F/F2 (1/2way)	£xxx+VAT Retail
		LSD448L15/L2 (1.5/2way)	£xxx+VAT

KAAZ

Front	DBM2060 (1.5way, 12 plates)	£xxx+VAT Retail	
Centre	DBM2070 (1.5way, 12 plates)	£xxx+VAT	
Rear	SBM2031 (1.5way, 20 plates)	£xxx+VAT	(also fits Evo1-3)

(WAVETRAC / RALLIART Gp.N / STANDARD OPEN)

RA581182S1 for Tommi Makinen Edition/E7

Kaaz DBM2060 Front LSD/Case

RA763555S2 (big non-homologated)

TOTH E4/6 Front

QUAIFE E4/6 Centre £

(Helical gear/torque bias type)

Evo.7~9, which has OE Active Centre Differential ("ACD")

The OE ACD changes everything – as this controls your centre diff. options. Providing you with gravel and tarmac options in one diff. By changing the ACD Controller, you can make the centre diff. more effective and controllable – such Controller units are available from GEMS, KAPS and MoTeC.

For FIA Group N, you should use the homologated front & rear diffs. by Ralliart or Toth (front only).

Homologated E8/9 front diff. has 12 plates and rear diff. has 16 plates

Cusco make diffs, but they do not have the correct design/Number of plates.

Ralliart offer gravel and tarmac set-ups (small difference in ramp angles).

Non-Group N options are:

For gravel we would recommend the Cusco MZ diffs., which use the Belleville Washers (cone springs) for initial preload.

For tarmac, we would recommend the Cusco RS diffs., which use a varying No. of small coil springs for initial preload. These provide very progressive action.

A further option for the Front diff. is the WaveTrac helical gear Torque Biasing Diff. , similar to the standard OE option, but stronger.

For track cars with AYC rear diff. Evo4-9, the AYC can be made more positive by adding the Cusco LSD, which replaces the AYC's OE open diff, which is controlled by the AYC clutch pack. (this can be run with or without AYC control)

E7/9 Diffs available are as follows:

CUSCO

Evo.7 (ACD) – for VCU car see E6 TME above

Front	RS Type	LSD449F (1way)	£xxxx+VAT Retail
		LSD449C/C15 (1or1.5way)	£xxxx+VAT
RS Rear	As for Evo.4-6 above		
AYC Rear	RS Type	LSD448F/F2 (1or2way)	£xxx+VAT Retail
		LSD448L15/L2 (1.5or2way)	£xxx+VAT

Evo.8-9

Front	RS Type	LSD450F (1way)	£xxxx+VAT Retail
		LSD450C/C15 (1or1.5way)	£xxxx+VAT

RS Rear As for Evo.4-7 above

AYC Rear As for Evo.7 above, Cusco

KAAZ

Rear SBM2031 £xxx+VAT

RALLIART - FRONT

Evo 7 RA580103S1 (ACD) £xxxx+VAT Retail

Evo 8/9 RA980736S3 (Standard setting) £xxxx+VAT

RA980736S4 (Hard setting) £xxxx+VAT

RALLIART - REAR

Evo7-9 RA534828K1 £xxxx+VAT

WAVETRAC – FRONT

Evo.8-9 76.309.190WK £xxx+VAT Retail

(Helical gear type - The Wavetrac does not noticeably bias torque on decel (although it does), unless severe loads are seen one side over another during that time. The thing to realize here, in the Evo's case, is that in the front axle position, it is often most desirable NOT to have axle clamping happening during decel, as it adversely affects turn-in. The Wavetrac in the front of an Evo works wonders on a track - it allows you to soften up the rear roll stiffness and get that car rotating to set up for accel out of the corner. And the Wavetrac wont get upset running off the curbs, or into the infield a little - it's very forgiving and makes for a smoother application of power, which can be kinder on the other transmission components).

See picture above – where it stands next to N3 diff.)

TOTH E8/9 front

EvoX Diffs available are as follows:

Evo.10

CUSCO

Front – SST	RS Type	LSD453F (1way)	£xxxx+VAT Retail
		LSD453C/C15 (1or1.5way)	£xxxx+VAT
	MZ Type	LSD453A (1way)	£xxxx+VAT
		LSD453B/B15 (1or1.5way)	£xxxx+VAT
Front – 5spdMT	RS Type	LSD454F (1way)	£xxxx+VAT Retail
		LSD454C/C15(1or1.5way)	£xxxx+VAT
	MZ Type	LSD454A (1way)	£xxxx+VAT
		LSD454B/B15(1or1.5way)	£xxxx+VAT
RS Rear	As for Evo.4-9 above		
AYC Rear	RS Type	LSD452F/F2 (1or2way)	£xxx+VAT Retail
		LSD452L15/L2 (1.5or2way)	£xxx+VAT

CUSCO ProAdjust

(Adjustable ramp angles 0°-15°-45°-45°/45°-55°/35°-65°/25° - 1, 1.5 or 2way)

Evo.7	Front	RS Type	LSD449R	£xxxx+VAT Retail
Evo.8-9	Front	RS Type	LSD450R	£xxxx+VAT
Evo.1-10	Rear	RS Type	LSD141R	£xxxx+VAT
		MZ Type	LSD141S	£xxxx+VAT