



Part Number: DLS3T0011F
Version: 4

4 POT BRAKE UPGRADE

PROCESS
SHEET



Lotus Sport – Fitting Instructions

4 POT BRAKE UPGRADE

APPLICATION SPECIFIC TO LOTUS S2 EXIGE VEHICLES FITTED WITH:

▪ A122G0007F	LOTUS CARS	16-SPOKE	6.5J X 16	ET31
▪ BLS3G6019F	LOTUS SPORT	240R 5-SPOKE	7J X 16	ET31
▪ BLS3G6007F	LOTUS SPORT	240R 5-SPOKE	7J X 16	ET31

TRACK USE ONLY

This equipment is intended for use on private property racing tracks only and is not suitable for use on public roads, use of the equipment on public roads may constitute a criminal offence. Accordingly, the purchaser of the equipment and all persons who may use the equipment must ensure that the equipment is not used on any public road. Lotus Motorsport Limited cannot and does not accept any liability arising directly or indirectly out of the use of the equipment, other than in respect of death or personal injury caused by its negligence. The purchaser's statutory rights when dealing as a consumer are not affected.

Difficulty





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OVERVIEW

This big brake kit will provide increased heat capacity, which means substantially more resistance to brake fade and calliper distortion with multiple stops from high speed. A firmer pedal due to stronger and stiffer components, as well as better modulation characteristics under threshold braking is also typical with this properly balanced brake upgrade. By sizing the calliper pistons properly for S2 Exige models, it has been able to optimize the performance and feel of the system. We have found that the increased heat capacity of this brake upgrade kit, resists fade much better and calliper distortion during race or track only applications. The whole brake system is stiffer which should provide a firmer pedal, as well as better modulation characteristics under threshold braking.

PADS: The pads are 16mm thick, 46.2 mm radial depth, with an area 43. 2 cm² and are a Pagid RS14 friction material. This is a full race pad with a medium-to-high friction value. It is a ceramic-type compound with very good modulation, high fade resistance, low heat conductivity, and a good wear rate up to a temperature of 650°C. It is kind on discs, with visible grooving, but a limitation of hairline cracks. Lotus Sport has used this friction material on the Lotus Sport Exige GT3 racecar and Lotus Sport Exige Cup 240 vehicles.

This bigger pad benefits heat capacity and wear rate, as it will absorb more initial heat (less thermal shock), and have better wear characteristics (longer pad life).

Although brake torque is directly proportional to piston area, system pressure, friction coefficient and effective radii, it is not affected by pad area. This pad profile benefits the heat capacity and wear rate of the components, as it will absorb more initial heat (less thermal shock), and have better wear characteristics (longer pad life) (Although in the case of a larger pad, the pad can mask a larger portion of the rotor face, absorbing more radiant energy and shielding the area from cooling). Lastly, the pad geometry is improved, since rubbing speed between the disc and the pad is greater at the periphery of the disc, the pad geometry is designed to reduce the area toward the center of the disc. This is done in an effort to produce even temperature and pressure distribution across the face of the pad.

DISCS: The discs are 308mm outside diameter, 28mm thick with 48 vanes, 14mm air gap and weigh 4.9kg.

The aluminium bell for the hub section of the disc saves weight over a one-piece solid disc, as this is both rotating and unsprung, it will benefit the acceleration, braking, and handling of the vehicle. This brake upgrade kit will handle the large temperature changes that the brake disc experiences during track use. Temperature differences will be evident in a one-piece disc and could cause warping of the disc. This results in vibration of the vehicle, pulsing of the brake pedal, but also pushes the pistons farther away from the disc (pad knock off). With this two-piece disc assembly, the iron disc heats up more evenly. This allows the disc to be used under severe conditions without having a detrimental effect.

CALIPERS: The calliper is a two-piece aluminium alloy body with 36 mm and 31.75 mm piston diameter bores, aluminium alloy pistons with dirt seals and is of the radial mount type. The calliper weight is 2.3kg



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WARNING / NOTES

- **THIS BRAKE KIT IS FOR TRACK USE ONLY!**
- **PLEASE BE AWARE THAT DISCS USED ON RACE TRACKS WILL BE SUBJECT TO HIGHER TEMPERATURES AND WEAR RATES THAN ACHIEVED WITH NORMAL ROAD USE. THIS CAN HAVE AN EFFECT ON THE LIFE OF THE DISC, ESPECIALLY IF HIGH TORQUE COMPETITION PADS ARE USED.**
- **DISCS ALONG WITH PADS ARE CONSUMABLE ITEMS!**

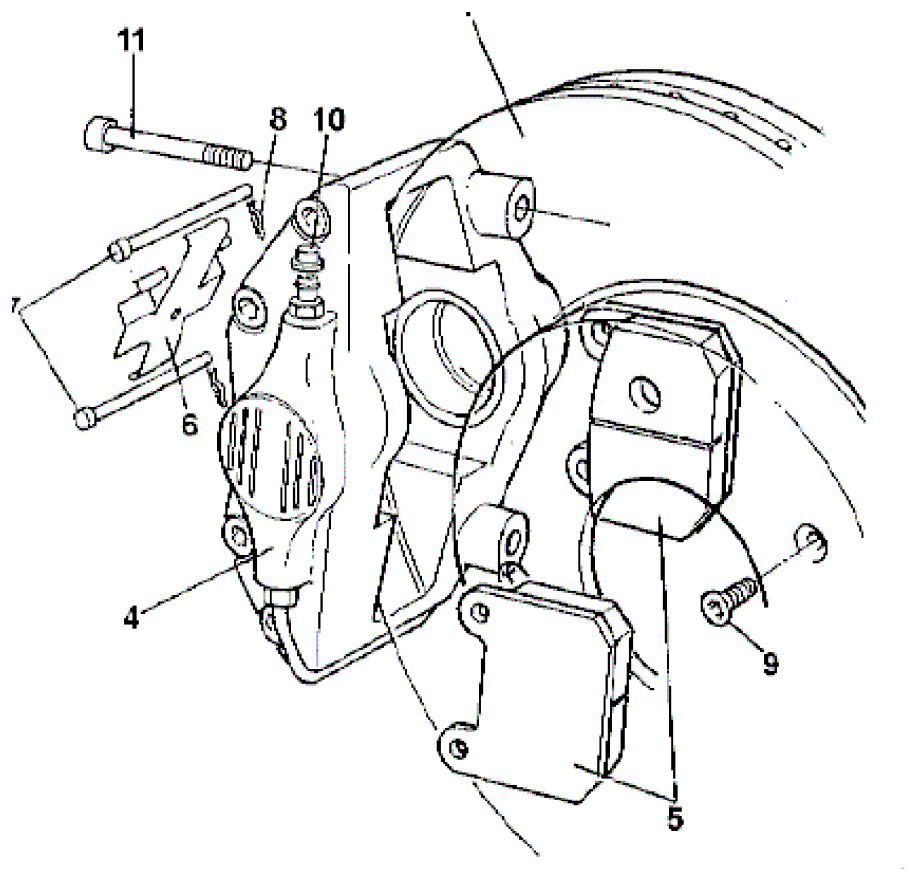
- Discs must be regularly and frequently inspected for excessive heat crazing and cracking.
- Discs with cracks emanating from mounting holes / slots, inside diameter, scallops, or outside diameter should be changed immediately.
- After heavy and prolonged use some surface crazing will often be evident. If this turns into distinct surface cracks which are radiating towards the inside or outside diameter the disc should be changed. **IF IN DOUBT REPLACE**
- All cast iron brake discs need to be bedded-in to ensure heat stabilisation and improve resistance to cracking. Cracks or even disc failure can occur during the first few heavy stops if careful bedding is not carried out.
- If pads do not get bedded properly and / or used to hard right out of the box will likely lead to pad glazing. Pad glazing is a condition where the resins in the pad crystallize on both, the pad friction surface and the brake disc surface, resulting in poor stopping performance, brake judder and vibrations. Also rapidly escaping volatile elements and moisture from the resin would seek an immediate escape route out of the friction compound, creating small fissures that would lead shortly to cracking and chunking.
- Brake Discs feature Curved Vanes. The brake discs are handed and should be installed with the cooling vanes running back from the inside to outside diameters in the direction of rotation.
- Brake Callipers are a safety critical item and it is recommended that callipers are reconditioned and piston seals inspected regularly to maintain optimum performance. Where callipers have been subjected to high temperatures or have been used in adverse conditions, the callipers should be reconditioned and the seals replaced more frequently to ensure that safety and performance levels are maintained. It is recommended that Brake Callipers if cleaned should be washed with soapy water or an alcohol based cleaning fluid e.g. Methylated Spirits.
- Do not use petrol or gasoline, as this will damage the seals. Parts must be absolutely dry before re-assembly.
- To obtain the best performance from racing brake systems, bleed the system thoroughly, immediately prior to each event using brake fluid from a new sealed bottle. This is particularly important in wet or humid conditions or when the brakes are excessively hot.
- Always use fresh fluid and replace bottle cap when not in use. Never re-use brake fluid.
- Circuits and drivers vary enormously in the amount of work they demand from the brakes and therefore the brake system may need to be tuned for each circuit by adjustment of the cooling airflow. The temptation to over cool the disc should be resisted. The aim is to keep the temperature as stable as possible within the working temperature range. High maximum to low minimum temperature cycles are the enemy of disc life.
- All bolts should be torqued correctly – see lotus service manual for standard part.
- All bolts torqued should be paint marked.
- Ensure all necessary safety procedures are followed.
- Do not attempt to do this modification with the engine running or when the engine is hot.
- It will be necessary to move the wheel balance weights and rebalance the wheel when fitting the brake kit.
- Read all instructions thoroughly before commencing work and ensure all components are present. If in any doubt, consult a lotus dealer before undertaking the work.



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SEQ	ACTIVITY – REMOVE EXISTING PARTS
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Referring to A120T0327J Lotus Service Notes:

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| 10 | Disconnect Brake hoses to callipers; install new braided hoses if not already on vehicle. |
| 20 | Remove existing front callipers and pads |
| 30 | Remove front discs and countersunk screw |

CAREPOINT	QUALITY STANDARD
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| 10 | Note it is recommended to fit braided brake hoses (ALS3J0046F) |
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SEQ	PART NUMBER	PART DESCRIPTION	QTY	F/C	TORQUE	TOOLING
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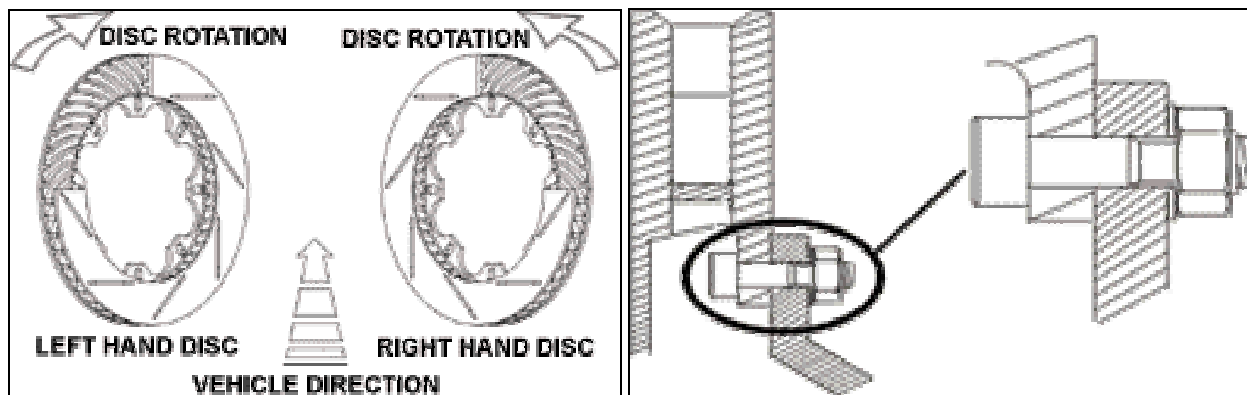
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SEQ	ACTIVITY – INSTALL BRACKETS
10	Using M10 Cap head bolt fix the new calliper-mounting bracket to the hub carrier, using the same calliper mounting holes previously used. Use Permabond A130 on both threads of bolts.
20	Paint mark head of bolts when correctly torque value achieved.
30	
40	
50	
60	

CAREPOINT	QUALITY STANDARD
10	Calliper mounting bracket should be offset to the inboard side i.e. so that 'calliper to bracket' mounting holes are 'inside' the ' bracket to upright'
50	

SEQ	PART NUMBER	PART DESCRIPTION	QTY	F/C	TORQUE	TOOLING
10	-	Permabond A130	-	-	-	
10	ALS3J0047F	Bolts, Bracket To Hub Carrier	2	-	58Nm	Torque Wrench
10	ALS3J0046F	Bracket, Callipers	1	-	-	



SEQ	ACTIVITY – MOUNT DISCS
10	If disc and bell are not pre assembled: Take 12off M6 bolts and 12off nuts and 24off washers from kit. Insert M6 bolt with washer from 'disc side'. Loosely tighten nut and washer on 'bell side' for all 12 fixings
20	Correctly torque 'opposite' fixings and paint mark when specified torque is achieved.
30	Install disc and bell assembly onto hub carrier. Mount the disc onto the hub and align the wheel bolts.
40	Insert new countersunk screw and tighten
50	Repeat steps 10 to 40 for front left wheel

CAREPOINT	QUALITY STANDARD
10	Note specific handing of disc before mounting the bells.
50	Before fitting disc assembly to hub carrier ensure that the mating face between mounting bell and hub is scrupulously clean.

SEQ	PART NUMBER	PART DESCRIPTION	QTY	F/C	TORQUE	TOOLING
10	ALS3J0043F	FRONT DISC, RH	1	-	-	
*10	ALS3J0044F	FRONT DISC, LH	1	-	-	
10	ALS3J0049F	Bolt, Disc to mounting bell	12	-	14.0Nm	Torque Wrench
10	ALS3J0049F	Nut, Disc to mounting bell	12	-	14.0Nm	Torque Wrench
10	ALS3J0049F	Washer, Disc to mounting bell	24	-	-	
40	A918W7120F	M6 x 16, Screw, Countersunk	1	-	Hand tight	Screw Driver

Note: Quantities for per side only



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SEQ	ACTIVITY – INSTALL CALLIPERS
10	Insert the brake pads into the calliper
20	Place callipers onto disc sides.
30	Insert 2off M10 Cap heads into calliper and mount onto the newly installed bracket. Apply PermaBond A130 to threads of bolt.
40	Paint marks the head of the bolt when correct torque has been achieved.
50	If your vehicle is already fitted with 'braided hoses' connect hose M10x1 end to Banjo female connector.
60	Insert banjo bolt with 2off copper washers above and below the banjo connection.
70	Tighten the banjo bolt onto the calliper
80	Repeat steps 10 to 40 for front left wheel
90	Check all connection for interference, rubbing of pipes and hoses, check all bolts correctly installed.
100	Follow Lotus Service Manual for refilling and bleeding of the brake hydraulic system.

CAREPOINT	QUALITY STANDARD
10	Bleed screws should be always positioned up most
10	Disc should always pass small piston first on differential bore callipers.
10	Crossover pipes should always be positioned at the bottom.

SEQ	PART NUMBER	PART DESCRIPTION	QTY	F/C	TORQUE	TOOLING
10	ALS3J0041F	FRONT CALLIPER, RH	1	-	-	
*10	ALS3J0042F	FRONT CALLIPER, LH	1	-	-	
10	ALS3J0055F	PAD, PAGID RS14	2	-	-	
30	ALS3J0046F	Bolts, Calliper To Bracket	2	-	58Nm	Torque Wrench
50	ALS3J0050F	Banjo Female Connector	1	-	-	
60	ALS3J0051F	Banjo Washer	2	-	-	
60	ALS3J0052F	Banjo Bolt	1	-	-	

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SEQ	ACTIVITY – BED IN
10	The pads must be 'bedded in' as per AP Racing 'road' recommendations before any race or circuit use.
20	For the first 10 miles, light braking from 50/60 mph down to 30 mph if possible in blocks of 5.
30	Do not attempt any high-speed stops down to zero at this point, as only the faces will heat up with the mass remaining cool along with the mounting area.
40	Do not attempt any high-speed stops down to zero at this point, as only the faces will heat up with the mass remaining cool along with the mounting area. increase the braking pressures similar to stopping in traffic, again avoiding if possible full stops from above 70 mph.
50	By now the area around the mounting bolts should be a light blue temper colour. This is a good indication that the correct heat soak has been achieved. For
60	For the next 100 miles gradually increase the braking effort after this full power stops can be used. The disc should now be an even dark to light blue temper colour, depending on the pad type and the braking effort being used during the process.
70	This process must be completed before any race circuit use.

CAREPOINT	QUALITY STANDARD
70	At the start of a session use a minimum of one warming up lap for the brakes i.e. gradually increase the effort at each corner and do not drag the brakes under power as in left foot braking.
70	Use at least one cooling down lap at the end of the session and if possible stay off the brakes.
70	Do not leave your foot on the brake when parked in the paddock after a track session. If you do, the hot spot created by the pad can distort the disc in that localized area causing a high spot, resulting in vibration under braking.
70	On the majority of car installations, race circuit use can be more exacting on the brake system than a fully prepared race car due to the following:- None or minimal cooling, increased chassis weight, longer braking distances due to driving technique or tyre grip. Therefore it is very important to check your brake system thoroughly after such use. Bear in mind race cars on average cover less than 50 laps of a circuit before being serviced.

SEQ	PART NUMBER	PART DESCRIPTION	QTY	F/C	TORQUE	TOOLING
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Disclaimer

Lotus accepts no liability for any direct, indirect or consequential damage or loss (including as a result of negligence) arising from the application of these fitting instructions by any person. For the avoidance of doubt, this does not affect your statutory rights and Lotus does not exclude liability (if any) to you for death or personal injury arising out of Lotus' negligence.

Please note that the fitting of any Lotus approved part(s) by anyone other than a Lotus approved engineer may invalidate the vehicle warranty.