

Assembly of the Powerlock Differential

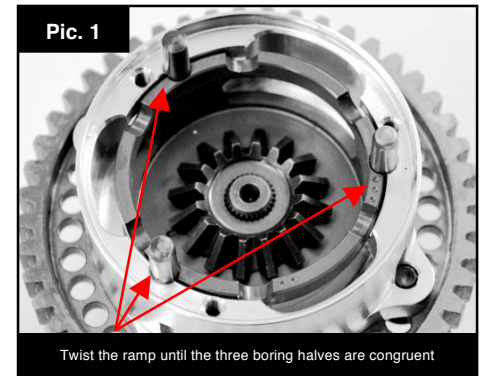
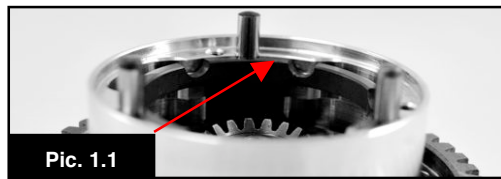
For the assembly please also take notice of the exploded drawing.

Flange sleeves, shaft seals and bearings were professionally pre-mounted into the aluminium differential housings left and right by SCS M2 Engineering. Check the external fins on burrs, if necessary remove them. Make sure you do not deform the fins.

Assembly of the Powerlock Differential housing A left side (Pic. 1)

- Fix the steel gearwheel 48 t. on the left side of the aluminium housing as pictured, use screw retention lacquer / thread locker (optional GE0086.00 for GENIUS cars)
 - Insert 2 external fins into the housing (optional only one 0,5mm fin or M10322)
 - Place 1 carbon disc 32x2,4mm on top (optional M10215, M10225 or M10226)
 - Insert the ramp with L marking into the aluminium housing A.
 - Push the bevel gear through the ramp and arrest in the carbon disc.
 - Twist the ramp until the three boring halves are congruent with the borings of the diff housing.
- Now put in the fixing pins 4x18mm.
- Press the diff. bevel gear axle into the left aluminium housing.
 - Check the ramp on free movement (by moving it up and down)

Important: The edge of the ramp must always be lower compare to the aluminum housing. See Pic. 1.1 (> - 0,1mm). Corrective: Grinding carbon disc by 0,1mm or use different fin thicknesses



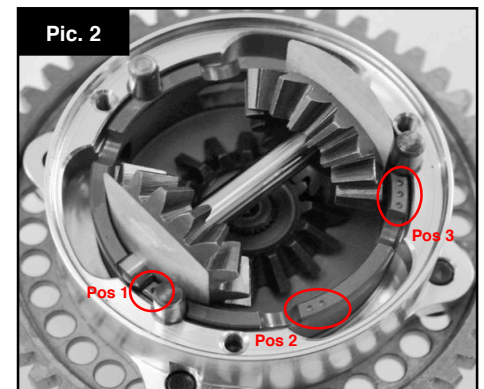
Variety of locking effect (Pic. 2)

On the acceleration side you have the choice of 3 different ramp angles (barrier/locking effect). These are marked on the front with 1, 2 or 3 points (Pic. 2). The higher the number of points, the more locking effect you will have with this torque regulated diff. As a base setup we recommend to start in Pos. 1 with touring and formula cars, in Pos. 2 with trucks.

The ramp on the brake side has almost no locking effect.

Furthermore the oil quantity has an influence on the locking effect (22ml filling), the less oil you use the more locking you will have (minimum 7ml / maximum 25ml oil)

- Equip the diff axle with the bevel gears B and diff spacer discs epoxy and place them in the corresponding ramp according to the desired locking effect (optional M10230).



Assembly of the Powerlock Differential housing B right side (Pic. 3 & 4)

-First mount the preload slide. Insert screw, spacer and o-ring from the outside. Fit spacer, nut and preload slide inside. Secure the screw by using the nut, so that the screw can be turned easily. Make sure that the o-ring seals the differential housing correctly.

Hint: Apply a drop of oil on the o-ring before tightening to prevent a damage on the o-ring.

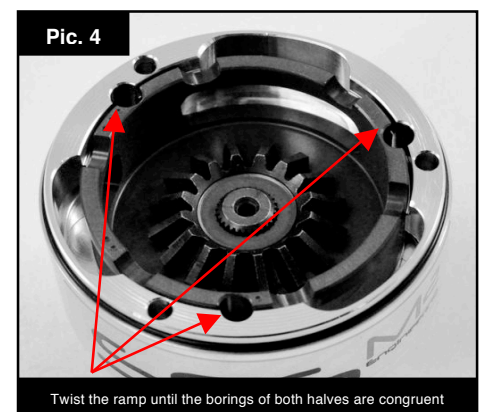
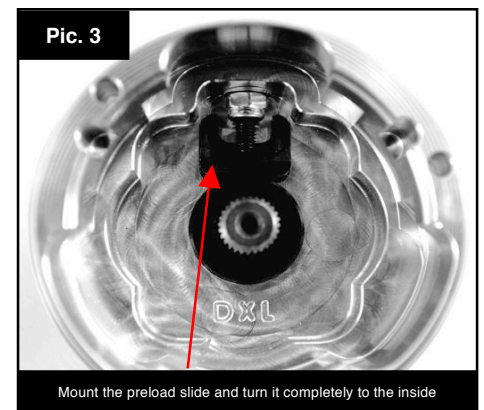
- The preload slide can be adjusted now. For assembly reason, the preload slide should be turned in maximum to the inside (Pic. 3).

- Place the preload plate on the preload slide.
- On top of the preload plate place the preload compensator, with the compensator facing down
- Place 1 external fin on top of the preload compensator (optional M10322).
- After that put 1 carbon disc 32x2,4mm on top of the fin (optional M10215, M10225 or M10226).
- Insert the ramp with R marking into the aluminium housing B.
- Push the bevel gear through the ramp and arrest in the carbon disc.
- Twist the ramp until the three boring halves are congruent with the borings of the diff housing.
- Press the diff. Bevel gear axle into the right aluminium housing.

Important: The edge of the ramp must always be lower compare to the aluminum housing. See Pic. 1.1 (> - 0,1mm). Corrective: Grinding carbon disc by 0,1mm or use different fin thicknesses.

Hint: The carbon discs are liable to wear and should be checked regularly. The thickness of the carbon discs should be between 2,2 and 2,4mm. This could be adjusted by additional external fins (optional M10322).

- Check the ramp on free movement (by moving it up and down) by using the 3 pins (4x18mm).
- Fix the o-ring on the aluminium housing B.



Mounting of the complete Powerlock Differential

- Check that both halves are assembled correct. Make sure the ramps and gears do not slip out of the housings.
- Put 1 pin into the other aluminium housing.
- Stick together the housing carefully. Check that the diff bevel gear axle stays in position.

Hint: The ball diff axles can be turned slightly, so that the housing halves fits properly.

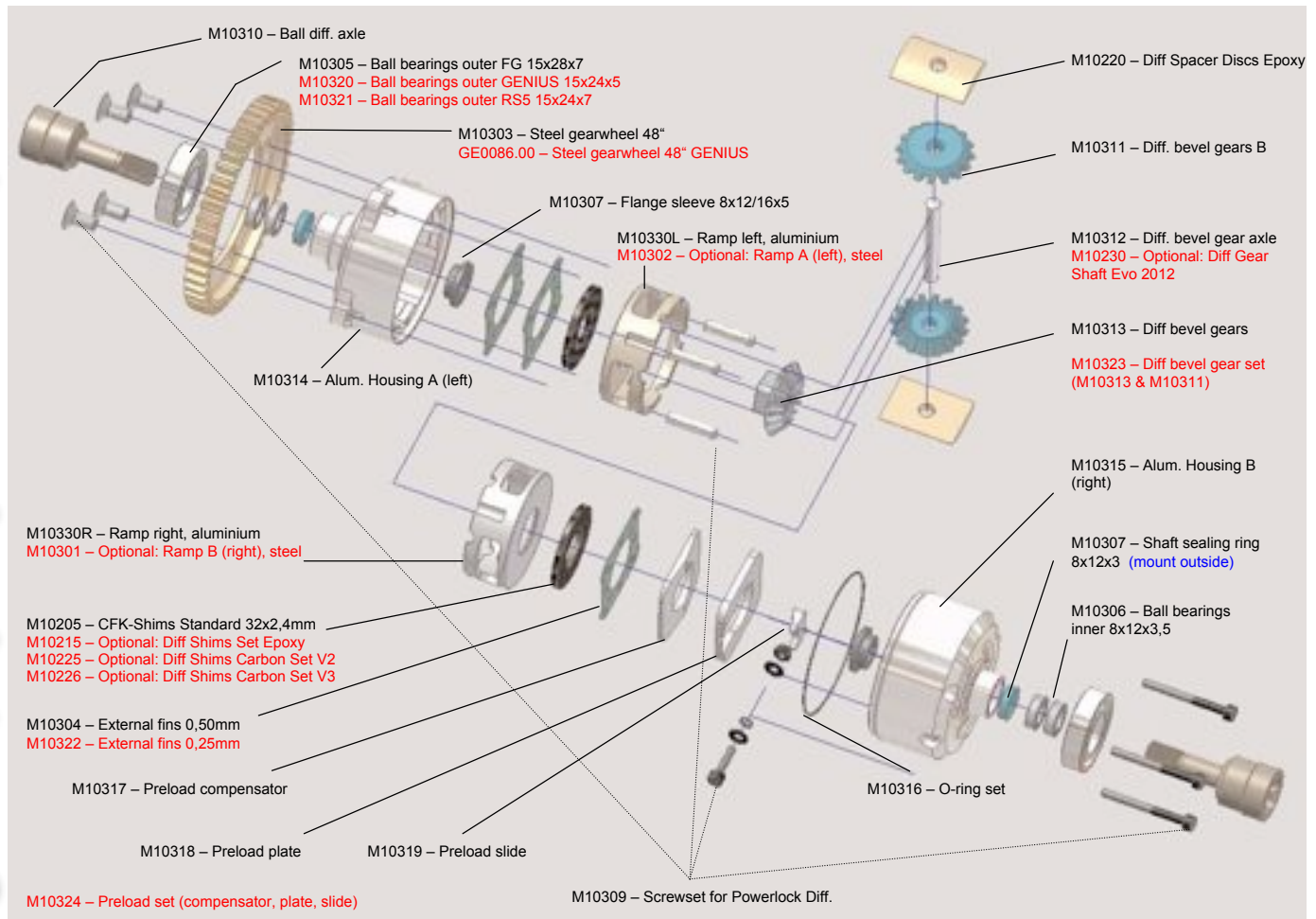
- Always verify that ramps, pins and gears are in position and don't slide out during assembly.
- Assembly both aluminium housings with the M3x30mm screws (without thread lock).

Important: Hand-screwed the aluminium housings, check always that ball diff axle can be turned easily. Before tighten up the screws completely use a rubber mallet and hit slightly on the ball diff axles to settle the inner parts.

Hint: Close the preload slide with the preload screw slightly by turning it clockwise. This is necessary that the car can rotate easily in midcorner, as well that the car is not nervous on exit and snappy when going on power.

Attention: The preload screw has no influence on the amount of locking effect. It is just there to compensate the play in the system.

- Finally put out a drive shaft (ball diff axle) and fill in 22ml oil.



Problem with the assembly?

- It is impossible to turn the ball diff axles after assembly the aluminium housings!
 - o Corrective 1: Preload screw is not fully open (turn screw anti clock wise)
 - o Corrective 2: Check again Pic. 1.1, remove 1 external fin (1 must be at least in) out of the left housing (optional M10322), or
 - o Corrective 3: Grinding carbon discs by 0,1mm to approx 2,3mm

Too much locking effect respectively the rear end of the car is sliding away on power?

- Firstly check if the preload screw is turned clockwise to preload the system, like described above.
- Secondly, check if you built up the differential in Pos 1 with 22ml of oil.
- Thirdly, possibilities to reduce the locking effect of the differential:
 - o Diff Shims Carbon Set V2 (29mm diameter), sliced and unsliced will reduce the locking effect even more (M10225)
 - o Exchange external fins 0,5mm with holes to external fins without holes 2x 0,25mm (M10322)
 - o Diff Shims Carbon Set V3 (32mm diameter) (M10226) in combination with external fins (M10322)
 - o Use Diff Shims Set Epoxy (26mm)

Run-in period and service:

- For maximum performance change differential oil after the first 30min of testing.
- Frequently oil service is recommended, latest every 3. race weekend.
- Additional check of all carbon shims and epoxy spacers is recommended (latest every 3. race weekend)

new	order number	description (english)	Bezeichnung (deutsch)	content	recommended retail price	weight (gramm)
POWERLOCK DIFFERENTIAL						
new	M10100	Powerlock Differential (FG, HARM, FSONE, BIG5)	Powerlock Differential (FG, HARM, FSONE, BIG5)	1 pc.	309,90 €	384,4 g
new	M10101	Powerlock Differential (GENIUS)	Powerlock Differential (GENIUS)	1 pc.	309,90 €	363,9 g
new	M10104	Powerlock Differential (RS5)	Powerlock Differential (RS5)	1 pc.	309,90 €	372,8 g
new	M10102	Powerlock Differential (CONRAST)	Powerlock Differential (CONTRAST)	1 pc.	319,90 €	384,4 g
new	M10103	Powerlock Differential (LAUTERBACHER)	Powerlock Differential (LAUTERBACHER)	1 pc.	319,90 €	438,8 g
new	M10107	Powerlock Differential (MECATECH) no maingear	Powerlock Differential (MECATECH) – kein Zahnrad	1 pc.	289,90 €	301,3 g
new	order nr.	DIFFERENTIAL - TUNING PARTS				
	M10215	Diff-Shim Set Epoxy (32/29/26mm)	Differentialscheibenset Epoxy (32/29/26mm)	6 pcs.	19,90 €	12,8 g
	M10225	Diff-Shim Carbon Set V2 (29mm)	Differentialscheibenset Carbon V2 (29mm)	2x2 pcs.	17,90 €	6,3 g
new	M10226	Diff-Shim Carbon Set V3 (32mm) for low grip tracks	Diff-Shim Carbon V3 (32mm) für rutschige Strecken	2 pcs.	11,90 €	3,5 g
	M10230	Diff Gear Shaft Evo 2012	Diff Gear Shaft Evo 2012	1 pc.	7,90 €	9,6 g
	M10330	Ramp Set Alu V2 (HART COAT)	Rampenset Alu V2 (HART COAT)	1 set	62,00 €	18,1 g
	M10120	Diff-Heater for Powerlock	Differentialheizdecke	1 pc.	42,50 €	50,7 g
new	order nr.	DIFFERENTIAL - SPARE PART LIST				
	M10110	Differential Oil 50ml	Getriebeöl 50ml	50 ml	9,90 €	54,0 g
	M10111	Differential Oil 100ml	Getriebeöl 100ml	100 ml	14,90 €	102,0 g
	M10205	Diff-Shim Carbon Standard (32mm)	CFK-Scheiben Standard (32mm)	2 pcs.	11,90 €	3,9 g
	M10220	Diff-Spacer Discs Epoxy	Spacer f. Kegelhäder, Halbmonde (Epoxy)	1 set	15,90 €	3,5 g
	M10301	Ramp B (right) f. Powerlock, steel	Rampe B f. Powerlock-Diff., Stahl	1 pc.	31,00 €	25,0 g
	M10302	Ramp A (left) f. Powerlock, steel	Rampe A f. Powerlock-Diff., Stahl	1 pc.	31,00 €	25,0 g
	M10330	Ramp Set Alu V2 (HART COAT)	Rampenset Alu V2 (HART COAT)	1 set	62,00 €	18,1 g
	M10330R	Ramp B (right) f. Powerlock, aluminium, HART COAT	Rampe B f. Powerlock-Diff., Alu, HART COAT	1 pc.	31,00 €	9,1 g
	M10330L	Ramp A (left) f. Powerlock, aluminium, HART COAT	Rampe A f. Powerlock-Diff., Alu, HART COAT	1 pc.	31,00 €	9,1 g
	M10303	Steel gearwheel 48" for Powerlock (SCS M2)	Stah-Hauptzahnrad 48" (SCS M2)	1 pc.	38,00 €	62,7 g
	GE0086.00	Steel gearwheel 48" for Powerlock (GENIUS)	Stah-Hauptzahnrad 48" (GENIUS)	1 pc.	38,00 €	58,9 g
	M10235	Main gearwheel 49" (LAUTERBACHER)	Hauptzahnrad 49" (LAUTERBACHER)	1 pc.	59,00 €	117,1 g
	M10304	External fins 0,50mm (with holes)	Außenlamellen 0,50mm (gelocht)	3 pcs.	19,55 €	5,9 g
new	M10322	External fins 0,25mm (without holes)	Außenlamellen 0,25mm (ungelocht)	3 pcs.	19,55 €	3,3 g
	M10305	Ball bearings outer FG (15x28x7mm)	Kugellager außen FG (15x28x7mm)	2 pcs.	8,00 €	30,7 g
	M10320	Ball bearings outer GENIUS (15x24x5mm)	Kugellager außen GENIUS (15x24x5mm)	2 pcs.	8,00 €	14,0 g
	M10321	Ball bearings outer RS5 (15x24x7mm)	Kugellager außen RS5 (15x24x7mm)	2 pcs.	8,00 €	19,1 g
	M10306	Ball bearings inner (8x12x3,5mm)	Kugellager innen (8x12x3,5mm)	4 pcs.	6,55 €	4,2 g
	M10307	Shaft sealing ring (8x12x3mm)	Wellendichtring (8x12x3mm)	2 pcs.	8,10 €	0,8 g
	M10308	Flange sleeve (8x12/16x5mm), aluminium, coated	Bundbuchse (8x12/16x5mm), Alu, beschichtet	2 pcs.	10,90 €	2,6 g
	M10309	Screwset for Powerlock-Diff.	Schraubensatz f. Powerlock-Diff.	1 set	4,90 €	17,8 g
	M10310	Ball diff. axle	Kugel-Diff. Achse	1 pc.	18,90 €	54,0 g
	M10311	Diff. bevel gears B	Diff.-Kegelzahnrad B (Ausgleichskegelräder)	2 pcs.	35,90 €	28,2 g
	M10312	Diff. bevel gear axle	Diff.-Kegelradachse	1 pc.	4,35 €	6,3 g
	M10313	Diff. bevel gears	Diff.-Kegelzahnrad, selbstsperrend (Vierkant)	2 pcs.	45,90 €	30,3 g
new	M10323	Diff bevel set	Diff.-Kegelzahnrad Set	4 pcs.	64,90 €	58,8 g
	M10314	Alum. housing A left f. Powerlock Diff.	Alu-Gehäuse A, links, f. Powerlock-Diff.	1 pc.	46,90 €	46,8 g
	M10315	Alum. housing B right f. Powerlock Diff.	Alu-Gehäuse B, rechts, f. Powerlock-Diff.	1 pc.	46,90 €	58,7 g
	M10316	O-ring set f. Powerlock diff.	O-Ringe für Powerlock-Diff.	1 set	1,80 €	0,2 g
	M10317	Preload compensator, aluminium, coated	Preload-Wippe, Alu, beschichtet	1 pc.	14,90 €	3,4 g
	M10318	Preload plate, aluminium, coated	Preload-Platte, Alu, beschichtet	1 pc.	16,90 €	4,5 g
	M10319	Preload slide, aluminium, coated	Preload-Schlitten, Alu, beschichtet	1 pc.	21,90 €	0,6 g
new	M10324	Preload set (compensator, plate, slide)	Preload Set (Wippe, Platte, Schlitten)	1 set	46,90 €	8,6 g
new	M10325	Diff update 2014, light kit (M10330, M10308, M10324)	Diff Update 2014, leichter Satz (M10330, M10308, M10324)	1 set	99,90 €	29,4 g