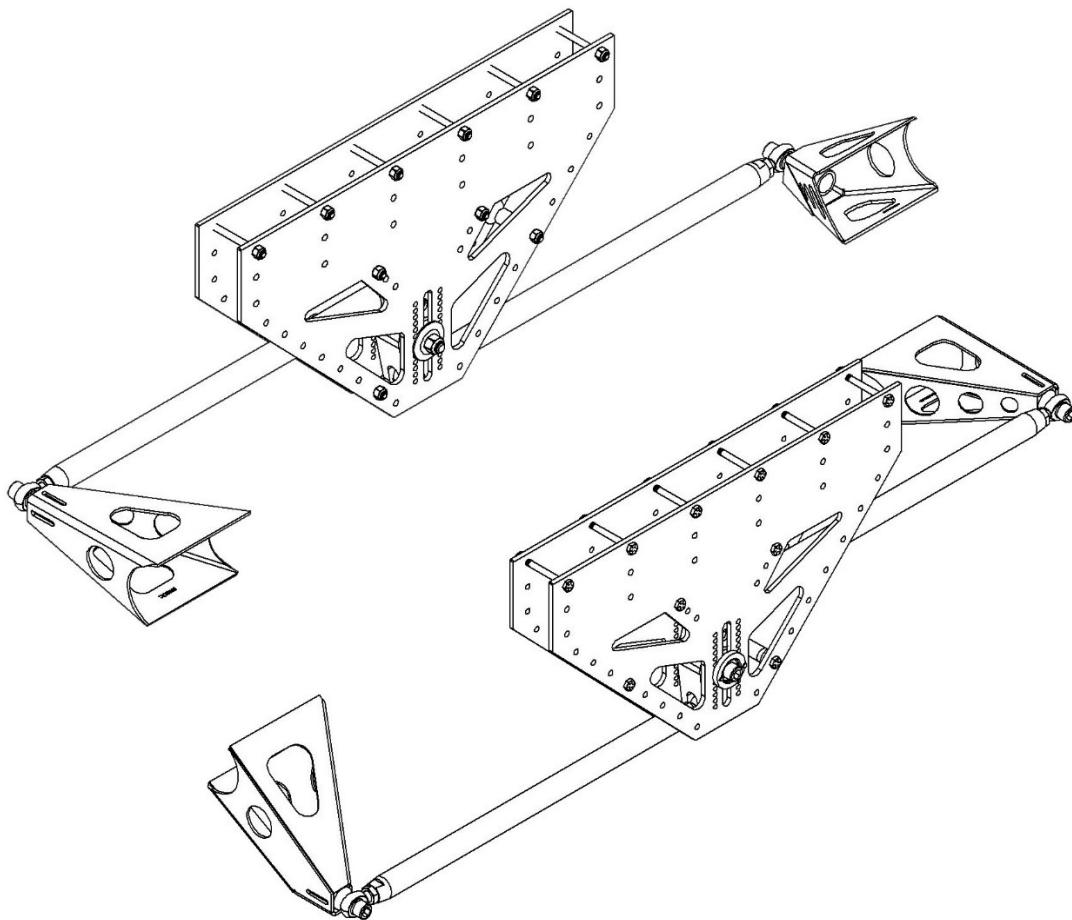




INSTALLATION GUIDE

PEG ADJUSTABLE WATT'S LINKAGE KIT



THIS GUIDE COVERS THE FOLLOWING KITS:

RP9938

RP9939

RP9940

RP9941

RP9942

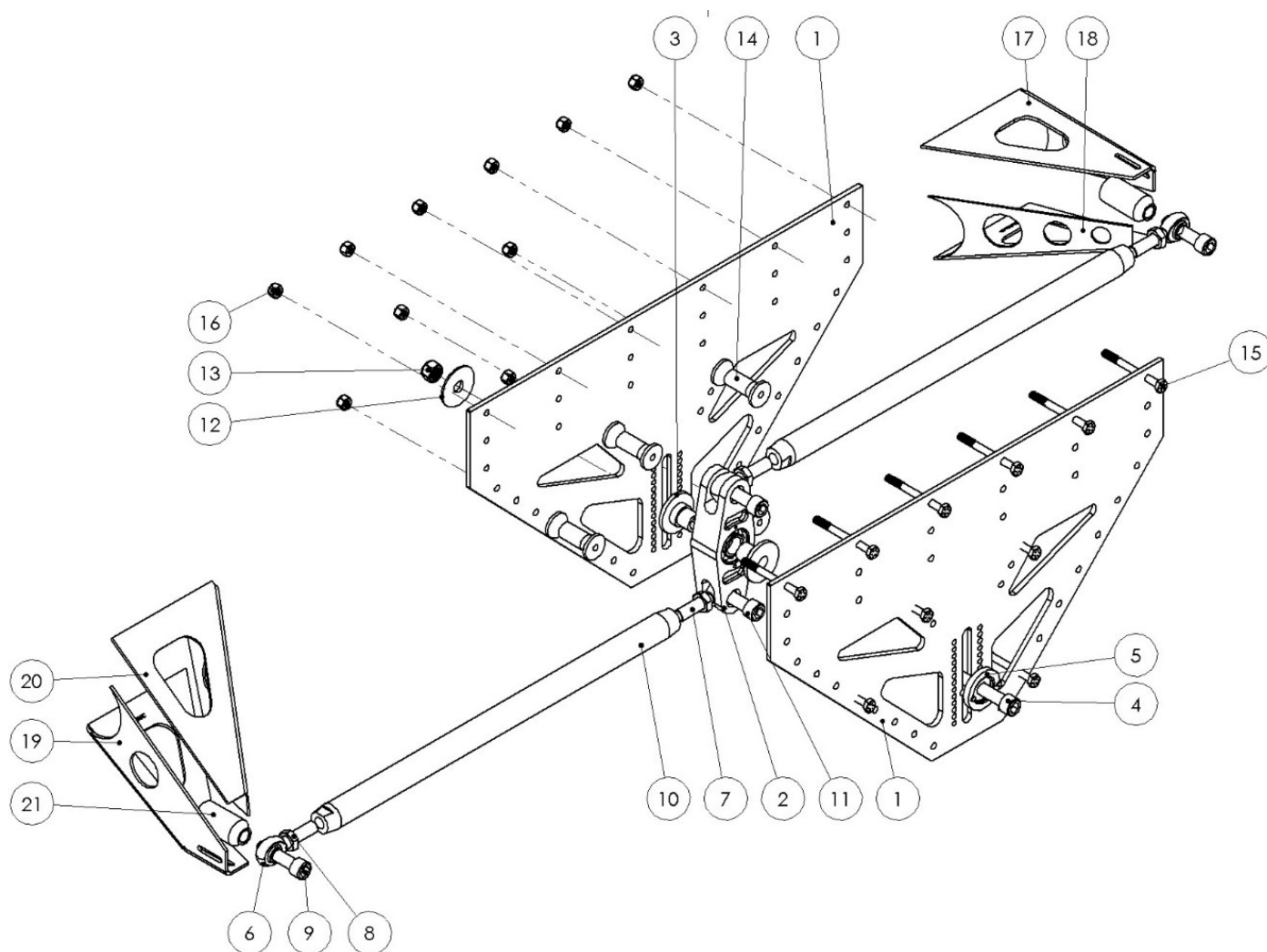
WARNINGS

- It is the responsibility of the purchaser and installer to verify the suitability of all components for the application before installation. If you are not sure of the suitability of this kit, or how to safely install it, do not use it.
- It is the responsibility of the installer to ensure all welds have appropriate penetration, side wall fusion and profile. If you are not sure what is appropriate, contact your local experienced chassis shop for assistance.
- Fasteners and hardware must be tightened and/or tensioned correctly as specified in the instructions below.
- Improper installation can be dangerous and lead to component failure.
- All installations require personal protective equipment (PPE) such as protective eyewear and hearing protection.
- Always follow proper safety procedures.
- All installations require a moderate level of mechanical skill and knowledge for best results.
- Please ensure you have an appropriate selection of hand tools required to complete the job before attempting any installation. Any unique or special tools required are referenced below.
- Periodic maintenance is required, see page 8 for more details.

If after following the instructions you still have difficulty in assembling your Race Products Watt's Linkage Kit, please contact us or the retailer where the kit was purchased for further assistance.

IF IN DOUBT, ASK! We're here to help at technical@raceproducts.net or on +61 7 3861 4205

EXPLODED ASSEMBLY DIAGRAM OF WATT'S LINKAGE KIT



CONTENTS OF WATT'S LINKAGE KIT

ITEM #	PART #	DESCRIPTION	QTY /SIDE
1	RP9043	Aluminium body bracket plate	2
2	RP9041	Billet aluminium bell crank	1
3	RP9021	Bell crank spacer bush	2
4	RP9090	Bell crank pivot bolt	1
5	RP9023	Rear Washer	1
6	JMXL7T	FK precision rod end, 7/16" LH thread	1
7	JMX7T	FK precision rod end, 7/16" RH thread	1
8	7/16NFTN	Jam nut, 7/16" thread	4
9	RP9062	Rod end/Tower bolt	2
10	RP9027	Billet aluminium arm	2
11	7/16NFx1.25SHCS	Bell crank rod end bolt	2
12	RP9024	Locating washer (for roll centre adjustment)	1
13	7/16NFNN	Nylon insert lock nut, 7/16" thread	1
14	RP9025	Body bracket plate spacer	4
15	1/4NFx2.75HTB	Body bracket plate bolt	10
16	1/4NFNN	Nylon insert lock nut, 1/4" thread	10
21	RP9018	Threaded boss	2

CONTENTS OF WATT'S LINKAGE KIT CONTINUED

ITEM #	PART #	DESCRIPTION	QTY /SIDE
Standard - 3" tube, RH High / LH Low:			
17	RP9116	Tower bracket RH Upper, 3" tube	1
18	RP9117	Tower bracket RH Lower, 3" tube	1
19	RP9115	Tower bracket LH Lower, 3" tube	1
20	RP9114	Tower bracket LH Upper, 3" tube	1
Options - 3" tube, LH High / RH Low:			
17a	RP9120	Tower bracket RH Upper, 3" tube (optional)	1
18a	RP9119	Tower bracket RH Lower, 3" tube (optional)	1
19a	RP9272	Tower bracket LH Lower, 3" tube (optional)	1
20a	RP9271	Tower bracket LH Upper, 3" tube (optional)	1
Options - 60mm tube, RH High / LH Low:			
17b	RP9037	Tower bracket RH Upper, 60mm tube (optional)	1
18b	RP9038	Tower bracket RH Lower, 60mm tube (optional)	1
19b	RP9036	Tower bracket LH Lower, 60mm tube (optional)	1
20b	RP9035	Tower bracket LH Upper, 60mm tube (optional)	1
Options - 60mm tube, LH High / RH Low:			
17c	RP9134	Tower bracket RH Upper, 60mm tube (optional)	1
18c	RP9133	Tower bracket RH Lower, 60mm tube (optional)	1
19c	RP9442	Tower bracket LH Lower, 60mm tube (optional)	1
20c	RP9441	Tower bracket LH Upper, 60mm tube (optional)	1
Options - AE86 specific (LH High / RH Low):			
17d	RP9569	Tower bracket RH Upper, AE86 (optional)	1
18d	RP9570	Tower bracket RH Lower, AE86 (optional)	1
19d	RP9568	Tower bracket LH Lower, AE86 (optional)	1
20d	RP9567	Tower bracket LH Upper, AE86 (optional)	1

WELDING GUIDELINES

The basic guidelines for welding the tower brackets to the diff housing and the crossmember to the vehicle are covered, however, we recommend a qualified chassis shop experienced in suspension component fabrication should perform the installation. Ensuring the towers are correctly aligned and the welds have an appropriate amount of penetration, side wall fusion and profile for the application is paramount for safety.

IF IN DOUBT, ASK! We're here to help at technical@raceproducts.net or on +61 7 3861 4205

PLANNING YOUR INSTALLATION

Please note:

- Tower brackets are manufactured from mild steel and are suitable for welding by either **MIG** or **TIG**.
- Body bracket plates are manufactured from **aluminium**. Do not weld to these. A steel crossmember **must** be fabricated and installed in the vehicle to mount the body brackets - see installation instructions below.
- Each tower bracket is supplied as three separate pieces and must be welded together before fitting to the diff housing.
- Each side consists of: Top bracket half, Bottom bracket half, Threaded boss (25mm diameter)
- The bracket halves are different thicknesses:

	High Side	Low Side
Top half	3mm	2mm
Bottom half	2mm	3mm

Before beginning installation, the following must be determined:

1. **Tower orientation** - Towers are supplied as either "right high / left low" or "left high / right low". This is typically determined by exhaust system placement or other chassis components. The high side tower is generally positioned on the opposite side to the exhaust or any obstructions.
2. **Body bracket height** - Measure from the centre of your axle tubes to the underside of your boot floor to determine the required height. The universal body bracket plates can be trimmed from the top to give a range of heights from 290mm down to 200mm. Note: trimming below 230mm will require re-drilling the body bracket mounting holes. Use the top holes on the tapered sides as a guide for height.
3. **Arm length** - Arms are supplied over length and must be cut to suit your application. Measure the distance from the tower pivot centreline to the bell crank arm pivot centreline to determine the required arm length. Both arms must be equal length. A wider mounting will help keep the diff centred as it goes through its arc.
4. **Roll centre position** - The roll centre is located at the bell crank pivot point. A good starting point for circuit race cars is to have the centre of the bell crank (in the middle of its adjustment range) halfway between the axle centreline and the bottom of the diff housing. Gravel rally applications generally run a bit higher.

WATT'S LINKAGE KIT INSTALLATION INSTRUCTIONS

Please use the following instructions in conjunction with the exploded view on page 3 as a guide.

TOWER BRACKET ASSEMBLY

1. Weld the threaded boss to the 3mm bracket half first. Align the outer edge of the 25mm diameter threaded boss with the end of the bracket. Weld through the slots, then add a good stitch weld on the inner end.
2. Weld the 2mm bracket half to the 3mm half to complete the assembly.
3. Once assembled as one piece, weld 360° around the threaded boss to secure.

INSTALLATION OF TOWER BRACKETS

1. Position the diff housing at normal ride height in the vehicle.
2. Determine the correct lateral position for the tower brackets. The towers should be positioned so that the arms will be approximately horizontal when the vehicle is at normal ride height.

Please note:

- High side bracket – The 3mm bracket half should be at the TOP, with the flat side facing outboard and the tapered side facing inboard. The top edge should be parallel to the ground.
- Low side bracket – The 3mm bracket half should be at the BOTTOM, with the flat side facing outboard and the tapered side facing inboard. The bottom folded edge should be parallel to the ground.

3. Mark the position of the tower brackets on the axle housing tubes. Ensure both towers are equidistant from the diff centre and parallel to each other.
4. Clean the axle housing tubes in the weld area, removing all paint, rust and contaminants.
5. Position the tower brackets on the housing tubes and tack weld in place. Check alignment and clearances through the full range of suspension travel before final welding.

Please note:

- Ensure towers are welded perpendicular to the axle housing tubes.
- The pivot hole in each tower must be aligned vertically when viewed from the rear of the vehicle.
- Double-check tower positioning allows for full suspension travel without interference.

INSTALLATION OF BODY BRACKETS

1. A steel crossmember must be fabricated and installed in the vehicle to mount the body brackets. This crossmember must be structurally mounted (welded or bolted) between the chassis rails. 50x25x3 RHS or 50x50x3 SHS is commonly used.
2. The crossmember is positioned behind the diff. The fore/aft position is determined by the tower brackets - once the towers are tacked/welded to the diff housing, measure from the tower rod end centreline to determine where the crossmember needs to sit so that the arms will be parallel to each other (when viewed from above).
3. Position the crossmember at the correct height for the bell crank pivot. A good starting point for circuit race cars is to have the centre of the bell crank (in the middle of its adjustment range) halfway between the axle centreline and the bottom of the diff housing. Gravel rally applications generally run a bit higher.
4. Ensure the crossmember is perpendicular to the centreline of the vehicle and level when viewed from the rear.
5. Tack weld the crossmember in position. Check clearances through the full range of suspension travel before final welding.
6. Once satisfied with positioning and clearances, complete the welds on both the crossmember and tower brackets. If bolting, use grade 8.8 or higher fasteners with appropriate reinforcement.
7. If required, trim the aluminium body bracket plates to the correct height for your application. The plates can be trimmed from the top edge to reduce overall height from 290mm down to 200mm. Note: trimming below 230mm will require re-drilling the body bracket mounting holes.
8. Bolt the aluminium body bracket plates to the crossmember using the supplied hardware.

Please note:

- The arms must be parallel to each other when viewed from above. Take care when positioning the crossmember.
- The crossmember must be rigid and not flex under load. The bell crank and arms transfer significant loads through the body brackets during cornering.
- Ensure adequate clearance for the bell crank to rotate through its full range of travel.
- Do not weld to the aluminium body bracket plates.

ARM PREPARATION

1. Arms are supplied over length with a 7/16" UNF left-hand thread machined in one end only.
2. Measure the required arm length from tower pivot centreline to bell crank arm pivot centreline.
3. Cut the arms to length, removing material from the non-threaded end.
4. Machine and tap a 7/16" UNF right-hand thread into the cut end of each arm to accept the rod end.
5. Install the rod ends into each end of the arms:
 - Left-hand threaded rod end into the factory-threaded end
 - Right-hand threaded rod end into the newly threaded end
6. Adjust the rod ends so that equal thread engagement is visible on both ends of each arm.

Please note:

- Both arms must be the same length for the linkage to function correctly.
- Minimum thread engagement for rod ends is 1.5x the bolt diameter (approximately 17mm for 7/16" thread).
- Use a thread locker on the jam nuts once final adjustment is made.

WATT'S LINKAGE ASSEMBLY

1. Install the bell crank between the body bracket plates using the pivot bolt assembly. The locating washer should be positioned between the bell crank and one of the body brackets. Do not fully tighten at this stage.
2. Connect the arms to the bell crank using the arm pivot hardware.
3. Connect the outer ends of the arms to the tower brackets using the tower pivot hardware.
4. Check that the bell crank can rotate freely and the arms move through their full range without binding or interference.
5. With the vehicle at normal ride height, adjust the bell crank position so that it is clocked slightly off centre. This reduces any theoretical bind when moving past centre.
6. Once satisfied with the position, tighten all pivot hardware to the specified torque. See torque chart on page 8.

ROLL CENTRE ADJUSTMENT

The peg design allows for easy roll centre adjustment under the vehicle. **To adjust the roll centre height:**

1. Loosen the bell crank pivot bolt.
2. Move the locating washer up or down to the desired position. The locating washer indexes into holes in the body bracket plate, allowing for incremental adjustment.
3. Re-tighten the bell crank pivot bolt to the specified torque.
4. Moving the locating washer UP raises the roll centre.
5. Moving the locating washer DOWN lowers the roll centre.

Please note:

- Small roll centre adjustments can have a significant effect on vehicle handling.
- Make adjustments in small increments and test the vehicle between changes.
- Record your settings for future reference.

MAINTENANCE REQUIREMENTS

Periodic inspection of the entire assembly is required:

- Check torque on all fasteners before each race meeting or every 1000km for street applications.
- Inspect rod ends for wear or excessive play. Replace if any free play is detected.
- Check all pivot points rotate freely without binding.
- Inspect welds for cracks or fatigue.
- Lubricate rod ends as per manufacturer's recommendations (FK rod ends are self-lubricating but benefit from occasional light lubrication).

TORQUE SETTINGS AND THREAD LOCKER RECOMMENDATIONS

Watt's Linkage Kit	Nut/bolt location	Nut/bolt size and description	Torque	Thread locker
Peg Adjustable	Bell crank pivot bolt	7/16" UNF x81mm SHCS 7/16" UNF Nyloc nut	79 Nm	None
	Arm to bell crank pivot	7/16" UNF x 1 ¼" SHCS	79 Nm	Loctite Blue 242
	Arm to tower pivot	7/16" UNF x45mm SHCS	79 Nm	Loctite Blue 242
	Rod end jam nuts	7/16" UNF Jam nut	79 Nm	Loctite Blue 242
	Body bracket to crossmember	1/4" UNF x 2.75" Hex bolt 1/4" UNF Nyloc nut	19 Nm	None

Definitions

SHCS Socket head cap screw

CSCS Countersunk cap screw

LHCS Low head cap screw