

Mackay Bieker Moth USER MANUAL

BM-V3



Your guide to an ultra fast experience

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1. INTRODUCTION



Congratulations on choosing a Mackay Bieker Moth, designed by Paul Bieker and built by Mackay Boats.

This manual has been compiled to help you to operate your Moth safely and with pleasure. It contains details of the boat and information on its operation and maintenance. Please read it carefully and familiarise yourself with the boat before using it.

The Moth is a development class. As such, every part of the boat is engineered and built to be as light as possible.

Due to the advanced nature of the **Mackay Bieker** Moth, it is assumed that you have a high level of experience with Moth sailing and these kinds of high-performance boats.

Damage can easily occur if the sailor does not have enough experience or does not maintain the boat regularly or check key areas of the boat each time before sailing.

If you are not familiar with this kind of boat, for your own safety please ensure that you obtain handling and operating experience before assuming command of your **Mackay Bieker** Moth.

Your dealer or national sailing federation or yacht club should be able to advise you of suitable and competent instructors for foiling Moth sailing.

Please keep this manual in a secure place, and hand it over to the new owner if you sell the craft.

2. SPECIFICATIONS

2.1 Boat Identification

The World Sailing (WS) Plaque Number is printed on the WS plaque which is affixed to the stern of your boat.

The Builders Hull Number is printed on the builders' plaque which is fitted beside the WS plaque inside the stern of your boat.



2.2 Boat Dimensions

Length:	3.355 m	11ft
Beam:	2.250m	7.45ft
Maximum Sail Area:	8.25m ²	88.8ft ²
Weight:	35-45kg	77-100lb

3. SAFETY INFORMATION

3.1 Loading

The maximum sailor weight for the Mackay Bieker Moth is **95kg**.

The maximum wind that the Mackay Bieker Moth should be sailed or raced in is **20 knots**.

3.2 Safety Limits

It is your responsibility to ensure that you sail within your limits and the limits of the equipment. Be wary of strong offshore breezes and ensure that you have a plan if you experience equipment breakage on the water.

3.3 Capsize Recovery

Risk of Capsize

The capsizing is an inevitable part of Moth sailing and the **Mackay Bieker** Moth is no different in that respect. As a racing craft, there is a high likelihood of capsizing if the Mackay Bieker Moth is sailed to its limits. You should practice capsizing recovery until you are totally familiar with it.

3.4 Buoyancy Tanks

The Mackay Bieker Moth has two buoyancy tanks in the event of damage or swamping. One tank forward of the mast and one aft of the mast.

If you do find water inside your hull – You must empty it as soon as possible to avoid further damage.

If a buoyancy tank is punctured, do not use the boat until the tank is properly repaired. If in doubt, contact Mackay Boats for a repair procedure.

If adding any fittings to the boat, ensure that any fasteners that penetrate the buoyancy tank are suitably sealed to keep the tank watertight. Adding parts may void the warranty.

3.5 Towing

If it is necessary to tow a **Mackay Bieker** Moth, use the following procedure:

- i) Place one wing on the side of an inflatable pontoon chase boat and sit on the wing to keep the wing connected to the chase boat.
- ii) Tow at slow speed as to avoid the lifting effect of the foils.
- iii) Stay at the tiller. In the event of loss of the rudder, maintain the wing contact with the chase boat.

4. SAILING

4.1 Launching

This is easiest to do in an offshore breeze and flat water as the boat will not be blown back on the shore when you right it.

Mackay Boats also offer a trolley for moving your boat while it is on its side.

Try to look for somewhere with a soft verge by the water's edge. If this is not possible, place something soft under the wing bar to protect it from the hard surface.

Capsize the boat at the edge of the water and remove the trolley from the hull.

Remove the main foil from its covers. Slide the foil into the slot in the hull.

Insert the main foil pin in the cockpit and insert the retaining pin. Connect the wand to the top of the main foil.

Remove the covers from the rudder foil and take the pin out of the gudgeons.

Ensure the tiller and extension goes under the rear wing tie at the back of the boat, and through the tiller bungy.

Line the rudder up with the gantry and insert the pin and clip.

If you are lifting the boat in by yourself, tie the mainsheet in hard:

- position yourself under the boom close to the mainsheet (on your back or shoulder), grab the side stay and foot strap nearest the ground with each hand. Lift and walk to the water.
put the boat down once in thigh-deep water and pull the boat, still on its side to deeper water.
- once in deep enough water (shoulder depth), position the boat to an upwind tacking angle and right the boat.

There are 2 ways of getting into the boat:

- Once the boat is upright you can climb over the windward wing and quickly grab the mainsheet and then tiller. If the wind is light, you need to quickly get to the other side by grabbing the leeward foot strap.
- You can also climb into the boat from the stern as not to capsize the boat over on top of you while climbing over the wing.

4.2 Retrieving

When coming into the shore always do this at slow speed, if you hit the bottom you can damage the foils so it is better to come in slowly and judge how deep it is.

As you come into the shore, capsize the boat early and swim rather than risk hitting the bottom.

Swim/walk the boat towards the shore.

Repeat the launching lifting technique to carry the boat out of the water and then follow the launching steps in reverse.

5. MAINTENANCE & CARE

Follow these tips to keep your **Mackay Bieker Moth** in good condition:

5.1 General Care

Ensure to rinse the boat down thoroughly with fresh water as there are many moving parts that can be damaged by salt and corrosion.

When installing fasteners use Anti Seize or similar to avoid fasteners binding and snapping.

Ensure any sand or dirt is cleaned off all surfaces.

Make sure your Mackay Bieker Moth is protected from the weather when storing.

5.2 Caring For Your Hull

The nomex core is susceptible to water damage if the very thin carbon skin is pierced. If this happens, the boat should be removed from the water immediately and repaired correctly prior to further use.

Please ensure you adequately equalize pressure in the hull on a hot day or if a large temperature differential exists between air and water temperatures.

Remove the front bung any time the boat is out of the water. The aft bung can be left taped up as there is a gauze breather bung located on the deck that allows the aft tank to breath. Only open the aft bung if you need to drain the boat.

Your **Mackay Bieker** Moth is built as light as possible to be as fast as possible. As such it is very fragile in some areas.

Do not stand or put heavy loads:

- On any area without non-skid, particularly forward of the mainsheet bridle on the aft deck or forward of the non-skid on the wing decks
- On the top of the hull under the aft deck and forward deck fairing
- On the hull anywhere other than the capsize pad.

There is extra reinforcement on the side of the hull between the front beam and the mast to allow for capsize recovery.

5.3 Caring for Your Foils

Check your foil fasteners before every sail. If they look at all compromised, they should be replaced before you take your moth sailing.

Mackay Bieker Moth foils are monolithic carbon fibre. As such, they are not subject to heat damage in normal use. However, we do advise that you avoid leaving your foils in direct sunlight or in your car. Please ensure they are kept below the cure temperature of 80 degrees Celsius/176 degrees Fahrenheit.

The **Mackay Bieker** Moth V1 foils are longer than conventional Moth hydrofoils. Please ensure you have adequate depth when launching and retrieving your boat to avoid damaging your foils.

Changing to non-supplied parts for the foils and foil systems will likely void your warranty on your Mackay Bieker Moth.

5.4 Transport

It is imperative that you remove the bungs from the hull whenever your boat is being transported to avoid damage due to pressure building up inside the hull.

Whenever you are transporting your **Mackay Bieker** Moth, pad the hull adequately.

Tie your boat down over the wings.

Avoid putting tie down straps over the hull.

The latest covers have webbing straps over the wings to use for tying the boats down.

Ensure padded bags are secured tightly around all foil sections.

6. Warranty

Please read the full Terms and Conditions, found on our website:

https://www.mackayboats.com/mackayboats/assets/File/Terms_and_Conditions.pdf

Your attention is drawn to the following clauses.

Mackay Boats warrants that the Goods will meet the relevant class rules (if any) and the requirements of the Specification (subject to the minor amendments referred to above) and will (save for any shipping damage notified as provided below) be constructed and delivered in accordance with good boat building practice.

This warranty is in addition to, and not in substitution for any warranties which the Purchaser may have the benefit of under New Zealand law and is personal to the Purchaser and can only be assigned with the agreement of Mackay Boats.

If there are any defects in the Goods, the purchaser will notify Mackay Boats of such defect within 180 days of delivery of the Goods to the Delivery Place. Mackay Boats will (at its option) repair or replace the defective part at no cost to the Purchaser as soon as practicable following such notification.

6.1 Design and Use Limits

The Purchaser acknowledges that Mackay Boats designs and constructs racing yachts to class rules and design specifications. In many cases, those designs are developmental, and are at the limits of design and fabrication tolerances.

The Purchaser accepts that by buying the Goods, it accepts the rules of the class, reasonable limits on use and care of the Goods (whether outlined in the Specification or not) and that the Goods may be developmental, and at the limits of what is possible.

It is possible that the Goods may fail from normal use. Mackay Boats will do everything it reasonably can, within the limits of its liability in clause 25 to rectify any loss or damage to the Goods in accordance with the warranty set out in our published Terms & Conditions.

Beyond that, the Purchaser accepts that it has purchased and will use the Goods on that basis and in terms of the voluntary assumption of risk outlined in clause 6.2.

6.2 Voluntary Assumption of Risk

Mackay Boats takes all reasonable care in designing and constructing racing yachts. It is something we do because we want to make the best and fastest yachts within class rules that we can.

In purchasing the Goods, the Purchaser acknowledges that yacht racing and associated activities can be high risk with a high level of danger, including property damage, loss of property and equipment and physical injury (potentially involving permanent disability or death) to the Purchaser and to third parties.

Mackay Boats can take no responsibility for any such losses or any claims in respect of them. The Purchaser, and anyone using the Goods, is expected to use the Goods for their intended purposes, within the reasonable limits (including weight limits, sea state, wind strengths and anticipated weather conditions) of the relevant class and the design limits of the Goods. In doing so, the Purchaser acknowledges that it accepts that it has purchased the Goods, uses them and participates in the class in the full understanding of the limits of the class. Mackay Boats cannot be responsible for the Purchaser's decision to purchase the Goods, how the Purchaser uses the Goods, or the decision to participate in the relevant class of yacht racing.

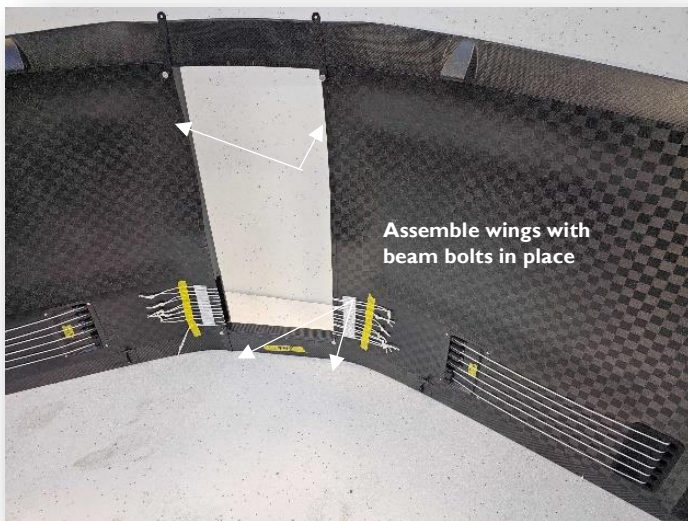
Similarly, the Purchaser agrees to use, care for and maintain the Goods in accordance with any instructions provided by Mackay Boats and the reasonable requirements of yachts of the same class as the Goods. We want you to enjoy your sailing, win races and succeed in competitions, but to do so sensibly.

Appendix A

ASSEMBLY GUIDE

To assemble your **Mackay Beiker Moth**:

- 1) **Fit the gantry.** Tighten the 3 fasteners using a ring spanner.
- 2) **Fit the wings.** Pre-assemble the wing assemble on the ground before fitting it to the hull.



- i) Place the front beam on the floor front side down and slide the 2 wing decks in place.
- ii) Slide the back beam onto the top of the wing decks.
- iii) Fit the 4 beam bolts in place to align the wing decks as shown.

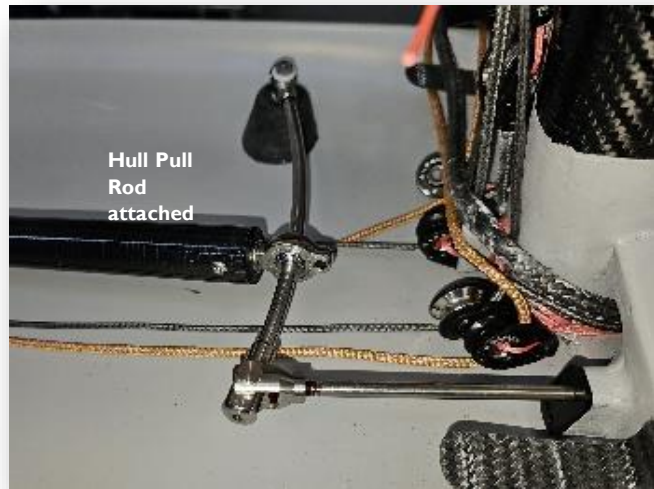
- iv) Screw the fasteners into the outer end of the beams to hold the wing decks in place.
- v) Put the assembly flat on the floor and fit the fasteners to the front beam also.
- vi) Lift the full assembly onto your hull and then you can fit the retainer bolts
- vii) Make sure there are no blocks or other items under the wing beams before bolting them in place or you might damage the laminate underneath.**
- viii) Loosely fit the 4 bolts on the front beam. The shorter 20mm bolts forward and longer 70mm bolts aft of the beam

- ix) Loosely fit the 2 x 20mm shorter aft bolts on the back beam.
- x) Tighten all 6 beam bolts.



3) Fit the Bowsprit.

- a) Thread the Wand length control lines.
- b) Put the bowsprit into the hull and pin in place with the forestay pin
- c) Fit the hull Pull Rod into the Bowsprit
- d) Pin the Gearing Rod to the Hull Pull Rod



4) Fit control lines.

- a) Attach control lines to mouse lines and gently pull through each line and then splice together.

If you lose the mouse, take off the cleat plate and turning sheave plate and feed a new mouse line in being careful not to cross another line.

5) Fit the deck covers.

- a) Slide the aft deck into position and then fit the 2 x 70mm longer bolts holding the front of the aft beam and wing deck. Fit the bolts midway along the aft deck.

Do not overtighten the bolts holding down the wing deck.

Do not move the High Load Cunningham block. It must be on the starboard side and right beside the carbon gusset.

- b) Once fitted, tape over the join the forward edge of the aft deck to the front beam cover to stop this popping off in a nose-dive.
- c) Slide the front deck fairing into the front holders and then hook the dog bone into the slot to hold it in place.



- 6) If you are using a Vakaros or similar device, we recommend a safety tether from your device to somewhere on the hull.

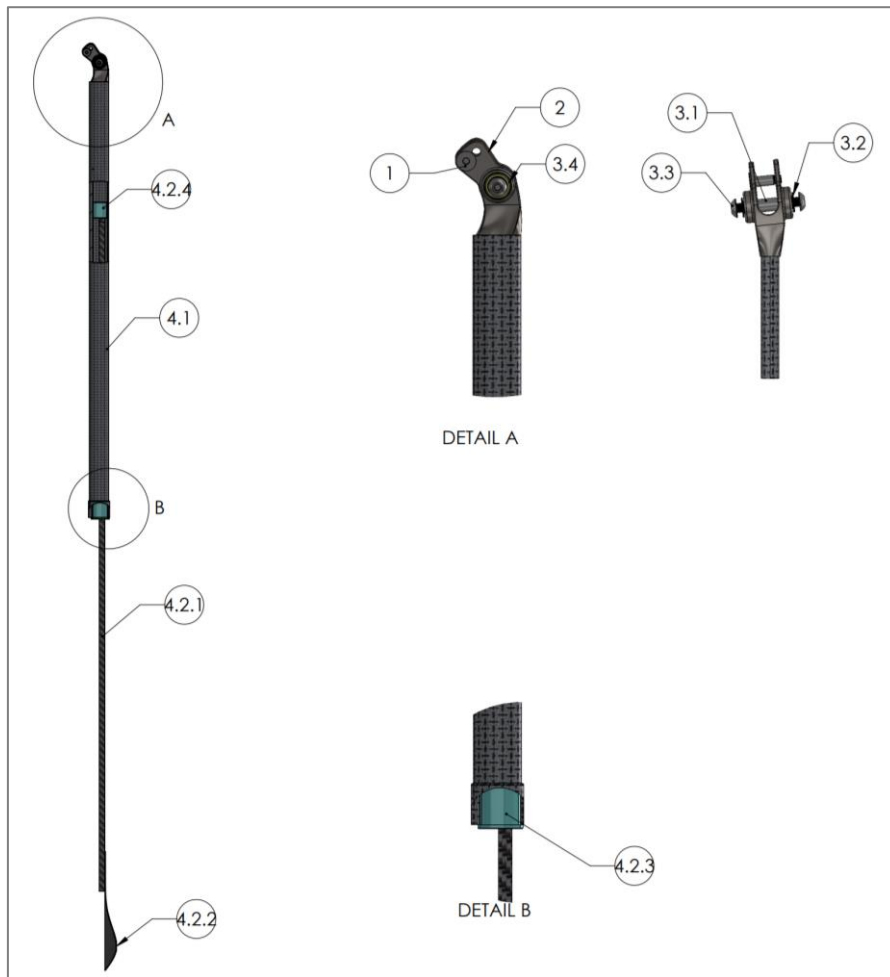
PART ASSEMBLIES

2098 Moth Gearing Rod Assembly



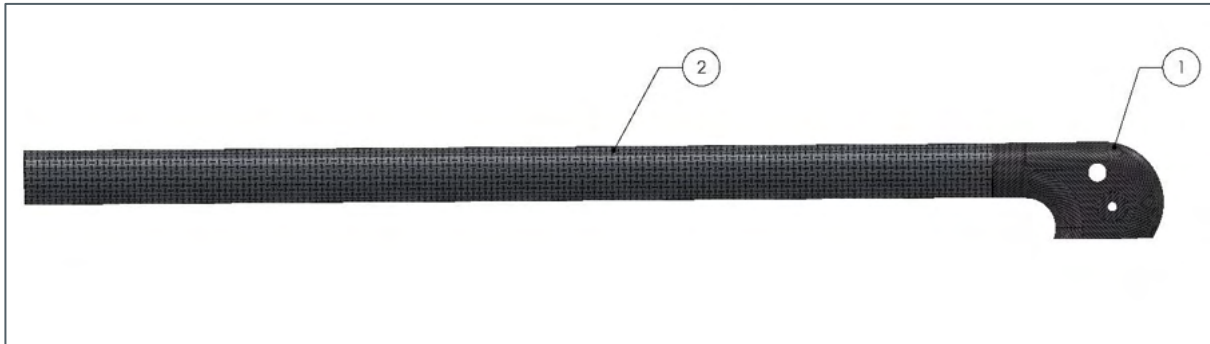
ITEM NO.	Part Name	Qty
1	2054 Gearing Rod Pivot Fork RevB	2
2	2050 Moth 12 x 5_8 Shallow sheave Rev A	2
3	2058 Gearing Rod RevC	1
4	2100 Moth M5 Gearing Rod Bolt	1

BM2001 Moth Wand Assembly



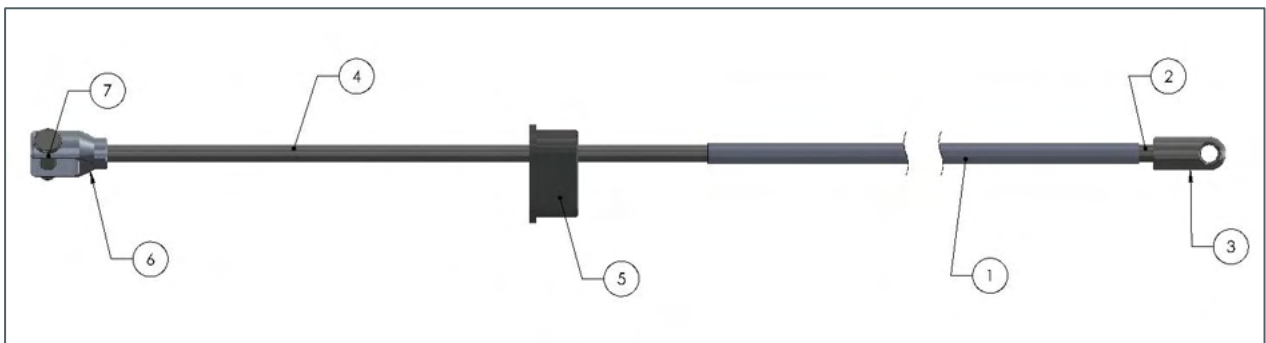
ITEM NO.	Assembly Name	Part Name	Qty
1		167 MothM5 CSK Pivot Bolt Wand Head	1
2		BM2002 Moth Wand Head RevC	1
3	BM2048 Moth Wand Head Axle Assembly		1
3.1		2059 Moth Wand Head Axle	1
3.2		3_16 x 1_2 x 20g Flat Washer	2
3.3		M5 x 8 BH HD	2
3.4		BM2005 Moth Wand Head Bush RevC	2
4	BM2003 Moth Wand Paddle Shaft and Receiver		
4.1		BM2017 Moth Wand Receiver Tube	
4.2	BM2031 Moth Wand Shaft with Paddle and Bushes		
4.2.1		BM2044 Moth Wand Shaft	1
4.2.2		BM2016 Moth Wand Paddle	1
4.2.3		BM2026 Moth Wand Length Bush B RevD	1
4.2.4		BM2025 Moth Wand Length Bush A RevF	1

BM2034 Moth Bow Sprit with Bulb



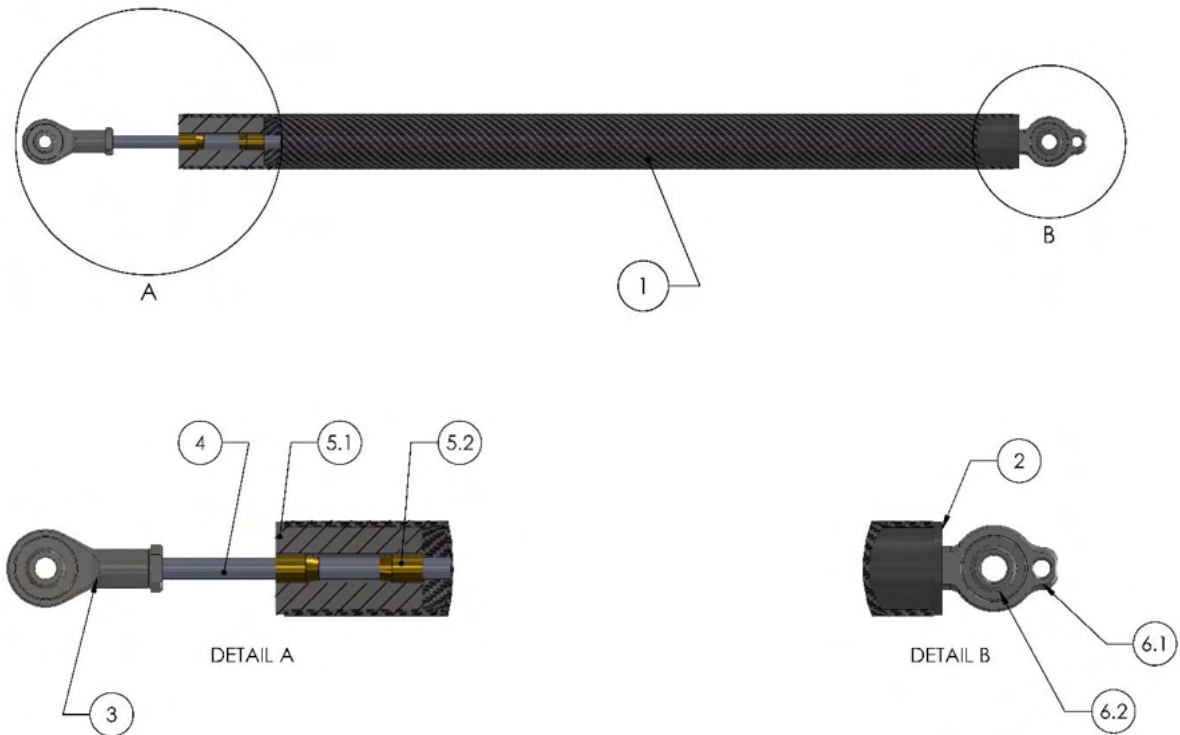
ITEM NO.	Part Name	Qty
1	BM2033 Moth Bow Sprit	1
2	BM2009 Moth Bow Sprit Tube	1

BM - V3 Moth Hull Pull Rod Assembly



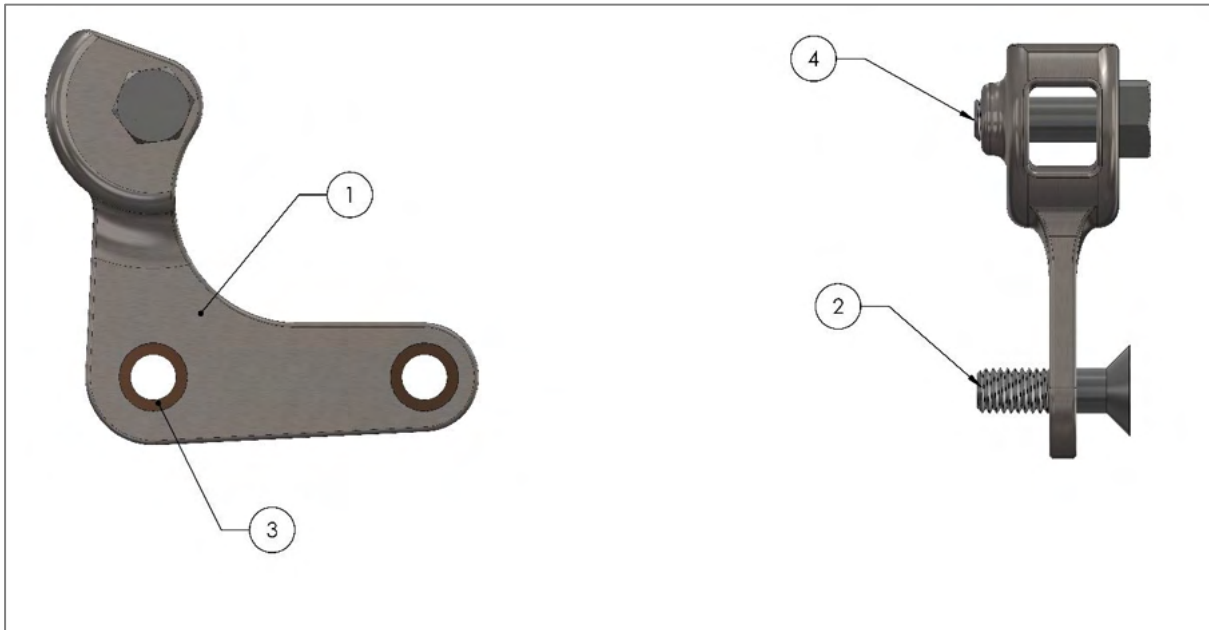
ITEM NO.	Part Name	Qty
1	BM2024 Moth Hull Rod Titanium Tube	1
2	M5x45 Threaded Rod	1
3	BM2030 Moth M5 Link Eye Nut	1
4	BM2038 Moth Hull Pull Rod ConRod	1
5	2053 Moth Pull Rod Tube Bush RevB	1
6	2056 Hull Pull Rod Fork RevA	1
7	5 x 15mm Clevis	1

BM3013_V3 Moth Ride Height Barrel Assembly



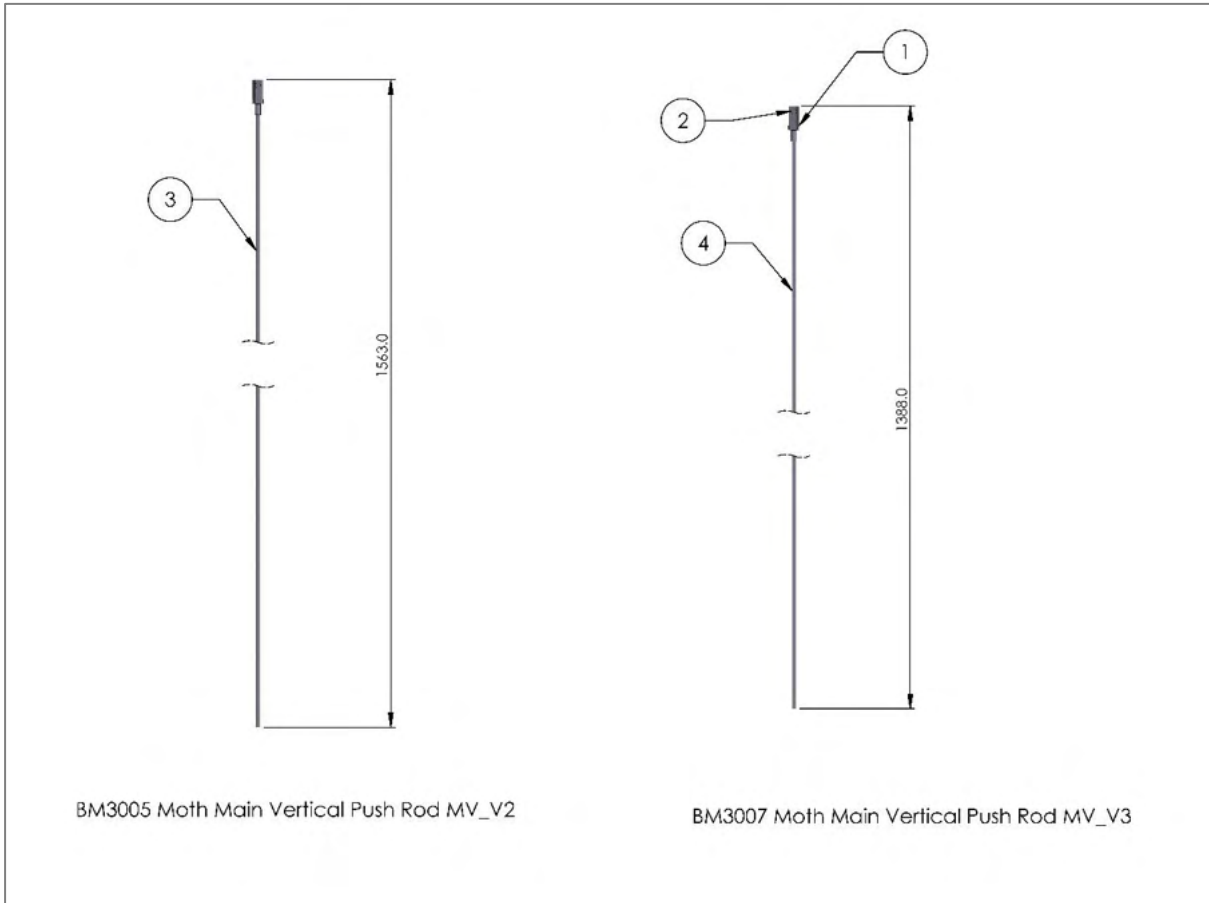
ITEM NO.	Assembly Name	Part Name	Qty
1		Carbon RH Barrel Tube	1
2		BM2036 Moth Ride Height Barrel Bush A	1
3		2020 5mm Rod End	1
4		M5 x 100 Threaded Rod	1
5	BM2037 Moth Ride Height Barrel Bush B with Threaded Brass Insert		1
5.1		2015 Moth Ride Height Barrel Bush B RevC	1
5.2		1166 M5 Threaded Brass Insert	2
6	2097 Moth 6mm Rod End with Becket		1
6.1		2055 Moth 6mm Rod End with Becket Body	1
6.2		2018 6mm Spherical Plain Bearing	1

BM3011_V3 RevB Moth Bell Crank Assembly



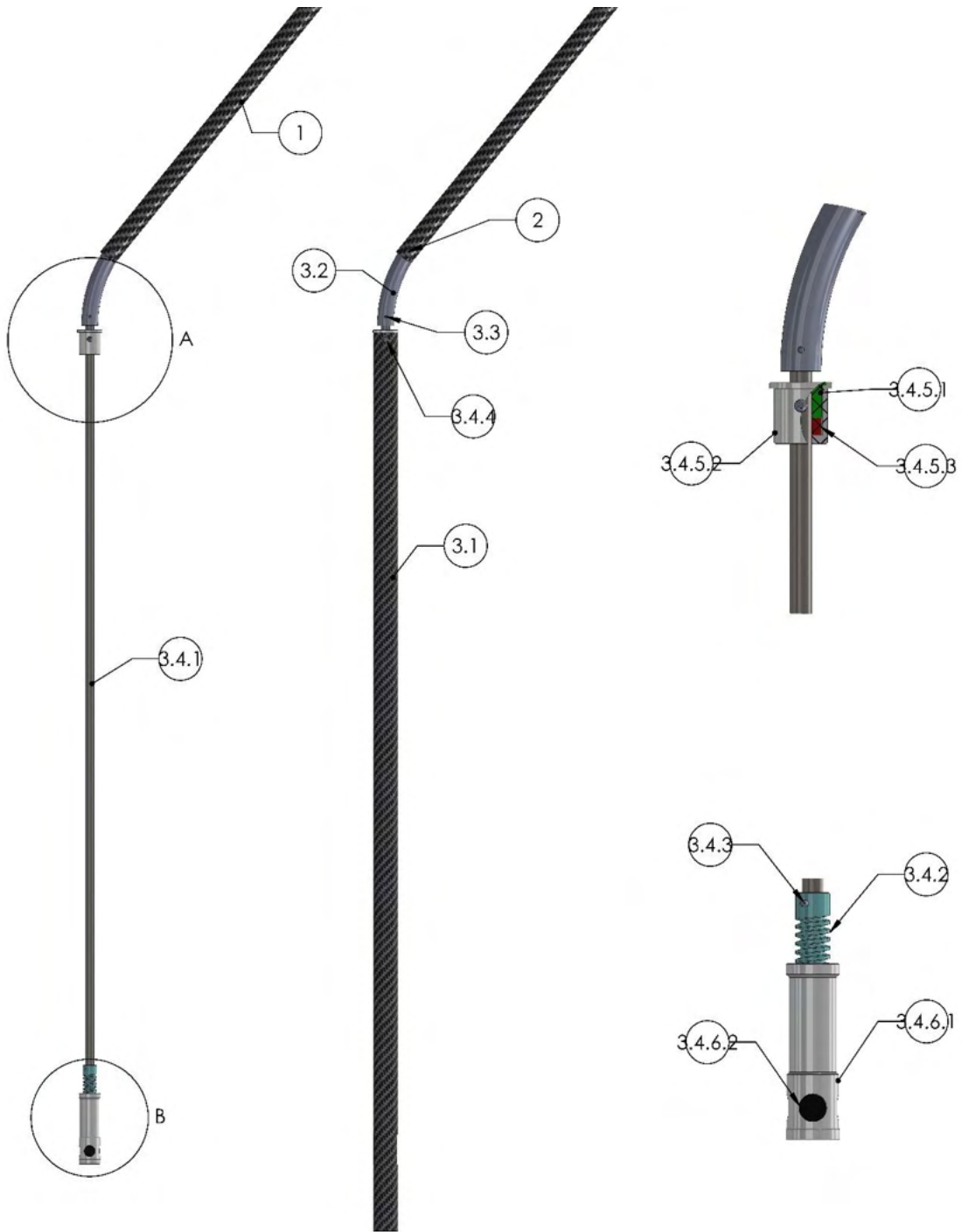
ITEM NO.	Part Name	Qty
1	2065 Moth Titanium Bellcrank RevB	1
2	1216 Moth Main Vertical Pivot Pin	1
3	BM3009 Moth Bell Crank Bush RevA	2
4	M5x16 Bell Crank Hex Bolt	1

BM3005_3007 Moth Main Vertical Push Rod Assembly



ITEM NO.	Part Name	BM3005	BM3007
1	2007 Moth Main Vertical Push Rod Fork	1	1
2	5mm Clevis and Circlip	1	1
3	BM3005b Moth Main Vertical Push Rod MV-V2	1	-
4	BM3007b Moth Main Vertical Push Rod MV-V3	-	1

BM3503 Moth Tiller and Extension Assembly (cont. page 22)



BM3503 Moth Tiller and Extension Assembly

ITEM NO.	Assembly Name	Part Name	Qty
1		BM3501 Moth Tiller Extension	1
2		M3 x 30 Button Head Socket Drive	1
3	BM3506 Moth Tiller Assembly		1
3.1		BM3500 Moth Tiller Tube Drilled Off	1
3.2		BM 3508 Moth Tiller Universal Joint	1
3.3		M3 x 30 Button Head Socket Drive	1
3.4	BM3505 Moth Tiller Internal Assembly		1
3.4.1		1277 Moth Worm Drive Titanium Tiller Tube 10 x 8 x 1100	1
3.4.2		BM3510 Moth Tiller SS Worm Drive B, Direct Fix Screw RevE	1
3.4.3		M3 x 2 Button Head Socket Drive	1
3.4.4		M3 x 8 Button Head Socket Drive	2
3.4.5	BM3232 Moth Rudder Rake Stopper Assm		1
3.4.5.1		BM3232A Moth Rudder Rake Stopper A RevB	1
3.4.5.2		BM3232B Moth Rudder Rake Stopper B RevB	1
3.4.5.3		BM3232C Moth Rudder Rake Stopper C RevB	1
3.4.5.4		M3 X * Grubscrew	2
3.4.6	BM3502 Moth Tiller Gudgeon and Cross Dowel		1
3.4.6.1		BM3509 Moth Tiller Acetal Worm Drive A, sliding gudgeon with pin cross dowel RevE	1
3.4.6.2		BM3511 Moth Worm Drive A Cross Dowel	1



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