muse 5

SUPPLEMENT
FOR HYBRID PARAGLIDER

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Contents

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GENERAL

In this supplement to the MAC PARA - MUSE 5 user manual you will find all information you need to know for flying this glider with a paramotor.

RANGE OF USE

Thanks its easy take-offs behaviour, high flight stability, canopy compactness the MUSE 5 is ideally suitable for paramotoring. The design of hybrid-risers with trims allows optimal settings for powered flying as well as settings for free flying without losing free flying certification.

SPECIFICATIONS

		Free flying	Powered flying
Muse 5	22 (XS)	58 - 75 kg *	75 - 100 kg **
Muse 5	25 (S)	70 - 90 kg *	93 - 120 kg **
Muse 5	27 (M)	80 - 100 kg *	104 - 133 kg **
Muse 5	29 (L)	87 - 110 kg *	116 - 147 kg **
Muse 5	31 (XL)	105 - 125 kg *	140 - 166 kg **
Muse 5	34 (XXL)	115 - 142 kg *	153 - 193 kg **

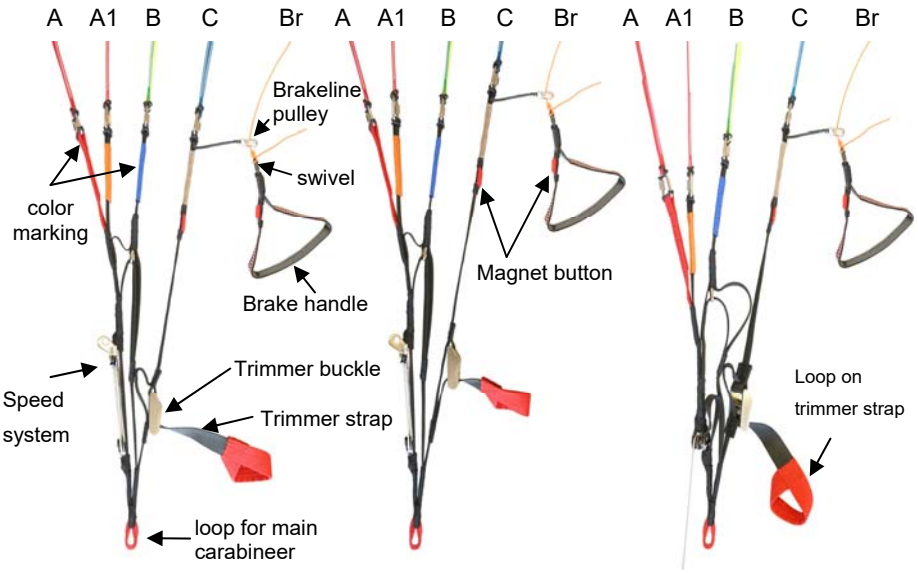
* Pilot, glider, equipment
** Pilot, glider, equipment incl. paramotro

HYBRID-RISERS

The MUSE 5 hybrid riser has four carrying straps. The two inner A-main lines lead to the front A-riser, the outermost A-line leads to the baby A-riser, the 3 B-lines and the stabiliser line to the B-riser, 3 C-lines to the C-riser. The hybrid risers are fitted with trims on C strap. These can be used for both adjusting the flying speed and compensation of the gyroscopic moment of the pamotor. For free flight without a motor the trims must be disabled by fully pull and hooking trimmer strap loops into the main carabiners. The hybrid-risers have a speed system for use when flying without the motor.

Caution: You are advised not to use the trims and speed system at the same time.

Illustrations of the Hybrid-Risers



Riser lengths Muse 5 PPG

	A	A1	B	C
Normal position	**525**	**525**	**525**	**525**
Trim open	**525**	**525**	**525**	**575**
Accelerated 22,25	**430**	**430**	**475**	**525**
Accelerated 27,29,31,34	**415**	**415**	**465**	**525**

The lengths are measured from the main attachment point to the lower edge of rapid links.

FLYING THE MUSE 5 WITH PARAMOTOR

This section is added to the section “Flying the Muse 5” in the MUSE 5 manual, which also basically applies to paramotoring.

Taking-off

Thanks its easy take-offs behaviour the trims don’t have to be opened when taking off with light wind. By zero wind or a wet canopy, releasing the trims by 1-2 cm will significantly help rising and filling of the canopy. Otherwise it is recommended to have the trims closed during take-off and landing in order to keep the take-off and landing speed as low as possible.

Paramotoring take-offs

Once the canopy is inflated up to the angle of about 80° degrees, open up the throttle to full power and lean back. This helps counter the engines thrust allowing it to push you forward rather than leaning forward towards the ground. Continue to run in an upright position. Once you have safely taken off continue heading into the wind. Release the brakes to gain enough altitude to allow you to get into your harness safely.

Experienced free flying paraglider pilots that start paramotoring have a tendency to lean forward with slightly applied brakes. When taking off with a paramotor you need to stand up straight and allow the thrust of the engine to push your body horizontally forward rather than diagonally down. It is important to not get into the harness as soon as you leave the ground. Right after take-off you are relatively low to the ground. The possible danger is if the engine happens to quit or loose thrust you quickly will be put back on the ground. Not rushing into your seat/harness allows your legs to act as landing gear instead of the bottom of your paramotor.

The recommended technique of getting into your harness is to climb to a safe height into the wind and then gently throttle back before getting into the seat. If you need to use your hand to help you get into your harness, be sure to put the brake toggle on the magnet first to avoid it being sucked into the prop. Also note that properly fastened leg straps makes getting into the harness much easier.

WARNING!! Do not jump or lift your legs immediately after or during your take off! This could have disastrous consequences when done with a paramotor if the wing has not reached the proper take off speed to create the necessary lift. Keep running, keep running and keep running until you are running through the air.

WARNING!! Do not attempt to get into the seat while holding the brake handles.

Flight

The flight characteristics of the MUSE 5 are identical when flying with or without a motor, at the same wing loading. In the expanded weight ranges for paramotoring the trim speed will be higher and manouevring will be significantly more dynamic because of the higher wing loading. Similarly with trims open speed will increase and manoeuvres will be more dynamic because of the lower angle of attack.

Flying in Turbulent Air

As a result of the higher canopy load and increased angle of attack, paragliders generally exhibit a higher degree of stability in powered flight. Even though the MUSE 5 is very stable and compact the trims should stay closed when flying through turbulent air. In such conditions, always keep the steering lines slightly taut and try to correct the movements of the canopy by active piloting to prevent possible collapse. In the same way, it is necessary to actively work with the throttle.

Power off landing

When deciding to land your paraglider check the wind direction and your height. The next step is to power off your engine at about 30 m. Glide toward your landing like a paraglider with trims set in the neutral setting with your brakes released. During your final glide just before touch down, you need to decelerate the glider by pulling your brakes converting your excess speed into lift before your feet touch the ground. Proper timing and how fast to pull your brakes depends on conditions. A general rule is to pull down on your brakes when your feet are approximately 0.5m over the ground. If too much brake is pulled too early, the glider may climb gaining height resulting in a sudden drop to the ground. Strong wind landings require correspondingly less brake. Every pilot should practice landings without power because one day your engine will fail (run out of gas etc.) and this skill could be useful.

Power on landing

Fly towards your desired landing area at a shallow angle. Start to flare the wing before touch down to loose speed then switch off your engine immediately after touchdown. In no wind conditions, be prepared to run a few steps after touchdown. Then pull the brakes few times dynamically (like a fluttering bird). This stops the canopy over your head and gives you time to turn and put the glider gently on the ground. Do not apply full brakes before you are safely on the ground. Do not turn unless the propeller stops turning.

The advantage of the power on landing is that if you get it wrong you can power up to launch and try again. The disadvantages are the increased risk of expensive propeller/cage damages if you approach too fast or forget to flare in time. Another danger is falling over with the engine running and getting your lines caught in the propeller. Make sure you switch off the engine before the wing deflates on top of you.

Attention! The final glide on approach during the landing should be straight and not done with any steep or alternating turns. This can result in dangerous pendulum movements too close to the ground.

Attention! Do not allow the canopy to come crashing down onto the leading edge. This can destroy the internal structure of your glider and affects the life of the ribs at the leading edge.

If possible, get familiar with the landing field before the approach. Check the wind direction before landing. Landing with power off requires much less space. Practice makes the master. Practice until you feel totally safe.

COMPATIBLE MOTORS

The certification test flights are carried out with a commercially available paramotors. Provided that maximum engine performance figures are not exceeded 25kW. Other motor models can be expected to produce similar handling behaviour.

THE CERTIFICATION REQUIREMENTS

Provided that the hybrid-risers are set to the neutral setting and locked by hooking the trim strap loop into the main carabiner it has EN / LTF certification as a paraglider.

All MUSE 5 sizes (-22, -25, -27, -29, -31 and -34) are DGAC approved for powered flight.

Line descriptions:

The following printed line plans show the line configurations.

Line types in colors:

Aramid/Polyester A-7343-075

Aramid/Polyester A-7343-090

Dynema/Polyester A-7950-080

Dynema/Polyester A-7950-100

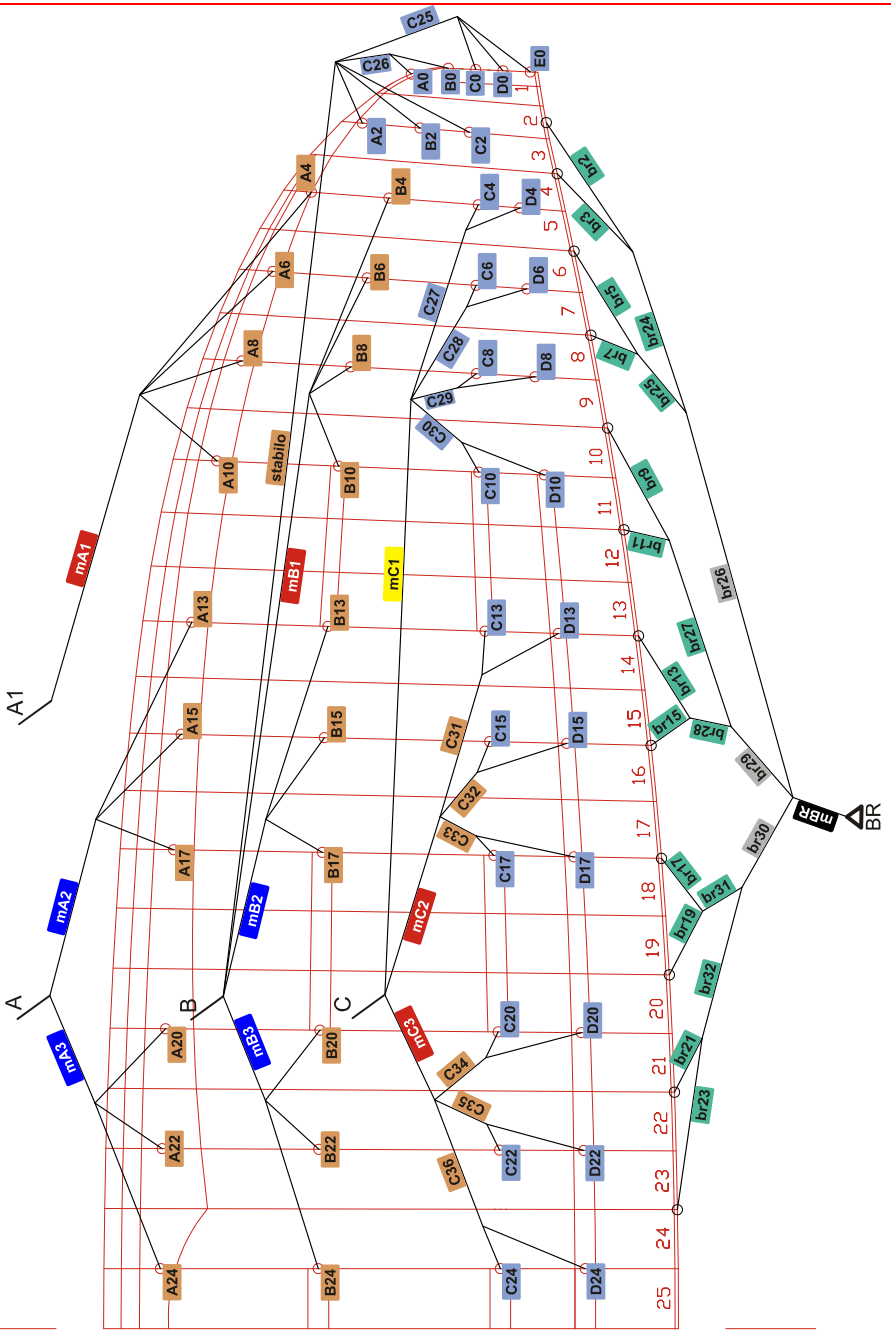
Dynema/Polyester A-7850-200

Aramid/Polyester A-7343-190

Aramid/Polyester A-7343-230

Aramid/Polyester A-7343-340

LINE PLAN MUSE 5 HYBRID



PARAGLIDER & SERIAL NUMBER

Paraglider type:

Serial number:

Manufacturing date: .....

Commisioning date: .....

TECHNICAL SPECIFICATIONS

Intermediate Performance EN-A Size		Muse 5 22 (XS)	Muse 5 25 (S)	Muse 5 27 (M)	Muse 5 29 (L)	Muse 5 31 (XL)	Muse 5 34 (XXL)
Zoom flat	[%]	88	92	96	100	104	109
Area flat	[m2]	22,46	24,55	26,73	29,00	31,37	34,45
Area projected	[m2]	19,94	21,79	23,73	25,75	27,85	30,59
Span flat	[m]	10,81	11,30	11,79	12,28	12,77	13,39
Aspect ratio flat	-	5,2	5,2	5,2	5,2	5,2	5,2
Root cord	[m]	2,55	2,67	2,78	2,90	3,02	3,16
Cells	-	50	50	50	50	50	50
Weight	[kg]	4,35	4,85	5,20	5,50	5,85	6,30
Weight range - PG*	**[kg]**	**58-75**	**70-90**	**80-100**	**87-110**	**105-125**	**115-142**
Weight range - PPG**	**[kg]**	**75-100**	**93-120**	**104-133**	**116-147**	**140-166**	**153-193**
Min.speed	[km/h]	23-25	23-25	23-25	23-25	23-25	23-25
Max.speed	[km/h]	37-39	37-39	37-39	37-39	37-39	37-39
Top speed (accelerator)	[km/h]	46-48	46-48	46-48	46-48	46-48	46-48
Glide ratio	-	+10	+10	+10	+10	+10	+10
Min. Sink rate	[m/s]	1,05	1,05	1,05	1,05	1,05	1,05

* Pilot, glider, equipment

** Pilot, glider, equipment incl. Paramotro

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