

DISCUS b - GXP

Revised
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Type Conversion Briefing Notes

The Discus b is a nice, easy to fly glider but can be difficult on take-off in particular when carrying water.

Discus b - GXP

TYPE CONVERSION

General

A first flight on type is a common cause of accidents. Therefore, take time to familiarise yourself with the glider and find out what is different on this type.

On The Ground

Read and understand these briefing notes and the aircraft manual.

Walk around the glider and note any features that are different to gliders you have flown before: retractable gear, wing section, ballast, tailskid/wheel, etc.

Get a briefing from an instructor who is familiar with the type. Your conversion to a new type must be authorized by an instructor who has flown this aircraft type.

Spend some time getting comfortable with the cockpit. Sit in the glider with the parachute on, strap in, close the canopy and familiarize yourself with the layout and controls: ASI, altimeter position, cable release, wheel-brake position, which lever is where? Can you reach all the controls? Is the seating comfortable?

Get someone to lift the tail to show the take-off and landing attitudes.

Do not attempt your first flight in crosswind or gusty conditions.

Take time and do not rush to take a launch.

Make sure your wing runner gives you a long run balancing the wings perfectly. Keep one hand on the cable release handle in case something goes wrong.

In Flight

Take a high aero tow for your first flight. This will allow more time to sort out everything, and if conditions are not soarable you have more time in the air.

After release relax and try a few turns at different bank angles, vary roll rates and speed, etc. Stall the glider straight ahead and in a gently banked turn. Any tendency to drop a wing? Buffet? Try to get a feel for the glider.

Fly at the approach speed recommended in the flight manual and approach configuration (wheel down) and open the airbrakes. Does the nose pitch up or down? Do they buffet? Do they suck out? Try again at a higher speed.

Fly the circuit to have a final turn that allows at least a half airbrake approach and landing. This will give a more stable approach.

Take another circuit or two, if possible. Can you achieve an appropriate circuit precision, i.e. good positioning, smooth half airbrake landing, speed control better than 5 kts, spot landing, straight short ground run, etc.

Have a nice flight !!

Pilot requirements

The pilot must have been converted to and flown several hours in both the club's PW5 and Astir single seat gliders, or equivalent, and must have been approved for cross-country flying in these gliders.

The pilot must have a full type conversion including briefing and flight manual familiarisation.

Permission to fly the Discus b will always be at the Duty Instructor's discretion.

Badge requirements may be waived at the discretion of the CFI.

SPECIFIC MINIMUM PILOT REQUIREMENTS

Pilots converting to the Discus b will have:

- QGP; and
- Minimum 30 hours PIC; and
- Minimum 30 flights PIC, 5 of which have been flown in the previous 30 days.

Minimum experience before planned cross country soaring in Discus b:

- Silver badge; and
- 3 spot landings – precision short field practice - on type, at the airfield to an instructor's satisfaction; and
- Basic understanding of the S100 operation, and
- Be familiar with the Discus b rig and de-rig section of the flight manual, familiar with XP's trailer and fittings and have experience of retrieving and rigging similar glider types.

Minimum experience before flying with water ballast:

- 10 flights on type; and
- Supervision of water loading and briefing by an instructor before first water ballasted flight.

Remember to add **water** ballast dump to pre-landing check list. Note that full water ballast takes four to five minutes to drain.

There are limitations on operating temperatures and heights when using water ballast - refer to the flight manual!

Features

Externally

Looks very nice.

Cockpit

Large enough for most pilots but needs some sorting out before your first flight. Tall pilots will need to adjust the seat back to be fully back.

Note the different positions available for the fixed end of the seat back adjustment cable.

Instrument panel: Lifts up, bangs down, gets stuck on wheel-brake lever.

Winter Vario: The mechanical vario is in m/s, not knots as we are used to on other club gliders. (1m/s is approximately 2 knots)

LXNAV S100: The S100 is a digital speed-to-fly variometer, final glide calculator and navigational system with simple moving map. It is the same as fitted to GPK. The User Manual is on the Club website.

Canopy: Lock is on the left-hand side. Jettison on left-hand **and** the right-hand side.

Trim: Needs some getting used to. Usually set well forward for take-off (check the flight manual).

Airbrakes: Effective.

Rudder pedals: Do not have a large adjustment range. Not much foot room around the pedals, especially when a long way forward.

Vent Knob: Good ventilation

Water dump Valve: On right hand side. Forward is valve closed, backwards is valve open. Operates both wing and fin tank. Add **water** ballast dump to your pre-landing checklist.

Wheel-brake: On the control column. Quite effective, watch nose-over tendency.

Undercarriage: Retract with lever on right side of cockpit. Retract **after** release from tow. The last part to bring the gear up and lock requires some technique: Don't just pull, swing it up.

Make sure **Undercarriage** is included in your checks. Check **forward for down!** Look at the decal to confirm!

A common mistake is to forget to raise the undercarriage after tow release, and then raise it, instead of lowering it, during the pre-landing checklist.

Handling

General overview

The Discus b, GXP, is a comfortable and easy to fly glider with good handling characteristics, effective airbrakes, and a gentle stall. The take-off however can be difficult, in particular when carrying water ballast. The main differences to our other club gliders are:

- Conventional landing gear, i.e. tail-dragger, so it is not as directionally stable in the early stages of the take-off roll and at slower speed in the landing roll.
- Water ballast,
- Retractable undercarriage.

These points need special attention and appropriate skills during ground run, on both aerotow or winch launch, and on landing. It is essential that the pilot is alert at all times.

Ground run

Keep your hand on the release until directional control is established.

A tail-dragger is directionally unstable during the first phases of the ground run. Pilots need to remember that during the ground run direction is controlled by the rudder and bank by the ailerons. These control inputs are applied independent of each other and could even be in a crossed configuration if there is a crosswind.

When taking up slack apply a little bit of wheel-brake so that the glider does not over run the rope. It is essential that the launch is started from a well-balanced position. If there is a crosswind, apply rudder to stop weather cocking. Ensure the wings are level or slightly banked into wind - but not too much – so the wing can't be dumped or lifted by the crosswind. Use instant, fast aileron input to keep the wings level (there might be some lag in the effects of these controls); use the rudder to track straight; be on your toes!

Do not have an inexperienced wing runner on the wing. Make sure the wing runner is an experienced pilot and brief them to give as much help as possible to keep the wings level during the initial ground roll.

Read the flight manual for recommended ground roll and lift off technique for your weight and glider CofG position.

If there is any problem, be ready to release immediately.

Water ballast

Because of the additional weight in the wings the wingtip runner should continue running as long as possible during the launch.

Water takes 4 to 5 minutes to dump. Add **water** ballast dump to your pre-landing check list, i.e. SUFBW. Remember the **Undercarriage** and check the lever is **forward for down!**

Aerotow

The aerotow is simple but remember you must fly the glider all the time. Aerotow must be done using the nose hook only.

After release from tow remember to retract the undercarriage.

Approach and landing

Your circuit needs to be planned and your landing checks should be done early to give you enough time to jettison the water (4 to 5 minutes from full). Normal checks are:

S	Straps	Check harness(es) correctly fastened and adjusted tight.
U	Undercarriage	Check down and locked (lever in the forward position).
F	Flaps	Not fitted to GXP
B	Airbrakes	Check fully open, then utilise as required.
W	Water	Water ballast valve fully open and locked in the rear position.

Do not land with water ballast onboard.

The recommended no water ballast approach speed is 51kts. Try to set up a final approach with half or slightly more airbrakes. The airbrakes are very effective. Make sure you have a proper round out and you hold off as long as possible. Touchdown speed is 38kts or less. Do not fly the glider onto the ground or force it down, otherwise the result could be a series of bounces and, in the worst case, PIO (see supplementary notes). A fully stalled-on landing is perfect.

Once on the ground track straight ahead, do not taxi or steer off the runway. If required use the wheel-brake which is quite effective. Be careful not to use too much wheel-brake as the glider will nose over and scrape the underside of the nose on the ground. If this happens at any speed a ground loop is likely. Gentle back pressure on the elevator in coordination with wheel-brake will assist.

Winch launching

Winch launching is permitted on the belly only.

It is essential that the launch is started from a well-balanced position and the glider is accurately aligned with the runway. If there is a crosswind, apply rudder to stop weather cocking. Ensure the wings are level or slightly banked into wind - but not too much -so the wing is neither forced to the ground nor lifted by the crosswind. Use instant, fast input of aileron to keep the wings level (there might be some lag in the effects of these controls); use the rudder to track straight.

Make sure the wing runner is an experienced pilot and brief them to give as much help as possible to keep the wings level during the initial ground roll.

When taking up slack, apply a little bit of wheel-brake so that the glider does not over run the cable. Release the wheel-brake just prior to the “all out”.

It is vital that you hold onto the launching hook release handle so that you can release immediately if either a wing touches the ground or directional control problems are experienced.

As a tail-dragger, GXP is not directionally stable in the early stages of the take-off roll. GXP is different from the Puchacz, DG1001, PW5, and Club Astir in this respect. You must be prepared to release immediately.

If there is any problem, you must release immediately.

Operational Information

(Always use the cockpit placards and the aircraft's flight manual for current limitations)

V_{ne}	Max permitted speed	135 kt
V_a	Max speed for manoeuvring	108 kt
V_{RA}	Max speed rough air	108 kt
V_t	Max speed on aerotow	97 kt
V_w	Max speed on winch / auto launch	81 kt
Typical towing speed		60 kt (70 kt with water)
Min.	approach speed	51 kt (62 kt at MAUW)
Max.	crosswind	11 kt
Max All Up Weight (MAUW)		525 kg
Min.	Pilot Weight (seat load, no ballast)	77 kg
Max.	Pilot Weight (including parachute)	110 kg
Max. Wing water ballast		184 ltr
Fin water ballast: (for every 28 ltr in the wings put 1 ltr in the fin tank)		1 per 28 ltr
Weak Link		680 daN (blue)
Main tyre pressure	above 360 kg AUW	4.5 bar (64 psi)
	below 360 kg AUW	3.5 bar (50 psi)
Max. L/D		42.5 at 54 kt

Supplementary Notes – Pilot Induced Oscillations (PIO)

PIO can occur when the glider touches down on the main-wheel and bounces back into the air. The pilot pitches the nose down and the glider strikes the ground, resulting in the nose pitching up rapidly. What happens next is that the nose pitching up causes the tail to pitch down, striking the ground. After the tail strikes the ground, the glider pitches nose down again, striking the wheel even harder. This process continues in a divergent oscillation which increases until something else occurs - usually, and all too often, structural failure just ahead of the fin unless the pilot takes action to correct the oscillation. To remedy the problem, it's simple - neutralize the controls after the first bounce - the glider will level out above the ground. Do not force the nose back down on or towards the ground. If the glider has bounced or climbed just a few feet, it will sink at a relatively gentle rate, and safely back to the ground of its own volition. If it is a BIG bounce, gently lower the nose and this time flare at the correct height. If the airbrakes are more than one-half open, gently closing them a little will allow additional time to flare correctly. Remember that lowering the nose decreases both angle of attack and lift, causing the glider to sink quite rapidly. Consequently, any forward control column movement must be gentle. The idea is to damp out the oscillation motion - i.e. pitch down gently (control column moving forward) as the nose comes up, and vice versa. When the oscillation stops, centralize the controls and let the glider land itself (as in Case One). DO NOT FORCE the nose back onto the ground. If for any reason the glider continues to oscillate (if your timing is poor, you will aggravate the oscillation), neutralize the controls and apply full airbrake. This will quickly reduce energy and stop the glider from flying, even if in a rather unpleasant and abrupt manner. It is less likely to cause damage than permitting the oscillation to continue unchecked.

This undignified and possibly expensive method of arrival can be avoided by:

1. Establishing the landing approach at the correct airspeed for the conditions. The greater the airspeed, the greater the pitch sensitivity.
2. Establishing the landing approach with half or more airbrake (the more the airbrakes are closed, the less pitch stability the glider will have, making a PIO more likely if otherwise mishandled).
3. Flare at the correct height. Don't fly the glider into or force it onto the ground. Aim to arrive with low energy, touching down with the main-wheel and tail-wheel simultaneously.

It should be noted that a correct approach (i.e. preparation for the flare and touchdown) is important in preventing this problem. Fly the correct approach speed (not too fast or too slow) using at least one-half airbrake, thus eliminating the pitch instability. These simple steps will greatly reduce the problem and risks of pilot induced oscillations.