

CIVIL AVIATION AUTHORITY – SAFETY REGULATION GROUP

MICROLIGHT TYPE APPROVAL DATA SHEET (TADS)

NO:BM53 ISSUE 9:

TYPE: Cyclone AX2000

- (1) MANUFACTURER: Cyclone Airsports Ltd, now supported by Mainair Sports Ltd, Unit B, Crawford Rd, Rochdale, Manchester OL165NU
- (2) UK IMPORTER: N/A
- (3) CERTIFICATION: BCAR Section S - Issue 1 (all variants)
Plus paper S901 - Issue 3
- (4) DEFINITION OF BASIC STANDARD: Drawing Schedules: AX2000 (582 engine) Issue 1
AX2000 (503 engine) Issue 1
AX2000 (HKS700e engine) Issue 1
- (5) COMPLIANCE WITH THE MICROLIGHT DEFINITION

(a) MTOW	450kg
(b) No. Seats	2
(c) Maximum Wing Loading	28.85kg/m ²
(d) Vso	36 mph (60.8 kph)
(e) Permitted range of pilot weights	55 – 90 kg per seat.
(f) Typical Empty Weight (ZFW)	210 kg
(g) ZFW + 172 kg crew + 1 hr fuel (17litres / 12kg)	394 kg
(h) ZFW + 86 kg pilot + full fuel (62 litres / 44 kg)	340 kg
(i) Max ZFW at initial permit issue	220kg

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(I) Power Plant See Table

Engine	Rotax 582/48	Rotax 503-2V	HKS 700E V3	HKS 700E BETA
Max RPM	6800 Peak 6200Max Contin	6800 6500 contin	6200 Peak 5800 Contin	6200 Peak 5800 Contin
MAX CHT	250C 480F	250°C 480°F	230°C 446°F	190°C 338°F
MAX EGT	650C 1200F	650°C 1200°F	N/K	N/K
Fuel Spec	83 MON or 90 RON minimum unleaded to BS(EN)228 or 97+ octane 4-star /MOGAS leaded fuel to BS 4040, or AVGAS 100LL.			
Engine Oil Spec	SuperTwo Stroke to TSCT (min)	As for 582 Engine	10-40 SAE to API min. SG	10-40 SAE to API min. SG
Gearbox oil spec				
Fuel/Oil Mix	50:1	50:1	N/A	N/A
Coolant Temperature	90C	N/A	N/A	N/A
Oil Pressure, 6200 rpm	N/A	N/A	29-58psi 2-4 bar	85psi 6 bar
Oil Temperature	N/A	N/A	122-212 °F 50-100 °C	122-190 °F 50-90 °C
Fuel Pressure	0.2-0.4 bar	0.2-0.4 bar	0.2-0.4 bar	0.2-0.4 bar

(8) INSTRUMENTS REQUIRED:

ASI	Altimeter	RPM	CHT / EGT	Compass	Coolant temp	Fuel Pressure	VSI	Slip ball
Required (0-100kts)	Required 0-20000 ft	Required 0-7000	Required 0-300C	Required 0-300C	Required 0-100C	Required	Required	Required

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(9) CONTROL DEFLECTIONS:

Elevator UP:	±18(Rotax) ±25(HKS)	Tailplane trim UP:	±15
Elevator DOWN:	±23(Rotax) ±20(HKS)	Tailplane trim DOWN	±40
Ailerons* UP:	±24	Rudder LEFT:	±35
Ailerons* Down:	±24	Rudder RIGHT:	±35

(10) PILOT'S NOTES, MAINTENANCE MANUALS REFERENCES:

10.1 Manuals approved for use with this aircraft.

- (a) Document Ref. Cyclone AX2000 Owner Manual Issue 4 with Rotax or HKS engine operator's manual as appropriate

10.2 The following placards are to be fitted:-

- (a) Flight Limitations Placard (to be visible to pilot)

See Annex D.

- (b) Engine Limitations Placard (to be located near to engine instruments)

See Annex D.

- (c) Fuel Limitations Placard (to be located near to filler cap)

An example is shown at Annex D.

- (d) Switches

See Annex D.

(11) MANDATORY MODIFICATIONS / SERVICE BULLETINS / AIRWORTHINESS DIRECTIVES ETC:

Service Bulletin	Description	Notes	Issued
SB AX2010	Aileron return pulley and batten loops		23/9/97
SB AX2016	Rudder bolt life		20/8/98
SB AX2017	Throttle lever shorten and replace stops		5/1/99

See Annex A for required modifications.

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Annual Bettsometer test is to be carried out to 1060 grammes with wing sails fitted and tensioned to flight. Test must be to both upper and lower surfaces.

(12) MINIMUM PERFORMANCE AT MAX TAKE-OFF WEIGHT

<u>Engine</u>	<u>Climb Rate at 50mph</u>
582 Rotax	650 ft/min
HKS 700e	500 ft/min
503 Rotax	370 ft/min

Stall or Minimum Flying Speed: 36mph IAS at MTOW / idle.

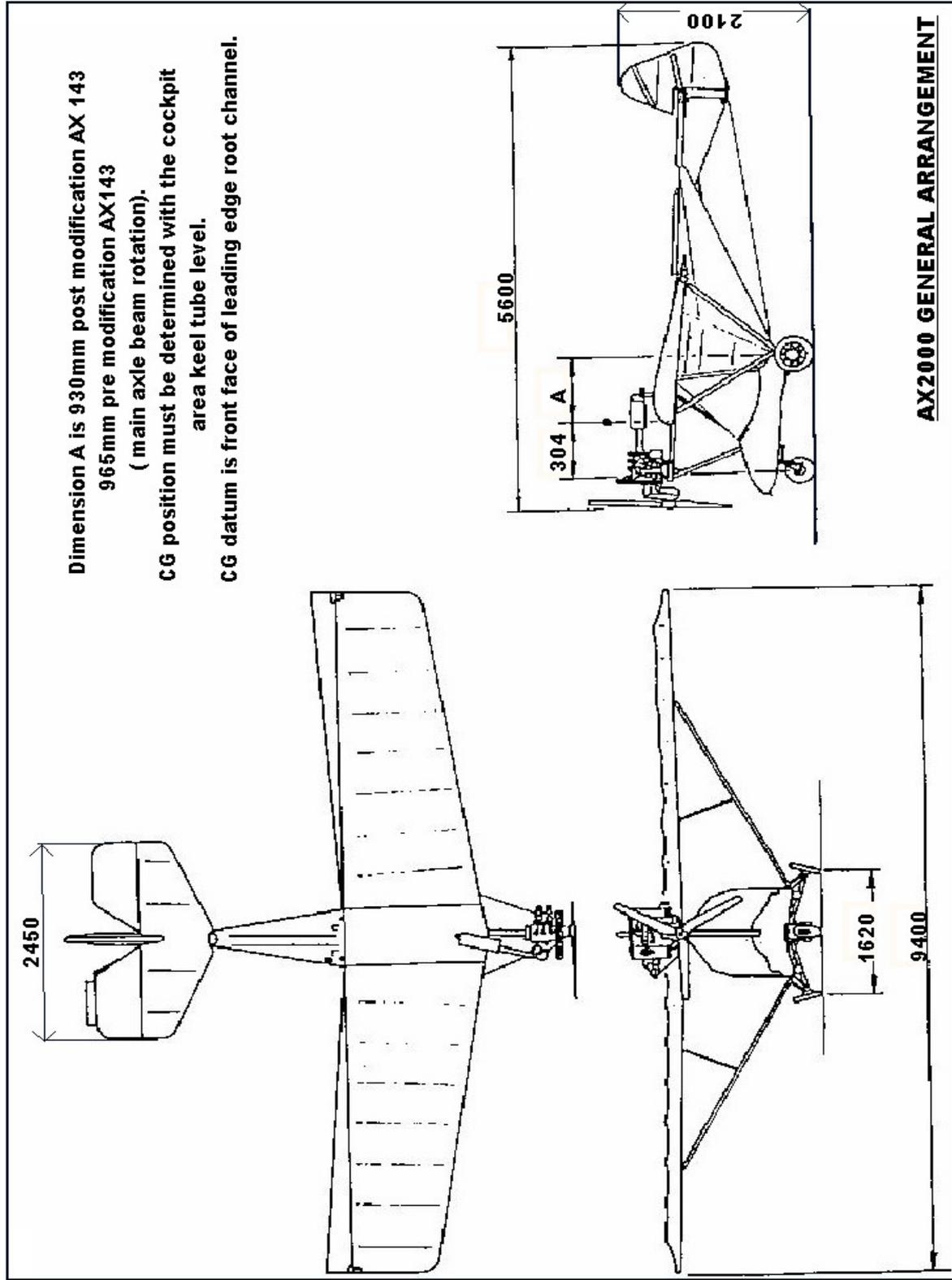
Issue History

<u>Issue No.</u>	<u>Reason and signatory</u>
1	14 January 1997 Initial issue. R J Hardy
2	18 March 1997 To introduce Aerotowing Modification AX110 R J Hardy
3	3 June 1997 To introduce Rotax 503 variant modification AX125 R J Hardy
4	6 April 1998 Introduction of HKS 700E V3 engine R J Hardy
5	17 August 1998 Inclusion of placarded empty weight in accordance with Paper S901 R J Hardy
6	4 March 1999 Revision of empty weight from 206 kg to 209 kg for HKS variants R J Hardy
7	2 July 1999 Compliance with BCAR Paper 901 Issue 3 at 450 kg. Cyclone AX2000 Owner Manual now at Issue 3 R J Hardy
8	31 March 2003 HKS 700e beta added and new support address. Cyclone AX2000 Owner Manual now at Issue 5 J Barratt
9	18 February 2005 Correction of wheel positions and effect of mod. 143 on CG data

J Barratt

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ANNEX A – MANDATORY MODIFICATIONS

Mod ref	Description	Notes	Date
AX242	Shorten throttle lever, see SB 2017		5/1/99

ANNEX B - APPROVED OPTIONAL MODIFICATIONS

The installation of all optional modifications is to be inspected by a BMAA inspector and an entry made in the appropriate logbook(s). Note that other approved modifications may exist which are not listed here.

AX91	THROTTLE TORQUE TUBE SPIGOT	19.6.96	MINOR
AX93	TRIM TAB HORN TUBE	21.10.96	MINOR
AX96	AILERON HORN TUBE	21.10.96	MINOR
AX98	MAIN AXIS - REMOVE WASHERS	13.11.96	MINOR
AX99	FUEL PICKUP	13.11.96	MINOR
AX100	FUEL TANK THINNER WALL	20.11.96	MINOR
AX101	NOSE WHEEL AXLE 6061-T6 MATERIAL	7.1.97	MINOR
AX103	AX2000 BATTENS - T/E ENDS	29.1.97	MINOR
AX106	RUDDER CABLE PULLEY CHANGE	12.2.97	MINOR
AX107	FOOTPLATE - MATERIAL CHANGE	21.2.97	MINOR
AX108	2 5/8" KEEL TUBE CHANGE	21.2.97	MINOR
AX109	AX3/AX2000 PMR4-CG/CR BATTEN ENDS	12.2.97	MINOR
AX111	AILERON PULLEY ALTERNATIVE	25.3.97	MINOR

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AX112	SUB-FIN LEADING EDGE BUSH	7.4.97	MINOR
AX113	AILERON TRIM TAB	7.4.97	MINOR
AX114	ENGINE STUDS ⇒ LOCTITED M10 BOLTS	7.4.97	MINOR
AX115	BOLT MOUNTING OF RECTIFIER	7.4.97	MINOR
AX116	DIAGONAL BRACING OF REAR ENCLOSURE FRAME	7.4.97	MINOR
AX117	ROOT RIBS 20mm LONGER - NO STRING	14.4.97	MINOR
AX118	COMPOSITE DOORS	14.4.97	MINOR
AX119	RIVETING OF TRIM TABS (ELEVATOR)	17.4.97	MINOR
AX120	TRIM TAB LINKAGE SPACERS	17.4.97	MINOR
AX121	SAND CAST L/E FITTING	17.4.97	MINOR
AX122	AX2000TOW SWIVEL ETC.	24.4.97	MINOR
AX125	AX2000 503 ENGINE	28.5.97	MINOR
AX/PG126	ALL 12V AIRCRAFT BSM INDICATOR	28.5.97	MINOR
AX/PG127	BRAKE RETURN SPRING ADDED	28.5.97	MINOR
AX128	Ø25 TO Ø1" TUBE	4.2.98	MINOR
AX129	FUEL TANK DRAIN	18.1.98	MINOR
AX135	AX3/AX2000 1 PIECE FILLER TUBE	18.8.97	MINOR
AX143	AX2000 MAIN AXLE ROTATION	3.4.98	MINOR
AX146	AX2000/3 FRONT AXLE TUBE CHANGE	22.1.98	MINOR
AX155	WING STRUT BOLTS - WASHER TO STOP THREADS BINDING	17.2.98	MINOR

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HG157	NEOPRENE PROTECTOR SLEEVE SIZE	26.2.98	MINOR
AX164	FITTING OF HKS 700E 2.58:1 4 STROKE ENGINE TO AX2000	5.3.98	MINOR
AX166	WING STRUT MATERIAL CHANGE	3.4.98	MINOR
AX174	AX2000 CERTIFICATION TO 450KG	12.3.98	MINOR
AX175	TOW LINE SWIVEL MOVED FROM V-BRIDLE APEX TO IN FRONT OF DROGUE	19.3.98	MINOR
AX176	AEROTOW PILLAR PLATES/RELEASE CORD	30.3.98	MINOR
AX180	REWIRE AX2000 582 TO ISOLATE POWER SUPP.	30.4.98	MINOR
AX182	NEW DOOR LAYUP (STRONGER & SIMPLER)	3.6.98	MINOR
AX183	AX3/AX2000 AILERON TUBE CHANGE	8.6.98	MINOR
AX185	AX3/2000 28mm x 1.5mm TUBE CHANGE	16.6.98	MINOR
AX186	EXHAUST POST BOLT (SB AX2015)	24.6.98	MINOR
AX188	HKS IMPROVED EARTH CONNECTION	30.6.98	MINOR
AX191	AX3 AILERON HINGE RE-INSTATE	17.7.98	MINOR
AX192	AX2000 WING TIP BUNG RE-DESIGN	29.7.98	MINOR
AX/PG193	EXHAUST HOOK ANGLE	30.7.98	MINOR
AX196	AX2000 HKS EXHAUST TAIL PIPE	11.8.98	MINOR
AX200	AX2000/AX3 RUDDER BOLT	18.8.98	MINOR
AX202	L SHAPE ANGLE AX2000/AX3	19.8.98	MINOR
AX208	HKS SPACER ZSP-072	3.9.98	MINOR
PG/AX209	BRAKE RETURN SPRING	3.9.98	MINOR

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AX212	FUEL PIPE CHANGE	10.9.98	MINOR
AX213	BOOST PUMP SWITCH SAME AS IGNITION SW.	10.9.98	MINOR
AX214	WING STRUTS T TYPE NUTS	10.9.98	MINOR
AX215	CAPACATOR SUPPRESSION & EIS SUPPLY RE- ROUTE	17.9.98	MINOR
AX230	HKS OIL TANK HOSE TO 5/8"	4.11.98	MINOR
AX232	DOOR HINGE RIVET CHANGE	5.11.98	MINOR
AX234	ZIP INSPECTION COVERS	10.11.98	MINOR
AX235	BRAKE CABLES THROUGH TUBE	11.11.98	MINOR
AX237	STITCHING TAPE PROTECTION	18.11.98	MINOR
AX240	POD/WINDSCREEN/ DASH BOARD FASTENINGS	10.12.98	MINOR
AX241	HKS ENGINE STAINLESS EXHAUST SPRINGS	10.12.98	MINOR
AX242	THROTTLE LEVER SHORTEN & KNOB	11.12.98	MINOR
AX243	TURNBUCKLES IN AILERON CABLES	11.12.98	MINOR
AX244	RUDDEN VELCRO TAB REMOVED	11.12.98	MINOR
AX245	ELEVATOR COVER DRAIN HOLES	11.12.98	MINOR
AX246	STEERING ROSE JOINT SPACERS CHANGE	11.12.98	MINOR
AX247	TRIM STOP - JUBILEE CLIP	11.12.98	MINOR
AX248	TRIM TAB - EXTRA RIVETS	11.12.98	MINOR
AX249	HKS - EARTH CONNECTION POINT	15.12.98	MINOR

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PG/AX250	FUEL TANK MATERIAL	16.12.98	MINOR
PG/AX251	TOWING MIRROR CHANGE	21.12.98	MINOR
PG/AX252	LYNX KIT FITTING	22.12.98	MINOR
PG/AX253	HKS ENGINE PLACARD SET	23.12.98	MINOR
PG/AX257	2mm GLAVANISED WIRE TO STAINLESS	20.1.99	MINOR
PG/AX258	4mm GALVANISED WIRE TO STAINLESS	21.1.99	MINOR
PG261	2.5mm GALVANISED WIRE TO STAINLESS	2.2.99	MINOR
PG262	3mm GALVANISED WIRE TO STAINLESS	2.2.99	MINOR
AX263	2mm WINDSCREEN	3.2.99	MINOR
AX264	AX2000 LEXAN COCKPIT TOP	3.2.99	MINOR
AX265	AX2000 INTAKE BALANCE PIPE ON MANIFOLD POSITION	3.2.99	MINOR
AX268	CENTRE SECTION STRAPS (SB AX2018)	8.2.99	MINOR
AX269	ADD BUNG TO STABILISOR TUBE 101232	10.2.99	MINOR
AX270	1.5mm WHITE TUBE BECOMES 1” 17swg	10.2.99	MINOR
AX273	AX2000 TAIL SKID	11.2.99	MINOR
AX274	ONE OFF AX2000 - SERIAL NO 7503	11.2.99	MINOR
AX275	STRENGTHEN AX2000 POD	16.2.99	MINOR
PG278	QTM RADIATOR HOSE BULGES	3.3.99	MINOR
PG/AX279	NON PVC FUEL HOSES	3.3.99	MINOR

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AX281	AX SS HOOK/BALL JOINT MOD (ROTAX JOINT)	5.3.99	MINOR
AX284	CENTRE SECTION COVER - SEE MOD AX268	8.2.99	MINOR
AX286	NOSE WHEEL BEARING POSITION & SPACER	15.4.99	MINOR
AX290	FUEL FILLER HOSE CHANGE	23.4.99	MINOR
AX291	AX2000 SLOTTED CENTRE SECTION COVER	5.5.99	MAJOR
AX293	REMOVE RIVETS FROM POD FIXING	17.5.99	MINOR
AX294	TWIN FILLER SYSTEM AND 62L CAPACITY	30.6.99	MINOR
AX301	BATTERY TRAY HOLE POSITIONS	6.7.99	MINOR
PG/AX305	SMALL BORE FUEL HOSE	19.7.99	MINOR
AX306	FOOT REST TUBE WALL GAUGE	5.8.99	MINOR
AX309	HKS EXHAUST SEALS & JUBILEE MOUNT	SEE MOD AX324	
AX310	HKS INLET SUPPORT	SEE MOD AX324	
AX311	RUDDER HORN BENDING	7.10.99	MINOR
AX312	WINDSCREEN & SUPPORT TUBE FIXING	7.10.99	MINOR
AX313	FUEL HOSE	7.10.99	MINOR
AX321	WING COVER BATTEN 1 ROOT STRENGTH	10.12.99	MINOR
AX322	LOWER WING STRUT TANG BOLT AX2000/AX3	10.12.99	MINOR
AX324	AX2000 HKS EXHAUST MOUNT	21.1.00	MINOR

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AX332	ELECTRIC FUEL PUMP SYSTEM FOR 582 AX2000		
AX334	FITTING OF HKS BETA ENGINE TO AX2000	05.05.00	MINOR
AX344	CHAMBER ON TRAILING EDGE, TO KEEP THE EDGE STRAIGHT, NEW MATERIAL FOR RIB	10.11.00	MINOR
AX345	LENGTH CHANGED, AX2000 TRAILING EDGE	10.11.00	MINOR
AX358	OILTANK FITTINGS	24.10.01	Minor
AX369	AX2000 fuel filler pipe modification	02/10/02	Minor
AX370	HKS exhaust and fuel pump mod	02/10/02	Minor
M106	HKS V3 oil scavenge system	22/6/03	Minor

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ANNEX C

WEIGHING INFORMATION

- | | |
|--------------------------|--|
| 1. CG Datum: | Front face of leading edge bolt channel on keel |
| 2. Weighing attitude: | Keel above pilot's seat horizontal |
| 3. Mainwheel moment arm: | 930mm aft of datum (post mod. AX143)
965mm pre mod AX143. |
| 4. Nosewheel moment arm: | 304 mm fwd of datum |
| 5. Fuel moment arm: | 1245mm aft of datum |
| 6. Crew moment arm: | 870mm aft of datum |
| 7. Crew weights: | Minimum 55 kg / maximum 90 kg |
| 8. Aft CG Limit: | 847mm aft of datum |
| 9. Fwd CG Limit: | 730mm aft of datum (HKS engines) |
| Fwd CG Limit: | 670mm aft of datum (Rotax engines) |

Note – Aircraft manufactured and registered after 3/4/98 have modification AX143 incorporated.

If the mod. has been carried out, the undercarriage main beam is vertical and there is no toe-in or out of the main wheels.

Pre-mod AX143, the beam was swept rearwards, with some toe-out of the main wheels.

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ANNEX D

PLACARDS

The following placards are fitted to the aircraft and should be maintained in a legible state:

PLACARD	LOCATION
Max. occupant weight P1 - 90 kg	Main placard situated on instrument panel
Max. occupant weight P2 - 90 kg	
Total occupant weight - 180 kg	
Min. cockpit weight - 55 kg	
Max. maneuver speed Va - 62 mph	
Never exceed speed VNe - 90 mph	
Aircraft empty weight: (to be completed)	
Max. take off weight - 450 kg	
Do not pitch Nose up or down more than 60°	
Baggage Total 12.5 kg	
Mag 1 - Mag 2 UP FOR ON	Ignition switch - next to magneto switches
Useable capacity 62 litres - (30 if 1 tank fitted)	Useable fuel capacity - (next to filler)
50:1 2 stroke oil (Rotax engines only)	
Pitch trim - Nose up - take off - nose down	Trim placard - on keel next to trim wheel
Master ON - OFF / Push to start	Master & Starter - next to switches
Fuel ON - OFF	Fuel tap - next to fuel tap on cockpit floor
For Rotax engines:	
Max. peak RPM 6800 (1)	Marked on instruments
Max. Continuous RPM 6200	Marked on instruments
Max. Coolant Temp 90° (582 model) (1)	Marked on instruments
Max CHT 480° (503 model) (1)	Marked on instruments
Fuel Pressure 0.2 - 0.4 Bar	Marked on instruments (optional)
For HKS 700E engine:	
Max. peak RPM 6200 (3min max)	Marked on instruments
Max. Continuous RPM 5800	Marked on instruments
Min Oil Pressure @ 6200, BETA engine – 85 PSI	Marked on instruments
Min Oil Pressure @ idle – 17 PSI	Marked on instruments
Max. Oil Temp 190° F 90° C	Marked on instruments
Max CHT 338° F 190° C	Marked on instruments
Fuel Pressure 0.2 - 0.4 Bar	Marked on instruments (optional)
Boost Pump ON-OFF	By boost pump switch, next to FP gauge
Green Charge, red high/lo volts (1)	By Battery State Monitor

(1) Battery State Monitor is mandatory for HKS aircraft, optional on others.