



## SECTION 9

### Pilot's Operating Handbook Supplement AST-01

#### VFR-DAY and VFR-NIGHT operation

#### Garmin G500 TXi, MVP-50P-AQ

This POH supplement is applicable and must be inserted into Section 9 of the Pilot's Operating Handbook when the AQUILA AT01-200C is equipped for Day- and Night-VFR.

**Section 1, 2 and 3 of the basic POH must be completely replaced by the section 1, 2 and 3 of this supplement.**

The information in this supplement adds to or replaces information in the basic POH.

The technical content of this document is approved under the authority of the DOA ref.  
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03.03.2021  
  
Date, Signature Office of Airworthiness

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### 0.1 RECORD OF REVISIONS

Issue	Reason for Change	Effected Pages	Date of Issue
A.01	Initial Issue (EASA 10072382)	All	02.03.2020
A.02	editorial changes	chapt. 1, 2	03.03.2021

### 0.2 LIST OF CURRENT PAGES

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1-1 to 1-12	A.02	03.03.2021
2-1 to 2-10	A.02	03.03.2021
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## 1.1 INTRODUCTION

This Pilot's Operating Handbook contains all the information the pilot and instructor require for the safe and efficient operation by day and night of the AQUILA AT01-200 aircraft.

It includes all information required in accordance with JAR-VLA and additional information considered by the manufacturer to be of value to the pilot.

This Manual consists of nine sections which cover all operational aspects of the aircraft equipped with a Garmin G500 TXi PFD and MVP-50P-AQ.

Optional equipment which has been installed on request of the customer (COM, NAV, GPS and others) is included in Section 9 "Supplements" of this Manual.

Information regarding equipment approved for installation in the AQUILA AT01-200 is provided in Section 6 of this manual and in the approved equipment overview list in the Maintenance Manual (Document Number MM-AT01-1020-110).

## 1.2 AIRCRAFT TYPE CERTIFICATION

The aircraft AQUILA AT01 is type-certified in accordance with the certification specifications of the *Joint Aviation Requirements for Very Light Aeroplanes (JAR-VLA*, including the revision VLA/92/1) by the Luftfahrt-Bundesamt, the National Aviation Authority of Germany.

The Type Certificate under the Type Certificate Data Sheet No. 1106 was issued on the 21<sup>st</sup> of September 2001.

In accordance with „Certification Review Item A-01“ (15.06.2007) as a Change to the Type Certificate of EASA.A.527, the AQUILA AT01 is certified for flights under N/VFR condition.

Based on this Type Certificate the model AT01-200 was certified.

*Category of Airworthiness:* Normal

*Noise Certification Basis:* CS-36 (Amendment 5)

*Approved for following operations:* VFR by day

VFR by night

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### 1.3 WARNING, CAUTIONS AND NOTES

Throughout the text, special text boxes marked WARNING, CAUTION and NOTE are used. These terms are defined as follows:

<b>WARNING</b>
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*Procedures, practices, etc. which may result in personal injury or loss of life if not strictly adhered to. The issues addressed under these text boxes directly affect the airworthiness and the safe operation of the aircraft.*

<b>CAUTION</b>
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*Procedures, practices, etc. which may result in damage to or destruction of equipment if not strictly adhered to. The issues addressed under these text boxes have an indirect or minor impact on the airworthiness and the safe operation of the aircraft.*

<b>NOTE</b>
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*Calls attention to additional procedures or information which are not directly associated with flight safety but are nevertheless important or deviate from standard practices.*

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## 1.4 PRINCIPLE AIRCRAFT DIMENSIONS

### 1.4.1 Overall Dimensions

Wing Span:	33.79 ft	(10.30 m)
Length:	24.28 ft	(7.40 m)
Height:	7.87 ft	(2.40 m)

### 1.4.2 Wings

Airfoil:	HQ-XX mod.	
Area:	113.02 sq. ft	(10.50 m <sup>2</sup> )
Aspect Ratio:	10.10	
Mean Aerodynamic Chord (MAC):	3.51 ft	(1.07 m)

### 1.4.3 Horizontal Stabilizer / Elevator

Area:	21.52 sq. ft	(2.00 m <sup>2</sup> )
Span:	9.84 ft	(3.00 m)

### 1.4.4 Fuselage and Vertical Stabilizer / Rudder

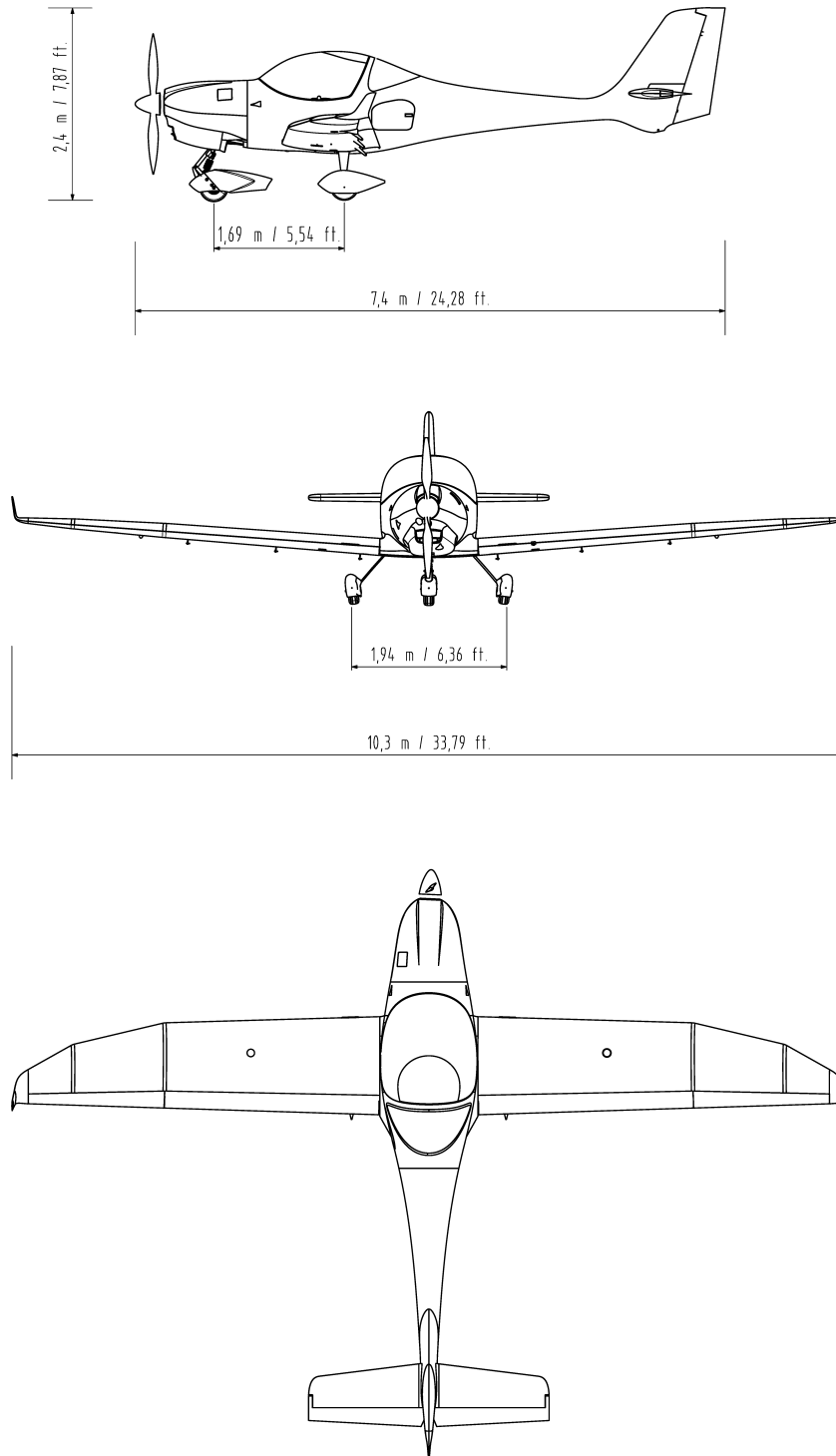
Maximum Fuselage Width	3.94 ft	(1.20 m)
Length	24.28 ft	(7.40 m)
Area (Vertical Tail):	15.61 sq. ft	(1.45 m <sup>2</sup> )

### 1.4.5 Landing Gear

Wheel Track:	6.37 ft	(1.94 m)
Wheel Base:	5.54 ft	(1.69 m)
Tire Size:	5.00-5	

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## 1.5 AQUILA AT01-200 – THREE VIEW DRAWING



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## 1.6 ENGINE

The ROTAX® 914 F3 is a 4-cylinder 4-stroke engine with air cooled cylinders and liquid cooled cylinder heads.

The Propeller is driven via an internal reduction gearbox with an integrated overload clutch and a hydraulic constant speed propeller governor.

Reduction Ratio of internal gearbox:	2.43 : 1
Displacement:	73.9 in <sup>3</sup> (1211 cm <sup>3</sup> )
max. Takeoff power (5 min.):	113,3 BHP (84.5 kW)
at max. Takeoff propeller speed:	2385 RPM
max. continuous power:	98.6 BHP (73.5 kW)
at max. continuous propeller speed:	2260 RPM

## 1.7 PROPELLER

Hydraulic two-blade, constant speed propeller

Manufacturer:	mt-Propeller
Type:	MTV-21-A/175-05
Diameter:	68.9 in (175 cm)

## 1.8 FUEL

The following fuel grades are approved for use (min. RON 95):

EN228 Super	ASTM D4814
EN228 Super plus	
AVGAS 100LL	ASTM D910
AVGAS UL 91	ASTM D7547

	<u>Left Fuel Tank</u>	<u>Right Fuel Tank</u>
Fuel Capacity (total):	15.8 US gal (60 l)	15.8 US gal (60 l)
Usable Fuel (total):	14.48 US gal (54.8 l)	14.48 US gal (54.8 l)
Unusable Fuel:	1.37 US gal (5.2 l)	1.37 US gal (5.2 l)

Due to the higher lead content in AVGAS 100LL, wear of the valve seats, deposits in the combustion chamber and lead sediments in the lubrication system will increase when using this type of fuel. Therefore AVGAS should only be used if you encounter problems with vapor lock or if the other fuel types are not available.

Lead free AVGAS UL 91 is similar to AVGAS 100LL (MON 91 ⇒ RON > 95) when it comes to vapor lock susceptibility. However, it does not suffer from lead induced problems.

(Please refer to the current issue of the operating manual for the ROTAX® 914 engine series)

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## 1.9 ENGINE OIL AND COOLANT

### 1.9.1 Engine Oil

Use only oil with an API classification of “SG” or higher. Heavy duty 4-stroke motor oils tend to meet these requirements. For more information regarding engine oil selection, please refer to the Operator’s Manual for all versions of the 914 engine series and to the current issue of the ROTAX® Service Instruction SI-914-019.

The following chart shows the recommended oil viscosity as a function of the climatic conditions. The use of multi-grade oils is recommended.

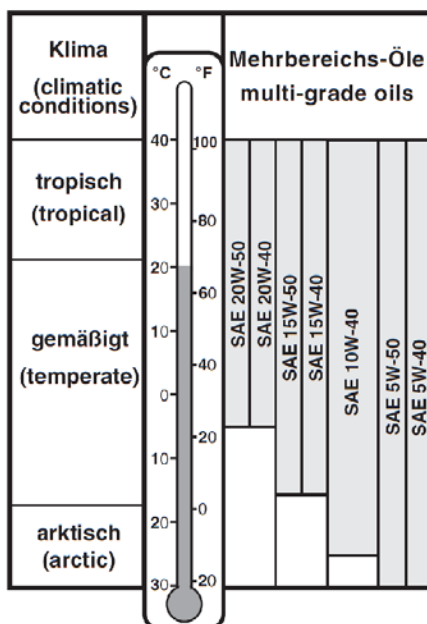


Figure 1-2

### CAUTION

#### **Do not use aviation grade oil!**

When operating the engine with AVGAS do **not** use full synthetic oil!

If the engine is operated extensively on AVGAS 100LL (more than 30hrs within 100hrs) the interval between oil changes shall be reduced to 50 hrs!

(please refer to the current issue of the ROTAX® Service Instructions SI-914-019)

Max. Oil Capacity:	3.17 US quarts	(3.00 l)
Difference between Max/Min:	0.475 US quarts	(0.45 l)
Max. Oil Consumption:	0.063 US quarts/hr.	(0.06 l/h)

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### 1.9.2 Engine Coolant

A conventional, ethylene glycol and water based coolant is used.

Please refer to the Operator's Manual for the 914 engine series, section 2.2, and to the current issue of the ROTAX® Service Instructions SI-914-019 when choosing an engine coolant.

Description	Ethylenglycol	Water
Mixture ratio [%] anti-freeze / water	50 + 15	50 - 15

**CAUTION**

*Low quality or contaminated coolant may lead to deposits in the cooling system which may result in insufficient engine cooling.*

**Coolant Quantity:** Minimum: 2.54 US quarts (2.4 l)  
Maximum: 2.64 US quarts (2.5 l)

**Overflow Bottle:** Minimum: 0.106 US quarts (0.1 l)  
Maximum: 0.21 US quarts (0.2 l)

### 1.10 WEIGHTS

Maximum Takeoff Weight (MTOW): 1653 lb. (750 kg)  
 Maximum Landing Weight (MLW): 1653 lb. (750 kg)  
 Empty Weight (MZFW): Refer to section 6  
 Max. Weight in Baggage Compartment: 88.2 lb. (40 kg)  
 (All baggage must be adequately strapped and secured)  
 Max. Wing Loading: 14.6 lb./ft<sup>2</sup> (71.4 kg/m<sup>2</sup>)  
 Min. Wing Loading: ca. 10.77 lb./ft<sup>2</sup> (52.6 kg/m<sup>2</sup>)

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## 1.11 TERMINOLOGY AND ABBREVIATIONS

### 1.11.1 Speeds

<i>IAS:</i>	(Indicated Airspeed) - the speed shown on the airspeed indicator
<i>KIAS:</i>	IAS expressed in knots
<i>CAS:</i>	(Calibrated Airspeed) - the indicated airspeed, corrected for position and instrument error. CAS is equal to true airspeed in standard atmosphere conditions at sea level.
<i>KCAS:</i>	CAS expressed in knots
<i>TAS:</i>	(True Airspeed) - the airspeed relative to undisturbed air, which is the CAS corrected for altitude, temperature and compressibility.
<i>GS:</i>	(Ground speed) - speed of the aircraft relative to the ground
<i>V<sub>A</sub>:</i>	Maneuvering Speed
<i>V<sub>S</sub>:</i>	Stall speed without engine power
<i>V<sub>S0</sub>:</i>	Stall speed without engine power in the landing configuration
<i>V<sub>X</sub>:</i>	Best Angle-of-Climb Speed
<i>V<sub>Y</sub>:</i>	Best Rate-of-Climb Speed
<i>V<sub>FE</sub>:</i>	Maximum Flap Extended Speed
<i>V<sub>NE</sub>:</i>	Never Exceed Speed - The speed limit that must not be exceeded at any time
<i>V<sub>NO</sub>:</i>	Maximum Structural Cruising Speed is the speed that should not be exceeded except in smooth air and then only with caution.

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### 1.11.2 Weight and Balance

<i>Reference Datum:</i>	An imaginary vertical plane from which all horizontal distances are measured for balance purposes
<i>Reference Line:</i>	fixed horizontal reference line
<i>Lever Arm:</i>	The horizontal distance from the reference datum to the center of gravity (C.G.) of an item
<i>Moment:</i>	The product of the weight of an item multiplied by its lever arm
<i>Empty Weight:</i>	Weight of the aircraft including unusable fuel, full operating liquids and full oil.
<i>Max. Takeoff Weight:</i>	Maximum permissible weight approved for the conduction of the takeoff run
<i>Useful Load:</i>	Difference between takeoff weight and basic empty weight
<i>Usable Fuel:</i>	Fuel available for flight planning
<i>Unusable fuel:</i>	Fuel remaining in the fuel tanks that cannot be safely used in flight.
<i>Center of Gravity (C.G.):</i>	The point at which the aircraft would balance if it were possible to suspend it at that point
<i>MAC:</i>	mean aerodynamic chord
<i>MTOW:</i>	maximum takeoff weight
<i>MWL:</i>	maximum landing weight
<i>MZFW:</i>	empty weight

### 1.11.3 Meteorological Terminology

<i>ISA:</i>	International Standard Atmosphere
<i>MSL:</i>	Altitude above sea level
<i>OAT:</i>	Outside Air Temperature
<i>QNH:</i>	Barometric pressure adjusted to sea level
<i>SAT:</i>	Static Air Temperature - equal to OAT
<i>VFR, Day:</i>	Beginning of morning civil twilight until end of evening civil twilight (sun 6° below horizon)
<i>VFR, Night:</i>	End of evening civil twilight until beginning of morning civil twilight (sun 6° below horizon)
<i>DVFR:</i>	Flight during the day according to visual flight rules
<i>NVFR:</i>	Flight during the night according to visual flight rules

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**1.11.4 Engine and Performance**

**TOP:** (Take-off Power) - maximum power permissible for takeoff  
**MCP:** (Max. Continuous Power) - maximum power permitted for continuous operation

**1.11.5 Various**

**Serial No. (S/N):** Serial Number of the Aircraft  
**Part No. (P/N):** Part Number  
**GFRP:** Glass Fiber Reinforced Plastic  
**CFRP:** Carbon Fiber Reinforced Plastic  
**ACL:** Anti Collision light  
**VFR:** Visual Flight Rules  
**PFD:** Primary Flight Display  
**ADC** Air-Data Computer  
**AHRS** Attitude and Heading Reference System  
**GDU** Garmin Display Unit  
**MFD** Multi-Function Display  
**AI** Attitude Indicator or Artificial Horizon  
**LDG:** Flaps - landing position  
**T/O:** Flaps - takeoff position  
**UP:** Flaps - cruise position  
**MP:** Manifold Pressure  
**COM:** Communication  
**NAV:** Navigation  
**CB:** Circuit Breaker  
**ATC:** Air Traffic Control  
**FF:** Fuel Flow  
**rpm:** revolutions per minute  
**AS:** AQUILA Supplement  
**EMS:** Engine Monitoring System  
**TCU:** Turbo Control Unit

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## 1.12 CONVERSION FACTORS

### 1.12.1 Length

$$1 \text{ ft} = 0.304 \text{ m}$$

$$1 \text{ in} = 25.4 \text{ mm}$$

### 1.12.2 Speed

$$1 \text{ kt} = 1.852 \text{ km/h}$$

$$1 \text{ mph} = 1.609 \text{ km/h}$$

### 1.12.3 Pressure

$$1 \text{ hPa} = 100 \text{ N/m}^2 = 1 \text{ mbar}$$

$$1 \text{ in. Hg} = 33.865 \text{ hPa}$$

$$1 \text{ psi} = 68.97 \text{ mbar}$$

### 1.12.4 Mass ("Weight")

$$1 \text{ lb} = 0.454 \text{ kg}$$

### 1.12.5 Volume

$$1 \text{ US Gallon} = 3.78 \text{ Liter}$$

$$1 \text{ Imperial Gallon} = 4,546 \text{ Liter}$$

### 1.12.6 Temperature

$$(t) \text{ }^\circ\text{C (Celsius)} = 5/9 ((t) \text{ }^\circ\text{F}-32)$$

$$(t) \text{ }^\circ\text{F (Fahrenheit)} = 9/5 (t) \text{ }^\circ\text{C}+32$$

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**LIMITATIONS**

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## 2.1 INTRODUCTION

This section includes all operating limitations, instrument markings and basic placards necessary for the safe operation of the aircraft, its engine, standard systems and standard equipment.

**WARNING**

*The aircraft must be operated in compliance with the operating limitations.*

The GARMIN G500 TXi Cockpit Reference Guide and the Operating Instructions for the Glass Panel Engine Monitor MVP-50P-AQ must be carried on board the aircraft and be accessible to the crew during flight.

## 2.2 AIRSPEED LIMITATIONS

The airspeeds given below are expressed in Indicated Airspeeds (IAS), the airspeed shown on the airspeed indicator:

Indicated Airspeed (IAS)	[kts]	Remarks
<b>V<sub>A</sub></b> Maneuvering speed	<b>112</b>	Do not make full or abrupt control movements above this speed. This may result in overloading the aircraft structure.
<b>V<sub>FE</sub></b> Maximum flap extended speed	<b>90</b>	Do not exceed this speed with flaps in T/O or LDG position.
<b>V<sub>NO</sub></b> Maximum structural cruising speed	<b>130</b>	Do not exceed this speed except in smooth air, and then only with caution.
<b>V<sub>NE</sub></b> Never exceed speed	<b>165</b>	Do not exceed this speed in any operational condition.

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## 2.3 AIRSPEED INDICATOR MARKINGS

The airspeeds given below are expressed in Indicated Airspeeds (IAS):

Marking (IAS)	[kts]	Remarks
White arc	<b>39-90</b>	Full flap operating range
Green arc	<b>49-130</b>	Normal operating range
Yellow arc	<b>130-165</b>	Operations in this region must be conducted with caution and only in smooth air.
Red line	<b>165</b>	Maximum speed for all operations.

## 2.4 POWER PLANT LIMITATIONS

### 2.4.1 Engine

- a) Manufacturer: BRP-ROTAX GmbH & Co KG, Gunskirchen, Austria  
b) Model: 914 F3

<b>NOTE</b>
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*The engine is equipped with a hydraulic propeller governor and drives the propeller via a reduction gearbox. The gearbox reduction ratio is 2.43 : 1.*

*The tachometer indicates the propeller speed. As a result, all rpm readings in this manual are expressed as propeller speeds, unlike the data in the Engine Operator's Manual.*

- c) Power Plant Limitations

Maximum Takeoff Power:	113.3 BHP (84.5 kW)
Maximum Takeoff Prop Speed (5 min.):	2385 RPM
Maximum Continuous Power:	98.6 BHP (73.5 kW)
Maximum Continuous Prop Speed:	2260 RPM

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d) Oil Pressure

Minimum: 11.6 psi (0.8 bar) below 590 RPM  
 Normal: 29 –72.5 psi (2.0-5.0 bar) above 590 RPM  
 Maximum during a cold start: 101.5 psi (7.0 bar)  
 (only for a short time)

e) Fuel Pressure\*

Minimum: 2.2 psi (0.15 bar)  
 Maximum: 5.1 psi (0.35 bar)

f) Manifold Pressure

Maximum (MCP): 35 inHg  
 Maximum (TOP, 5 min): 40 inHg

g) Oil Temperature

Maximum: 266 °F (130 °C)  
 Minimum: 122 °F ( 50 °C)

h) Cylinder Head Temperature (CHT)

Maximum: 248 °F (120 °C)

i) Minimum temperature to start the engine

Minimum: -13 °F (-25 °C)  
 At an OAT below -13 °F (-25 °C) the engine must be preheated.

### 2.4.2 Propeller

a) Manufacturer: mt-Propeller Entwicklung GmbH, Atting, Germany

b) Model: MTV-21-A/175-05

c) Propeller diameter: (68.9 in) 1,75 m

d) Propeller speed limitations

Maximum take-off propeller speed (max. 5 min): 2385 RPM

Maximum continuous propeller speed: 2260 RPM

\* Difference of fuel pressure minus airbox pressure

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## 2.5 MARKINGS ON THE ENGINE MONITOR MVP-50P-AQ

The following table shows the instrument markings shown on the MVP-50P-AQ and their meaning.

MVP-50P-AQ	Red Line (minimum)	Green Arc (normal operating range)	Yellow Arc (caution)	Red Line (maximum)
Tachometer [RPM]	---	535 – 2260	2260 - 2385	2385
Oil Temperature [°F] [°C]	122 (50)	122 - 266 (50 – 130)	---	266 (130)
Cylinder Head Temperature [°F] [°C]	---	---	---	248 (120)
Oil Pressure [psi] [bar]	11.6 (0.8)	29 – 72.5 (2.0 – 5.0)	11.6 – 29 (0.8 – 2.0) 72.5 – 101.5	101.5 (7.0)
Fuel Pressure [psi] [bar]	2.2 (0.15)	2.2 – 5.1 (0.15 – 0.35)	---	5.1 (0.35)
Manifold Pressure [inHg]	---	0 – 35	35 – 40	40
Voltmeter [V]	11	12.5 – 15.5	11 – 12.5	15.5
Amperemeter BAT [A]	---	-3 – +100	< -3	---
Amperemeter ALT1 [A]	-5	+1 – +42	-5 – +1 > +42	---
Amperemeter ALT2 [A]	---	-3 – +20	< -3 > +20	---

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## 2.6 WEIGHT LIMITS

Maximum Takeoff Weight	1653 lb	(750 kg)
Maximum Landing Weight	1653 lb	(750 kg)
Max. Weight in Baggage Compartment	88.2 lb	( 40 kg)

**WARNING**

*Exceeding the weight limits can overload the aircraft and is prohibited. In addition, aircraft performance and handling characteristics may be detrimentally affected. The stall speed will increase, so that the instrument markings are no longer accurate.*

## 2.7 CENTER OF GRAVITY LIMITS

The reference datum is located at the wing leading edge, at the fuselage-wing junction. With the aircraft leveled, the reference datum and the vertical fall in a plane.

The center of gravity must be within the following limits:

Forward Limit:	16.8 in.	(0.427 m)	aft of Datum
Rearward Limit:	20.6 in.	(0.523 m)	aft of Datum

**WARNING**

*Exceeding the center of gravity limits is prohibited. Exceeding the limits reduces the controllability and stability of the aircraft.*

The procedure to determine the center of gravity location for flight is provided in Section 6 of this handbook.

## 2.8 MANEUVER LIMITS

The aircraft is certificated in accordance to the JAR-VLA. That certification includes the following maneuvers:

- a) All normal, non acrobatic maneuvers.
- b) Stalls: Wings level stall
- c) Steep Turns: Angle of Bank  $\leq 60^\circ$
- d) Chandelle: Entry Speed 120 kts
- e) Lazy Eight: Entry Speed 110 kts

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**NOTE**

*All acrobatic maneuvers as well as maneuvers with a bank angle exceeding 60° are prohibited.*

## 2.9 FLIGHT LOAD FACTORS

The following flight load factors may not be exceeded while performing any approved maneuvers.

Flight Load Factor [g]	at V <sub>A</sub>	at V <sub>NE</sub>	With Flaps Extended
Positive	4.0	4.0	2.0
Negative	-2.0	-2.0	0

**WARNING**

*Exceeding the flight load factors limits may result in damage to the aircraft structure.*

**CAUTION**

*Maneuvers that include intentional negative flight load factors are not permitted.*

*Intentional Spinning is not permitted.*

## 2.10 CREW

Maximum number of people on board: 2

Minimum crew: 1 Pilot

With only one person on board, the aircraft may only be operated from the left seat.

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## 2.11 KINDS OF OPERATION LIMITS / MINIMUM EQUIPMENT

Certified for: visual flights by Day and Night

Table 1	For VFR by Day and Night*
Flight and navigational instruments	<ul style="list-style-type: none"> <li>• Garmin G500 TXi</li> <li>• Magnetic Compass</li> <li>• Working timepiece with a seconds hand **</li> <li>• VHF Transceiver ***</li> <li>• GPS Receiver Garmin 400W/500W Series or GTN (6XX/7XX)</li> <li>• Attitude Indicator<sup>1</sup> (standby AI, e.g. Garmin G5)</li> <li>• Airspeed indicator<sup>1</sup> (standby ASI, e.g. Garmin G5)</li> <li>• Altimeter<sup>1</sup> (standby Baro-ALT, e.g. Garmin G5)</li> <li>• Transponder with altitude encoding or a Transponder without altitude encoding plus an altimeter</li> </ul>
Power Plant Instruments	<ul style="list-style-type: none"> <li>• MVP-50P-AQ</li> <li>• Annunciator panel AP7DAQ</li> <li>• BAT2</li> <li>• TCU</li> </ul>
Lighting	<ul style="list-style-type: none"> <li>• Position lights</li> <li>• Anti Collision Lights</li> <li>• Landing Lights</li> <li>• Instrument lighting</li> <li>• Cabin lighting</li> <li>• Flashlight</li> </ul>
Other Equipment	<ul style="list-style-type: none"> <li>• Seat belts for each occupied seat</li> <li>• Emergency Hammer</li> <li>• Battery ≥ 34 Ah</li> <li>• Alternator ALT 2</li> </ul>

\* The minimum equipment listed in Table 1 is valid for Germany. Other countries may require different minimum equipment. This may depend on the type of flight being carried out and the route being flown.

\*\* In Germany a watch with a seconds hand may be used as a working timepiece. Please observe all differing national regulations.

\*\*\* In Germany a VHF Transceiver is not required for flights that do not leave the vicinity of an uncontrolled airfield (§4 Abs. 3 FSAV). Regulations of other nations must still be observed.

<sup>1</sup> Electrically independent from the on-board power supply for at least 30 min. flight time (e.g. back-up battery in the Garmin G5)

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**NOTE**

*For specific operations, additional equipment may be necessary. It is the aircraft operator's responsibility to observe the applicable requirements.*

**2.12 FUEL LIMITATIONS**

	<u>Left Fuel Tank</u>	<u>Right Fuel Tank</u>
Fuel capacity (total):	15.85 US gal (60.0 l)	15.85 US gal (60.0 l)
Usable fuel (total):	14.48 US gal (54.8 l)	14.48 US gal (54.8 l)
Unusable fuel:	1.37 US gal (5.2 l)	1.37 US gal (5.2 l)

For approved fuel grades, please refer to paragraph 1.8.

**CAUTION**

*To ensure both fuel tanks are emptied evenly, switch to the other tank at least every 60 minutes.*

**NOTE**

*The amount of unusable fuel was determined with flap on LDG and  $V_{FE} = 90$  kts. It is the worst case fuel supply configuration within section 4 "NORMAL PROCEDURES".*

**NOTE**

*The fuel quantity, fuel used and fuel remaining functions of the G500 TXi / MVP-50 are advisory information only and must be verified by the pilot.*

**2.13 TEMPERATURE LIMITATIONS**

Parts of the aircraft structure that are exposed to direct vertical sunlight must be painted WHITE.

The cooling system of the engine was certified up to ISA +23°C.

For climbing in OAT higher than ISA +23°C an appropriate airspeed of more than  $v_y$  has to be selected by the pilot.

**2.14 OPERATING ALTITUDE**

The Aquila AT01-200 has a maximum operating altitude of 16,400 ft.

For flights over FL120 an appropriate oxygen supply for all persons aboard is recommended. Furthermore national regulations may be considered if applicable.

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## 2.15 PLACARDS

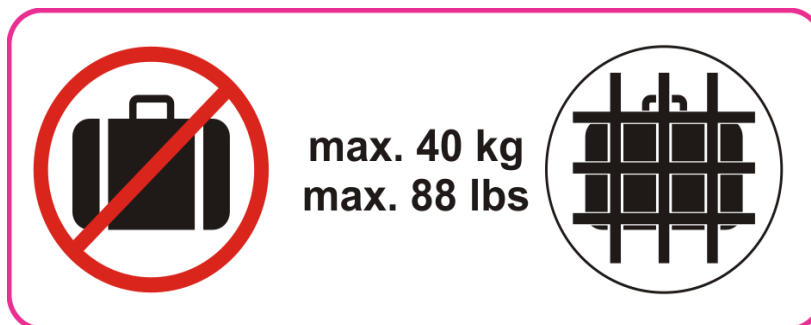
- 1) On the instrument panel, in the lower middle section of the panel:

This aeroplane is classified as VLA (Very Light Aeroplane) for Day and Night VFR in non-icing conditions. All aerobatic maneuvers including intentional spinning are prohibited. See Flight Manual for other limitations.

- 2) On the instrument panel below the Airspeed Indicator:

**Maneuvering Speed  
VA = 112 kts**

- 3) On the inner surface of the baggage compartment door:



- 4) On the instrument panel next to the main switches:

**CAUTION**  
Electric Main Fuel Pump  
BAT2 ON for Flight  
OFF for Parking

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## SECTION 3

### EMERGENCY PROCEDURES

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### 3.1 INTRODUCTION

This section provides checklists with the recommended procedures for coping with various emergency situations.

Emergencies caused by aircraft or engine malfunctions are extremely rare if all pre-flight inspections and required maintenance is properly conducted.

However, should an emergency situation occur, the procedures provided here are recommended to correct the problem and master the situation.

Not all types of emergency situations or combinations can be described in the POH. A pilot must therefore always use good airmanship and have a sound knowledge of the aircraft and its systems.

#### 3.1.1 Resetting Circuit-breakers

The **one time only** resetting of a tripped circuit breaker or safety switch is considered a recommendation for the following emergency procedures.

Applicable for all switches:            pushing the top = ON; pushing the bottom = OFF

**CAUTION**

*A tripped circuit breaker or safety switch should only be reset if it is needed for continued safe flight and landing. In extreme cases, resetting a circuit breaker may cause an electrical fire.*

*A circuit breaker or safety switch should only be reset **once** and be inspected after flight.*

### 3.2 AIRSPEEDS FOR EMERGENCY OPERATION

Airspeed (IAS)		[kts]
Maneuvering speed	V <sub>A</sub>	112
Speed for best glide ratio		
Flaps	UP	78
Flaps	T/O	73
Precautionary landing with / without engine power		
Flaps	LDG	60
Landing without engine power		
Flaps	T/O	65
Flaps	UP	70

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### 3.3 ENGINE FAILURES – CHECKLISTS

#### 3.3.1 Engine Failure before Take-off

1. Throttle IDLE
2. Brakes APPLY as required

#### 3.3.2 Engine Failure Immediately After Take-off and during Climb

1. Airspeed (IAS) 70 KIAS

<b>WARNING</b>
----------------

*Depending on the own speed and altitude, the wind condition and the remaining engine power a forced landing must be initiated under consideration of the local conditions.*

*Turning back to the runway only at adequate altitude, otherwise land straight ahead ! Pay attention to the speed !*

Check the following items (if time allows):

2. Fuel selector valve SWITCH to fullest or other tank
3. **Fuel Pump AUX** switch ON
4. Ignition switch BOTH
5. Throttle wide OPEN
6. Propeller control lever HIGH RPM position
7. Choke PRESS (OFF)
8. Carburetor heat PULL (ON)

Before landing (if possible):

9. Fuel selector valve OFF
10. Ignition switch OFF
11. **ALT1 / BAT** switch OFF
12. **ALT2 / BAT** switch OFF

<b>WARNING</b>
----------------

*With **ALT1 / BAT** switch in OFF position: Stall warning system inoperative and flap position cannot be changed!*

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### 3.3.3 In-flight Engine Failures

#### A) ENGINE ROUGHNESS

- |                                |   |
|--------------------------------|---|
| 1. Carburetor heat             | PULL (ON)   |
| 2. <b>Fuel Pump AUX</b> switch | ON  |
| 3. Ignition switch             | SWITCH through the positions<br>L-BOTH, then R-BOTH |
| 4. Throttle                    | Maintain setting                                    |
| If roughness continues:        |   |
| 5. Throttle                    | REDUCE to min. required for flight                  |
| 6. Precautionary Landing       | PERFORM (see 3.4.1)                                 |

#### B) LOSS OF OIL PRESSURE

- |   |  |
|---|--|
| 1. Oil Temperature  | CHECK  |
| If oil pressure sinks below the green range and the oil temperature remains normal: |  |
| 2. Land at the nearest airfield   |  |
| If oil pressure sinks below the green range and the oil temperature rises:          |  |
| 2. Throttle   | REDUCE to min. required for flight             |
| 3. Precautionary landing  | PERFORM (see 3.4.1), Engine may fail suddenly! |

#### C) LOSS OF FUEL PRESSURE

- |                                |  |
|--------------------------------|--|
| 1. <b>Fuel Pump AUX</b> switch | ON   |
| 2. Fuel selector valve         | SWITCH to fullest or other tank  |
| 3. Throttle                    | REDUCE to min. required for flight, if possible (Manifold pressure below air pressure) |
| 4. <b>Fuel Pump AUX</b> switch | OFF, when fuel pressure in green range   |

<b>NOTE</b>
-------------

*After switching fuel tanks, it may take up to 8 seconds for full fuel pressure to be built up.*

If fuel pressure remains below the green range:

- |                          |  |
|--------------------------|--|
| 5. Precautionary landing | PERFORM (see 3.4.1), Engine may fail suddenly! |
|--------------------------|--|

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D) SUDDEN LOSS OF MANIFOLD PRESSURE & PROPELLER RPMI. TCU warning light (YELLOW) is NOT blinking - possible Turbocharger defect (loud Bang?)

- |    |                         |  |
|----|-------------------------|--|
| 1. | Throttle                | KEEP manifold pressure in green range          |
| 2. | Propeller control lever | KEEP RPM in green range                        |
| 3. | Oil pressure gauge      | MONITOR  |
| 4. | Precautionary landing   | PERFORM (see 3.4.1), Engine may fail suddenly! |

II. TCU warning light (YELLOW) is blinking - waste gate is not closing

- |    |                            |  |
|----|----------------------------|--|
| 1. | Throttle                   | KEEP manifold pressure in green range                        |
| 2. | Propeller control lever    | KEEP RPM in green range                                      |
| 3. | <b>TCU</b> switch          | OFF<br>(Cover up, switch down)                               |
| 4. | <b>TCU</b> circuit breaker | PULL   |
| 5. | <b>TCU</b> circuit breaker | after 5 seconds PRESS  |
| 6. | <b>TCU</b> switch          | after 10 seconds (TCU self-test completed)<br>ON (switch up) |

If the situation does not improve:

- |    |                       |  |
|----|-----------------------|--|
| 7. | Precautionary landing | PERFORM (see 3.4.1), Engine may fail suddenly! |
|----|-----------------------|--|

**WARNING**

*If there is a failure of the Turbocharger or a waste gate fixed in open position, an engine power of 66kW (88,5 BHP) is remaining.*

*(see section 5 for resulting take-off distance and remaining climb rate for balked landing)*

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E) SUDDEN INCREASE OF MANIFOLD PRESSURE & PROPELLER RPMI. TCU warning light (YELLOW) is blinking - waste gate closed

1. Throttle KEEP manifold pressure in green range
2. Propeller control lever KEEP RPM in green range
3. Precautionary landing PERFORM (see 3.4.1)

**WARNING**

*If the waste gate is closed, only a distinctly reduced engine power is available.*

II. TCU warning light (YELLOW) is NOT blinking - gas bowden cable broken

1. Throttle REDUCE to min. required for flight
2. Propeller control lever KEEP RPM in green range

If manifold pressure cannot be reduced:

3. Throttle wide OPEN (increase engine power until engine is running as calm as possible)
4. Propeller control lever KEEP RPM in green range

When safe approach altitude for nearest landing field is reached:

5. Perform emergency landing with engine off according to section 3.4.2.

If the situation does not improve:

**WARNING**

*When the gas Bowden cable is broken, the spring-loaded throttle valve is opening in the carburetor completely (take-off power 115% MCP). With the failure only on one side the engine will run very roughly and only by setting full throttle on the still controllable carburetor safe climbing is still possible. For landing the engine has to be turned off at a safe altitude.*

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F) OSCILLATION OF MANIFOLD PRESSURE & PROPELLER RPM

I. TCU warning light (YELLOW) is NOT blinking - Malfunction TCU

- |    |                            |  |
|----|----------------------------|--|
| 1. | Throttle                   | mittlere Position (Wastegate offen)                          |
| 2. | Propeller control lever    | Drehzahl im zulässigen Bereich halten                        |
| 3. | <b>TCU</b> switch          | OFF<br>(Cover up, switch down)                               |
| 4. | <b>TCU</b> circuit breaker | PULL   |
| 5. | <b>TCU</b> circuit breaker | after 5 seconds PRESS  |
| 6. | <b>TCU</b> switch          | after 10 seconds (TCU self-test completed)<br>ON (switch up) |

When there is no stabilisation:

- |    |                         |                                       |
|----|-------------------------|---------------------------------------|
| 6. | <b>TCU</b> switch       | OFF (switch down)                     |
| 7. | Throttle                | KEEP manifold pressure in green range |
| 8. | Propeller control lever | KEEP RPM in green range               |
| 9. | Precautionary landing   | PERFORM (see 3.4.1)                   |

**WARNING**

*Depending on the last waste gate position, without a working TCU there is only a distinctly reduced engine power available.*

G) EXCEEDANCE OF THE MAXIMUM ALLOWABLE MANIFOLD PRESSURE OR OF THE MAXIMUM DURATION FOR OPERATION WITH TAKE-OFF POWER

I. BOOST warning light (RED) is illuminated - Exceedance of max manifold pressure (40inHg)

- |    |                         |                                       |
|----|-------------------------|---------------------------------------|
| 1. | Throttle                | KEEP manifold pressure in green range |
| 2. | Propeller control lever | KEEP RPM in green range               |
| 3. | <b>TCU</b> switch       | check, if ON (switch up)              |

If there is no switch failure - **Malfunction of TCU likely! (refer to 3.3.3 F)**

II. BOOST warning light (RED) is blinking - Exceedance of max. duration for TOP (5 min)

- |    |                         |                                       |
|----|-------------------------|---------------------------------------|
| 1. | Throttle                | KEEP manifold pressure in green range |
| 2. | Propeller control lever | KEEP RPM in green range               |
| 3. | Flight                  | CONTINUE                              |

**WARNING**

*Every exceedance indicated by BOOST warning light has to be recorded in the bordbook together with information regarding type, duration and date of the exceedance! Exceedances of less than 3 seconds will not be indicated.*

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H) ENGINE RESTART PROCEDURE WITH STOPPED PROPELLER

- |    |                                    |                                |
|----|------------------------------------|--------------------------------|
| 1. | Non-essential electrical equipment | OFF                            |
| 2. | <b>ALT1 / BAT</b> switch           | ON                             |
| 3. | <b>ALT2 / BAT2</b> switch          | ON                             |
| 4. | Propeller control lever            | HIGH RPM position              |
| 5. | Fuel selector valve                | SWITCH to fullest tank         |
| 6. | <b>Fuel Pump AUX</b> switch        | ON                             |
| 7. | Throttle                           | warm engine<br>cold engine     |
|    |                                    | OPENED 2 cm (0,8 inch)<br>IDLE |
| 8. | Choke                              | warm engine<br>cold engine     |
|    |                                    | PUSHED (OFF)<br>PULL (ON)      |
| 9. | Ignition switch                    | BOTH, then START               |

When power is restored:

- |     |                      |                         |
|-----|----------------------|-------------------------|
| 10. | Oil pressure         | CHECK                   |
| 11. | Choke                | PUSHED (OFF)            |
| 12. | Electrical equipment | SWITCH ON (as required) |
| 13. | Oil temperature      | CHECK                   |

**NOTE**

*The engine can also be restarted by Windmilling if the airspeed is increased to approx. 120 kts.  
Approx. 1000 ft / 300 m of altitude is required in this method.*

I) ENGINE RESTART PROCEDURE WITH WINDMILLING PROPELLER

At airspeeds above 60 kts the propeller continues to windmill with the engine off.

- |    |                             |                                 |
|----|-----------------------------|---------------------------------|
| 1. | Airspeed                    | 78 KIAS                         |
| 2. | <b>ALT1 / BAT</b> switch    | ON                              |
| 3. | <b>ALT2 / BAT2</b> switch   | ON                              |
| 4. | Fuel selector valve         | SWITCH to fullest or other tank |
| 5. | Propeller control lever     | HIGH RPM position               |
| 6. | <b>Fuel Pump AUX</b> switch | ON                              |
| 7. | Ignition switch             | BOTH                            |
| 8. | Throttle                    | hot engine<br>cold engine       |
|    |                             | OPENED 2 cm (0,8 inch)<br>IDLE  |
| 9. | Choke                       | hot engine<br>cold engine       |
|    |                             | PUSHED (OFF)<br>PULL (ON)       |

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When power is restored:

- |     |                      |                         |
|-----|----------------------|-------------------------|
| 10. | Oil pressure         | CHECK                   |
| 11. | Choke                | PUSHED (OFF)            |
| 12. | Electrical equipment | SWITCH ON (as required) |
| 13. | Oil temperature      | CHECK                   |

### 3.4 FORCED LANDINGS

Generally the flight path should always be chosen such that, in the event of an emergency, a suitable landing field can be reached.

**CAUTION**

*If, after a forced landing, the aircraft flips over, an emergency hammer can be used to break through the canopy. For this purpose an emergency hammer is attached to back of the right hand seat.*

#### 3.4.1 Precautionary Landing

**NOTE**

*A precautionary landing occurs when the pilot decides to discontinue flight to avoid a situation degrading into an emergency. This way the pilot has time to make decisions and choose an adequate landing site or divert to an airfield. The procedure for a precautionary landing is fundamentally the same as a normal landing, which is described in Section 4.*

*The choice of the landing field is here of particular importance.*

*Deteriorating weather is a leading cause of precautionary landings.*

- |    |  |  |
|----|--|--|
| 1. | Locate Suitable Field  | CONSIDER wind direction, terrain and obstructions. |
| 2. | Seat Belts and Harnesses   | TIGHT  |
| 3. | Initiate descent   |  |
| 4. | If possible: Overfly landing site at a low altitude and inspect (wind direction, terrain and obstructions) |  |
| 5. | Abeam the touchdown point:   |  |
|    | Throttle   | AS REQUIRED  |
|    | Propeller Control Lever  | HIGH RPM position                                  |
|    | Carburetor Heat  | PULL (ON)  |
|    | <b>Fuel Pump AUX</b> switch  | ON   |
|    | Flaps  | LDG  |
|    | Airspeed   | 60 KIAS  |

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6. Touch down with lowest possible airspeed.
7. After touchdown:
 

Brakes	APPLY as required
Fuel selector valve	OFF
Ignition switch	OFF
<b>ALT1 / BAT</b> switch	OFF
<b>ALT2 / BAT2</b> switch	OFF

### 3.4.2 Emergency Landing

**NOTE**

*An emergency landing occurs in a state of distress, such as an engine failure, fuel starvation or mechanical problems with the aircraft. In this case a pilot typically has significantly less time to choose a landing site compared with a precautionary landing.*

1. Airspeed:
 

Flaps in LDG position	60 KIAS
Flaps in T/O position	65 KIAS
Flaps in UP position	70 KIAS
2. Fuel selector valve OFF
3. Ignition switch OFF
4. Seat belts and harnesses TIGHT
5. COM (ATC) REPORT location and intention
6. **ALT1 / BAT** switch OFF
7. **ALT2 / BAT2** switch OFF
8. ELT if necessary activate manually

**WARNING**

*With **ALT1 / BAT** switch in OFF position: Stall warning system inoperative and flap position cannot be changed!*

## 3.5 SMOKE AND FIRE

### 3.5.1 Engine Fire on the Ground

1. Fuel selector valve OFF
2. Throttle WIDE OPEN
3. **ALT1 / BAT** switch OFF
4. **ALT2 / BAT2** switch OFF
5. Ignition switch OFF
6. Aircraft EVACUATE immediately once engine stops

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### 3.5.2 Engine Fire In-flight

1. Throttle WIDE OPEN
2. Fuel selector valve OFF
3. Cabin heat PUSHED (OFF)
4. Canopy slide-window OPEN
5. Perform a precautionary landing without engine power as described in Section 3.4.2

### 3.5.3 Electrical Fire with Smoke on the Ground

1. **ALT1 / BAT** switch OFF
2. **ALT2 / BAT2** switch OFF

If engine is running:

3. Throttle IDLE
4. Fuel selector valve OFF
5. Ignition switch OFF
6. Canopy OPEN
7. Fire extinguisher (if installed) USE as required

### 3.5.4 Electrical Fire with Smoke in Flight

1. **ALT1 / BAT** switch OFF
2. **ALT2** switch OFF (**BAT2** still ON)
3. **Avionics** switch OFF
4. All switches (except Ignition) OFF
5. Cabin ventilation and canopy slide-window OPEN
6. Flashlight ON
7. Fire extinguisher (if installed) Use only if smoke persists
8. Land immediately Refer to Section 3.4 Forced Landings

After landing and aircraft comes to a halt:

9. Engine Shut down
10. Canopy OPEN
11. After engine stops Evacuate aircraft

**CAUTION**

*When a large amount of smoke is present or the fire extinguisher has been used, ventilate the cabin by unlocking the canopy latch. If possible, the fire extinguisher should be secured after use.*

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**WARNING**

*Turning the **ALT1 / BAT** and **ALT2** switches OFF turns off all electrical and electronic equipment, including the flaps, stall warning and landing light!*

**3.6 INADVERTENT FLIGHT IN ICING CONDITIONS****WARNING**

*Intentional flight in icing conditions is prohibited. During unintentional flight in icing conditions proceed as follows:*

1. Carburetor heat PULL (ON)
2. Leave icing conditions immediately by flying a reciprocal heading and/or changing altitude
3. **P/S Heat** switch (if installed) ON
4. Propeller Control Lever HIGH RPM position
5. Cabin heat PULL (ON)
6. Move the control surfaces periodically to keep them from freezing.

**CAUTION**

*The stall speed increases with ice accumulation on the wing leading edge.*

*Airspeed indicator, altimeter and vertical speed indicator readings may be inaccurate with ice accumulation on the leading edge of the wing. Additionally, the stall warning system may be inoperative or may not work correctly.*

**3.7 SPIN RECOVERY PROCEDURE**

1. Rudder Full deflection opposite direction of rotation
2. Elevator Neutral or slightly forward
3. Aileron Neutral
4. Throttle IDLE
5. Flaps UP
6. Rudder Neutral when rotation stops
7. Elevator Carefully ease out of dive

Make a smooth recovery from the dive to regain level flight attitude. Do not exceed  $V_{NE}$ .

**WARNING**

*During spin recovery, adherence to the recovery sequence is essential!*

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### 3.8 POWER-OFF GLIDE

Achievable gliding distances vary depending on altitude and current wind conditions. This is very important when choosing a landing site or reaching a near-by airfield.

To achieve maximum gliding distance:

1. Flaps UP
  2. Airspeed 78 KIAS
  3. Demonstrated glide ratio 14
- This means approx. 2.3 NM can be covered for every 1000 ft of altitude (no wind)

<b>NOTE</b>
-------------

*Headwinds, tailwinds and wing contamination can significantly influence the distance achievable in glide.*

### 3.9 LANDING WITH A FLAT TIRE

When landing with a defective tire, or this is suspected, proceed as follows:

1. Flaps LDG position
2. Perform touch down on the side of the runway opposite the defective tire. This allows the use of the entire runway width to correct any directional changes caused by the defective tire. (for example: left tire defective, land on the right side of the runway)
3. Perform touch down with the undamaged main tire first. Lower nose wheel as quickly as possible to improve controllability on the ground.
4. Roll out with full aileron deflection in the direction of the undamaged main tire. This reduces the load on the damaged tire.
5. When landing with a defective or damaged nose wheel:  
Touch down with minimum speed.  
Keep nose wheel off the ground as long as possible.

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## 3.10 ELECTRICAL SYSTEM MALFUNCTIONS

### 3.10.1 Complete Electrical System Failure

- |  |                  |
|--|------------------|
| 1. Flight attitude                         | STABILIZE        |
| 2. Flashlight                              | ON               |
| 3. <b>ALT1 / BAT</b> switch                | CHECK if ON      |
| 4. <b>ALT2 / BAT2</b> switch               | CHECK if ON      |
| 5. <b>BAT</b> circuit breaker (see 3.1.1)  | RESET if tripped |
| 6. <b>ALT1</b> circuit breaker (see 3.1.1) | RESET if tripped |
| 7. <b>ALT2</b> circuit breaker (see 3.1.1) | RESET if tripped |

If power cannot be restored, it is recommended to use the flashlight for the instruments and:

- |                            |   |
|----------------------------|---|
| 8. Throttle                | below 100% indexed position (increase engine power until engine is running as calm as possible) |
| 9. Propeller control lever | below MCP marking   |
| 10. Precautionary Landing  | PERFORM (see 3.4.1), Engine may fail suddenly!  |

**WARNING**

*In case of a complete electrical system failure the Main fuel pump is automatically separated from the remaining on-board power supply by a relay. It is supplied with electricity from Alternator 2 directly. In this condition the TCU is not controlling the turbocharger anymore and, depending on the last waste gate position, there may be a distinctly reduced engine power available.*

**WARNING**

*Failure of all electrical instruments (PFD, Engine Monitoring), stall warning system inoperative and flap position cannot be changed!*

**WARNING**

*Before returning the aircraft to service, problems must be investigated and damages must be resolved.*

Possibilities for stabilizing the attitude at N/VFR:

- ⇒ Visual external references (e.g. horizon, lights on ground)
- ⇒ Standby Attitude Indicator with its own battery (e.g. GARMIN G5 AI, if installed)

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**3.10.2 Battery discharges (BAT)**

Warning light **ENG** (RED) with ammeter values **ALT1** and/or **ALT2** shown in RED and thus **BAT** shown in YELLOW (with or without **ALT1** and/or **ALT2** warning light is illuminated)

If an ammeter value for BAT is shown in YELLOW on the MVP, the power supply of both alternators into the on-board electricity system is insufficient - Battery is discharging.

- |            |  |
|------------|--|
| 1. Ammeter | CHECK for defect Alternator(s)<br>for <b>ALT1</b> acc. point 3.10.3<br>for <b>ALT2</b> acc. point 3.10.4 |
|------------|--|

if **both alternators are defect:**

- |   |                     |
|---|---------------------|
| 2. <b>Fuel Pump AUX</b> switch  | CHECK, if ON        |
| 3. <b>ALT1</b> switch   | CHECK, if OFF       |
| 4. <b>ALT1</b> circuit breaker  | CHECK, if PULLED    |
| 5. <b>ALT2 / BAT2</b> switch  | CHECK, if OFF       |
| 6. <b>ALT2</b> circuit breaker  | CHECK, if PULLED    |
| 7. <b>ALT2 Disconnect</b> circuit breaker   | CHECK, if PULLED    |
| 8. Brightness level of all additional instruments not necessary for the safe continuation of the flight has to be reduced to half or the instruments have to be turned off. |                     |
| 9. Ammeter and voltmeter  | MONITOR             |
| 10. Precautionary Landing   | PERFORM (see 3.4.1) |

**WARNING**

*The MAIN fuel pump is no longer supplied with electricity in case alternator 2 (ALT2) has failed and the fuel pump is separated from the remaining on-board power supply by turning ALT2 switch off. In this case the AUX fuel pump is the only fuel supply for the engine.*

**WARNING**

*A properly maintained and fully charged battery alone is able to supply all necessary systems with electricity for at least 30 minutes. The illuminating of the ENG (YELLOW) warning light with BAT ammeter values shown in YELLOW are indicating the beginning of the 30 minute period. After 30 minutes engine failure due to failure of the remaining AUX fuel pump has to be expected.*

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**3.10.3 Alternator 1 (ALT1) failure**

Warning light **ENG** (RED) with ammeter values **ALT1** shown in RED and / or **ALT1** warning light is illuminated

1. **ALT1** switch SWITCH through OFF – ON, approx. 10 sec. break
2. **ALT 1** circuit breaker (see 3.1.1) PUSH, if tripped

If **ALT1** or **ENG** warning light is still illuminated because of **Amp ALT 1**:

3. **ALT1** circuit breaker PULL
4. **ALT1** switch OFF
5. Brightness level of all additional instruments not necessary for the safe continuation of the flight has to be reduced to half or the instruments have to be turned off.
6. Ammeter and voltmeter MONITOR
7. Precautionary Landing PERFORM (see 3.4.1)

**NOTE**

*The remaining Alternator 2 (ALT 2) is delivering approx. 15A into the on-board power supply and a properly maintained and fully charged battery alone is able to supply all necessary systems with electricity for at least 30 minutes.*

*Despite the pilot turned off the audio panel it is still possible to radio with COM1 via the headset because the audiopanel is establishing a connection even if it is turned off (failsave design). Intercom functionality ist not possible anymore.*

**WARNING**

*Before returning the aircraft to service, problems must be investigated and damages must be resolved.*

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### 3.10.4 Alternator 2 (ALT2) failure

Warning light **ENG** (RED) with ammeter values **ALT2** shown in RED and / or **ALT2** warning light is illuminated

- |  |                  |
|--|------------------|
| 1. Fuel pump <b>AUX</b> switch                       | ON               |
| 2. <b>ALT2 / BAT2</b> switch                         | check, if ON     |
| 3. <b>ALT2</b> circuit breaker(see 3.1.1)            | PUSH, if tripped |
| 4. <b>ALT2 Disconnect</b> circuit breaker(see 3.1.1) | PUSH, if tripped |

If **ALT2** or **ENG** warning light is still illuminated because of **Amp ALT2**:

- |   |                     |
|---|---------------------|
| 5. <b>ALT2</b> and <b>ALT2 Disconnect</b> circuit breaker   | PULL                |
| 6. <b>ALT2 / BAT2</b> switch  | OFF                 |
| 7. Brightness level of all additional instruments not necessary for the safe continuation of the flight has to be reduced to half or the instruments have to be turned off. |                     |
| 8. Ammeter and voltmeter  | MONITOR             |
| 9. Precautionary Landing  | PERFORM (see 3.4.1) |

**WARNING**

*The MAIN fuel pump is no longer supplied with electricity in case alternator 2 (ALT2) has failed and the fuel pump is separated from the remaining on-board power supply by turning ALT2 switch off. In this case the AUX fuel pump is the only fuel supply for the engine.*

**NOTE**

*The remaining Alternator 1 (ALT1) is delivering approx. 42A into the on-board power supply and a properly maintained and fully charged battery alone is able to supply all necessary systems with electricity for at least 30 minutes.*

*Despite the pilot turned off the audio panel it is still possible to radio with COM1 via the headset because the audiopanel is establishing a connection even if it is turned off (failsave design). Intercom functionality is not possible anymore!*

**WARNING**

*Before returning the aircraft to service, problems must be investigated and damages must be resolved.*

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### 3.10.5 Low Voltage Indication

#### A) On the ground (voltmeter values YELLOW or RED)

1. Engine speed Increase RPM until value turns GREEN (RPM should be below 1350)
2. All non-essential equipment OFF, until value turns GREEN.
3. If the value remains YELLOW or RED Do not fly before problem is eliminated.

#### B) In flight (voltmeter values YELLOW or RED)

1. All non-essential equipment OFF, until value turns from YELLOW to GREEN or from RED to YELLOW
2. If the value remains YELLOW or RED CHECK ammeter for defective alternator(s)  
for **ALT1 + ALT2** acc.section 3.10.2  
for **ALT1** acc. section 3.10.3  
for **ALT2** acc. section 3.10.4

#### C) During approach and landing (voltmeter value YELLOW or RED)

1. After landing Proceed in accordance with section 3.10.5 A)

<b>WARNING</b>
----------------

*If, at any point, the voltmeter value turns RED, land at the nearest airfield and solve the problem before continuing flight.*

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### 3.11 FLAP CONTROL SYSTEM MALFUNCTIONS

#### FLAP POSITION INDICATOR or FLAP ACTUATOR MALFUNCTION

1. **Flap Actuator** circuit breaker (see 3.1.1) RESET, if tripped
2. **Flap Control** circuit breaker (see 3.1.1) RESET, if tripped
3. Flap position visually CONFIRM on the left wing
4. Airspeed maintain within the WHITE ARC on the airspeed indicator
5. Flap switch switch through all positions.

If the flap actuator is inoperative or the flap position indicator reading is incorrect, approach and landing must be conducted at airspeed safe for the current flap setting.

**WARNING**

*During landings with the flaps not in the landing position, stall speed and landing distance increase.*

### 3.12 TRIM CONTROL SYSTEM FAILURES

#### 3.12.1 Trim System Inoperative

1. **Elevator Trim** circuit breaker (see 3.1.1) RESET, if tripped
2. Trim switch repeatedly PRESS “Nose UP” and then “Nose Down”

**NOTE**

*An inoperative trim system does not affect aircraft controllability. However, the control stick forces are considerably higher and may reach up to 22 lb (10kg).*

3. Land at the nearest airfield.

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### 3.12.2 Trim Actuator Runaway

1. Control Column HOLD in position
2. **Elevator Trim** circuit breaker PULL
3. Trim switch CHECK if pressed or jammed

If the problem is obvious, and can be solved:

4. **Elevator Trim** circuit breaker (see 3.1.1) RESET

<b>NOTE</b>
-------------

*Approx. 8 seconds are required to trim from full nose-down to full nose-up or vice versa.*

If the problem cannot be solved:

5. Land at the nearest airfield.

## 3.13 AVIONICS MALFUNCTIONS

### 3.13.1 Complete Avionics Failure

1. **Avionics** switch SWITCH OFF then ON, approx. 20 sec. interval  
If the switch trips to the OFF position:
2. Land at the nearest suitable airfield.

### 3.13.2 Receive Mode Failure of COM-Equipment

1. Push-to-Talk (PPT) switch CHECK, if pilot's and co-pilot's PTT-switches are not pressed or jammed (also check transceiver display). CHECK connectors.
2. Head-set Momentarily switch off SQUELCH.  
If no noise is audible:  
CHECK head-set connectors.

### 3.13.3 Transmit Mode Failure of COM-Equipment

1. Transmit-Signal TX CHECK if displayed while transmitting.
2. Selected frequency CHECK, if correct
3. Microphone CHECK, if necessary replace head-set.

If the problem cannot be eliminated, set transponder to 7600 (radio failure) as required.

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### 3.13.4 Primary Flight Display Failure

1. **PFD** circuit breaker (see 3.1.1) RESET, if tripped

It is possible to safely continue flight, even if the PFD failure cannot be corrected in flight, by referencing the remaining instruments. It may, none the less, be prudent to land at the nearest airfield.

<b>NOTE</b>
-------------

*Following information is still available when the PFD fails:*

<u>Attitude:</u>	Natural horizon or attitude indicator
<u>Altitude:</u>	GPS altitude, Transponder altitude, ground visibility
<u>Heading/Track:</u>	Compass, GPS ground track
<u>Airspeed:</u>	GPS ground speed, stall warning

### 3.13.5 Magnetometer Failure

1. Navigation via GPS ground track

<b>NOTE</b>
-------------

*In the event of a magnetometer failure a red X will be displayed over the course display. If the GDU 1060 is receiving a valid GPS ground track signal, the magnetic heading display will be replaced with the GPS ground track. The GPS ground track is displayed in magenta.*

### 3.13.6 Complete Navigation System Failure

1. Navigation Compass, GPS

<b>NOTE</b>
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*In the event of a complete navigation system failure (magnetometer and GPS ground track) a red X will be displayed over the course display and the markings on the compass rose disappear.*

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### 3.13.7 AHRS Failure

1. Attitude Natural horizon or attitude indicator

<b>NOTE</b>
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*In the event of an AHRS Failure, the horizon is no longer displayed on the PFD. Additionally a red "X" and in yellow "AHRS FAILURE" is displayed. A Navigation System Failure, as described in section 3.13.6, accompanies an AHRS Failure.*

### 3.13.8 ADC Failure

1. Continue flight Using stand-by instruments (see 3.13.4)

<b>NOTE</b>
-------------

*Failure of the Air Data Computers (ADC) is indicated through a red X and yellow text above the airspeed indicator, the altimeter, the vertical speed indicator, the TAS and the OAT indicators. Certain functions, such as TAS and wind calculation, are no longer usable.*

### 3.13.9 Complete MVP-50P-AQ Failure

1. **Engine Instr 1** circuit breaker (see 3.1.1) RESET, if tripped

If the MVP-50P-AQ failure cannot be corrected, maintain power settings and land at the nearest suitable airfield.

<b>NOTE</b>
-------------

*During a total failure of the Glass Engine Monitoring Instrument AND modified power settings a RPM overshoot is not possible with the following settings:*

- 1) Throttle (MP): 100% indexed position
- 2) Propeller Control Lever (rpm):
  - ⇒ During climb: HIGH RPM
  - ⇒ All other flight phases: below marking „MCP“

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### 3.14 STARTER MALFUNCTION

During engine start on ground, power transmission from the starter to the engine is defect (a continuing and excessive howling tone is audible).

1. Throttle IDLE
2. Ignition switch OFF
3. Repair damage before conducting planned flight.

### 3.15 IN-FLIGHT FAILURES AND MALFUNCTIONS

#### 3.15.1 Inadvertent Release and Opening of the Canopy in flight

In the event of an inadvertent release and opening of the canopy in flight, a stationary canopy opening angle of about 20° - 30°, depending on the flight condition, is reached. Because the canopy opens forwards, the canopy cannot be torn off during flight. Even though the airflow conditions around the aircraft change considerably with an open canopy in flight, the aircraft remains fully controllable. Initial flight attitude changes can be easily corrected. Do not unbuckle the seat belt in order to close the canopy. During solo flights, carefully try to close the canopy without neglecting flight tasks and pilot responsibilities. If this is not possible, continue the flight with the open canopy and land at the nearest airfield.

1. Keep calm, there is no imminent danger.
2. Flight attitude Stabilize flight attitude. Under consideration of the actual conditions, establish stationary horizontal level flight.  
  
Airspeed 65 – 75 KIAS
3. Canopy If possible, close and lock canopy in flight. Check the canopy locking and the position of the Canopy Locking Lever periodically until landing.  
If it is not possible to close the canopy, continue flight with the open canopy and land at the nearest airfield.

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