

SECTION 2

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.

2.2 AIRSPEED LIMITATIONS

The airspeeds below shown as Indicated Airspeeds (IAS):

Indicated Airspeed (IAS)	kts	Remarks
V_A Maneuvering Speed	112	Do not make full or abrupt control movements above this speed. This can result in overload of the aircraft structure.
V_{FE} Maximum Flap Extended Speed	90	Do not exceed this speed with flaps extended.
V_{NO} Maximum Structural Cruising Speed	130	Do not exceed this Speed except in smooth air, and then only with caution.
V_{NE} Never Exceed Speed	165	Do not exceed this speed in any operation.

2.3 AIRSPEED INDICATOR MARKINGS

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The airspeeds below shown as Indicated Airspeeds (IAS):

Marking	kts	Remarks
White Arc	44-90	Full Flap Operating Range
Green Arc	52-130	Normal Operating Range
Yellow Arc	130-165	Operations must be conducted with caution and only in smooth air.
Red Line	165	Maximum speed for all operations.

2.4 POWER PLANT LIMITATIONS

2.4.1 Engine

- a) Manufacturer: ROTAX Aircraft Engines, Gunskirchen, Austria
- b) Model: 912 S3

NOTE

The engine is equipped with a hydraulically propeller governor and drives the propeller through a reduction gear. The reduction ratio is 2,43 : 1. The Tachometer indicates the propeller speed. Therefore in this handbook all RPM readings are propeller speeds, unlike the data in the Engine Operator's Manual.

- c) Power Plant Limitations

Maximum Takeoff Power: 69,0 (KW)
 Maximum Takeoff Prop Speed: 2260 (rpm)

Maximum Continuous Power : 69,0 (KW)
 Maximum Continuous Prop Speed: 2260 (rpm)

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d) Oil Pressure

Minimum : 0,8 (bar) below 1440 (rpm)
Normal: 2,0 – 5,0 (bar) above 1440 (rpm)
Maximum during Cold Start: 7,0 (bar)
(for a short time)

e) Fuel Pressure

Minimum: Red Warning Light

f) Oil Temperature

Maximum : 130 (°C)
Minimum: 50 (°C)
Optimal Operating Temperature: 90 – 110 (°C)

g) Cylinder Head Temperature

Maximum : 135 (°C)

2.4.2 Propeller

a) Manufacturer: mt-Propeller, Atting, Germany

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

c) Propeller Diameter: 1,75 (m)

d) Propeller Speed Limitations

Maximum Takeoff Prop Speed: 2260 (rpm)
Maximum Continuous Prop Speed: 2260 (rpm)

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2.5 POWER PLANT INSTRUMENT MARKINGS

The following table shows the power plant instrument markings and their color code significance.

Instrument ⇒	Tachometer (rpm)	Oil Temperature (°C)	Cylinder Head temperature (°C)	Oil Pressure (bar)
Red Line (Minimum)	-	50	-	0,8
Green Arc (Normal Operating Range)	535-2260	50-130	-	2,0 - 5,0
Yellow Arc (Caution)	--	--	--	5,0 – 7,0
Red Line (Maximum)	2260	130	135	7,0

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2.6 OTHER INSTRUMENT MARKINGS

Instrument	Red Arc (Minimum)	Green Arc (Normal Operat. Range)	Green/Red Arc (Caution)	Red Arc (Maximum)
Voltmeter (Volt)	8-11	12-15	11-12	15-16
Ammeter (Ampere)	-	-	-	-

2.7 MASS LIMITS (Weight Limits)

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

WARNING

Exceeding the weight limits can lead to an overload of the aircraft. The flight performances and the flight behavior of the aircraft will be clearly worse.

2.8 CENTER OF GRAVITY LIMITS

The procedure to determine the basic empty weight of the aircraft and the center of gravity location is provided in section 6 of this handbook. 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 are in one plane.

The center of gravity must be within the following limits:

Forward Limit	31% MAC = 427	(mm) aft of Datum
Rearward Limit	40% MAC = 523	(mm) aft of Datum

WARNING

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The aircraft must be flown with the center of gravity position within the approved operating range, otherwise aircraft controllability and longitudinal stability will be reduced. The procedure to determine the center of gravity location for flight is provided in Section 6 of this handbook.

2.9 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: Slow Deceleration
- c) Steep Turns: Bank Angle < 60°
- d) Chandelle: Entry Speed 120 (kts)
- e) Lazy Eight: Entry Speed 110 (kts)

NOTE

All acrobatic maneuvers as well as maneuvers with bank angles exceeding 60° prohibited.

2.10 FLIGHT LOAD FACTORS

The following flight load factor limits must be kept while performing permissible maneuvers.

Flight Load Factor	with V_A	with V_{NE}	With Flaps Extended
Positive	4,0	4,0	2,0
Negative	-2,0	-2,0	0

WARNING

Exceeding the flight load factor limits may result in damage of the aircraft structure.

CAUTION

Maneuvers that include negative flight load factors are not permissible.
Intentional Spinning is not allowed.

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2.11 CREW

Maximum Persons on Board: 2

Minimum Crew: 1 Pilot
With one person on board, the aircraft must be operated only from the left seat.

2.12 KINDS OF OPERATION LIMITS

The aircraft may be operated in day VFR only.

Minimum Equipment: Flight- and Navigation Instruments

Altimeter (0 to 20.000 ft)
Airspeed Indicator (0 to 200 kts)
Magnetic Compass

Minimum Equipment: Power Plant Instruments

Fuel Level Indicator	Oil Temperature Indicator
Low Fuel Pressure Warning Light	Oil Pressure Indicator
Cyl. Head Temperature Indicator	Manifold Pressure Indicator
Ammeter	Tachometer
Voltmeter	Warning Light "Alternator"

Minimum Equipment: Cabin

2 x Safety Belts

NOTE

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

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2.13 FUEL LIMITATIONS

	<u>Left Fuel Tank</u>	<u>Right Fuel Tank</u>
Fuel Capacity (total):	60	60 (Liters)
Usable Fuel (total) :	54,8	54,8 (Liters)
Unusable Fuel:	5,2	5,2 (Liters)

For approved Fuels, refer to paragraph 1.8.

2.14 DEMONSTRATED CROSSWIND COMPONENT

The max. demonstrated crosswind component is 15,0 (kts) / 27,0 (Km/h).

WARNING

A takeoff with crosswind components outside of this limit may result in the loss of aircraft controllability.

2.15 TEMPERATURE LIMITATIONS

Temperature range for aircraft operating:

Minimum Temperature for Takeoff: -25°C Outside
Temperature

Maximum Temperature for Takeoff: 38°C Outside
Temperature

Parts of the aeroplane structure which are exposed to direct vertical sunlight, have to be coloured WHITE.

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2.16 PLACARDS

- 1). On right instrument panel above the circuit breakers.

The aircraft is certified for VFR flights on day, outside of icing conditions. No aerobatic maneuvers, including spins are approved. For further operating limitations refer to POH.




- 2). On instrument panel, below the airspeed indicator.

MANEUVERING SPEED
V_A = 112 KIAS

- 3). On instrument panel, below the row of switches.

ALT / BAT	FUEL PUMP	AVIONICS	NAV-LIGHTS	ANTI COLLISION LIGHT	LANDING LIGHT	INSTRUMENT LIGHT	CABIN LIGHT
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- 4). On instrument panel, near the flap switch and on the left flap.

FLAPS		
CRUISE		RED
TAKEOFF		YELLOW
LANDING		GREEN

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- 5). On instrument panel right of the appropriate circuit breaker.

Com/NAV	Stall Warning	Warning Lights
Intercom	OAT / CHT	Alternator Warning-Light
Turn Coordinator	Fuel Gauge	Reserve
Blind-Encoder	Instruments 1	Trim-Control
Attitude Gyro	Instruments 2	Flap-Control
Direction Gyro	12 V-DC Receptacle	Starter-Relay
GPS	Battery	Flap Actuator
Transponder	Alternator	Trim- Actuator

Equipment Bendix King Avionic
(see Section 9, Supplements AVE1, AVE2)

- 6). On top of the middle console

FOR	N	30	60	E	120	150
STEER						
FOR	S	210	240	W	300	330
STEER						
DATE:				AIRPATH		

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- 5). On instrument panel right of the appropriate circuit breaker.

Com/NAV	Stall Warning	Warning Lights
Intercom	OAT / CHT	Alternator Warning-Light
Turn Coordinator	Fuel Gauge	Ventilation Avionic
Blind-Encoder	Instruments 1	Trim-Control
Attitude Gyro	Instruments 2	Flap-Control
Direction Gyro	12 V-DC Receptacle	Starter-Relay
GPS	Battery	Flap Actuator
Transponder	Alternator	Trim- Actuator

Equipment Garmin Avionic
(see Section 9, Supplements AVE4, AVE5, AVE6)

- 6). On instrument panel, right of the magnetic compass.

FOR	N	30	60	E	120	150
STEER						
FOR	S	210	240	W	300	330
STEER						
DATE:				AIRPATH		

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- 5). On instrument panel right of the appropriate circuit breaker.

Com/NAV 1		
Com/NAV 2	Stall Warning	Warning Lights
Intercom	OAT / CHT	Alternator Warning-Light
Turn Coordinator	Fuel Gauge	Ventilation Avionic
Blind-Encoder	Instruments 1	Trim-Control
Altitude Gyro	Instruments 2	Flap-Control
Direction Gyro	12 V-DC Receptacle	Starter-Relay
GPS	Battery	Flap Actuator
Transponder	Alternator	Trim- Actuator

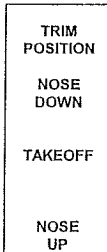
Equipment Garmin Avionic plus COM/NAV Bendix King KX 125
(see Section 9, Supplements AVE1, AVE4, AVE5, AVE6)

- 6). On instrument panel, right of the magnetic compass.

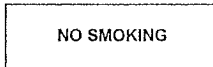
FOR	N	30	60	E	120	150
STEER						
FOR	S	210	240	W	300	330
STEER						
DATE:				AIRPATH		

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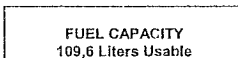
- 7). On instrument panel, near the trim position indicator.



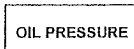
- 8). On instrument panel, in sight of the pilot



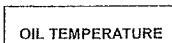
- 9). On instrument panel, below the fuel level indicator.



- 10). On instrument panel, below the oil pressure indicator.



- 11). On instrument panel, below the oil temperature indicator.



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- 12). On instrument panel, below the cylinder head temperature.

CYL. HEAD TEMP.

- 13). Below the instrument panel at the control knobs.

CABIN HEAT PULL ON

CARB. HEAT PULL ON

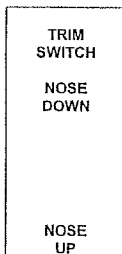
CHOKE PULL ON

- 14). On the instrument panel, in front and behind throttle and propeller levers.

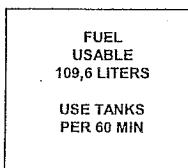
OPEN	HIGH RPM
IDLE	LOW RPM

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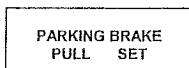
- 15). On the middle console, next to the trim control switch.



- 16). On the middle console, next to the fuel selector / shut-off valve.

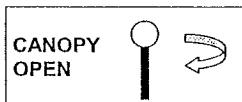


- 17). On the middle console, next to the parking brake control knob.



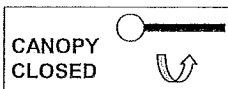
- 18). Next to canopy release handle inside and outside the cabin.

- a) Left to canopy release handle.

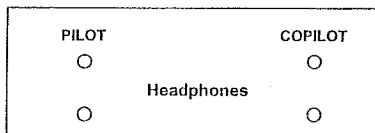


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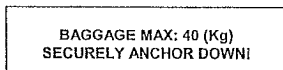
- a) right to canopy release handle.



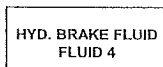
- 19). On the console between the seats.



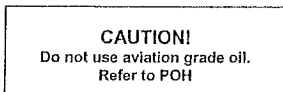
- 20). On the baggage compartment door, backside.



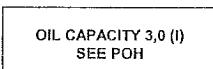
- 21). On the brake reservoir at the firewall.



- 22). On oil door of the upper cowling, inside.



- 23). On the oil filler cap.



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- 24). On the engine coolant overflow bottle.

COOLANT

- 25). On the expansion tank

COOLANT
DO NOT OPEN!

- 26). On the wings, adjacent to the fuel filler caps.

EN 228 SUPER
EN228SUPER plus
AVGAS 100LL
USABLE
54,8 Liters

- 27). On the the fuselage shell on the outside at the position of the ELT (if installed)

ELT
INSTALLED HERE

- 28). On the bottom of fuselage, next to the drain valve.

FUEL DRAIN

- 29). Under each wing and on skid plate.

TIE DOWN

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- 30). On the main wheel fairings.

2,5 bar

- 31). On nose gear wheel fairing.

2,0 bar

- 32). On instrument panel, next to 12 V DC receptacle (if installed).

12-14 VDC
Max. 8 A

- 33). On instrument panel, next to the ELT remote switch (if installed)

ELT- REMOTE-
CONTROL
To activate switch transmitter
to ARMED

- 34). At the jack up points under the wing



- 35). At the Warning Lights on the instrument panel

Alternator Control

Fuel Pressure

- 36). At the cowling, on the left side next to the exhaust port



Electric Ground
Exhaust Port

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- 37). At the cowling front side, immediately below the landing light:

WINTER KIT MUST BE REMOVED ABOVE 59°F (15°C)
(WINTER KIT SHOULD BE INSTALLED BELOW 41°F (5°C))

2.17 RESERVED

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