MD3 Rider

and

SportRider

MAINTENANCE MANUAL

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MD3 RIDER and SportRider

AIRCRAFT MAINTENANCE MANUAL

Model:

Serial number:

Registration:

Owner: .....

.....

.....

LIST OF THE REVISIONS AND THE REPAIRS

Ordinal No.	Number of document - bulletin	It concerns to pages No.	Date of issue:	Signature :

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1. Technical descriptions

1.1. Basic and general descriptions:

Classical all-metal MD3 Rider with high-wing with side-by-side seats.
The aircraft is equipped with tricycle landing gear.
Standard powerplant consist of, 4 cylinder, 4 stroke Rotax 912S or UL (80,100hp) engine and three blade propeller.

MD3 conforms to Czech UL-2 and Germany BFU-DULV requirements for “sport flying vehicles”, in LSA version named SportRider conforms to USA Light Sport Aircraft category

SLSA approved

Letecká amatérská asociace ČR – Light Aircraft Association of the Czech Republic

Typový průkaz – Type Certificate

Vydává Letecká amatérská asociace České republiky (dále LAA ČR)
na základě pověření a v souladu s ustanoveními
zákona č. 49/1997 Sb. o civilním letectví v platném znění.

Označení typu letecké techniky:
Designation of the type of aviation technology:

Dvoumístný, jednomotorový aerodynamicky řízený vzpěrový hornoplošný ultralehký letoun - Sportovní letající zařízení, konstrukce z nýtovaných plechů AL slitiny se svařovaným kokpitem z ocelových trubek a kompozitovou aerodynamickou karosérií typové označení: **MD3 Rider.**
Maximální vzletová hmotnost 450 kg, MTOM lze překročit o hmotnost integrovaného záchranného systému , maximálně do 472,5 kg

Držitel typového průkazu:
Owner of Type Certificate:

GRYF Aircraft s.r.o
Cihelní 573
687 25 Hluk Česká republika

Flyitalia S.r.l
Via Gorizia, 1
96100 Siracusa Italy

Výrobce: GRYF Aircraft s.r.o. Cihelní 573, Hluk

Schváleno technickou komisí LAA ČR dne:
Approval of the Technical commission of LAA CR:

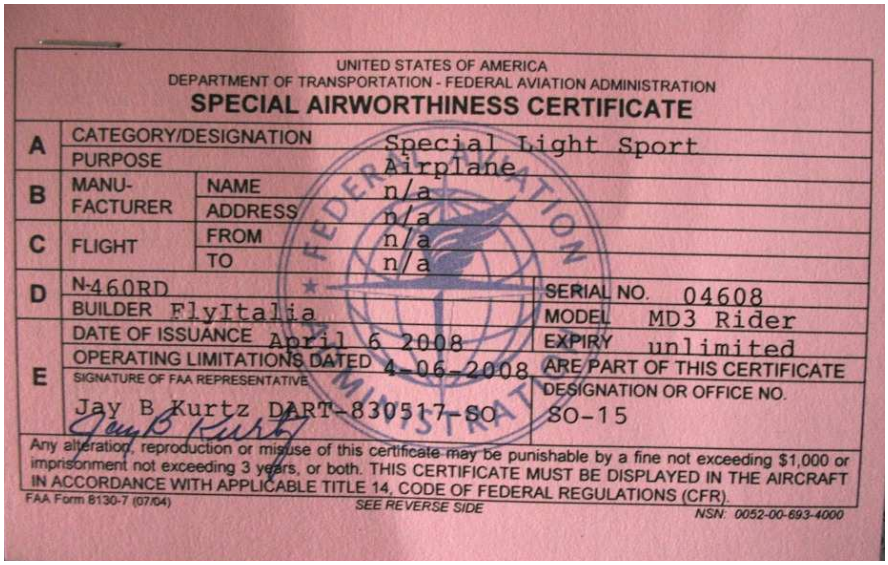
31.5.2006

Typový průkaz je zaregistrován u LAA ČR pod značkou:
Type certificate is registered in LAA CR under registration sign:

ULL – 02 / 2006

Hlavní technik LAA ČR:
Chief Engineer of LAA CR:
Ing. Václav Chvála

Ředitel správy SLZ:
Managing director of the LAA:
Letecká amatérská asociace ČR
Na Kotli 289
102 00 Praha 10
Tel.: +420 271 085 587
Jiří Koubík



UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION - FEDERAL AVIATION ADMINISTRATION
SPECIAL AIRWORTHINESS CERTIFICATE

A	CATEGORY/DESIGNATION	Special Light Sport	
	PURPOSE	Airplane	
B	MANU-FACTURER	NAME	n/a
		ADDRESS	n/a
C	FLIGHT	FROM	n/a
		TO	n/a
D	N-460RD		
	BUILDER FlyItalia	SERIAL NO.	04608
E	DATE OF ISSUANCE April 6 2008	MODEL	MD3 Rider
	OPERATING LIMITATIONS DATED 4-06-2008	EXPIRY	unlimited
	SIGNATURE OF FAA REPRESENTATIVE	ARE PART OF THIS CERTIFICATE	
	Jay B Kurtz DART-830517-SO	DESIGNATION OR OFFICE NO.	SO-15

Any alteration, reproduction or misuse of this certificate may be punishable by a fine not exceeding $1,000 or imprisonment not exceeding 3 years, or both. THIS CERTIFICATE MUST BE DISPLAYED IN THE AIRCRAFT IN ACCORDANCE WITH APPLICABLE TITLE 14, CODE OF FEDERAL REGULATIONS (CFR).

FAA Form 8130-7 (07/04) SEE REVERSE SIDE NSN: 0052-00-693-4000

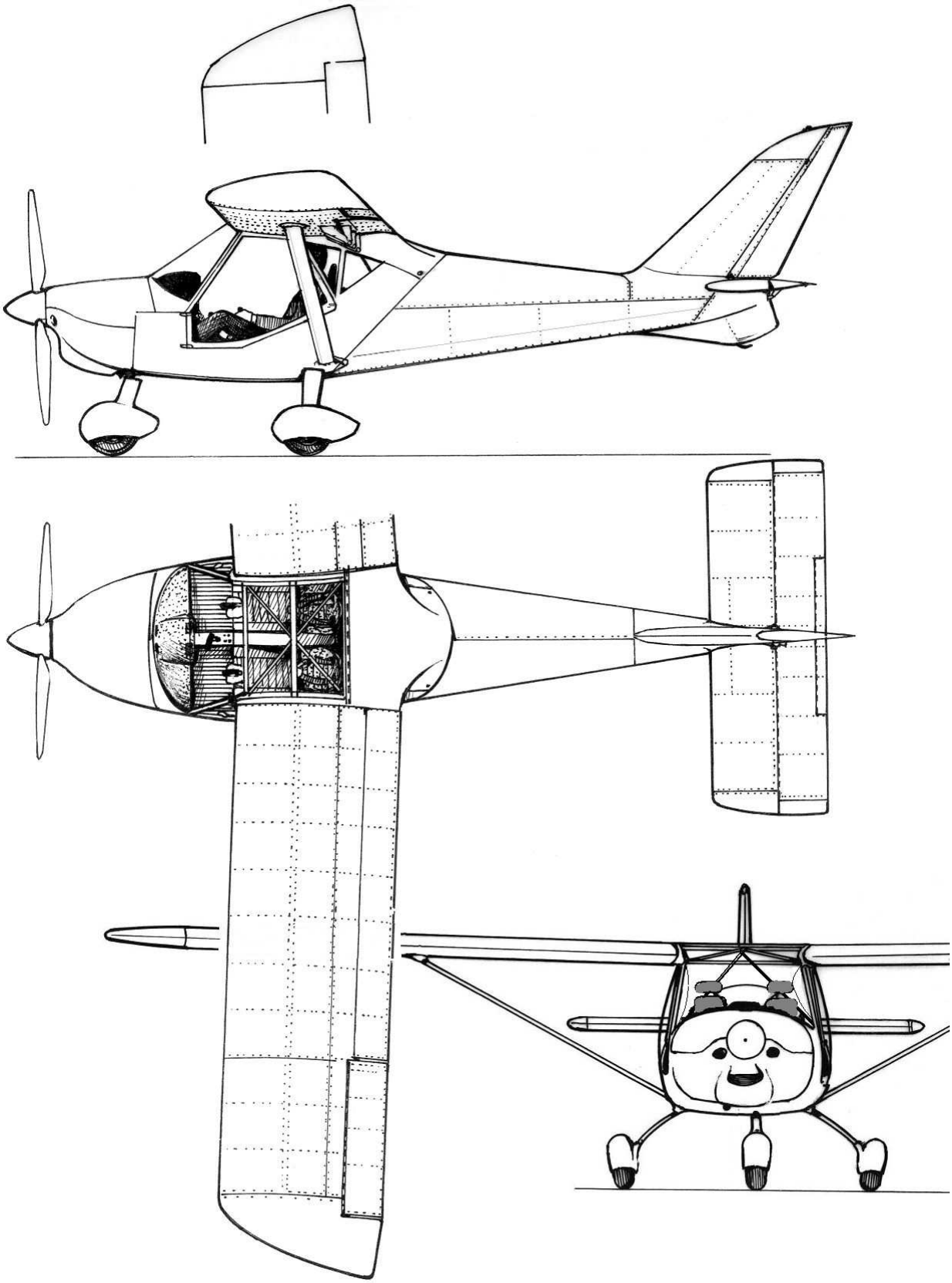
1.1.1. Designation

MD3 Rider designed to be ideal for training, CROSS-COUNTRY flying and flying for fun.

1.2. Basic Technical data

1.2.1. Airplane views

1.2.2. Three – view drawing



1.2.3. BASIC DIMENSIONS

Wing span	9.0	m	28,5	ft
Length	5.9	m	19,3	ft
Height	2.3	m	7,5	ft
Wing area	9.9	m^2	106,6	sq ft

Forward swept wing: -3 °

1.2.4. Tires-inflation

Nose landing gear - 180 +20 kPa / 26,5 + 3 psi
Main landing gear - 180 +20 kPa / 26,5 + 3 psi

1.2.5. WEIGHTS

	MD3 RIDER	MD3 RIDER UL	MD3 SPORTRIDER
Empty weight	**295 kg** / 650 lb	**275 kg** / 606 lb	**297 kg** / 655 lb
Maximum take-off weight	**450 kg** / 992 lb	**450 kg** / 992 lb	**576 kg** / 1270 lb
Strength limit MTOW	480 kg / 1058 lb	480 kg / 1058 lb	**600 kg** / 1322 lb

Maximum load factor +4 / -2 (ultimate + 6 / -3)

1.2.6. POWER PLANT

1.2.6.1. Engine ROTAX

	912 S	912 UL	914 UL
Maximum power	100HP / 73,5 kW	80 HP / 59,6 kW	115 HP / 85,7 kW
Time limited	max. 5 min.		max. 5 min.
For	5800 rpm		5800 rpm
Without limit	95 HP / 69,0 kW		100 HP / 74,5 kW
For	5500 rpm	5800 rpm	5500 rpm
Cylinder volume	1352ccm	1211ccm	1211ccm
Compression ratio	10,5 : 1		9,0 : 1
Dry weight	56,6 kg	54 kg	61,1 kg
Ignition unit		DUCATI double CDI	
Carburetor		2 x BING 64-3	

1.2.7. Operation fillings

Fuel **94 l** automotive petrol SUPER - BA 96 *in two 47 l integral wing fuel tanks*
Gear box oil API-GL5 (0, 5 l)

1.2.8. PROPELLERs

1.2.8.1. Standard:

WOODCOMP SR 200 B - wooden 3-blade on the ground adjustable

∅ 1.68 m

Optional:	Klassic 160/3/R	- composite on the ground adjustable 3-blade	∅ 1.6 m
	Winglet 165/3/R	- on the ground adjustable 3-blade	∅ 1.65 m
	Varia 170/2R	- composite in the flight variable pitch 2-blade	∅ 1.70 m
	SR 2000 XA	- in flight variable pitch wooden	∅ 1.70 m

DUC FC three-blade - composite on the ground adjustable ∅ 1.727 m
- weight 3,375 kg

DUC SWIRL three-blade - composite IN FLIGHT variable ∅ 1.75 m
- hand drive operaion (standard)
- case constand speed
- electric drive operation (option)

1.3. Technical description of the plane

1.3.1. Technology

All-metal semi-monocoque airframe, primary glued and riveted from aluminum alloy sheets by blind rivets, with welded cockpit cage from 4130 steel tubes.

1.3.2. General

The MD3 airframe is of semi-monocoque construction glued and riveted from aluminum alloy sheets by blind rivets. Cockpit cage is welded from 4130 steel tubes.
Fairings and large fuselage shell is produced form fiberglass or carbon composites.

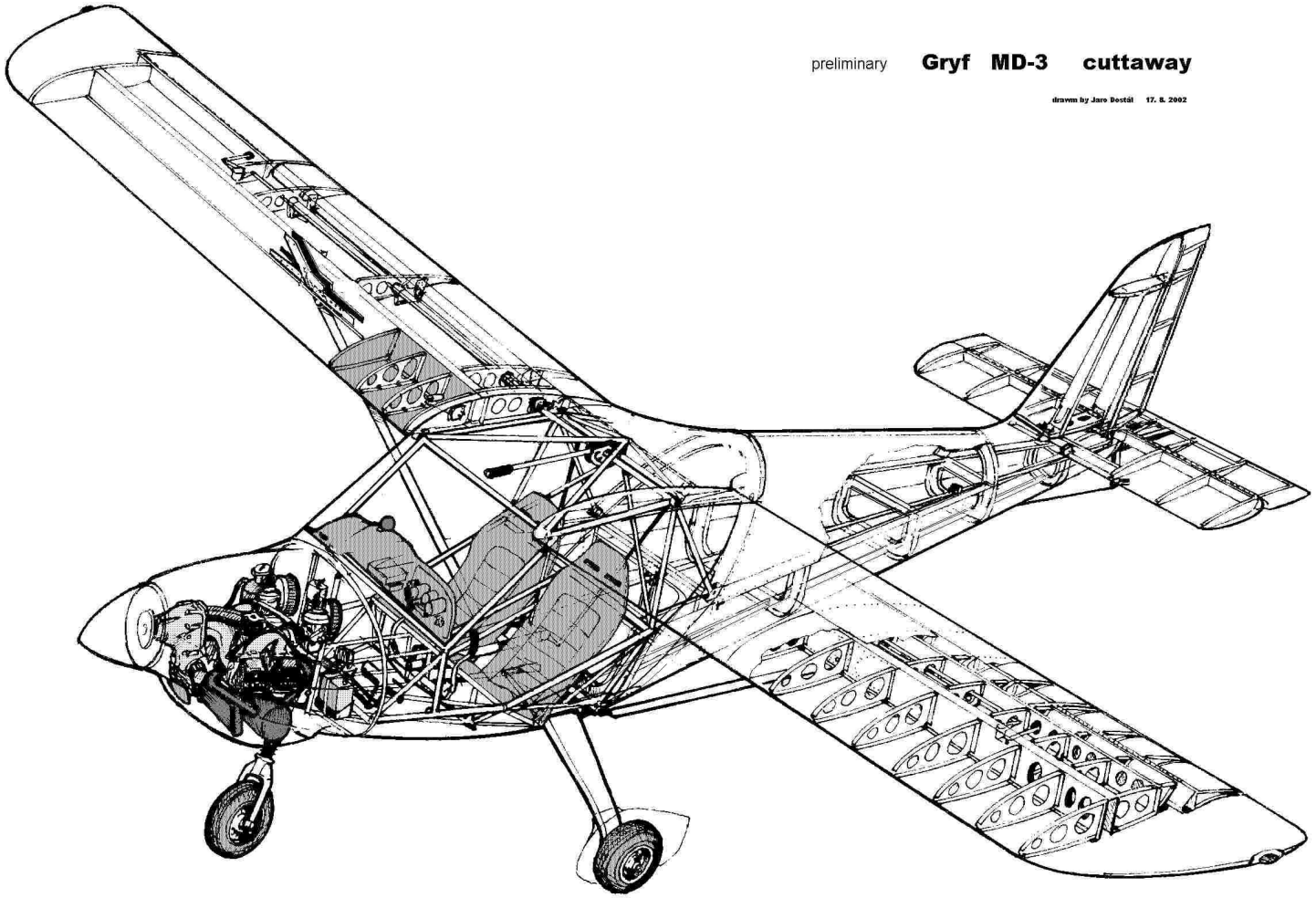


Fig.: MD3 Rider aircraft construction

1.3.3. Fuselage

1.3.3.1. Fuselage cockpit cage

FUSELAGE COCKPIT CAGE is welded from steel tubes. Its structure cover firewall, engine mounting hinges and front wheel bracket in the front, wing struts and main gear hinges on its sides and instrument panel frame and seats brackets, safety belts, arm-rest and control levers hinges in the middle. On the rear part it has 4 rear fuselage part hinges. On the top welded cage carries wing hinges, prepared for its folding and brackets of aileron and flap controls.

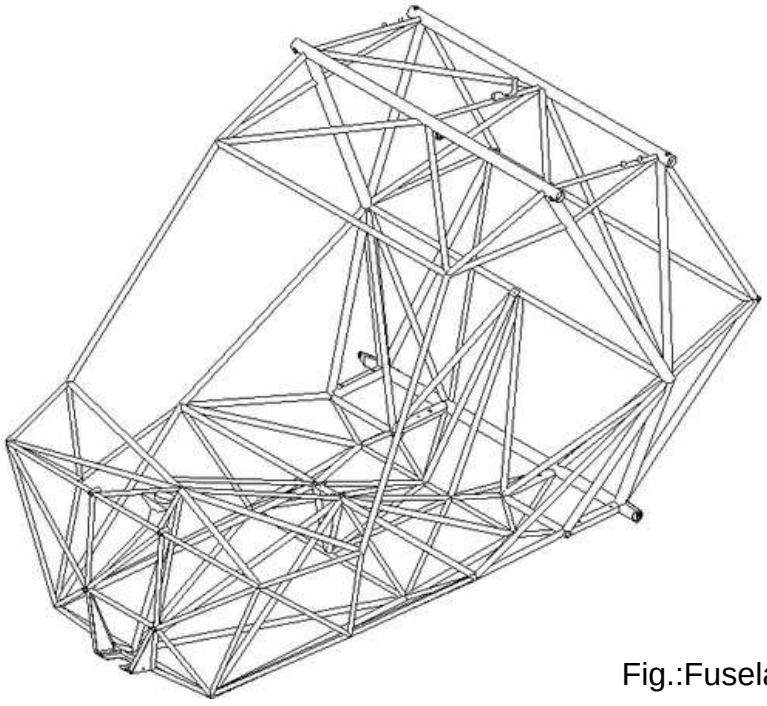


Fig.:Fuselage cockpit cage

1.3.3.2. Cockpit Fairing

Cockpit fairing is produced from glass fiber composite, glued on the tubes and sheets of airframe and covers firewall, instrument panel including air vents, windshield frame in the front, conection to the wings in the top and door frames on the sides. In the rear COCKPIT FAIRING is equipped by foldable cargo compartment doors, needed to be folded for wing folding too.

1.3.3.3. Rear fuselage part cone

Rear fuselage part cone is riveted from aluminum alloy sheets with integral fin and with horizontal tail hinges on the rear “floor” and rudder hinges on the fin beam. Aluminum alloy cone is finished by composite fairings with aerodynamically smooth transition between horizontal and vertical areas and creates small bottom fin with tail-bump.

1.3.3.4. Side Canopy doors

Side Canopy doors from carbon fiber with integral 3D shaped plexiglas windows on its full surface enables great view and easy access. Doors are hinged on the front hinges and locked in 2 points on the top and bottom rear corners, equipped by classic outside handles with key locks, and lever handles from the inside in the bottom frame.

1.3.4. Wing

ALL METAL WINGS with simple aerodynamically shaped strut and efficient MS(1)-0313 airfoil with OMEGA-beam pressed ribs and integral fuel tanks 92 liters. Ailerons and large flaps with 15°, 30° and 38° deflection are hinged on rear help-beam. Large aerodynamically shaped wingtips increase wing efficiency. There is possibility to tilt wings backward to tail.

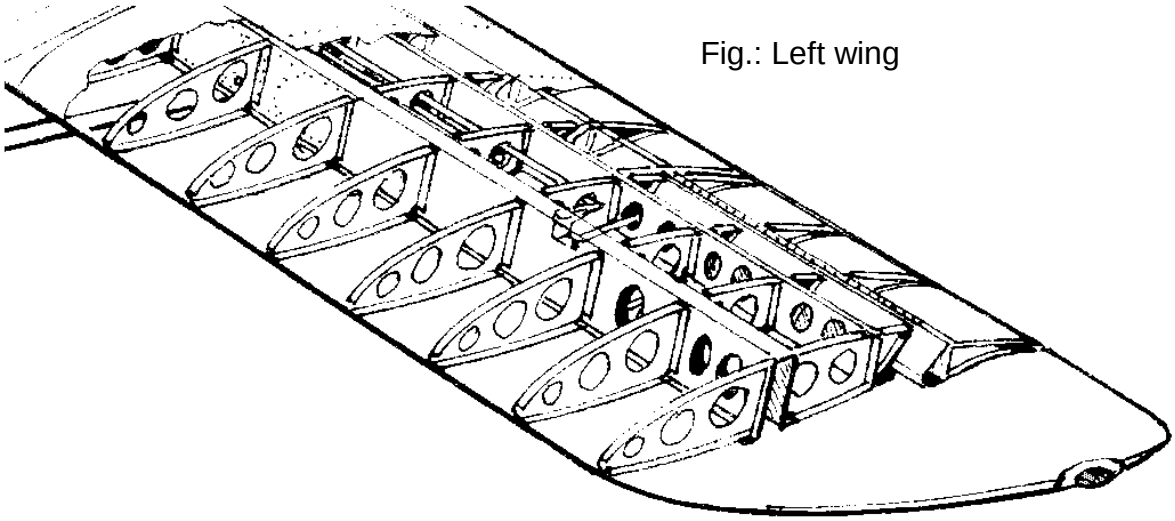


Fig.: Left wing

1.3.4.1. Ailerons

40% 1:1,5 differential ailerons are connected to upper side of airfoil with piano-hinge and and driven through control lever riveted to root rib

1.3.4.2. Flaps

Fowler flaps are connected to wing over three arms and are electrically driven (BETAKOM system) over tube in two points root and middle arm section.
They have three positions 15°(start), 30°(landin g) and 38°(short landing)

Fig.: Flaps in landing position

1.3.5. Tail

Classic-type all-metal TAIL has symmetrical NACA 12% profile. Horizontal Tail Unit (HTU) consists of stabilizer and elevator with trim tab. The semi monocoque construction consists of duralumin ribs, spars and skin. Construction is riveted by blind rivets and glued by Efimastic PU50.
Trapezoidal Vertical Tail Unit (VTU) consists of fin and rudder. The rudder is attached on the fin by two hinges. The frame of VTU is composed of metal sheet spar and duralumin skin.(riveted and glued by Efimastic PU50)

1.3.5.1. Stabilizer

Classic-type all-metal horizontal tail glued by Emfimastic PU50 and riveted by blind rivets from aluminum alloy sheets and pressed ribs and bended beams has symmetrical 12% airfoil NACA 0012. Stabilizer is connected to fuselage over 2+2 connection points on auxiliary front and main rear spar. Joint brackets on fuselage are riveted with solid rivets.

1.3.5.2. Elevator

The same technology rectangular shape elevator *(with pressed 2024T3 aluminum alloy ribs and skin)* is connected with stabilizer through on the airfoil (rear beam) top fixed piano hinge and has electrically controlled integral TRIM-TAB as a standard.

1.3.5.3. Fin

Fin with symmetrical 12% airfoil NACA 0012 is integral part of Rear fuselage part structure.
Rudder is hinged in two hinges and controlled from bottom - by control cables.
In the top of fin-tip there is located bracket for optional tail strobe light placing.

1.3.5.4. Rudder

The rudder is the trapezoidal shape and formed with a duralumin spar and skin and attached with two hinges at the fin.
Rudder upper tip is formed with fiberglass cover.

1.4. Landing gear

1.4.1. General description

The aircraft is equipped with fixed, tricycle landing gear.

The nose wheel is steerable, composite main gear is equipped with hydraulic brakes.

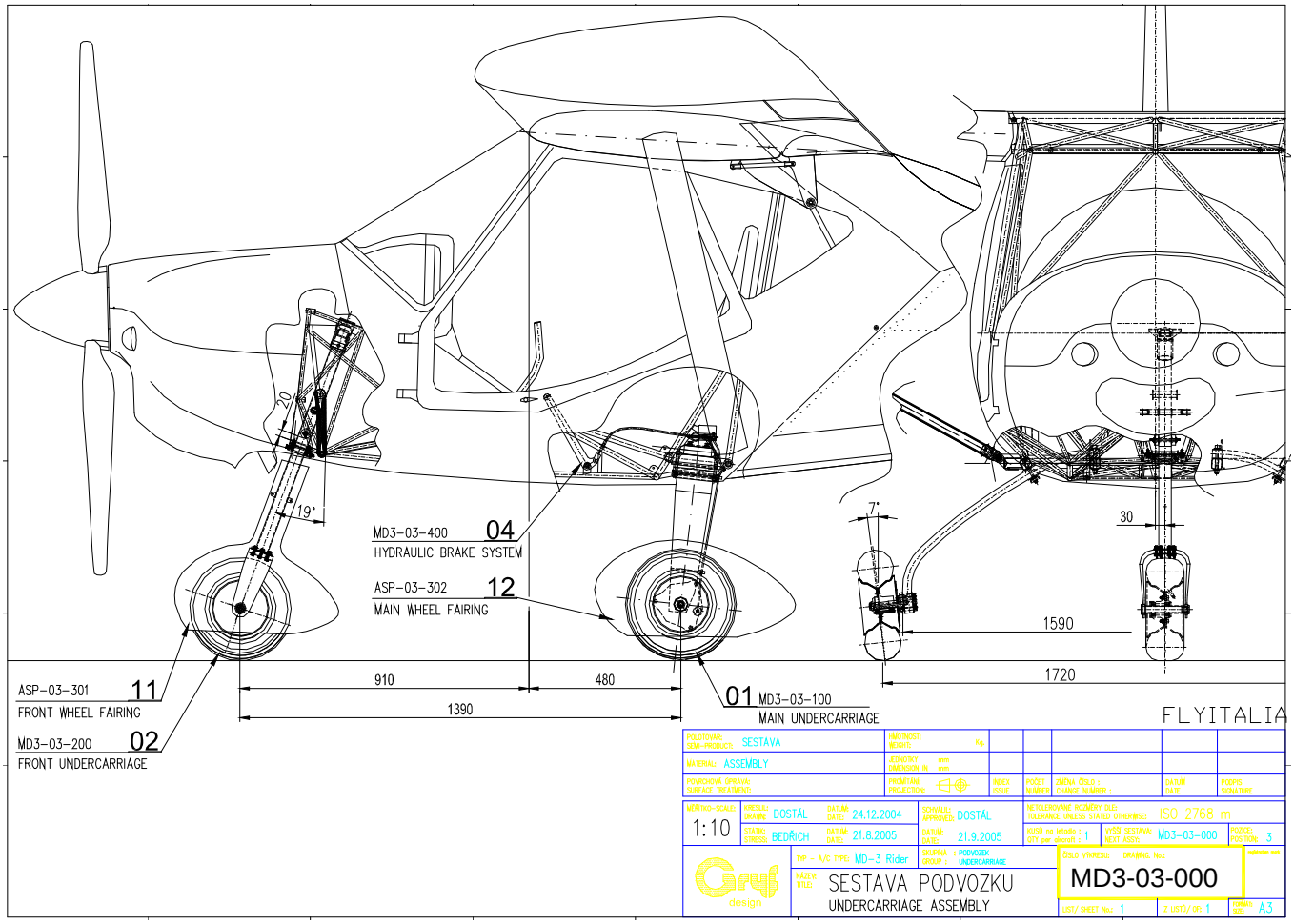


Fig.:Tricycle landing gear

1.4.2. The main landing gear

The main landing gear consists of right and left composite legs which are fixed in two brackets inside fuselage welded cage. The legs are formed from fiberglass springs. The main wheels **14x4**" are equipped with hydraulic disc brakes (Aerospol) controlled by leveler on the central column.

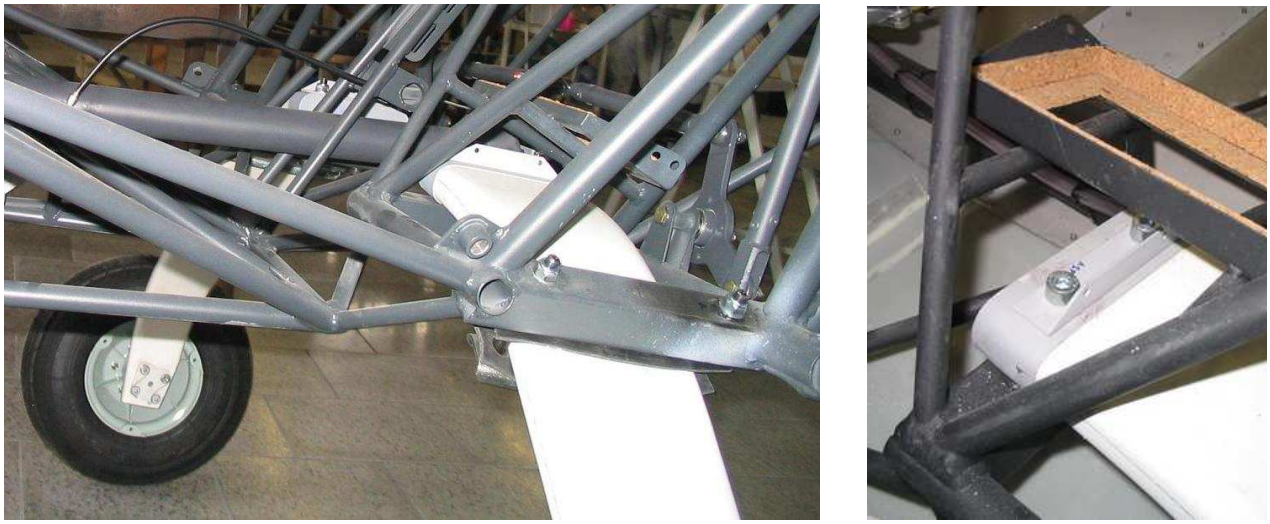


Fig.: Fixing of the main landing gear leg

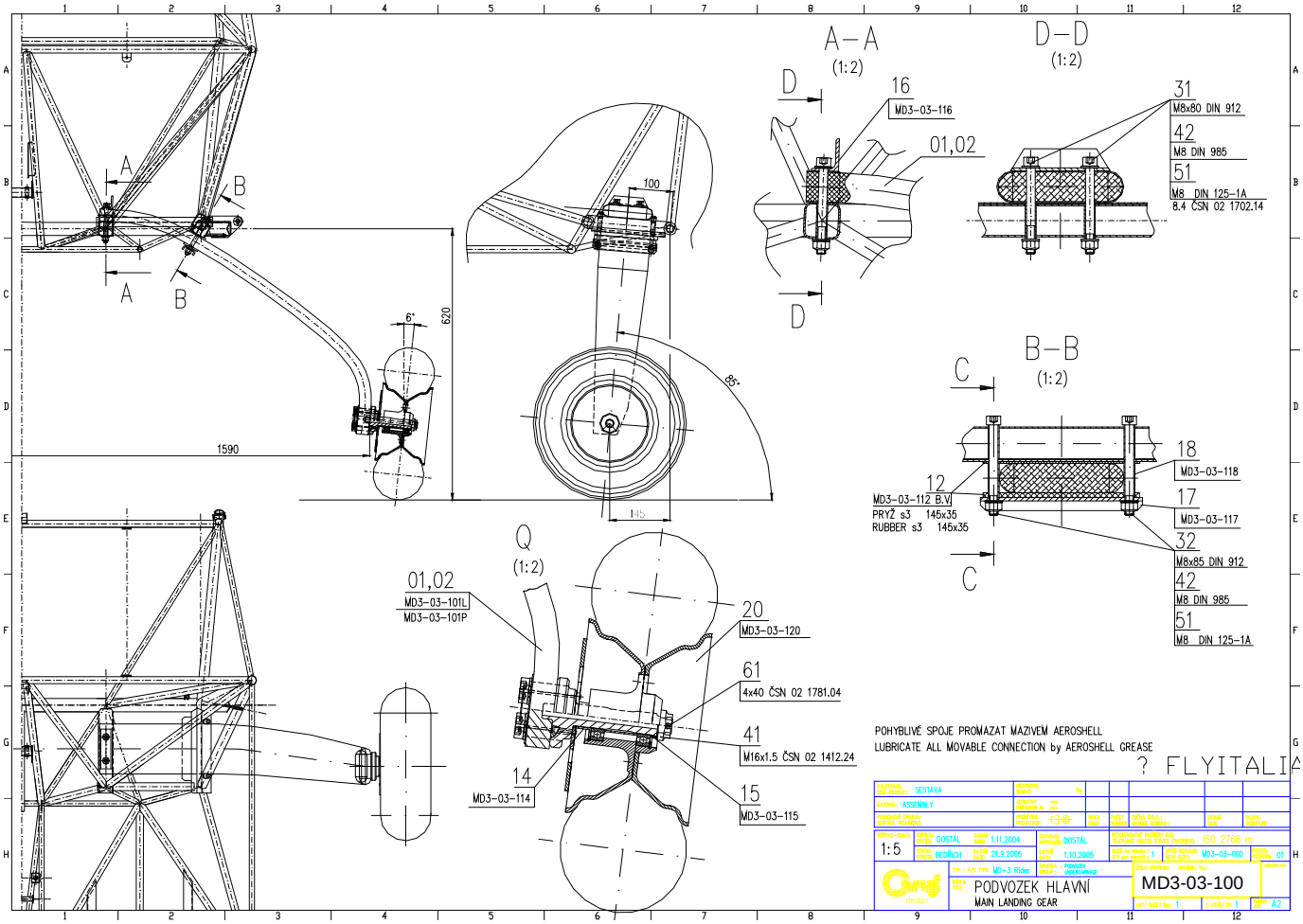


Fig.: Main landing gear

1.4.3. Nose wheel landing gear

Steerable nose landing gear consists of front landing gear leg. Rubber cable shock absorbing unit and suspension stop. The nose leg is made from steel tube. Fork is from carbon fiber. Two rods are used for the leg steering by the control pedals. Wheel 13x4”.

Fig.:Front landing gear leg with composite (carbon) fork

Fig.:Rubber cable suspension unit

1.4.4. Wheel brakes

Main landing gear wheels are equipped with hydraulic disc brakes.
The brake system consists of the brake handle in the middle column, hydraulic brake master cylinder, plastic hoses, brake caliper with hydraulic brake cylinder, brake pads and the brake discs.

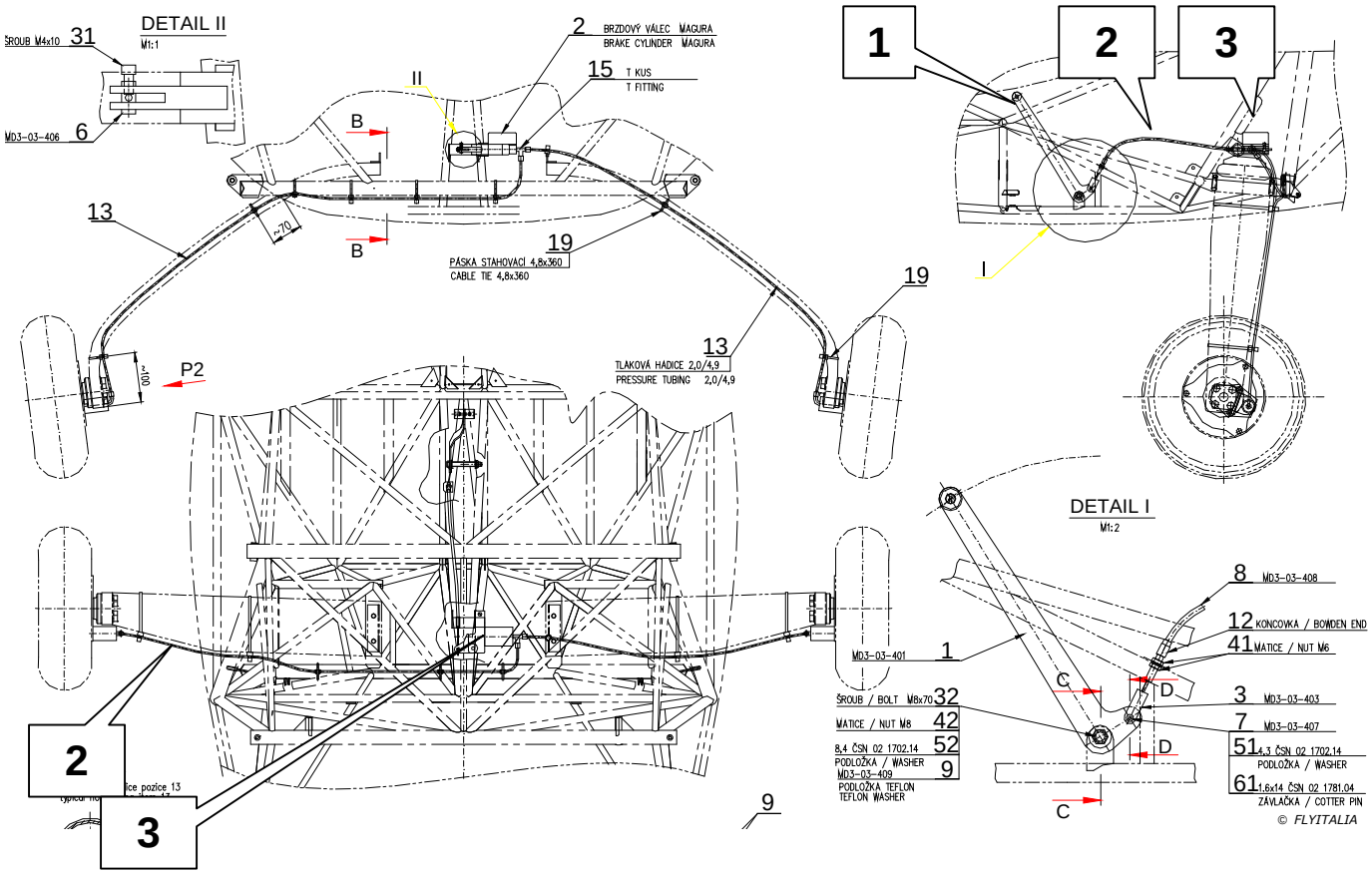
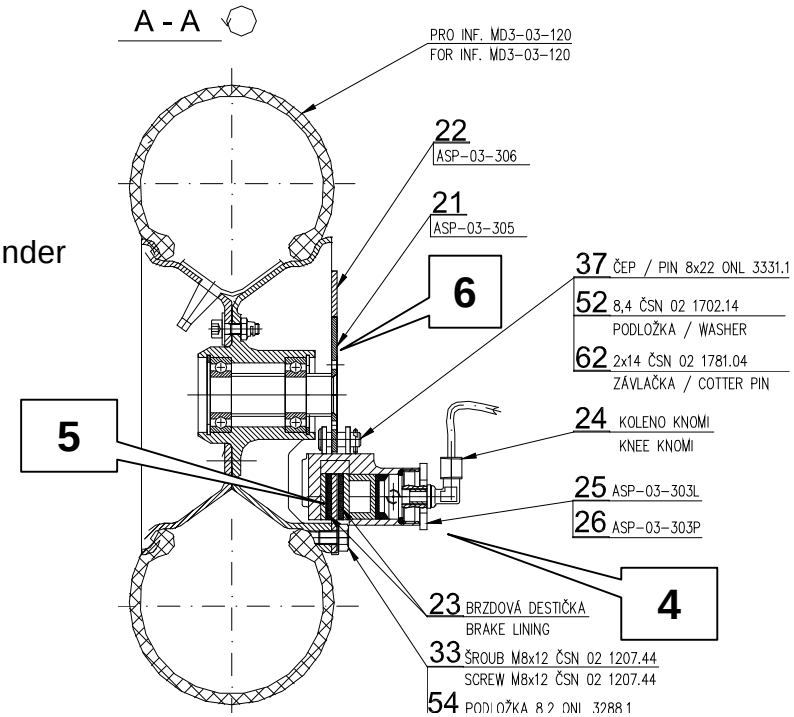


Fig.: **Brake system**



1. brake handle
2. plastic hoses
3. hydraulic master cylinder
4. brake caliper with brake cylinder
5. brake pads
6. brake disc

1.4.5. Wheel fairings

All landing gear wheels can be optionally equipped by composite wheel fairings.

1.5. Auxiliary tail skid

Auxiliary tail skid protects tail of aircraft from inadvertent damage during tail down landing conditions. ATS is made from aluminum alloy pressed U profiles and covered by fiberglass formed cover – with shape of auxiliary bottom fin.

Fig.: Auxiliary tail skid

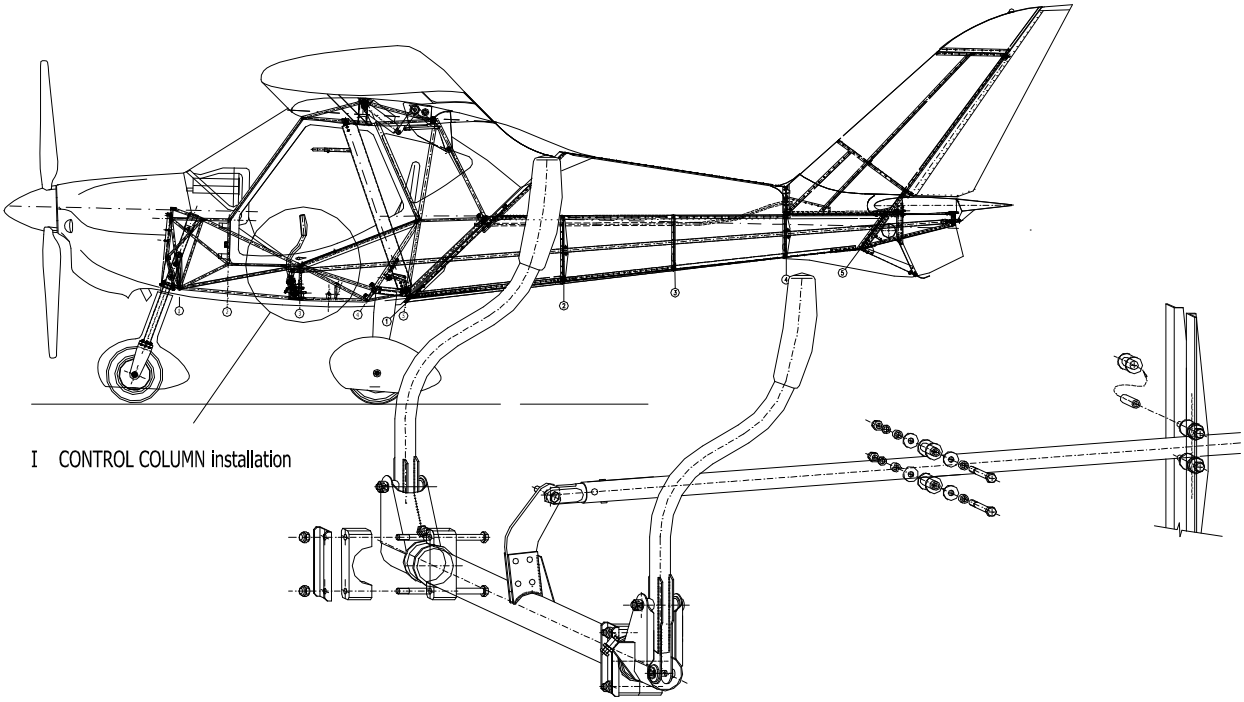
1.6. Three-axis control

Full dual control, with classic joysticks between pilot legs and pedals full controllable for both pilots..Flap handle, trim handle, throttle and choke are placed on the central column.

Fig.:Dual control system

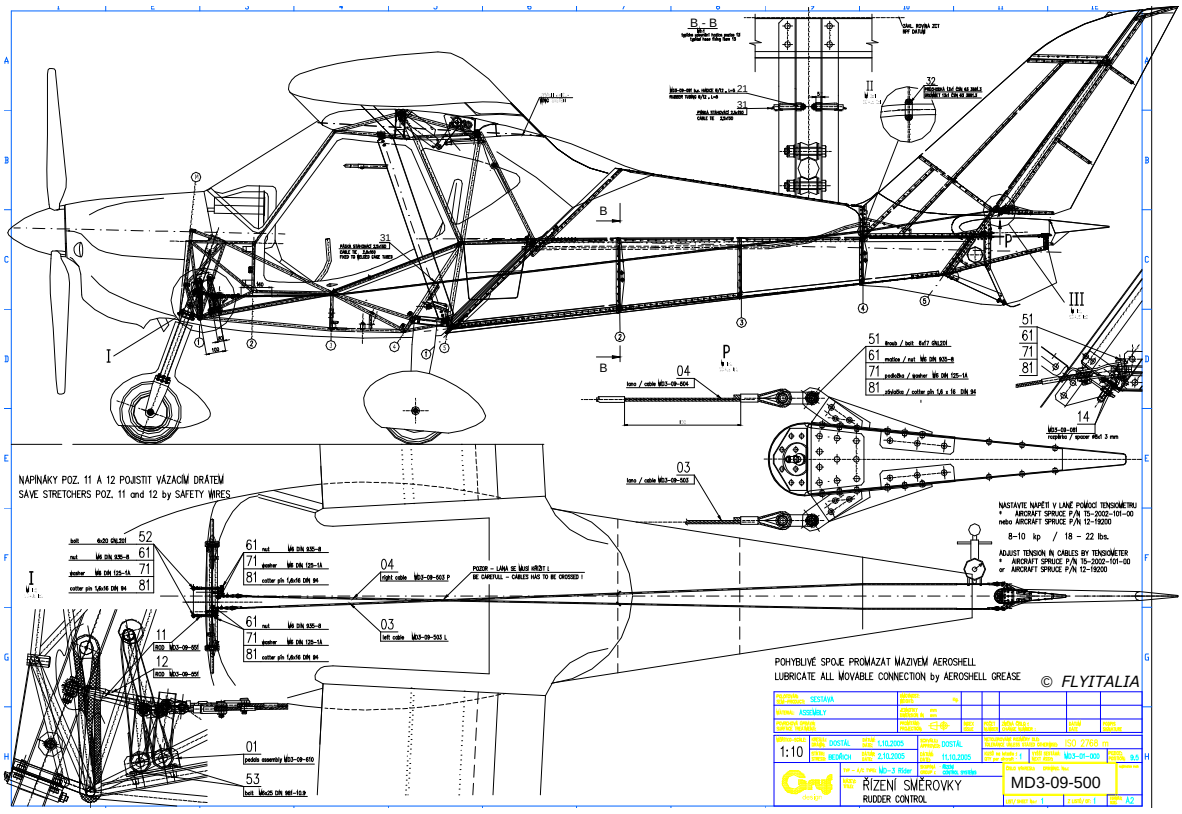
1.6.1. Elevator control

Elevator is controlled by joysticks, fixed in control column through one rod only guided in rod pulleys fixed in metal brackets in welded cage and rear fuselage cone and connected directly with elevator lever.



1.6.2. Rudder control

Rudder is controlled by wires in plastic slide tubes and connected through front undercarriage leg control levers. Stretchers are located in the front – accessible from the cockpit.



1.6.3. Ailerons control

Ailerons are controlled by joysticks, fixed in control column through system of cables, stretchers and pulleys in fuselage and rods and levers and rod skids in the wings. Aileron control system is possible / or needed (for folded wing) to divide by disconnecting of wing rods ends near rear wing hinge - and differenced by using of non-linear levers 1:1,5 roughly.

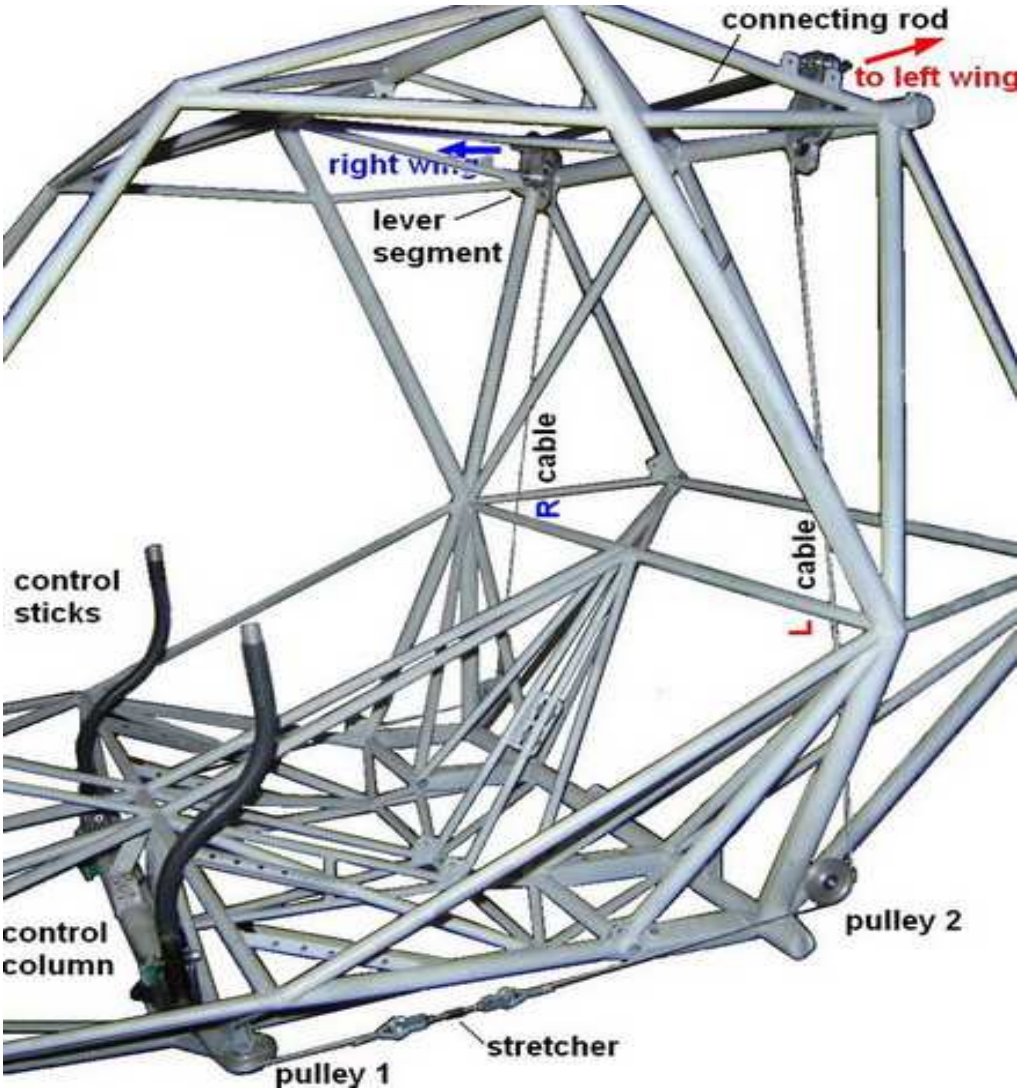
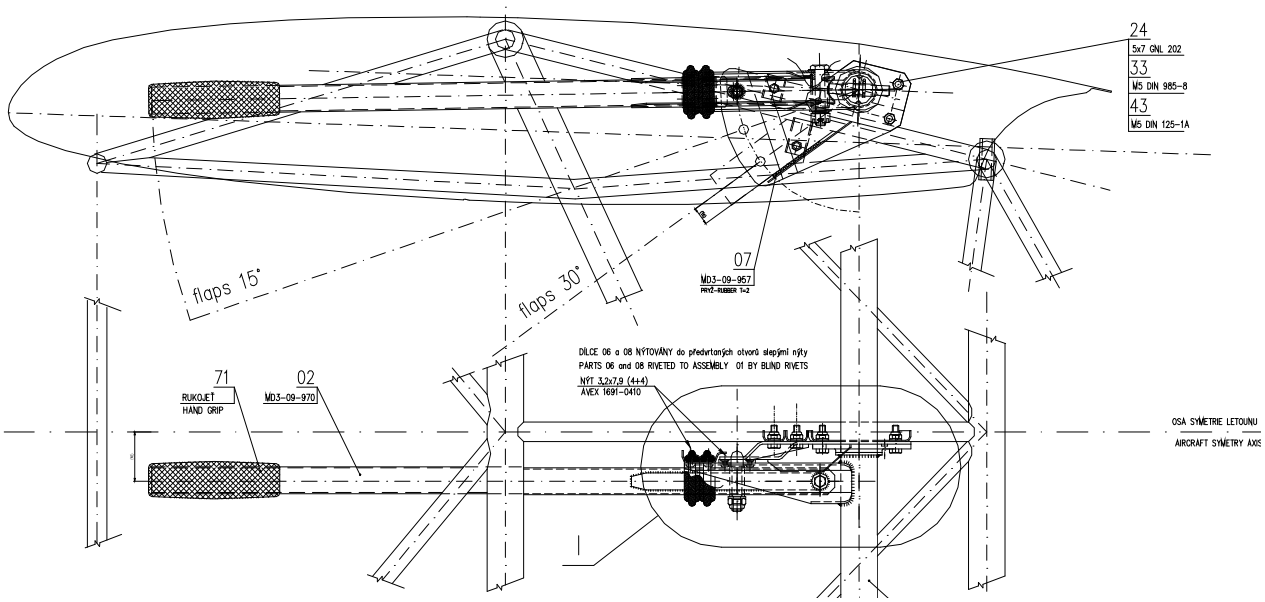


Fig.:Ailerons control system

1.6.4. Flaps control

Flaps are controlled by electric actuator BETACOM placed in the cockpit ceiling, through torsion tubes with ball/fork connection into wing root ribs.

Fig.:Electric flap actuator



Basic UL version uses ceiling placed hand operated lever for flaps acuating

1.6.5. Elevator trim tab control

Elevator trim tab is controlled by electric actuator placed in the elevator middle, installed from its top surface.
System uses for installation and drive original bolts, screws and ends, original screw rod is reinforced by disguised and glued tube

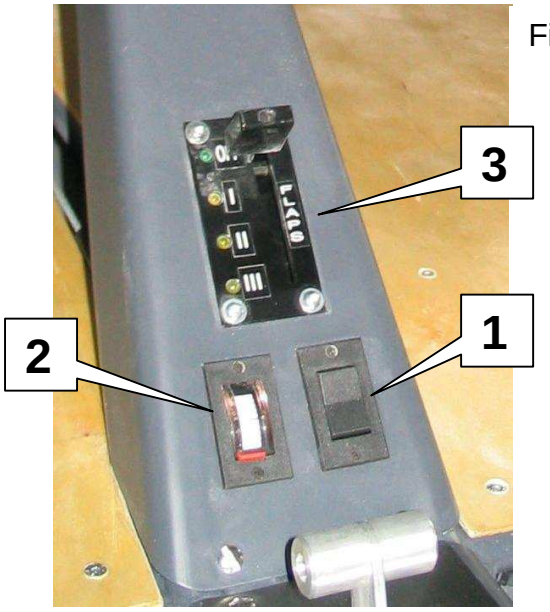


Fig.: Electric trim control placing in cockpit middle column

1. trim control switch
2. trim position indikator
3. BETAKOM flaps control system

Fig.: Electric trim actuator Aircraft Spruce (MAC/ Ray Allen) set

1. trim control switch
2. trim position indikator
3. trim actuator

1.7. Cockpit

1.7.1.1. Description

Followed picture describes positions of all basic control levers, drivers, installation of instruments and cabin equipment, needed for basic pilot information about correct use of this plane:

Fig.: Cockpit

Individual integral side-by-side seats for two persons in enclosed cabin, the main pilot's seat being to port.
Special shape of the cockpit with safety "broken" floor with plywood panels and adjustable composite seats enables not only better comfort, but higher pilot safety during the crash.
Upholstered composite seat and four point safety belts are standard.
Dual control standard: dual control sticks, dual rudder pedals, central located throttle, choke, flaps and elevator trim handles. Two fuel valve levers standard on the right desk, right of its gauges and minimum level indicators.
Hydraulic brakes of main wheels controlled by handle on the middle column (end of arm rest) between pilots.
Rear located baggage compartment is accessible from inside or from outside for carrying of larger cargo.

1.7.2. Instrument panel

MD3 Rider instrument panel is equipped with the left side located flight instruments, starter and master switches, right side located powerplant instruments (engine, fuel, etc) , breakers and switches and center located NAV / COM panel with fixed position of FLYDAT in its bottom. MD3 Rider instrument panel can be equipped by various versions of instruments or their combination, including glass-cockpit.
The standard version included classic analog instruments – according to followed picture *(with all standard options displayed).*

Fig.:Example of panel included standard analog instruments

1.7.2.1. Standard analog instrument panel

FLIGHT INSTRUMENTS are located on the **left side panel** :

Standard : ∅ 3" Airspeed indicator, Altimeter, vertical speed indicator, electric Turn-coordinator
Compass std located on the top of instrument panel

Option : Horizont
Directional Gyro Horizont

ENGINE INSTRUMENTS are located on the **right side panel** :

Standard : 2 Fuel Gauges with minimum level signalization and two fuel shut off valves, Fuel pressure and Manifold pressure gauges, Ampermeter (incl. *shunt),* 12V socket, switches and brakers

Option : **VOX intercom Flightcom 403mc**
VOLTMETER VDO,
Map trap / holder

CENTER PANEL :

Standard : **FLYDAT**

Option : **Radio/Transceiver ICOM A200**
Transponder **Garmin GTX 320A**
GPS Garmin 296 *incl. quick dismountable panel mount*
GPS Bendix King Skymap IIIC *incl. panel mount SM 2204*
Quick dismountable **Rack mount** *SM 2204C for Skymap*
GARMIN GNC 250XL - integrated communication GPS **moving map**

1.7.3. Standard analog flight instruments

standard

BG-3E Altimeter
ø 80mm, under 20 000 ft, air pressure in mbar, 3 pointers

optional

Winter 8039 altimeter ø 80mm, under 10 000 ft,

standard

Winter 8023 speedmeter ø 80mm

50 – 300 km/h

optional

LUN1108 Speedmeter 300 km/h ø80mm,
colors according to specification **Mikrotechna**

standard

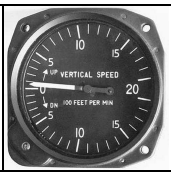
Winter 5161 vertical speed indicator 10 m/s , ø 80mm

optional

BC10-1B vertical speed indicator (Vario) 10m/s , ø 80mm

alternative

Winter 5162 vertical speed indicator 2000 feet/min , ø 80mm



standard

BZW-4B electric Turn-coordinator (without conector)

optional

slip (bank) indicator Winter QMII 36x60mm (or ø 60mm possible)

standard

Compass CM-24, on top mounted ø 60mm (2”)

advanced

Mikrotechna LUN 1241 electrical artificial horizon (attitude gyro) 14 or 28V DC

luxury

vertical compass R.C.Allen RCA15AK-2 electrical 14VDC w/o lights, ø 75mm, 1.035kg

1.7.4. Radio – transceivers

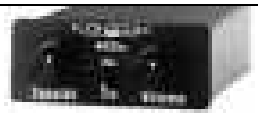
advanced

ICOM A200 transceiver (radio) great performance and reliability , simple handling, most prefed by customers	

optional

Bendix King KY97A transceiver (radio) - changeable with ICOM A200, good imunity oposite to interference	

advanced

VOX intercom Flightcom 403mc max 4-place VOX installation intercom with adjustable preference and next audioinputs	

advanced

VHF antenna CI 122 118-136MHz, developed specially for "**bottom mounted**" position - **perfect communication air-to-ground**	
Full cable set for assembly, including antenna type test on place	

1.7.5. Headsets

optional

Headphones **Flightcom 4DLX** with mechanical noise absorbing, better "cushion", phone on the "gooseneck"	
Headphones **Flightcom 5DX** with mechanical noise absorbing, gel ear-cushion, phone on the "gooseneck"	
Headphones **Flightcom Classic ANR** with electronical noise absorbing ANR, gel "cushion", phone on the "gooseneck"	

1.7.6. GPS

Garmin 296, 396, **496** Color display resolution 480 × 320 pixel (diagonal 97 mm) Chargeable batery lithium-ion Batery capacity on one charge: by full underlight 8 hours of operation, maximal 15 hours Weight 450 g		

installationable **Bendix/King Skymap IIIC** *(Skyforce)*

- color GPS with moving map, cost incl. Atlantic datacard, easy control

luxury

PANEL MOUNT SM2204 for Bendix/King Skymap, simple to fit, suitable for any flat instrument panel, integral power/SMB connector available as an option - ideal for permanent installation	

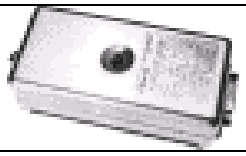
optional

RACK MOUNT SM2204 for Bendix/King Skymap II and IIIC, to be fitted into a standard radio stack - with the flexibility to remove your unit at will through the "push and release" mechanism	

optional

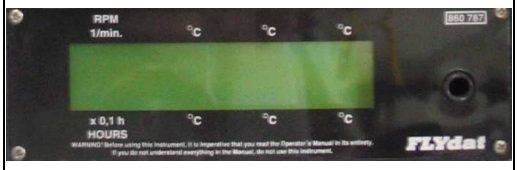
installation **Garmin GNC 250XL**, **integrated communication / GPS**, moving map with great resolution, automatical set-up, shown CTR, TMA, RESTR, APT, NDB, Intersection, complet Jeppensen 760 VHF channels . Optimal in connection with GTX 320 transponder)	

1.7.7. Transponder and antennas

Garmin GTX 320A (suitable for A200 radiostation), classical in mode A/C, cost including installation kit	luxury 
A-30 altitude encoder ("blind" , for C mode)	luxury 
Antenna CI 105 960-1220 MHz, developed for DME and transponders, output for BNC connector (same like KA 60 by Bendix-King	luxury 

1.7.8. Standard engine instruments

STANDARD set

ROTAX *FLYdat* ENGINE MONITORING numerical multiinstrument: **RPM** 1/min, **EGT**/PTO-front °C, **CHT** ℃, **oil temperature** ℃, operating **HOURS**, **EGT**/PTO-rear°C, **EGT** display ↑↓, **oil pressure**–bar TEVESO-ROTAX	
FUEL LEVEL INDICATOR Škoda 120 (2 pcs.)	
FUEL PRESSURE INDICATOR **ROTAX** English, incl. Hoses, T-piece and shutter (damper) - TEVESO - ROTAX 874 230	
MANIFOLD PRESSURE GAUGE (-indicator / boostmeter) TEVESO – ROTAX	
AMPERMETER **-30/+30 A** TEVESO - ROTAX	
SHUNT(bočník) **WESTACH 237-2A** 30 AMPs	

ALTERNATIVE *to ampermeter and shunt*

VOLTMETER VDO TEVESO - ROTAX	

1.7.9. Optional instruments

TEVESO EMS 3712 , ENGINE MONITORING SYSTEM (rounded - Ø80mm) **TEVESO kat. 000 900** / Balda	
BW MED-80 engine multiinstrument / analogically-numerical RPM,EGT,CHT,OIL T,OIL P, AUX + FUEL FLOW (rounded - Ø 80) ulmtechnologie kat 62.022	
BW MED-80 engine system probes for fluxmeters (fuel flow measurement) ulmtechnologie kat 62.023	

ENGINE HOUR METER TEVESO 966 075		
FLIGHT HOUR METER WINTER started from 50kph, recomended for flying schools and aircraft renting , ø80 or ø57, 12/24V ULAVIONICS		
FUEL PRESSURE INDICATOR WESTACH 2C8-8 0-16psi = 0-1kg/cm2, Ø2", ROUND MODEL		
MANIFOLD PRESSURE INDICATOR **WESTACH 2C4-14** ø 2" rounded, 0-50 in.Hg.		
MANIFOLD PRESSURE INDICATOR **WESTACH 2C4-14SS** ø2 1/4"square, 10-50 in.Hg., altitude compensated		
Ampermeter WESTACH 2C6-15 60-0-60 Ø2", ROUND MODEL		
SHUNT(bočník) **WESTACH 237-3A** 60 AMPs		
Ampermeter WESTACH 2C6-22 30-0-30 Ø2", ROUND MODEL		
VOLTMETER WESTACH 2C5 0-16V Ø2", ROUND MODEL		
FUEL CONSUMPTION GAUGE including fuel sonde. Doubled information about fuel in tank and its consumption, possible calibration of non-linearity in fuel tank gauges, 3% inaccuracy, ø 57mm ULAVIONICS		
QUARTZ ELECTRIC AIRCRAFT CLOCKS aircraft spruce P/N 10-22812-12V		
EXHAUST TEMPERATURE ROTAX 336 040		
TACHOMETER ROTAX 966 403		
OIL TEMPERATURE VDO TEVESO 000 540		
OIL PRESSURE VDO TEVESO 000 530		
HEAD TEMPERATURE VDO		

1.8. Power plant

ROTAX 912 S 100HP engine with electric starter, stainless steel exhauster with integral heating, airbox, and 3-blade on the ground adjustable Woodcomp propeller SR200 and own design spinner with 35mm plug are **STANDARD.**

80 HP Rotax 912 optional for *UL version*,

Turbocharged Rotax 914 optional for *Sporty version*

ROTAX® AIRCRAFT engine type 912 ULS (series)
non certified - 100 hp @ 2380 propeller rpm

picture shows 912 ULS 3 -DCDI with options, alternator, airbox

DESCRIPTION:

4-cylinders
4-stroke
liquid/air cooled engine
with opposed cylinders

dry sump forced lubrication with separate 3 l (0.8 gal US) oil tank

automatic adjustment by hydraulic valve tappet

2 CD carburetors

mechanical diaphragm pump

electronic dual ignition

electric starter

integrated reduction gear
i = 2,273
(option i=2,43)

⚠ WARNING:
This aircraft engine does not comply with federal safety regulations for standard aircraft.
This engine is for use in experimental and ultralight uncertified aircraft only and only in circumstances in which an engine failure will not compromise safety.

Technical Data:

Performance for standard conditions (ISA)

ENGINE Type:	**912 ULS D.C.D.I.** **912 S D.C.D.I.**
performance	**69,0 kW (95,0 hp) @ 5500 1/min(rpm)**
	Max. 5 min.: 73,5* kW (100,0* hp) @ 5800 /min(rpm)
torque	128 Nm (94,0 ft.lbf.) @ 5100 1/min (rpm)
Max. RPM:	5800 1/min (rpm)
Bore:	84, 0 mm (3,31 in.)
stroke:	61 mm (2, 40 in.)
displacement:	1352,0 cm3 (82,6 cu.in.)
compression ratio:	10,5:1
ignition unit:	DUCATI double CDI
ignition timing:	4°up to 1000 1/min (rpm)/ above 26°
spark plugs:	ROTAX part no. 297 940
generator performance:	250 W DC @ 5500 1/min
voltage:	13,5 V

OPERATING MEDIA:

Fuel:	**min. RON 95*** - min. AKI 91* *leaded or unleaded or AVGAS 100 LL
Oil:	API SF or SG
cooling liquid:	**50% BASF Glysantin-Antikorrosion / 50% water**

WEIGHT- engine with gearbox i=2,43:	**56,6 kg (124,8 lb.)**

WEIGHT-Options :

oil radiator 886 029:	0,5 kg (1,1 lb.)
radiator 995 697:	1,0 kg (2,2 lb.)
slipping clutch:	1,0 kg (2,2 lb.)
Airbox:	1,3 kg (2,8 lb.)
air cleaner 825 711:	0,15 kg (0,3 lb.)
exhaust:	4,0 kg (8,8 lb.)
air guide hood:	0,8 kg (1,8 lb.)
vacuum pump:	0,8 kg (1,8 lb.)
Hydraulic propeller governor:	2,7 kg (5,9 lb.)
external alternator 40 A/ 12 V DC:	3,0 kg (6,6 lb.)
engine truss assembly:	2,0 kg (4,4 lb.)
rectifier regulator:	0,1 kg (0,2 lb.)
instrument FLYDAT:	0,5 kg (1,1 lb.)
recall instrument RDAT:	1,0 kg (2,2 lb.)
fuel pump with installed fuel lines:	0,2 kg (0,4 lb.)

1.8.1. Analog engine instruments

If analog engine instruments are installed then the instruments limit indicators should show the following:

Function	Minimum Limit	Normal Operating	Caution Range	Maximum Range
Engine speed (RPM)	-	1400-5500	5500-5800	5800
Cylinder Head Temperature (CHT)	-	-	-	135 ^{0}C 275 ^{0}F
Exhaust Gases Temperature (EGT)	-	-	-	880 ^{0}C 1616 ^{0}F
Oil Temperature	-	90 -110 ^{0}C 194 - 230 ^{0}F	50 -90 ^{0}C 122 - 194 ^{0}F 110 -130 ^{0}C 230 - 266 ^{0}F	130 ^{0}C 266 ^{0}F
Oil Pressure	0,8 bar 12 psi	2 – 5 bar 29 – 72,5 psi	0,8 – 2 bar 12 – 29 psi 5 – 7 bar 72,5 – 102 psi	7 bar 102 psi cold engine starting

1.9. Fuel

Detailed info in ROTAX engine manual

1.10. Oil

Detailed info in ROTAX engine manual

1.11. Propeller

MD3 Rider is standard equipped with 3-blade on the ground adjustable propeller Woodcomp SR200 and own design spinner with 35mm plug

WOODCOMP
CZECH REPUBLIC

ON GROUND ADJUSTABLE PROPELLER - TYPE SR 200	
PROPELLER DIAMETER	**1680 mm**
APPLICATION :	FOR **MAX. 100HP** ENGINE

PROPELLER BLADES - CONSTRUCTIONAL DESIGN:

1. WOOD-CARBON (BLACK) BLADES WITH PLASTIC LEADING EDGE.

For propeller blades with wooden core and carbon-fiber surface, the leading edges of the blades are cast from highly resistant plastic material, that serves as protection against impacting sand, small stones, water and other effects, which may damage propeller blades. These blades are available for propeller diameter 1600mm and 1680mm.

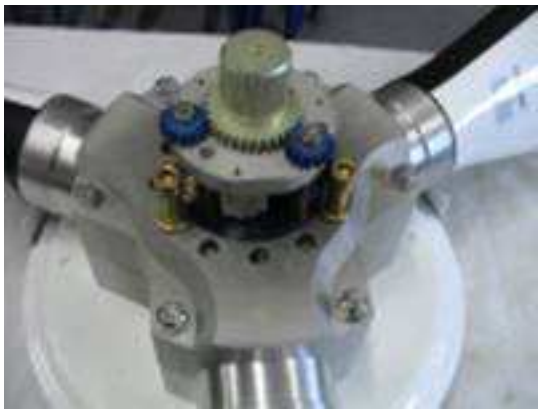
standard for MD3 Rider :

2. WOOD-COMPOSITE (WHITE) BLADES WITH PLASTIC LEADING EDGE.

For propeller blades with wooden core and glass-laminated surface in white or black color, the leading edges of the blades are cast from highly resistant plastic material, which serves as protection against impact of sand, small stones, water and other effects, which damage propeller blades. These blades are available for propeller diameter 1600mm and 1680mm.

3. WOODEN BLADES WITH COMPOSITE LEADING EDGE.

Wooden propeller blades, that are equipped with leading edges made of highly resistant composite material, serving as protection against impact of sand, small stones, water and other effects, which damage propeller blades. The blade surface is protected with several spray coatings of very high quality and highly resistant polyurethane paint. The color versions are TRANSPARENT or WHITE. These blades are available for blade diameters of 1450mm, 1500mm, and 1600mm and 1680mm.



The propeller SR 200 can be equipped with a central adjusting mechanism, which makes it possible to adjust all three propeller blades simultaneously, by means of a single control element. This ensures that all three propeller blades are permanently adjusted to the same working angle.

1.12. Engine mounting

The engine mounting is welded from CrMo tubes and is attached to the firewall with 4 bolts. The mounting is fixed to cockpit welded cage through four rubber silentblocks.

Fig.: Engine mounting

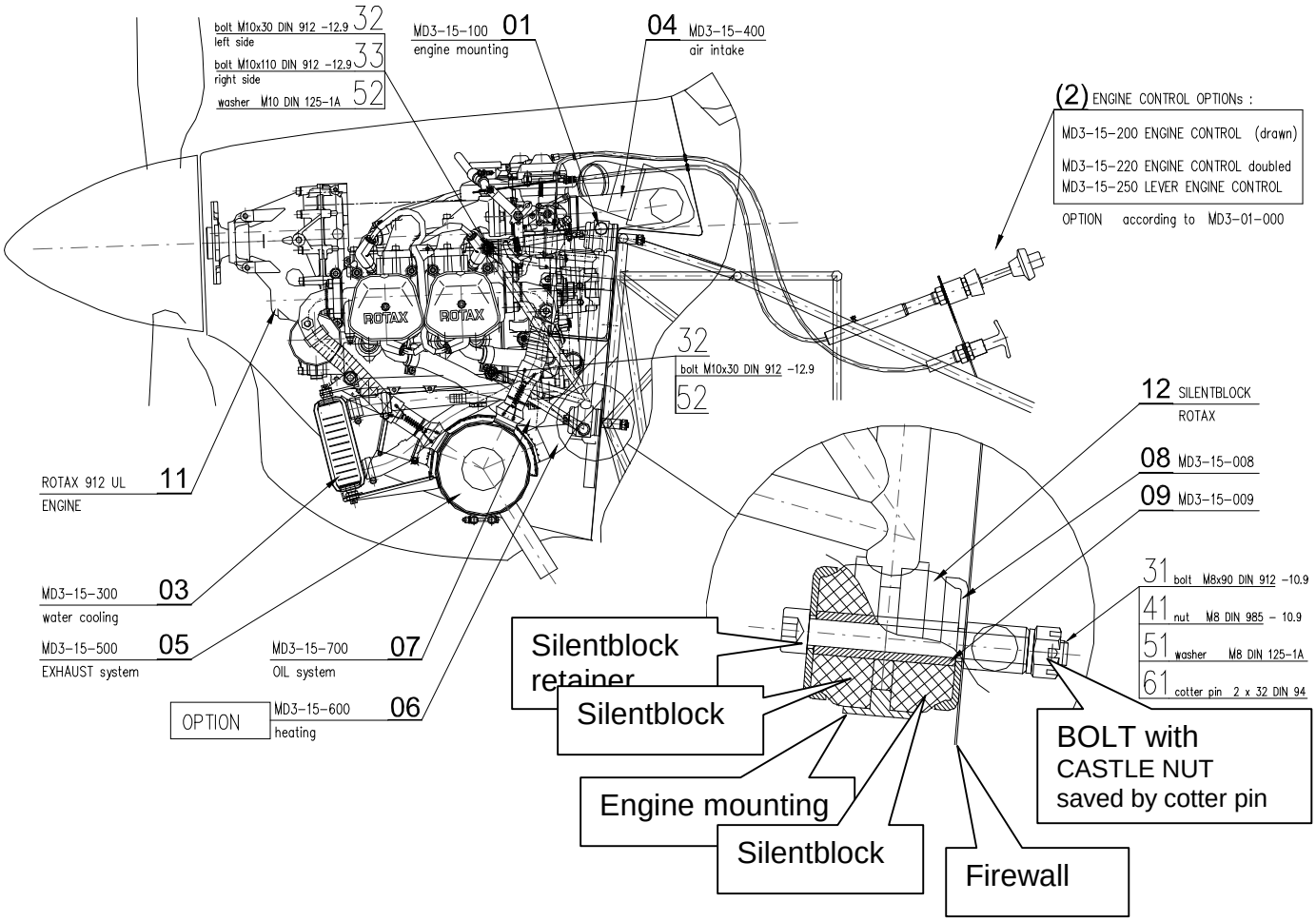


Fig.: Engine mounting suspensions

1.13. Engine cowlings

There are two fiberglass cowlings (upper and lower).

Composite engine cowlings with natural aerodynamic shape are fixed by screws (bottom) and connected by quick-closing CAM-LOCKs (top part) – to be easy removable for preflight inspections. Bottom cowlings have great air intake for water-cooler in the bottom, right-side small air intake for cylinders direct cooling and left side for air box. Oil cooler has independent right side NACA inlet.

Fig.: Engine cowlings

1.14. Fuel system

The standard fuel tank volume is 2x 46 l. The tanks are located inside the wing.
Fuel is pulled from the fuel tanks through the fuel selectors located inside the cockpit on the right–side instrument panel. Then through the fuel filter to the engine fuel pump and on to carburetor.
The main drain valve / gascolator is located on the right side of firewall – and accessible from bottom engine cowling air outlet. The tanks can be optionally equipped drain valves too. The fuel tank filler neck is placed on the upper side of wing. Fuel quantity is indicated by 2 fuel gauges with minimum level signalization.

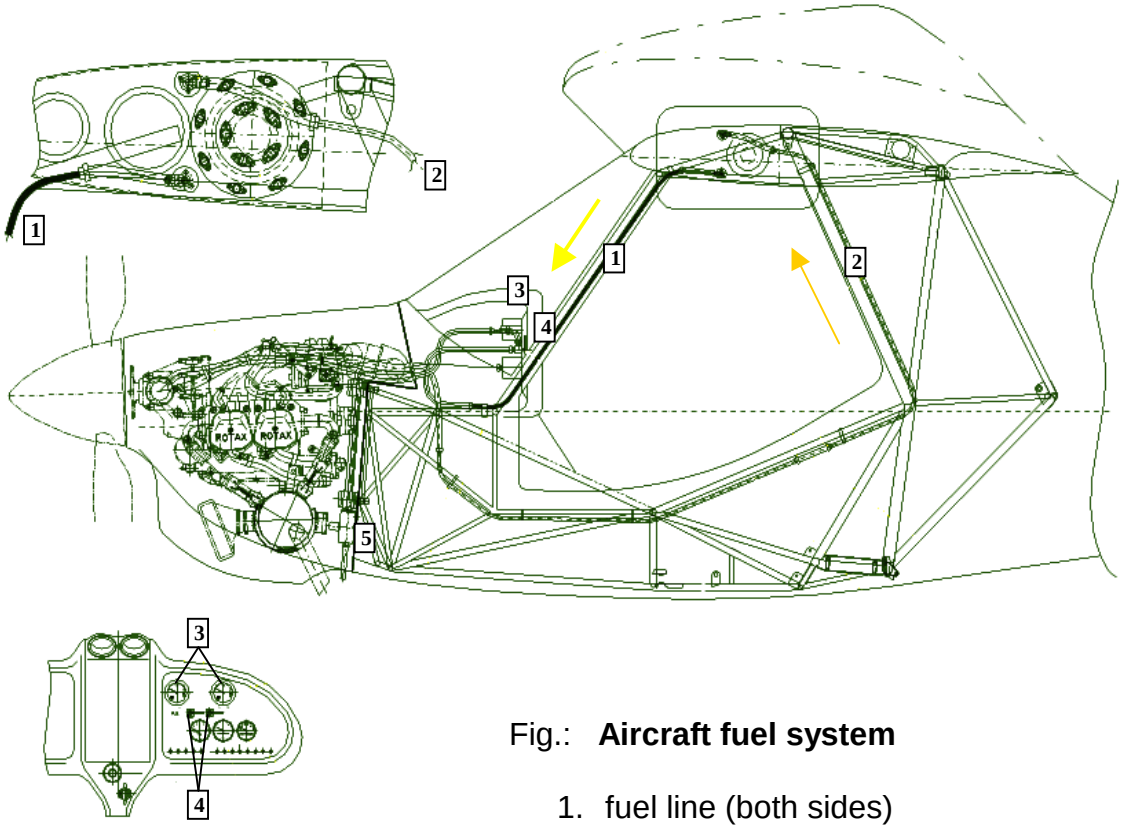
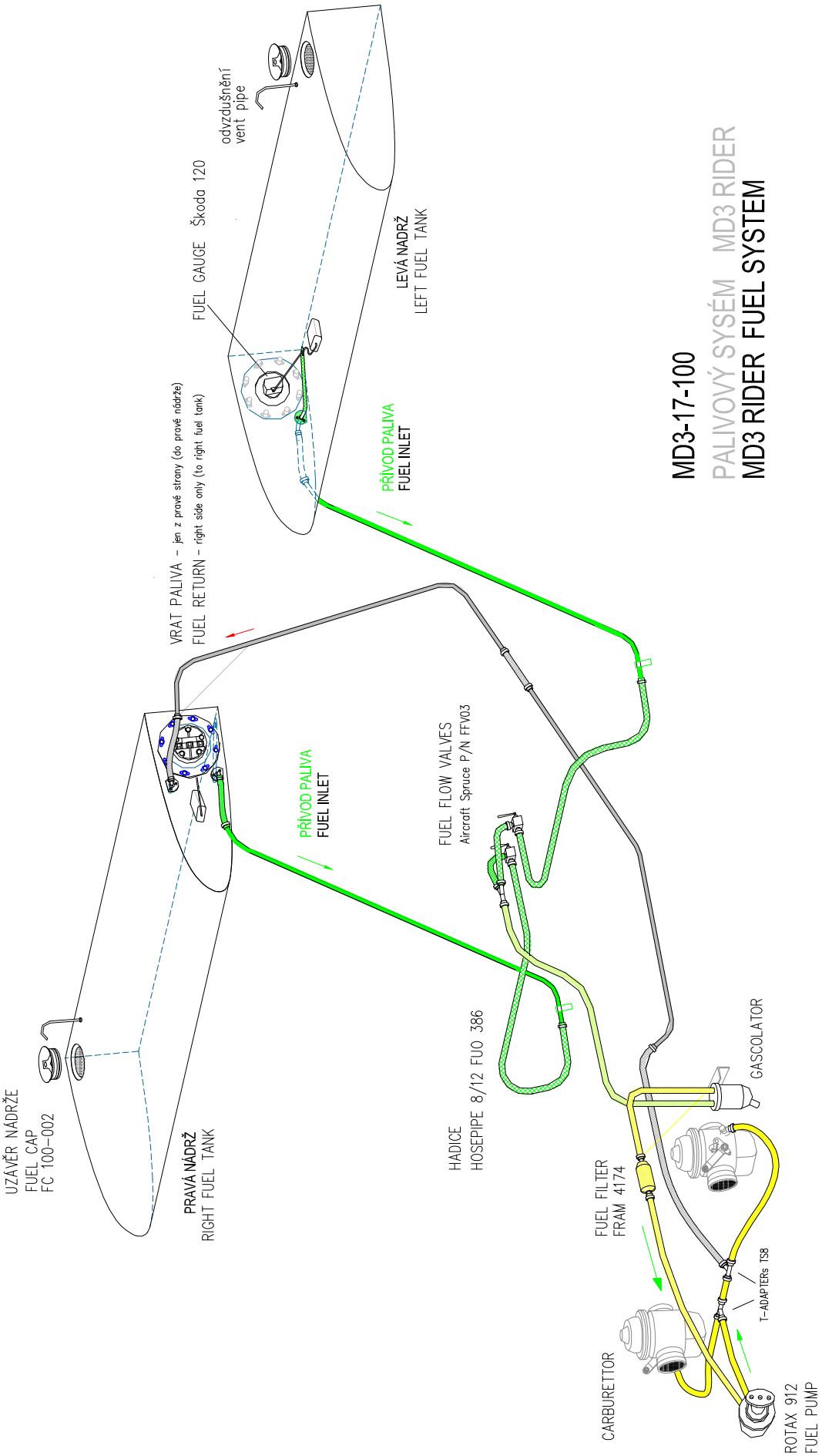


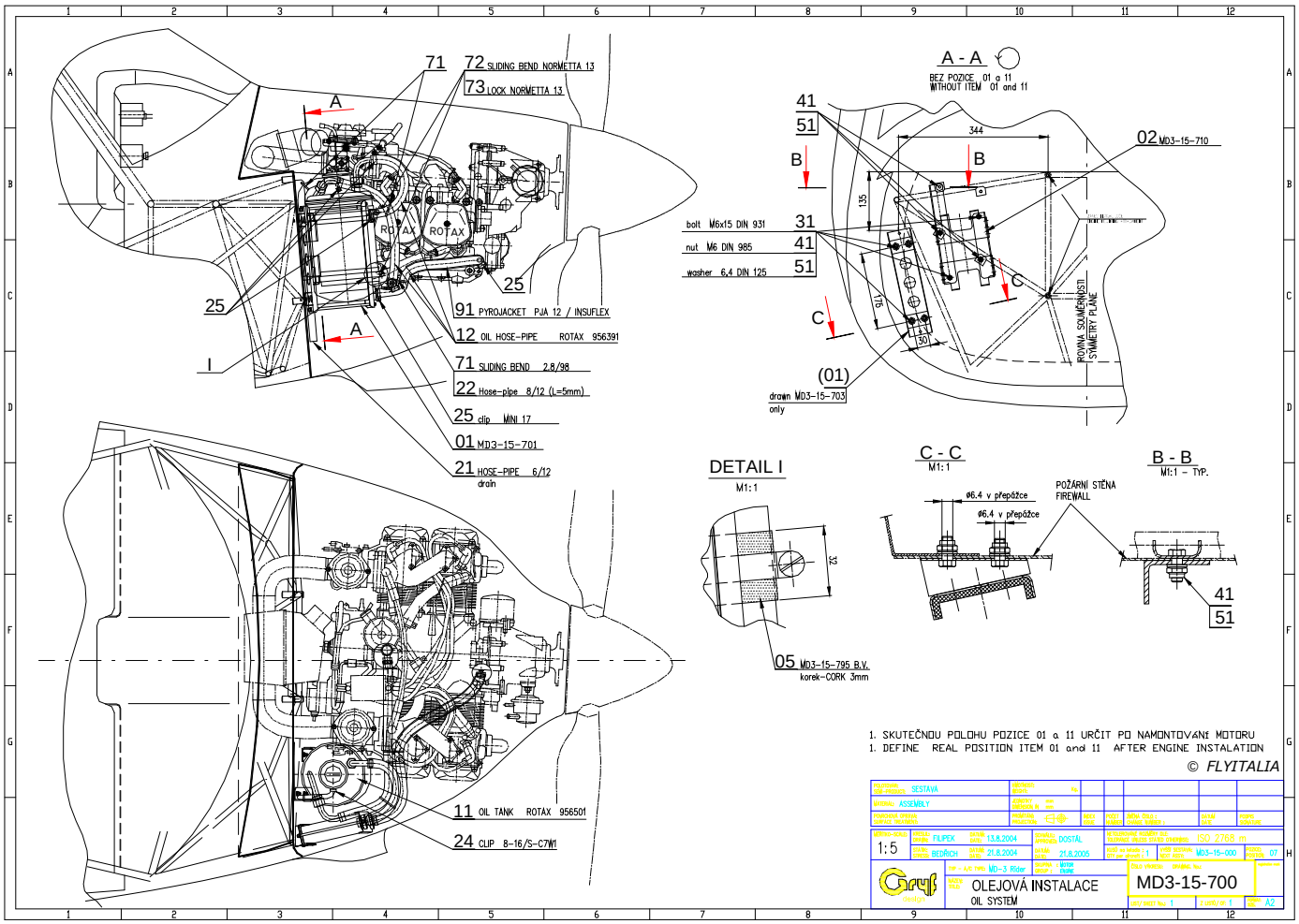
Fig.: **Aircraft fuel system**

1. fuel line (both sides)
2. return fuel line (right side)
   - for 100HP Rotax 912 ULS only
3. fuel level gauges
4. fuel valves
5. main drain valve / gascolator


MD3-17-100
PALIVOVÝ SYSÉM MD3 RIDER
MD3 RIDER FUEL SYSTEM
odvzdušnění
vent pipe
FUEL GAUGE Škoda 120
LEVÁ NADRŽ
LEFT FUEL TANK
PŘÍVOD PALIVA
FUEL INLET
VRAT PALIVA - jen z pravé strany (do pravé nádrže)
FUEL RETURN - right side only (to right fuel tank)
PŘÍVOD PALIVA
FUEL INLET
FUEL FLOW VALVES
Aircraft Spruce P/N FFV03
UZÁVĚR NÁDRŽE
FUEL CAP
FC 100-002
PRAVÁ NÁDRŽ
RIGHT FUEL TANK
HADICE
HOSEPIPE 8/12 FUO 386
FUEL FILTER
FRAM 4174
GASCOLATOR
T-ADAPTERs TS8
CARBURETTOR
ROTAX 912
FUEL PUMP

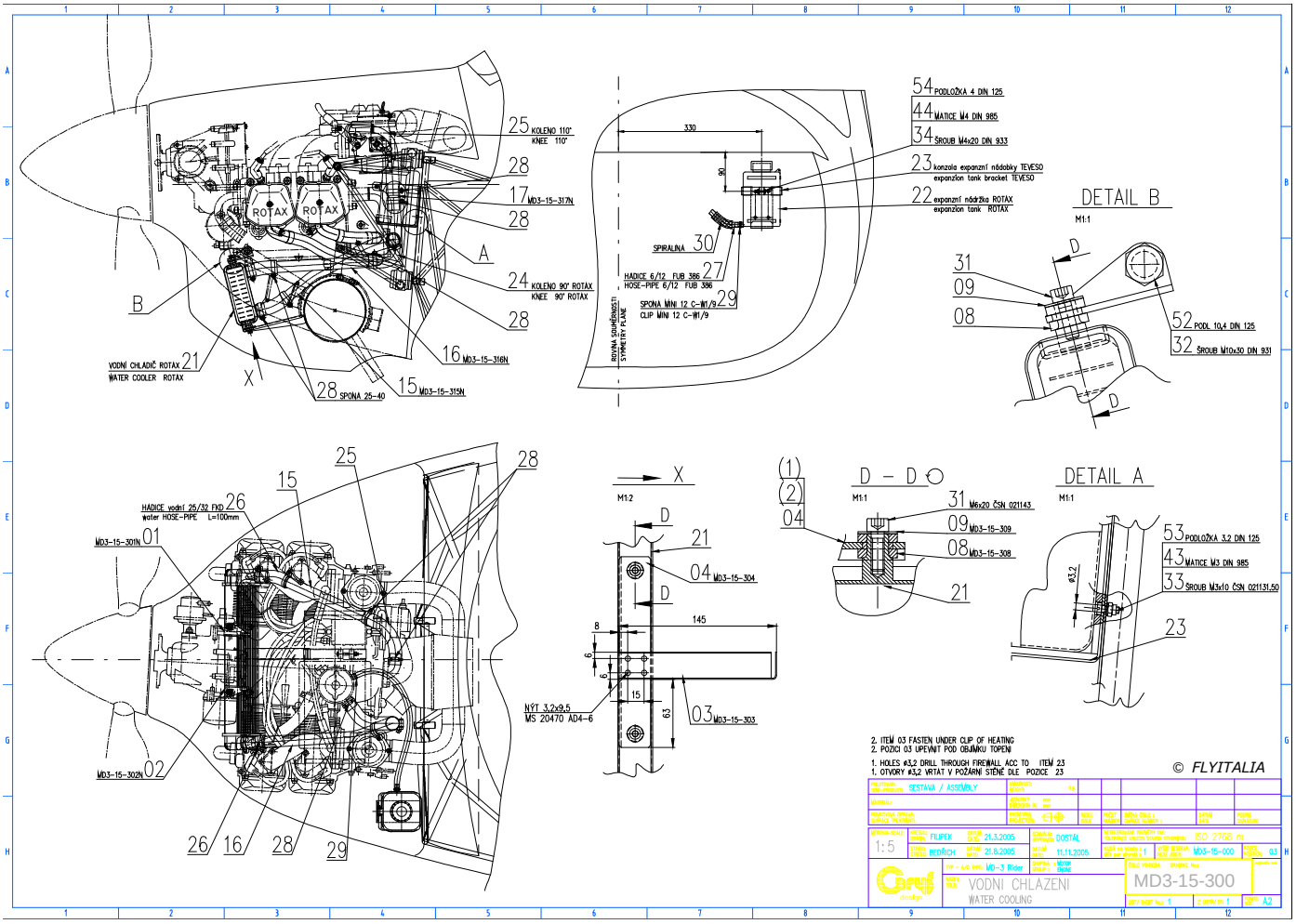
1.15. Engine lubrication system

The Rotax 912 is provided with a dry sump forced lubrication system. The oil pump pulls the motor oil from the oil tank via the oil cooler. Then forces it through the oil filter to the lubrication points in the engine. The surplus oil emerging from the lubrication points accumulates on the bottom of the crankcase and is forced back to the oil tank by the blow-by gases.
The oil tank is equipped with a vent hose.
The engine lubrication system is further described in documentation supplied with the engine.



1.16. Cooling system

The cooling system uses two forms of cooling. The cylinder heads are liquid cooled and the cylinders ram air cooled. The radiator is located in the front of the lower engine cowling. The coolant is forced through the radiator by a water pump, driven from the crankshaft to the cylinder heads. From the top of the cylinder heads the coolant passes on to the expansion tank which allows for coolant expansion. The expansion tank is closed by a pressure cap with an excess pressure valve and return valve. When the temperature rises the coolant creates excess pressure, a relief valve opens and the coolant flows through a thin hose to the overflow bottle installed on the firewall.
The engine cooling system is more completely described in documentation supplied with the engine.

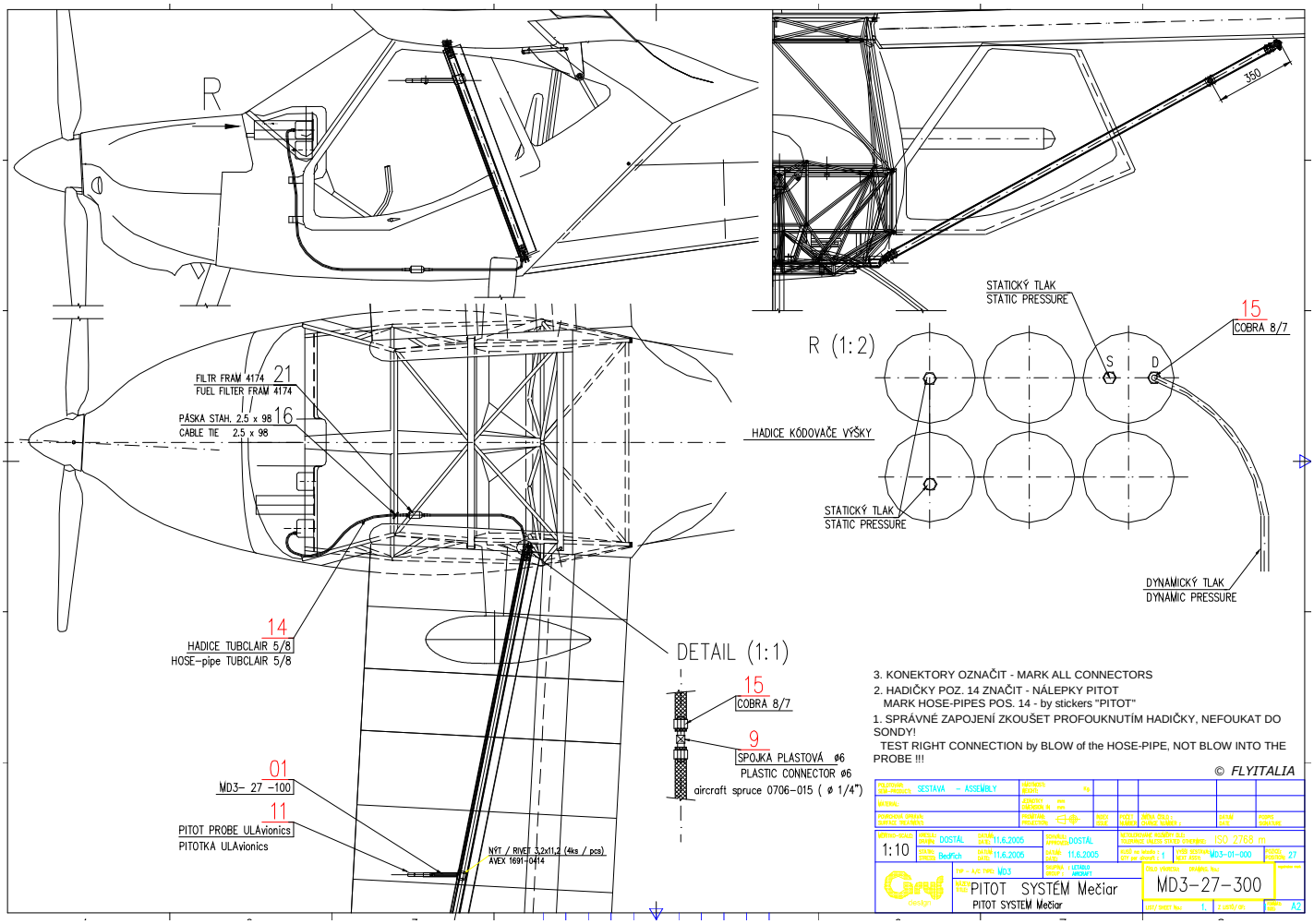


1.17. Heating

Air is preheated by the passage through a water cooler. Then an air collector leads the preheated air to the exhanger in the exhaust system, yhen through the valve directly to the cockpit. The heating valve is operated with a cable from the heating valveflap to a small push/pull handle located on the instrument panel. Pull the handle to open the heating valve and bring hot air into the cockpit.

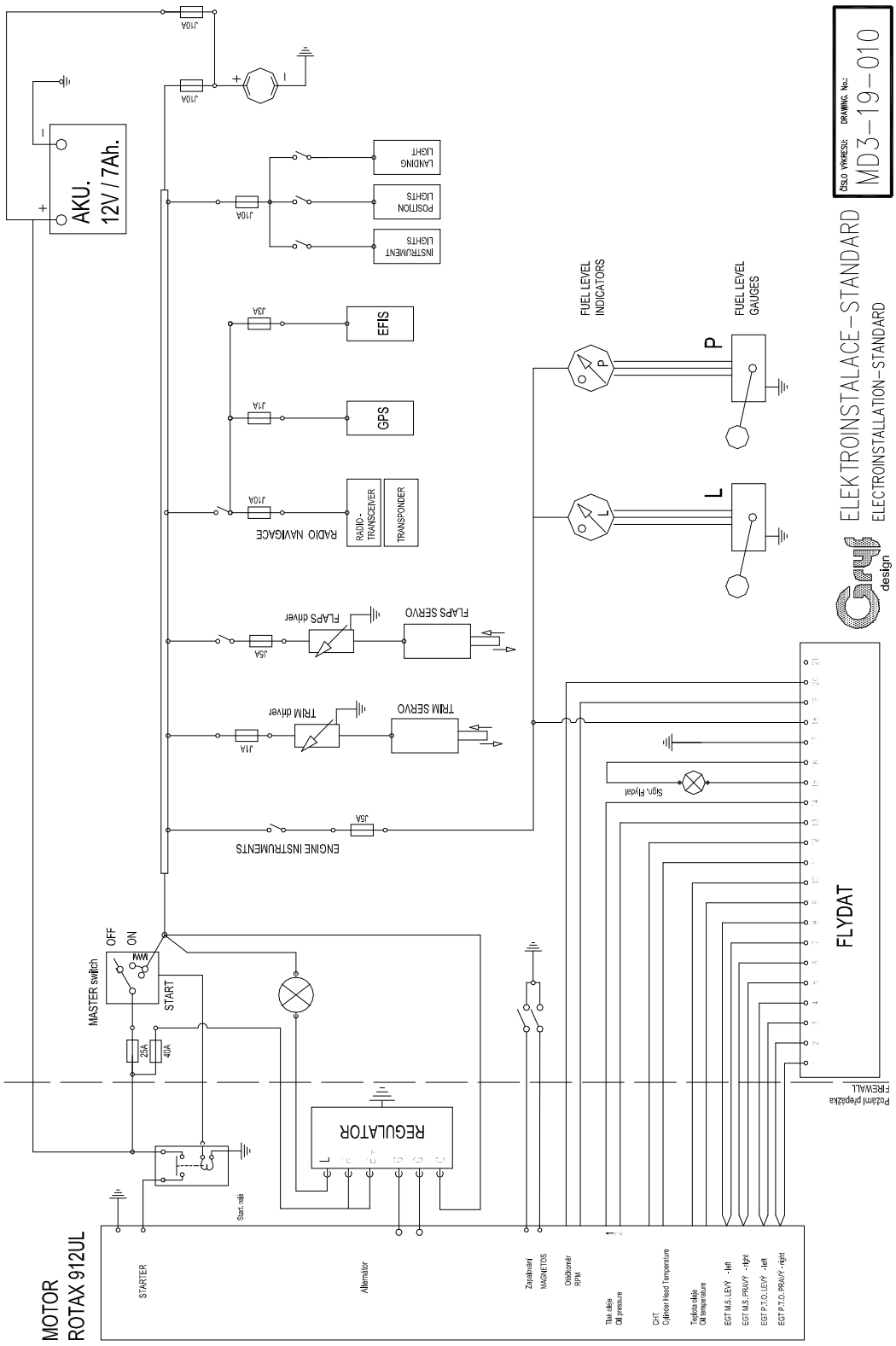
1.18. Pitot-static system

The pitot-static tube, located under the left wing on the strut, provides dynamic air pressure. Static air pressure of standard system is used from cockpit, to have more safety indications around slow speeds.
Pressure distribution to individual instruments is done through flexible plastic hoses.
Keep the system clear to ensure its correct function. System is equipped with dirt pockets.



1.19. Electric system

The electric system is a single-wire type with the negative side connected to the chassis. The power source is a single-phase generator integral to the engine. Aircraft uses 12V/16Ah battery. Separate appliances have separate switches. The circuits of the particular sections are each guarded individualy by fuses or circuit breakers . The dual engine ignition is a separete of the electrical system.The wiring system will vary and depends on the instrumentation, electronic equipment and electric acessories of your aircraft. Standard electroinstallation system is followed :



1.20. Placards

A new aircraft is equipped with placards supplied by the airplane manufacturer.
These placards explain the purpose of controls, instruments, airspeed limits, weight limits, etc.
The placards are usually attached to the appropriate instruments and controls. Limitation placards
are attached to the canopy, external placards are attached on the appropriate aircraft part, however placards may vary slightly from plane to plane.

CAUTION
The owner (aircraft operating agency) of the aircraft is responsible for the readability of placards during the aircraft service life.

In case of placard damage or unreadibility, it is permissable to copy placards (copy on suitable adhesive tape) and replace the damaged placard.

2. Operation

2.1. Operation outlines

During operation of the **MD – 3 RIDER** it is required to have in the following documentation in the plane:

- Aircraft Maintenance Manual for **MD – 3 RIDER**
- Aircraft Flight Manual for **MD – 3 RIDER**
- Engine Operator's Manual
- Propeller Operator's Manual
- Additional documents supplied with instruments or equipment

The airworthiness and operational readiness of the airplane depends upon the careful adherence to the recommended procedures and reguletions. Climate, aerodrome conditions, dustiness, manner of hangaring and other factors, such as corrosive effects of industrial or seaside areas, should be considered.

The procedures given in this manual suit average operational conditions, more harsh environments may require more frequent maintenance intervals.

2.2. Airplane assembly

2.2.1. Wing

2.2.1.1. Wing assembly

The wing assembly procedure for an aircraft not-equipped with the optional wing folding mechanism is the following (3 persons are needed to accomplish this task):

Necessary tools

- a hammer to move the suspension pins
- a screwdriver to attach fillets
- wrenches to tighten the suspension bolt nuts
- lubricant to preserve the suspensions

Wing – to fuselage assembly procedure

The assembly procedure of one half of the wing is the following.
The procedure for both halves is similar.

1. Thoroughly clean and lubricate all the wing suspensions and bolts with a suitable lubricant before the assembly. Also lubricate the flap root groove.
2. The first person holds the wing tip, the second person holds the wing root leading edge, while the third holds the wing root trailing edge.
3. Set the wing carefully on the wing attachments on the fuselage in such a way that the wing flap is set with the slot on the control pin. When sliding the wings on the attachments take increased care so that damage to hoses and cables cannot occur.
4. Set the wing so that the attachments on the wing and on the fuselage are concentric.
5. The person keeping the wing on the leading edge will insert the pin into the main attachment and shift it by means of slight hammering to the stop.
6. Insert the pin into the rear attachment of the wing and push it by slight hammering to the stop. Put the washer on the pin and screw the nut on it. Secure the nut by means of the safety cotter pin.
7. Put on the washers on the wing main attachment pin and screw the nut on it. Secure the nut by means of the safety cotter pin.
8. Put in lower (fuselage) pin of the wing strut and secure the joint.
9. Put in upper (wing) pin of the wing strut and secure the joint.
10. Connect the aileron control pull rod, secure the joint.
11. Connect wiring.
12. Install pitotstatic system and carry out leakage test of the pitotstatic system.
13. Install fillets.

2.2.1.2. Wing disassembly

Necessary tools

- a hammer to tap the suspension pins out
- a screwdriver to unscrew the fillet connection screws
- wrenches to unscrew the rear wing suspension nut
- a drift made from duralumin round or other suitable material to drive out the wing suspension pins

Wing - from –fuselage disassembly

1. Remove the fairings.
2. Disconnect hoses of pilotstatic system.
3. Disconnect cable plugs and sockets of electrical system.
4. Disconnect aileron control pull rod.
5. Disconnect wing strut.
6. The first person will lay hold on the wing tip, the second person by the root on the leading edge, the third person by the root on the trailing edge.
7. Push out the safety cotter pin securing the castle nut of the rear pin and knock out the rear pin of the wing attachment.
8. Push out the safety cutter pin securing the castle nut of the main pin and knock out pin on the main atatchment of the wing.
9. By pulling the wing in direction from the fuselage, disconnect the wing from the fuselage.
10. Position the disconnected wing in such a way that its damaging cannot occur.

2.2.2. Horizontal tail unit

2.2.2.1. Necessary tools

- a wrench to tighten nuts
- a screwdriver to attach the tail unit/fuselage fairing

2.2.2.2. Horizontal tail unit (HTU) - from – fuselage disassembly

1. Unscrew attachment bolts of HTU-fuselage fiberglass cover.
2. Disconnect the trim tab electric control cables.
3. Disconnect the elevator control rod.
4. Remove the safety pins securing the castle nuts on the bolts of the stabilizer suspensions. Screw off the nuts and remove the washers.
5. Draw the HTU out of the fuselage.
6. Put connecting components in a safe place to avoid loosing them.

2.2.2.3. HTU-to-fuselage assembly

1. Make the connecting components ready, clean and lubricate HTU suspensions
2. Insert the HTU from the rear into the fuselage as far as the stabilizer will go into the two pins in the front and the two bolts in the rear. Take care of the trim tab electric control cables.
3. Put the washers on the bolts. Screw on the castle nuts, and secure with a safety cutter pins.
4. Attach the HTU/fuselage fairing using screws.
5. Insert the bolt to connect the elevalor control hinge with the control rod. Put on a washer, screw on the castle nut and secure with the cutter pin.
6. Connect trim tab electric control cables.
7. Adjust the elevator and trim tab deflections.

2.2.3. Vertical tail unit

2.2.3.1. Necessary tools

- a wrench to tighten/remove the nut

2.2.3.2. Rudder - from – fuselage disassembly

1. Disconnect the rudder control cables, attach the ends of the cables together to keep the cables from sliping inside the fuselage.
2. Remove the safety cutter pin from the lower suspension bolt. Remove the caslle nut and washer.
3. Lift and remove the rudder from suspensions.

2.2.3.3. Assembly procedure

1. Put the rudder on the fin suspensions from above. Use care no! to move the spherical bearings in the rudder suspensions.
2. If necessary insert a washer to adjust lower suspension clearance.
3. Put the washer on the lower suspension bolt, tighten the castle nut and secure with a safety cutter pin.
4. Attach the rudder control cables.

2.2.4. Landing gear

2.2.4.1. Disassembly of nose landing gear wheel

1. Jack and support the airplane.
2. Disassemble the nose landing gear wheel pant.
3. Cut the locking wire securing side screws.
4. Disassemble one side screw.
5. Release the wheel axle from the wheel hub and the fork eyes.

2.2.4.2. Assembly of nose landing gear wheel

1. Clear the wheel axle of impurities and grease it slightly.
2. From one side shift Ihe axle into the landing gear leg fork eye.
3. Gradually put on the long spacer, shim, nose wheel, shim and short spacer on the wheel axle (from the right in the flight direction).
4. From both sides screw and tighten screw in the wheel axle.
5. Check for free turning of the nose wheel (turning must be continual without catching).
6. Secure side screw with locking wire to prevent from their releasing.
7. Reassemble the wheel pant.

2.2.4.3. Disassembly of main landing gear wheel

The main landing gear assembly consists of the brake disk and the brake.

1. Jack and support the airplane.
2. Disassemble the main landing gear wheel pant.
3. Unscrew bolts connecting the brake plate with the wheel disc.
4. Disassemble the cotter pin of the securing nut.
5. Unscrew the nut.
6. Remove the washer from the wheel axle.

2.2.4.4. Assembly of main landing gear wheel

1. Clear the wheel axle of impurities and apply slight layer of grease on it..
2. Shift the wheel on the axle.
3. Put the washer on the wheel axle.
4. Screw and tighten the nut on the wheel axle.
5. Secure the nut with the new cotter pin.
6. Reassemble the brake plate, secure bolts with the washer.
7. Reassemble the wheel pant.

2.2.5. Removal and replacement of wheel fairings

The aircraft may be equipped with optional wheel fairings to prevent wing lower surface pollution and reduce aerodynamic drag.

2.2.5.1. Main landing gear wheel fairing

Dismounting

1. Support the airplane to lift the main wheel with the wheel fairing to be removed.
2. Cut the safety wire securing the screw that attaches the wheel fairing to the axle and the safety wires securing the screws at internal leg side.
3. Remove the screw attaching the wheel fairing to the axle.
4. Remove the screws attaching the wheel fairing to the main landing gear leg from the inner side.
5. Remove washers.
6. Remove the wheel fairing.

Installation

Use the following procedure to install a wheel fairing on an airplane not equipped with wheel fairings by the manufacturer (use the opposite procedure to the dismounting one (see above) to install a wheel fairing back on a main leg).

1. Support the airplane to lift a main wheel on which a wheel fairing would be installed on.
2. Remove the cotter pin securing the castle nut on the wheel axle.
3. Remove the castle nut and washer.
4. Put the new castle nut, supplied with wheel fairings, on the wheel axle, tighten.
5. Secure the nut with a cotter pin.
6. Install a wheel fairing on the wheel.
7. Attach the wheel fairing to the main leg with screws (use washers), slightly tighten.
8. Use the screw and washer to attach the wheel fairing to the caslle nut on the axle, slightly tighten.
9. Adjust wheel fairing position.
10. Tighten all the screws.
11. Secure all screws with safety wires.
12. Remove the airplane from supports.

2.2.5.2. Nose-leg wheel fairing

1. Lift and support aircraft middle section.
2. Dismount and remove the nosewheel axle.
3. Remove the nosewheel.
4. Unscrew the screws attaching the wheel fairing to the nosewheel fork.

2.2.6. Installation and relinstallation of instruments

The installation procedure will depend on the instrument being installed.
Follow the manufacturer's recommendations.
On this account, there is need to remove the instrument panel when installing or removing an instrument.
Remove the instrument attaching screws and remove the instrument from the back of the instrument panel (after disconnection of appropriate wires or hoses).
If it is necessary to gain access to the instrument wiring, remove the sheet cover over the instrument panel.

Fig.: Dismounted instrument panel (left, right) with instruments

2.3. Measurement of control surfaces deflections

2.3.1. Required deflections

The deflection of the control surfaces are specified in the *Record about the checking of control surfaces and tension of airplane cables* (see Appendices of this Manual) and in the following figure. A protractor wtth deflecting hand is used by the airplane manufacturer to measure deflections. The protractor is attached to a control surface with a hand clamp. There are also alternative procedures in the following text.

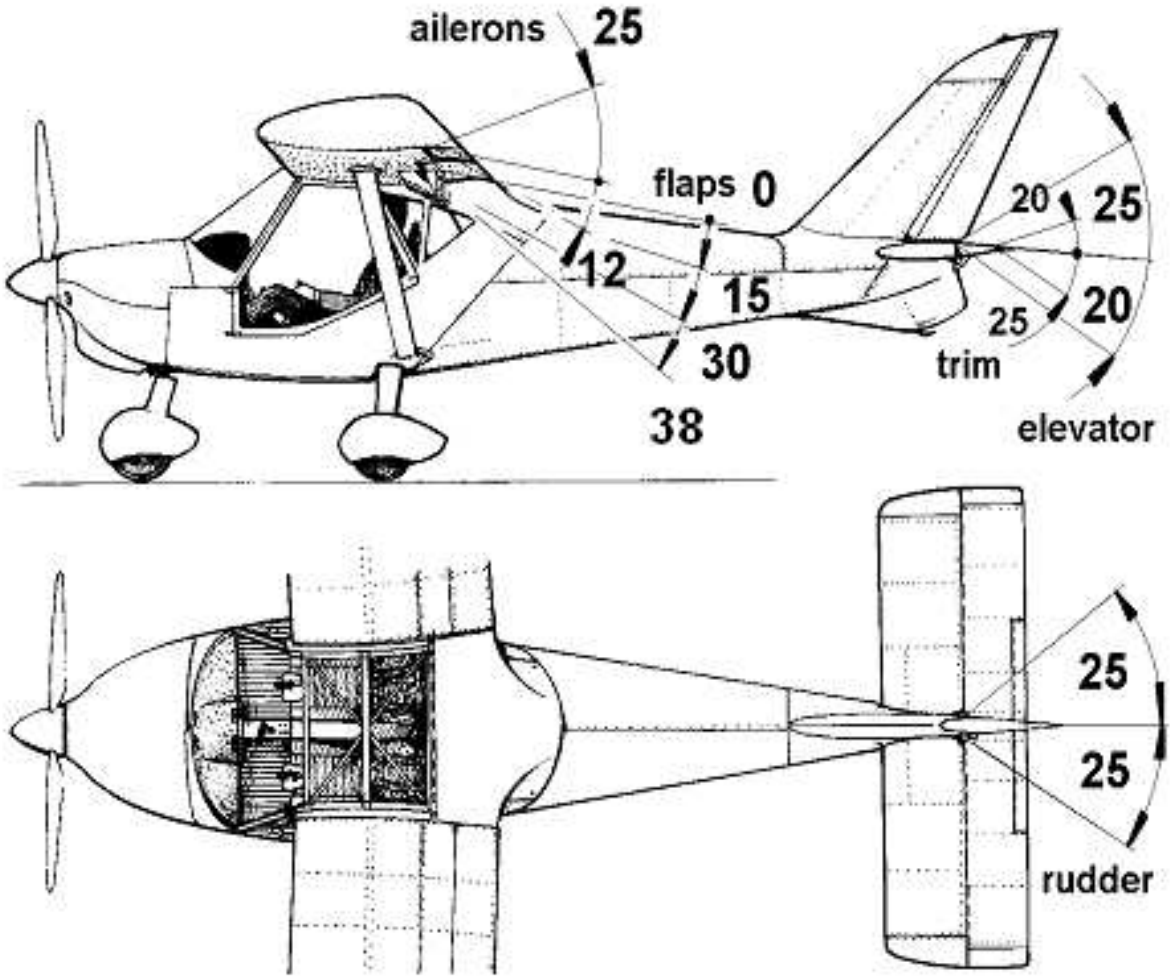


Fig.: Required aircraft deflections

2.3.2. Aileron deflection measurement

Measurement procedure:

1. Attach a protractor with a deflection hand at the aileron upper surface by means of a clamp.
2. Set the aiferon in neutral position (the aileron must fit the wing profile).
3. Zero the protractor - starting position for measurement.
4. Deflect the aileron fully down/up and note the deflections.
5. Compare, the measured deflections with the ones specified in the *Record about the checking of control surfaces and tension of airplane cables*. If required - adjust the aileron deflection.

If a protractor is not available, the following procedure may be substituted:

1. Insert a stiff cardboard sheet of paper in the space between the aileron and the flap. Hold the drawing paper against the flap.
2. Put the aileron in a neutral position. Then trace its profile (upper surface from the hinge to the trailing edge). Then trace the profile of the aileron fully deflected in both directions.
3. Remove the drawing paper and measure the deflection from the neutral position using a protractor.
4. Compare, the measured deflections with those specified in the *Record about the checking of control surfaces and tension of airplane cables*. If required - adjust the aileron deflection.

2.3.3. Flap deflection measurement

The wing flaps can be set in 4 positions. RETRACTED, TAKEOFF, LANDING (2 positions).
Measurement procedure:

1. Cut a strip of aluminium sheet 2 inches (50 mm) wide. The strip is than attached to the flap lower surface (somewhere in the middle of the flap span). The strip should overhang the flap trailing edge.
2. Attach a protractor with a deflection hand at the strip using a clamp.
3. Zero the protractor - this will be the starting position for measurement with the flaps retracted.
4. Extend the flap to the required position using the flap control lever and read the deflection.
5. Compare, the measured deflections with those specified in the *Record about the checking of control surfaces and tension of airplane cables*. If required - adjust the flap deflection.

If a protractor is not available, the following procedure may be substituted:

1. Insert a stiff cardboard sheet of paper in the space between the aileron and the flap. Hold the drawing paper against the flap.
2. Trace the profile of the retracted flap on the lower surface from the hinge to the flap trailing edge).
3. Move the flap to an extended position and trace the lower surface profile again.
4. Remove the drawing paper and measure the deflection from the "RETRACTED" position using a protractor.
5. Compare, the measured deflections with those specified in the *Record about the checking of control surfaces and tension of airplane cables*. If required - adjust the flap deflection.

2.3.4. Elevator deflections measurement

The starting position to measure the elevator deflections is the neutral positions of the control stick and elevator. The neutral position of the control stick is set by the aircraft manufacturer, by means of a jig. The distances between the control stick and instrument panel, and between the control stick and fuselage side can be used to set the neutral position. When the elevator is in the neutral position, the chord of the Horizontal tail unit will be parallel to upper edge of the fuselage side.

Measurement procedure:

1. Attach a protractor with a deflection hand at the elevator trailing edge.
2. Set the elevator to the neutral position.
3. Zero the protractor.
4. Fully pull or push the control stick to deflect the elevator and read the deflection.
5. Compare, the measured deflections with those specified in the *Record about the checking of control surfaces and tension of airplane cables*. If required - adjust the elevator deflection.

If a protractor is not available, the following procedure may be substituted:

1. Support the airplane under the tail skid and firewall and set the airplane in a horizontal position.
2. Stand a suitable staff close to the elevator trailing edge and mark the neutral position of the elevator.
3. Move the control stick and fully deflect the elevator. Mark the positions of the elevator while fully deflected.
4. Measure the distances between marks on the staff.
5. Compare, the measured deflections with those specified in the *Record about the checking of control surfaces and tension of airplane cables*. If required - adjust the elevator deflection.

2.3.5. Rudder deflection measurement

The rudder deflections are set by the aircraft manufacturer. If necessary the rudder deflections can be ad|usled by adjuslable stops located on the rudder control cable in the cockpit.
A measuring instrument is used by the aircraft manufacturer to measure the rudder deflections.
The instrument is put on the vertical tail unit and a rudder deflection may be read directly.
The rudder deflection may be measured however, when the set the rudder is set to the neutral position. Stand a suitable staff at the ruder trailing edge and mark lower edge of the rudder. Fully deflect the rudder and measure using a ruler between the mark on the staff and the lower edge of the rudder. Compare the measured distance with those specified in *Record about the checking of control surfaces and tension of airplane cables*.

2.3.6. Trim tab deflections measurement

The trim tab deflection is measured from the neutral position. When the trim tab profile does not protrude from the elevator profile with elevator set in neutral position.

Measurement procedure:

1. Attach a protractor with a deflection hand at the trim tab.
2. Neutralize the trim tab and the elevator.
3. Zero the protractor.
4. Set the trim tab in maximum lower or upper position using the trim tab control lever and read the deflection from the protractor scale.
5. Compare, the measured deflections with those specified in the *Record about the checking of control surfaces and tension of airplane cables*. If required - adjust the trim tab deflection.

2.4. Permissible Tolerances

The following table indicates the permissible tolerances for critical parts of the airplane. These values should not be exceeded in operation.
It is expected that an operator will take steps if excessive plays are found on/in part not listed below.

System	Procedure to find a play	Procedure to remedy a play	Max. product. play	Max. operat. play
Ailerons control system	Block ailerons up to the wing and move the control stick to the left and right	Check condition of bearings and replace if needed	*0.08 in* 2 mm	*0.2 in* 5 mm
Elevator control system	Block elevator up to the stabilizer, pull and push the control	Check condition of bearings and replace if needed	*0.08 in* 2 mm	*02 in* 5 mm
Flaps control system	Set the flaps in all position by degrees and then handle the flap trailing edge near the flap root, move the trailing edge up/downward to find possible plays	Check the part wiin oval hole for the control pin in the flap root rib and replace the worn-out pin or the part with oval hole	*0 08 in* 2 mm	*0.2 in* 5 mm
Trim tab control system	Set trim tab in neutral position and then handle the trim tab trailing edge, move the trailing edge up/downward to find possible plays	Check control servo rod and pin and condition of electric cables	*0.08 in* 2 mm	*0.2 in* 5 mm
Wing-Fuselage attachment	Move the wing tip and note play in wing suspensions	Check wing suspensions, replace pins	0	*0.08 in* 2 mm
HTU attachment	Move the stabilizer tip forward-rearward	Replace bearings in suspension points and bearings in control system	0	*0 08 in* 2 mm
Rudder hinges	Lift the rudder	Change swivel bearing or insert a washer under the lower hinge pin	*0.04 in* 1 mm	*0 08 in* 2 mm
Nose wheel	Push the rear part of the fuselage down (use a weight) to lift the nosewheel, then move the wheel forward- rearward	Remove the wheel, remove the rim and tire and replace the bearings	*0.04 in* 1 mm	*0.12 in* 3 mm
Main landing gear	Lifl the wing tip (hold the wing under the main spar) to lifl a main leg, then move the wheel forward-rearward and note play in bearings or leg attachment	Check the leg attachment wheels attachment replace the bearings if necessary	*0.04 in* 1 mm	*0 12 in* 3 mm

2.5. Weighing the airplane and C.G. calculation

WARNING
Never exceed the maximum take-off weight and c. g. range for any configuration of crew, fuel and baggage as shown in the flight manual.

The removal or addition of equipment may result in changes to the center of gravity and empty weight of the aircraft. The permissible useful load can also be affected. In such case a new weight and balance is necessary to determine the new empty weight and center-of-gravity position. The new empty weight and C.G. position should be recorded in the *Flight Manual, Record about the weighting and location of gravity*. Then a new permitted crew weight for fueling and baggage must be computed and recorded. The cockpit placard "Load Limits" should also be updated.

2.5.1. Empty weight determination

The empty weight of an aircraft includes all operating equipment that has a fixed location and is actually installed in the airplane. It includes the weight of the painted airplane, accumulator, standard and optional equipment, full engine coolant, hydraulic fluid, brake fluid, oil. The aircraft is weighed without crew, fuel and baggage.
The following weighing procedure is recommended:

1. Remove excessive dirt, grease, moisture from the airplane before weighing.
2. Weigh the airplane inside a closed building to prevent errors due to wind.
3. Place the scales, calibrate zero.
4. Place the airplane on the scales (use boards to run on the scales or lift the airplane – see airplane jacking).
5. Place the airplane in a level flight position (use suitable rests under the wheels).
6. Check the configuration for weighing (e.g. empty weight).
7. Weigh the airplane and record the values in *Record about the weighting and location of gravity* (make a copy of standard Record included in section Appendices).
8. Compute the weight and C. G. position according to the formula *Record about the weighting and location of gravity.*
9. Compute and record permitted crew weight for fueling and baggage -see Pilot's Operating Manual.
10. Up-date the placard "Load Limits" (make a new one) and attach in the cockpit.

2.5.2. Operating C. G. range calculation

On the basis of knowledge of arms, weights of items, airplane empty weight the C. G. position it is possible to calculate weight and C. G. position according *Record about the weighting and location of gravity* (you can find in Appendices).

3. Ground handling

3.1. Assembling for transportation and hangaring

The foldable variant of airplane can be easily assembled into a hangaring or transportation state.

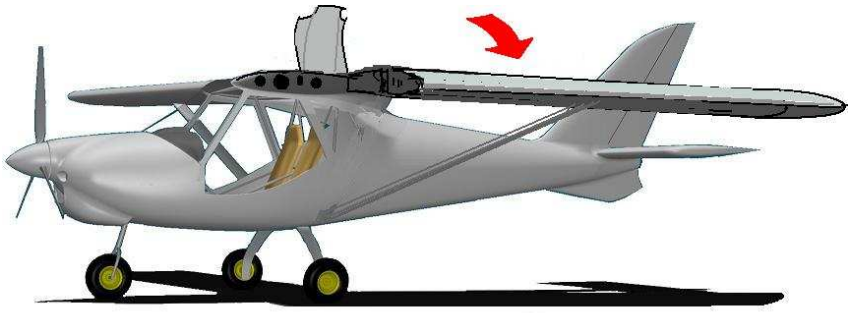


Fig.: Folding the wing

This assembling includes:

- Unlocking, opening and turning up the rear fuselage/baggage fairing
- disconnecting aileron controls and front wing hinges
- folding the wings including struts towards the fin
- fixing the wings including struts to the fin by using of separate transportation jig

3.2. Unlocking, opening and turning up the rear baggage fairing

Unlock and open CAM Locks of baggage door and fold it to the front.
Put a piece of foam under the gull-wing baggage door (between this and cabin ceiling)

3.3. Disconnecting aileron controls and front wing hinges

- It is necessary to disconnect aileron control rods ends from the wing horn levers before disconnection of wing hinges.
- Then disconnect front (main) wing hinge pin, accessible from the inside of cabin ceiling

3.4. Folding the wings

Although it is possible to make it yourself, recommended is some helper will then hold the wing tips.

ATTENTION!
Be careful - Set the ailerons and flaps into the neutral (0°) position

Before folding them to prevent the undesirable stressing of the connecting parts and control levers

With aileron control rods disconnected and front wing hinges pins dismounted the wing can be turned to push on the leading edge to the rear. Flaps control will be disconnected itself during movement.

Repeat the procedure with the second wing

For the transportation, we recommend to put the dismantled pins into the loosen forks of the wing hinges again and to lock them.

3.5. Parking

3.5.1. General

Parking the airplane in the open air should be considered as an emergency measure in view of the dangerous effects of the strong wind and slackening of the skin due to rain or excessive humidity. It is recommended to moor aircraft in worse weather conditions together with covering it by fabric protection.

Ground equipment: - pressure sensor plug of the airspeed indicator
- securing set for mooring
- Fabric covers

3.5.2. Pressure sensor plug of the airspeed indicator

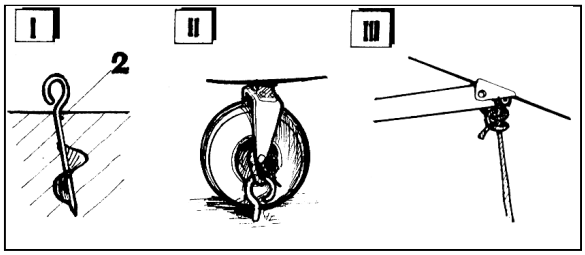
Airspeed indicator is protected against blowing through by means of a rubber plug put on the input pipe of the total pressure sensor located in front of the wing -end of left wing-strut. The plug is provided with a red flag.

3.6. Mooring

The airplane should be moored if parked outside the hangar to protect it against possible damage in case of increased wind intensity.
The airplane mooring equipment consists of the following:

- 3 mooring bolts
- 2 long and 1 short mooring cable

Mooring bolts should be screwed in the ground and the airplane should be moored by means of cables as shown in Fig. 3.



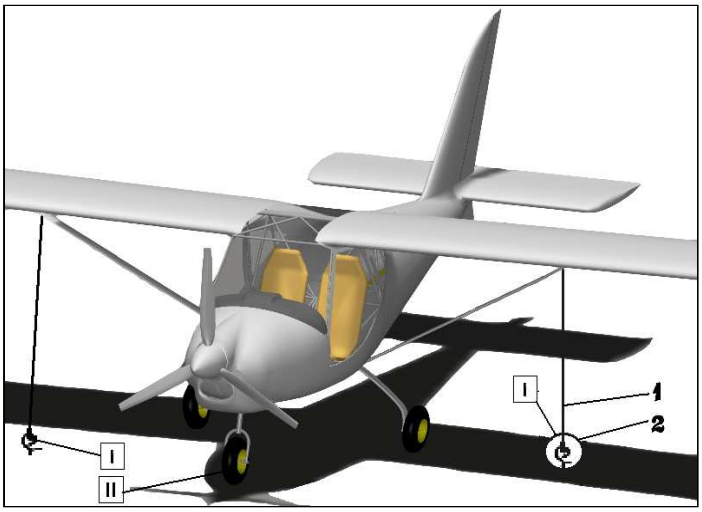


Fig.: Airplane mooring

1 - Mooring cable
2 - Mooring bolt
3 - Cable to join stabilizers

I - Mooring ring (bolt) detail

II - Cable fixing to the landing gear hinge

III - Cable fixing to the wing hinge

3.7. Hangaring

Moving the airplane during hangaring, parking, etc. is recommended by pushing the empty airplane. Grip the fin cone of the airplane close to the fin and push it slightly down to pick up the nose landing gear.
The airplane can be then controlled simple by side movements. If the assistance of further persons is needed, the wing struts near their hinges on the wing or leading edges are the recommended positions for pushing the airplane.
Pushing or leaning on the control surface skin is forbidden.

3.8. Towing

It is easy to tow the airplane a short distance by holding the blade root, since the empty weight of
this airplane is relatively low. Suitable surfaces to hold the aircraft airframe, are the rear part of the fuselage before the fin. A tow bar may be used to tow the aircraft over long distances. Steerable nose wheel is equipped with the stops, it is impossible to turn it around.

CAUTION
Avoid excessive pressure on the aircraft airframe - especially at the elevator, rudder, trim etc.
Handle the propeller by holding the blade root - never the blade tip!
When starting the engine manually - always handle the propeller on a blade surface i.e. do not hold only an edge.
Towing the airplane with a car is not allowed.

4. Maintenance

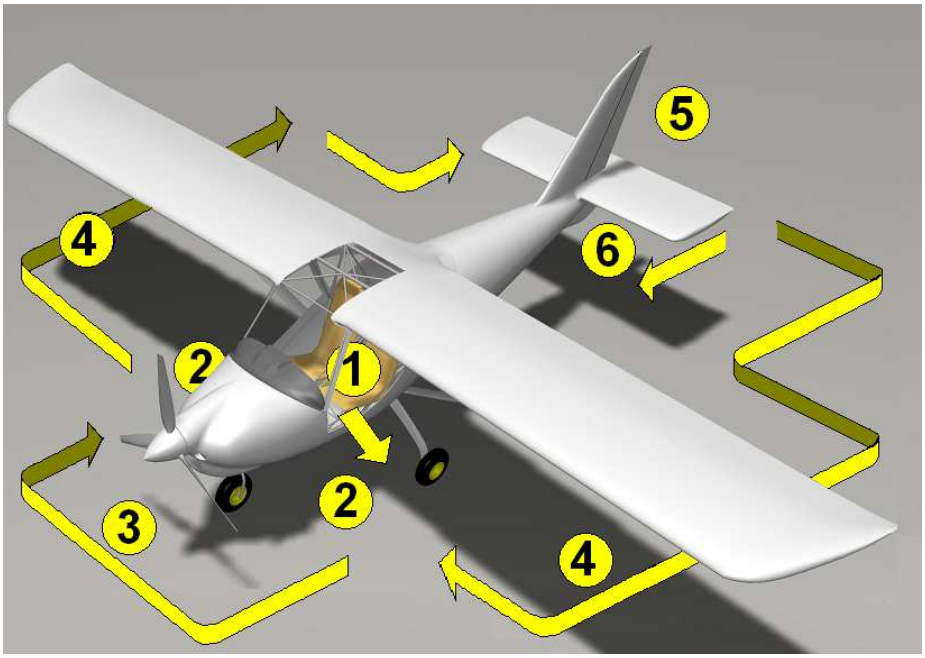
4.1. Overall maintenance survey

Airplane maintenance is required to maintain its airworthiness. Periodical events are performed (periodical and pre-flight inspections) along with irregular events e. g. a repair of damage as required.

4.2. Pre-flight inspection

A pre-flight inspection is performed prior to the beginning of each flight. A pre-flight inspection should be repeated prior to each flight even during the same day. The Pre-flight inspection is a visual check of the aircraft for deformations, surface damage, fuel and oil system leaks, prop damage, released locks, covers and cowlings etc. Any damage or failure should be repaired immediately if the airworthiness is affected or when the aircraft can not be put out of operation. It is important to perform a pre-flight inspection carefully to prevent problems from arising.

4.2.1. Direction of pre-flight inspection



4.2.2. Steps of pre-flight inspection

1. COCKPIT

- Engine igniter switch OFF
- Attachment and position of the pilot seat
- Check of the safety belts
- Condition of the instruments equipment
- Function of the hand control
- Function of the directional control
- Attachment and freedom of engine control
- Brake function
- Condition of the laminate shell and transparent canopy

2. LANDING GEAR

- Condition of the landing gear and brake control
- Attachment and check of the composite legs of the main landing gear
- Attachment and check of the rubber shock absorber of the front landing gear
- Inflation of the tires

3. POWER PLANT

- Condition of the engine, propeller and locking of bolted connection
- Condition of the silent block and engine attachment to fuselage structure
- Condition and attachment of the exhaust silencer
- Condition of the ignition system
- Condition of the fuel system - hoses and pumps
- Attachment condition of the accumulator + input conductors

4. WING

- Attachment of the struts and locking of the connecting bolts
- Checking of the skin
- Condition and deflection of the ailerons, its piano hinges and control rods
- Condition and deflection of the flaps, flap hinges and its control rods
- Checking of the fuel tank tightness (“crying”) around fuselage leading edges

5. CONTROL CABLES

- Condition and tension of the rudder control cables
- checking of locking of the turnbuckles and guide-Bowden’s and hoses

6. TAIL UNIT

- Condition of the horizontal and vertical surfaces, skin and composite tips
- checking of the elevator and rudder deflection and condition of their hinges
- checking of the elevator trim tab, servo rod and acceptable space
- checking of the tail skid

4.3. Post-flight inspection

Post-flight inspection is performed at the end of each flight day. The post-flight inspection events are the same as the pre-flight ones. If possible failures, damages and malfunctions should be recorded and repaired immediately. It is recommended to clean and/or wash the airplane and check that the fuel and oil consumption are in the normal range.
Lastly record all hours flown and other data in appropriate documentation (Log Book etc.)

4.4. Periodical inspection

4.4.1. Periodical inspection intervals

The periods for overall checks and contingent maintenance will depend on the conditions of the operation and the overall condition of the airplane. The manufacturer recommends maintenance checks and periodic inspections in the following periods:

1. after the first 25±2 flight hours
2. after every 50±3 flight hours
3. after every 100±5 flight hours or annual inspection

Refer to the Rotax 912 Operator's Manual for engine maintenance.

Refer to the propeller Maintenance Manual for propeller maintenance.

4.4.2. Periodical inspections Sign off sheets

The following Periodical maintenance Sign off Sheets is intended for copying and serves as the Maintenance Records. It is also recommended to include small repairs, damages and their remedy or replacement.

Some parts of the airplane (engine, propeller etc.) may have special time limits – refer to the appropriate manuals for maintenance time limits and procedures.

4.4.3. Periodical inspections – events

Model:	S/N.:	Hours flown:	Date of inspection:
MD 3 Rider	Registration:	No. of Takeoffs:	

Event	Event description	Inspection			Carried out by:	Inspected by:
		25 hrs the first	50 hrs every	100 hrs every		
1.	Prior to the inspection clean and wash the airplane surfaces, if needed	x	x	x		
2.	**Engine**	See engine manufacturer's instructions				
3.	**Engine compartment**					
3.1.	**Fiberglass engine cowlings**					
3.1.1.	Check condition of cowlings and locks- repair any damage			x		
3.1.2.	Remove engine cowling	x	x	x		
3.1.3.	Visually check inside fireproof -repair any damage		x	x		
3.2.	**Engine mount**					
3.2.1.	Visually check condition, attachment, security of attachment bolts: engine-engine mounting, engine mounting - firewall	x	x	x		
3.2.2.	Visually check condition of rubber silent blocks – replace those cracked and excessively deformed			x		
3.3.	**Suction system**					
3.3.1.	Visually check condition, attachment and security of air filter at carburetor inlet - clean filter acc. to the engine manual	x	x	x		
3.3.2.	Visually check condition of suction tubing	x	x	x		
3.3.3.	Check carburetor – condition, control attachment and lubricate	x	x	x		
3.4	**Battery**					
3.4.1.	Visually check attachment and security		x	x		
3.4.2.	Check charging – charge if needed			x		
3.4.3	Visually check condition and attachment of wire leads - replace those damaged	x	x	x		
3.5.	**Wiring**					
3.5.1.	Visually check condition and integrity of wires, connections, security of wires	x	x	x		

Event	Event description	Inspection			Carried out by:	Inspected by:
		25 hrs the first	50 hrs every	100 hrs every		
3.6.	**Fuel system**					
3.6.1.	Visually check condition, integrity, attachment and security of hoses – replace those damaged	x	x	x		
3.6.2.	Visually check fuel filter condition - replace stopped up filter	x	x	x		
3.6.3.	Visually check system for leaks	x	x	x		
3.7.	**Cooling system**					
3.7.1.	Visually check radiator for condition and leaks			x		
3.7.2.	Visually check condition, attachment of hoses, check system for leaks	x	x	x		
3.7.3.	Check coolant quantity in the expansion tank – add or change coolant acc. to the engine manual if needed	x	x	x		
3.7.4.	Visually check condition and attachment of overflow bottle on the firewall			x		
3.8.	**Lubrication system**					
3.8.1.	Visually check condition and attachment of oil tank			x		
3.8.2.	Check oil cooler for condition, attachment and leaks	x	x	x		
3.8.3.	Visually check hoses for condition, leaks, attachment and security – replace damaged hoses	x	x	x		
3.8.4.	Check oil quantity – add or change oil acc. to the engine manual if needed	x	x	x		
3.9.	**Exhaust system**					
3.9.1.	Visually check exhaust system for condition, cracks, deformations or damage – repair / replace	x	x	x		
3.9.2.	Visually check condition and attachment of the muffler – repair / replace	x	x	x		
3.9.3.	Check joint security	x	x	x		
3.10.	**Heating**					
3.10.1.	Visually check hose leading hot air into the cockpit – check hose for condition, integrity, attachment and secutity		x	x		
3.10.2.	Check condition, function and control of the heating flap		x	x		
3.11.	**Lubricate per Lubricating Chart**	x	x	x		

Event	Event description	Inspection			Carried out by:	Inspected by:
		25 hrs the first	50 hrs every	100 hrs every		
4.	**Propeller**	**See manufacturer's instructions**				
4.1.	**Blades**					
4.1.1.	Inspect blades for abrasions, cracks, paint damage, condition of blades leading edges and tips – repair according to the propeller manual	x	x	x		
4.2.	**Spinner**					
4.2.1.	Visually check spinner for condition, abrasions, cracks, paint damage – repair large damage		x	x		
4.2.2.	Remove spinner		x	x		
4.2.3.	Check prop attachment, security of bolts		x	x		
4.2.4.	Check run -out			x		
4.2.5.	Install spinner			x		
4.2.6.	Pitch change mechanism (if is installed)	**See manufacturer's instructions**				
5.	**Landing gear** **Nose wheel landing gear**					
5.1.	**Nose wheel leg**					
5.1.1.	Check condition and attachment of the nose wheel leg (lift airplane nose)	x	x	x		
5.2.	**Wheel pants**					
5.2.1.	Visually check wheel pants condition – repair damages and cracks		x	x		
5.2.2	Remove fairing (reinstall when nose wheel inspection is completed)			x		
5.3.	**Rubber cable and rubber suspension stop**					
5.3.1.	Visually check cable and rubber suspension stop for excessive wear, cracks, deformation – replace if needed		x	x		
5.4.	**Tire**					
5.4.1.	Check tires for condition, cuts, uneven or excessive wear and slippage– replace if needed		x	x		
5.4.2.	Check pressure – inflate to required pressure	x	x	x		
5.5.	**Wheel**					
5.5.1.	Visually check for cracks, permanent deformation – if damaged, replace			x		
5.5.2.	Check valve condition around the hole in the rim			x		
5.5.3.	Check condition of bearings, wheel free rotation, clearance			x		

Event	Event description	Inspection			Carried out by:	Inspected by:
		25 hrs the first	50 hrs every	100 hrs every		
5.6.	**Joints**					
5.6.1.	Check security of fixed points	x	x	x		
5.6.2.	Check nose wheel free rotation inside the leg – the rotation should not be too free to prevent shimmy		x	x		
5.7.	**Nose wheel control system**					
5.7.1.	Check control rods condition		x	x		
5.8.	**Lubricate per Lubricating Chart**	x	x	x		
6.	**Landing gear** **Main landing gear**					
6.1.	**Fiberglass legs**					
6.1.1.	Visually check condition of legs – repaint damaged areas, contact airplane manufacturer if cracks were found	x	x	x		
6.1.2.	Inspect leg attachment into the fuselage (no clearance)		x	x		
6.1.3.	Check security of fixed joints	x	x	x		
6.2.	**Wheel pants**					
6.2.1.	Visually check wheel pants condition – repair damage and cracks		x	x		
6.3.	**Tires**					
6.3.1.	Check tires for condition, cuts, uneven or excessive wear and slippage– replace if needed	x	x	x		
6.4.	**Wheel**					
6.4.1.	Visually check wheel rims for cracks, permanent deformations – replace wheel rim in case of cracks			x		
6.4.2.	Check valve condition around the hole in the disc			x		
6.4.3.	Check condition of bearings, wheel free rotation, clearance		x	x		
6.5.	**Brakes**					
6.5.1.	Check attachment of brake system hoses to the main leg			x		
6.5.2.	Visually check condition of pads – steady and symmetry abrasion of pads – replace pads if needed		x	x		
6.5.3.	Check wear of the disc			x		
6.5.4.	Check brake system for leaks – add brake fluid and bleed the system if a brake pedal has soft movement	x	x	x		

Event	Event description	Inspection			Carried out by:	Inspected by:
		25 hrs the first	50 hrs every	100 hrs every		
7.	**Wing**					
7.1.1.	Visually check condition – no loose rivets, deformations, cracks or any other damage – contact the airplane manufacturer	x	x	x		
7.1.2.	Check clearance of wing suspensions – move the wing tip upward-downward, frontward-rearward			x		
7.1.3.	Check strut of wings for condition and attachment	x	x	x		
7.1.4.	Check condition and attachment of fiberglass wing tips			x		
7.2.	**Aileron**					
7.2.1.	Visually check condition	x	x	x		
7.2.2.	Check free movement	x	x	x		
7.2.3.	Check aileron piano-hinges	x	x	x		
7.2.4.	Check clearance		x	x		
7.2.5.	Check security of control rod ends	x	x	x		
7.2.6.	Lubricate per Lubricating Chart	x	x	x		
7.3.	**Flap**					
7.3.1.	Fully extended the flaps and visually check condition	x	x	x		
7.3.2.	Check flap hinge	x	x	x		
7.3.3.	Check clearance	x	x	x		
7.3.4.	Check condition of flap control (rods, torsion tubes, joints, security)	x	x	x		
7.3.5.	Lubricate per Lubricating Chart	x	x	x		
7.4.	**Pitotstatic tube**					
7.4.1	Check pitotstatic tube attachment			x		
7.4.2.	Check pitotstatic system for leaks			x		
7.5.	**Wing suspension**					
7.5.1.	Remove wing fillets	x	x	x		
7.5.2.	Visually check condition of wing suspensions, wing folding mechanism, cleanness of folding system, lubrication	x	x	x		
7.5.3.	Check wear, corrosion			x		
7.5.4.	Check security of joints	x	x	x		
7.6.	**Lubricate per Lubricating Chart**	x	x	x		

Event	Event description	Inspection			Carried out by:	Inspected by:
		25 hrs the first	50 hrs every	100 hrs every		
8.	**Fuselage**					
8.1.	**Fuselage surface**					
8.1.1.	Visually check condition – no loose rivets, deformations, cracks or any other damage - repair small damage or contact the airplane manufacturer	x	x	x		
8.1.2.	Visually check condition of fiberglass parts			x		
8.2.	**Cockpit canopy**					
8.2.1.	Visually check canopy condition for – cracks, scratches, any other damage - drill end of cracks	x	x	x		
8.2.2.	Check canopy locks for condition and operation	x	x	x		
8.2.3.	Check canopy rubber packing			x		
9.	**Horizontal tail unit**					
9.1.	**Visually check condition** - no loose rivets, deformation, cracks, scratches, and any other damage – contact the airplane manufacturer	x	x	x		
9.2.	**Visually check condition and attachment of fiberglass tips**			x		
9.3.	**Check elevator free movement**	x	x	x		
9.4.	**Check elevator hinge**	x	x	x		
9.5.	**Check clearance** – move stabilizer upward-downward, frontward-rearward - contact the airplane manufacturer if clearance exceeded tolerances		x	x		
9.6.	**Check security of joints at control column**	x	x	x		
9.7.	**Trim**					
9.7.1.	Visually check condition		x	x		
9.7.2.	Check hinge		x	x		
9.7.3.	Check control		x	x		
9.8.	**Lubricate per Lubricating Chart**	x	x	x		
10.	**Vertical tail unit**					
10.1.	**Visually check condition** - no loose rivets, deformation, cracks, scratches and/or other damage – contact the airplane manufacturer	x	x	x		

Event	Event description	Inspection			Carried out by:	Inspected by:
		25 hrs the first	50 hrs every	100 hrs every		
10.2.	**Visually check condition and attachment of fiberglass tips**			x		
10.3.	**Check rudder free movement**	x	x	x		
10.4,	**Check rudder suspensions**	x	x	x		
10.5.	**Check clearance** – move rudder upward-downward			x		
10.6.	**Check joints security**	x	x	x		
10.7.	**Lubricate per Lubricating Chart**	x	x	x		
11.	**Cocpit**					
11.1.	**Instrument panel**					
11.1.1.	Visually check condition and attachment of the instrument panel		x	x		
11.1.2.	Visually check condition and attachment of individual instruments		x	x		
11.1.3.	Check function of instrument			x		
11.1.4.	Check throttle and choke levers free movement	x	x	x		
11.1.5.	Inspect completeness and readability of placards			x		
11.2.	**Seats**					
11.2.1.	Visually check seat upholstery, remove upholstery			x		
11.2.2.	Visually check seats and backrests condition			x		
11.2.3.	Check other damage on the seats			x		
11.2.4.	Visually check main landing gear legs attachment inside the fuselage			x		
11.3.	**Safety belts**					
11.3.1.	Visually check condition, attachment and security			x		
11.4.	**Elevator and aileron control**					
11.4.1.	Check hand control free movement	x	x	x		
11.4.2.	Check clearance	x	x	x		
11.4.3.	Check joints security	x	x	x		
11.4.4.	Check control stops for condition			x		
11.4.5.	Check condition an security of cables	x	x	x		
11.4.6.	Check tension of control cables			x		
11.4.7.	Lubricate per Lubricating Chart	x	x	x		

Event	Event description	Inspection			Carried out by:	Inspected by:
		25 hrs the first	50 hrs every	100 hrs every		
11.5.	**Rudder control**					
11.5.1.	Check stiffness of movement	x	x	x		
11.5.2.	Check joint security	x	x	x		
11.5.3.	Check stops condition			x		
11.5.4.	Check condition an security of cables	x	x	x		
11.5.5.	Check tension of control cables			x		
11.5.6.	Lubricate per Lubricating Chart	x	x	x		
11.6.	**Flap and trim control**					
11.6.1.	Check operation of flap and trim control levers		x	x		
11.7.	**Complete lubricating per lubricating Chart**	**x**	**x**	**x**		
11.8.	**Engine Test Run (see FM)** • idling • throttle and choke levers operation • acceleration – deceleration • r.p.m. drop with either magneto switched off • max. r.p.m. • test brake system efficiency	x	x	x		
11.10.	**Test flight**	x	x	x		
11.11.	**Clean the airplane surface**	x	x	x		

4.5. FLUIDS

The fluids are: fuel, engine oil, liquid coolant and brake fluid.
Filling locations can be seen in the Figure below. Fuel an brake fluid filling locations are described in 3.5.3 and 3.5.4.

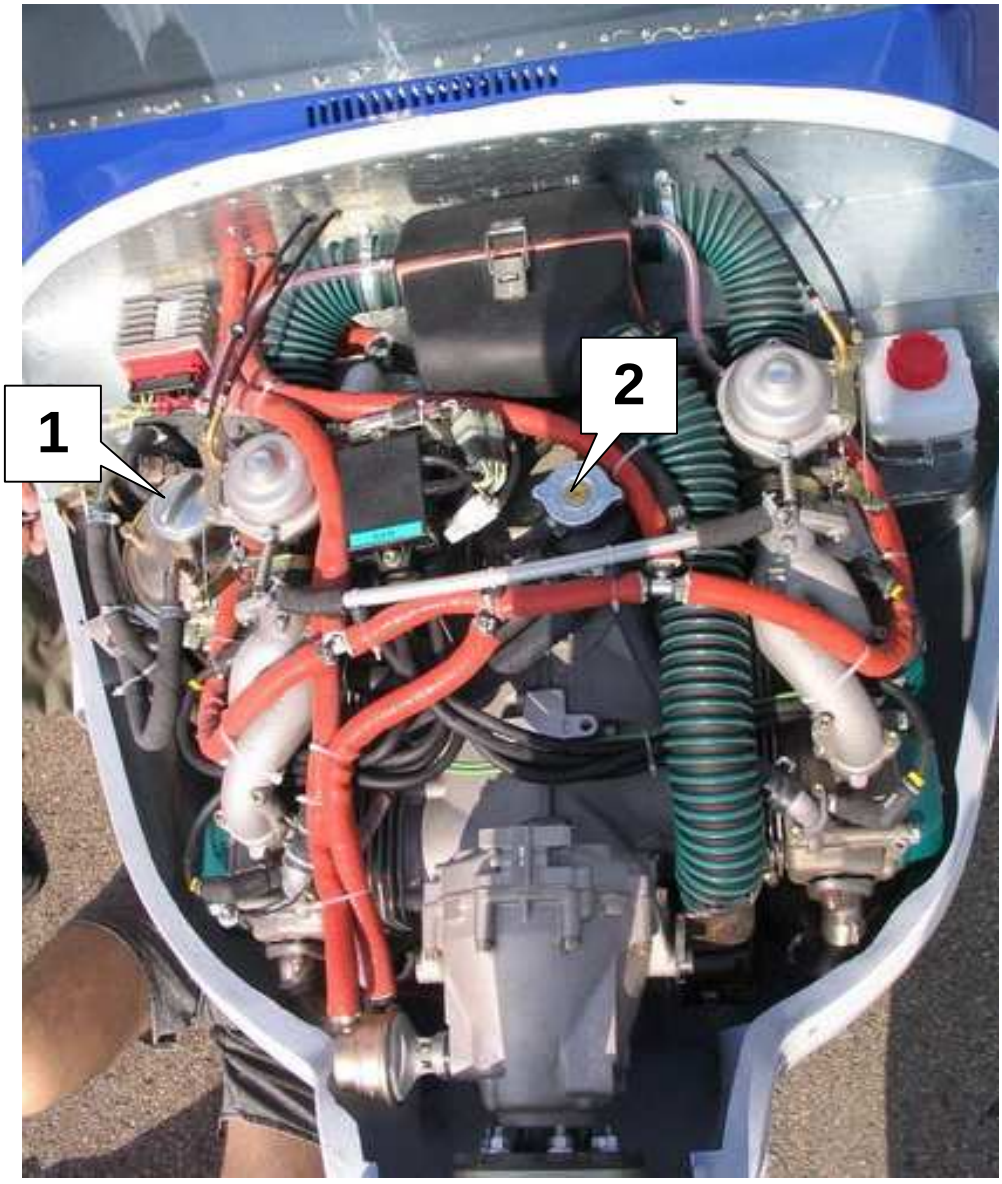


Fig.: Filling locations in engine compartment

2. oil tank throat
3. liquid coolant tank throat

4.5.1. ENGINE OIL

4.5.1.1. Recommended brands and table of oils

See Rotax Engine Operator's Manual for suitable oil grades

4.5.1.2. Oil quantity

The total oil quantity in the Rotax 912 lubricating system amounts to 3,5 liters. Prior to oil check, turn the propeller by hand **(ignition switched off!!!!)** several times to pump oil from the engine into the oil tank, or leave the engine, or leave the engine idle for 1 minute. The oil level in the oil tank should be between the min. and max. Marks and should not be below min. mark.

4.5.1.3. Oil filling

The oil tank is located in the engine compartment and is accessible when engine upper cowling is removed. The oil level in the oil tank should be between the min. and max. Marks and should not be below min. mark.

4.5.1.4. Oil emptying

Unscrew the plug located on the bottom of the oil tank to empty out the oil. To empty oil from the engine, unscrew the plug located on the bottom of the engine, close to the oil return hose. It is recommended to empty oil when the engine is warm.

4.5.2. COOLANT

4.5.2.1. Recommended types

Refer to the Rotax 912 Operator's Manual for recommended coolant types. The „ BASF Glysantin Anticorrosion", „ FRIDEX G 48" or „ Glysantin Protect Plus (produced BASF)" is recommended by the engine manufacturer. The engine manufacturer also recommends the use of antifreeze concentrate during cold weather operation.

4.5.2.2. Coolant quantity

Total coolant quantity is about 1,5 liters.

4.5.2.3. Coolant refilling

The expansion tank located in the engine compartment is used for filling. In addition to that, an overflow bottle to absorb coolant in the case of engine overheating.

4.5.2.4. Coolant emptying

Disconnect the hose going from the radiator into the pump (on the lowest part of the cooling system) to empty coolant into a suitable container.

4.5.3. BRAKE FLUID

4.5.3.1. Recommended types

Only brake fluid of J 1703c classification should be used for hydraulic brake system (type for middle hard or hard operation).

Czech Republic	Foreign
• Syntol HD 205 or • Syntol HD 260	• ATE Blau • STOP SP 19 • MOBIL Hydraulic Brake Fluid 550 • PENTOSIN Super Fluid • AGIP. 1 Brake Fluid Super HD • NAFTAGAS AT-2 • INA UK-2

These brake fluids types may be blended as required and refilled in any mixing proportion.

4.5.3.2. Brake fluid refilling

Brake fluid refilling is necessary when a low brake system efficiency occurs due to a fluid leak. A brake fluid filling hole is in the brake master cylinder. It is recommended to use a hypodermic needle to refill the brake cylinder. See table for suitable brake fluid types to use for refilling the brake system. Press brake repeatedly during refilling. Bleed the system after refilling.

4.5.3.3. Brake fluid emptying

Brake fluid thickens during aircraft operation and absorbs water. This condition causes brake system failures.. It is not possible to determine when this may occur. The best way to prevent trouble is to change the brake fluid every year.

4.5.4. FUEL

4.5.4.1. Recommend brands

Refer to the ROTAX 912 Operator's Manual

4.5.4.2. Fuel quantity

The standard aircraft is equipped with two 36 l integral wing fuel tanks.
Keep the maximum permitted take-off weight in mind when adding fuel to a large tank.

4.5.4.3. Fueling

Precaution

The following precautions should be maintained during fueling to prevent fire.

WARNING

- No smoking or open flames during fueling!
- Fire extinguisher should be within reach!
- Under no circumstances add fuel with the engine running!
- Connect the aircraft to ground prior fueling!
- No person in the cockpit during fueling!

Fuel tank filler is located on the upper side of the wings.

CAUTION

It is highly recommended to pour gasoline through a filter if it was not tested for water content. After fueling, allow 20 min. for water to settle out on the bottom. Drain off some fuel and look for water. Avoid getting gasoline on the cockpit canopy which will run the Perspex canopy!!!

4.5.4.4. Fuel emptying

Precaution

Use the same precautions as during fueling

Draining procedure

1. Connect the airplane to the ground
2. Open the main fuel valves
3. Put an empty gas can under the drainage hose
4. Open the drain valve on the firewall
5. Close the drain valve when desired quantity of fuel is reached
6. Close the main fuel valves

NOTE

Remove the fuel tank filler cap to speed up draining.

4.6. Lubrication

4.6.1. Lubrication fundamentals

There are some parts e.g. landing gear, which are exposed to external conditions and to varying loads. These parts will be inspected during pre-flight and during periodical inspections. These should be lubricated as is necessary, but at least in the intervals specified below.

4.6.2. Recommended lubricants

4.6.2.1. Greases

Greases are mineral oils thickened with calcic, sodium, lithium or any other thickeners of aliphatic acids.
The greases do not SAE classification and their usage is recommended by manufacturer.
Grease may be applied all the year round

The following greases are recommended:

- Greases of LV series are of waxy, semi-solid or butyraceous consistency and water resistant. They are used at very low temperatures (-58F) and at high temperatures (302F)
- There are two types marked LV2 and LV3. Each type has specific characteristics determining its use.
-

Czech Benzina Benzinol	Foreign
LV2	Castrol
	Castrolease LM
	Mobil
LV3	Mobilgrease MP
	Shell
	Retinax A
	Litol 24

4.6.3. Lubrication points

Unit	Lubricating point	After the first 25 hrs.	Every 50 hrs	Every 100hrs	Lubricant
Prop	Adjustable props acc. To Prop Manual				
Engine	Oil change acc to engine Manual				
	Carburetor control in engine compartment	x	x		LV2 LV3 foreign grease
	Chock control	x	x		LV2 LV3 foreign grease
Nose wheel landing gear	Landing gear leg in the area at inlet into the termination	x	x	x	Oil
	Bearings in pull rod terminals	x	x	x	Oil
Main landing gear	Pins of brake pads holder		x		LV2 LV3 foreign grease
Wing	All movable joints of wing folding mechanism (if installed)	x	x	x	LV2 LV3 foreign grease
Ailerons	Hinges		x		oil
	Control hinge pin			x	LV2 LV3 foreign grease
	Two armed aileron control levelers inside the wing			x	LV2 LV3 foreign grease
	The passages of aileron control cables			x	LV2 LV3 foreign grease
flaps	hinges			x	oil
	All movable joints in cockpit			x	LV2 LV3 foreign grease
	Flap control pins		x		LV2 LV3 foreign grease
HTU	Elevator hinge		x		Oil
	Elevator control rod			x	LV2 LV3 foreign grease
VTU	Rudder suspension			x	LV2 LV3 foreign grease
	Rudder control cables			x	Oil
Trim tab	Trim tab hinge	x	x		Oil
	Control rods		x		Oil
Stick control	All moveable joints in cockpit			x	LV2 LV3 foreign grease
Rudder control	All moveable joints in cockpit			x	LV2 LV3 foreign grease
	The passages of rudder control cables			x	LV2 LV3 foreign grease

4.7. Mechanism adjustments

4.7.1. Torque moments

Metric thread		Strength class									
		4D	5D	4S	6E	5S	5R	6S	8G	10K	12K
M4	N.m					1,67					
	kg.m					0,17					
M5	N.m					3,45					
	kg.m					0,35					
M6	N.m	4,31	4,90	5,39	5,88	6,86	7,84	8,33	9,80	13,72	16,67
	kg.m	0,44	0,50	0,55	0,60	0,70	0,80	0,85	1,00	1,40	1,70
M7	N.m	5,88	7,84	8,82	9,80	10,78	11,76	12,74	14,70	20,59	25,49
	kg.m	0,60	0,30	0,90	1,00	1,10	1,20	1,30	1,50	2,10	2,60
M8	N.m	8,33	10,78	12,74	13,72	15,69	17,65	19,61	22,55	32,36	38,24
	kg.m	0,85	1,10	1,30	1,40	1,60	1,80	2,00	2,30	3,30	3,90
M10	N.m	16,18	21,57	24,51	27,45	31,38	34,32	37,26	44,12	61,78	73,54
	kg.m	1,65	2,20	2,50	2,80	3,20	3,50	3,80	4,50	6,30	7,50
M12	N.m	27,45	36,28	42,16	47,07	52,95	58,83	63,74	74,53	104,93	125,52
	kg.m	2,80	3,70	4,30	4,80	5,40	6,00	6,50	7,60	10,70	12,80
M14	N.m	43,14	58,83	66,68	73,54	78,54	93,16	98,06	117,67	164,75	196,13
	kg.m	4,40	6,00	6,80	7,50	8,00	9,50	10,00	12,00	16,80	20,00
M16	N.m	60,80	78,45	93,16	98,06	107,87	127,48	131,29	164,75	225,55	274,58
	kg.m	6,20	8,00	9,50	10,00	11,50	13,00	14,00	16,80	23,00	28,00
M18	N.m	88,25	117,67	137,29	156,90	171,61	196,13	205,93	245,16	343,23	411,87
	kg.m	9,00	12,00	14,00	16,00	17,50	20,00	21,00	25,00	35,00	42,00
M20	N.m	117,67	156,90	176,51	196,13	225,55	245,16	274,58	313,81	441,29	539,36
	kg.m	12,00	16,00	18,00	20,00	23,00	25,00	28,00	32,00	45,00	55,00
M22	N.m	147,09	196,13	225,55	245,16	284,39	313,81	333,42	392,26	558,97	676,65
	kg.m	15,00	20,00	23,00	25,00	29,00	32,00	34,00	40,00	57,00	69,00
M24	N.m	205,93	274,58	313,81	353,03	392,26	441,29	470,71	549,17	755,11	970,85
	kg.m	21,00	28,00	32,00	36,00	40,00	45,00	18,00	56,00	77,00	99,00
Ultimate strength		37	50	37	-	50	-	60	80	100	120
9 in %		25	22	14	-	7	-	8	12	8	8
Yield point		21	28	32	36	40	45	48	64	90	108

Torque moment formula (valid for all bolt sizes):

$M_{kmax} = 1,065 \times ((d \,.\, s \,.\, s) / m)$

Legend:

M_k	torque moment	kg . cm
d	bolt shank diam.	cm
s	min. yield point	kg / cm^2
m	safety factor	(m = 1,25 for s<50 kg/mm^2, m =1,43 for s>50 kg/mm^2)
s	lead of helix	cm

4.8. Brake system efficiency adjustment

4.8.1. Brake pad replacement

Brake pad replacement is only performed when a pad is worn – out.

CAUTION
Due the possibility of brake fluid leaking, it is advisable not to loosen the hose cup nut during brake pad removal. In the case of a leak in the brake system, filling and bleeding is necessary.

4.8.1.1. Brake pad replacement procedure

1. Jack the airplane
2. Remove the cotter pin, unscrew the slotted nut, remove the washer from the axle
3. Bend small tabs on the 3 washers and unscrew the screws connecting the brake disc to the wheel rim
4. Remove the wheel and the distance ring from the axle
5. Take the brake disc off (leave the brake on a main leg)
6. Remove the cotter pins, shift the pins out and remove the brake pads
7. Install a new brake pad, secure the pins with cotter pins
8. Put the brake disc on the wheel
9. Put the distance ring and the wheel on the axle (adjust the distance ring between bearings)
10. Set tab washers on the screws, apply Loctite and attach the brake disc to the inner part of the rim. Bend the tabs of the washers to secure the screw heads
11. Put the washer on the axle, tighten the slotted nut and secure with a cotter pin

4.8.2. Bleeding

It is important to thoroughly bleed the brake system. Otherwise the system function may be unreliable and the brakes may fail. There are two main reasons for air entering the brake system:

1. Disconnected or loose hoses
2. Insufficient quantity of brake fluid

Procedure:

1. Loosen the bleeding screw in the brake cylinder
2. Press brake repeatedly to bleed the brake system
3. Tighten the screw
4. Repeat several times or until the brake offers resistance against motion (feels firm)

NOTE

If the brake efficiency remains unsatisfactory after bleeding or if the brake motion is excessive, fill with brake fluid and bleed the system again. Continue until all the air is out the system.

Fig.: Brake bleeding system
1. bleeding screw

4.9. Control surfaces deflection setting

Control surfaces deflections of a new aircraft are set by the manufacturer. Deflections are adjusted to values specified in the Control Surfaces Deflection Record enclosed in this manual. A neutral position of the control surfaces and controls is used as a base for adjustment of deflections.

4.9.1. Aileron deflection adjustment

A range of deflections are set using tensors on the cable control system in the fuselage or adjustable end of the rods inside the wings.

4.9.2. Elevator deflection adjustment

The range of elevator deflection is set using one adjustable rod in the control system.

4.9.3. Rudder deflection adjustment

The range of rudder deflection is set using tensors on the cables between pedals and elevator arm.

4.9.4. Trim deflection adjustment

The range of trim deflection is set using adjustable end of the rod.

4.9.5. Flap deflection adjustment

The range of flap deflection is set using adjustable electromechanical spur and adjustable ends of the connection rods which connects torsion tube inside the wing with flap arm on the middle hinge.

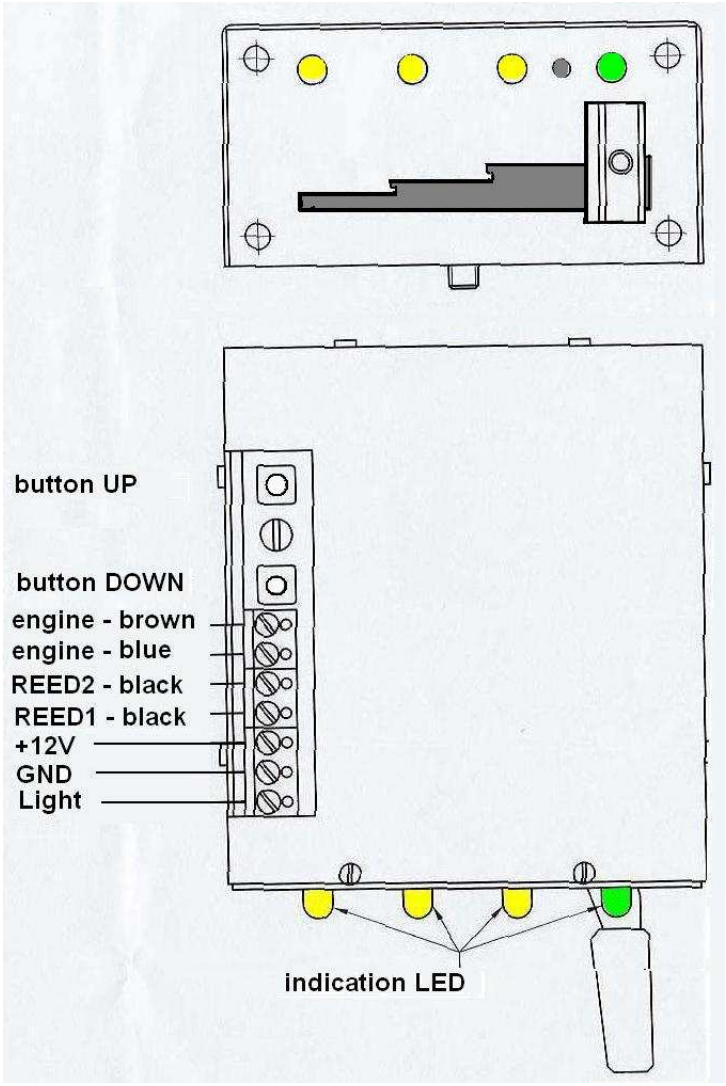
4.9.5.1. Adjusting steps of flap deflection

1. Position „OFF“ (flaps closed) is already adjusted from producer

2. Position „I“ (or any else). Move switch to first position. With buttons “UP” and “DOWN” adjust position to chosen position (for example 15 °). After pushing both buttons “UP” and “DOWN” together (circa 2 seconds) adjusted position is set. (in memory)

3. Position „II“ (or any else). Move switch to second position. With buttons “UP” and “DOWN” adjust position to chosen position (for example 30 °). After pushing both buttons “UP” and “DOWN” together (circa 2 seconds) adjusted position is set. (in memory)

4. Position „III“ (or any else – end position). Either is possible to use end movement to end switch (if our order was ordered it for 42 °, after 2-nd serial production the same actuator position will be mechanically adapted for 38°) This position is adjusted by actuator producer and position does not to be adjusted it is acceptable. Another possibility is to adjust position III the same style like in item 2 and 3. *(In this case end switch will be used as protection)*



Drawing of control parts and connection places

This control system has possibility to adjust intensity of LED diodes too.

To input “Light” is needed to connect source voltage for cockpit lighting (+12V, so only if lighting is connected in power supply +12V) , or to lighting of instruments.

-If it will be in input “Light” connected voltage +12V, LED diodes will light with lower intensity.

-If it will be connected in input “OV”, LED diodes will light with full intensity.

4.9.5.2. Adjusting of forces for actuator flap drive

Flaps have possibility to limit force, which driver created during its opening. Default there is adjusted force around 65 kg, which can be changed by user according to his needs in some range (roughly from 35 kg to 80kg)

To adjust the force you will need flat screwdriver with diameter 2mm.

Specific adjustment of correct force would be done during flight with knowledge about maximal speed in which we can open the flap (for specific airplane).
Then during the flight we increase this speed for opening 10 - 20 km/hour. If in this speed we move flap handler into position III (the best from position II), after correct done force adjusting flaps would be returned into position II.
The force we can change by turning of switch, to which we are able with small screwdriver *(described above).*
Slot *(hole)* for screwdriver is placed in the front panel between LED indication diodes marked “OFF” and “I”.

When we turn screwdriver in the clock arms direction we increase drive force, when we make it opposite way we decrease force.
Every change of switch position in one position increase or decrease force around 5kg.

Force adjusting is depending on temperature, from this reason result force can be in higher temperatures (*for example during summer)* and result force in lower temperatures,

(For example during winter), little another.

Adjusting of the force we recommend checking every half year.

Notice of MD3 Rider designer:

BE CAREFULL, **DO NOT CROSS LIMITS** described in MD3 Rider FLYING MANUAL !!!

4.10. Steerable nosewheel landing gear adjustment

A steerable nosewheel adjustment is necessary so the airplane tracks during straight taxiing with engine idling (to eleiminate prop turning moment) with rudder pedals held in neutral position (no crosswind!).

Procedure:

1. Lift the nosewheel and neutralize wheel and rudder pedals
2. Adjust the nosewheel control using the adjustable ends located close to the control levers under the fuselage.

4.11. Engine idle adjustment

Because the engine idle is adjusted on a running engine, use extreme caution near the propeller. The aicraft should be tied down. Use the adjustment screw on the carburetor of the Rotax 912 engine to adjust the idle. Idle engine speed is approximately 1400 r.p.m.

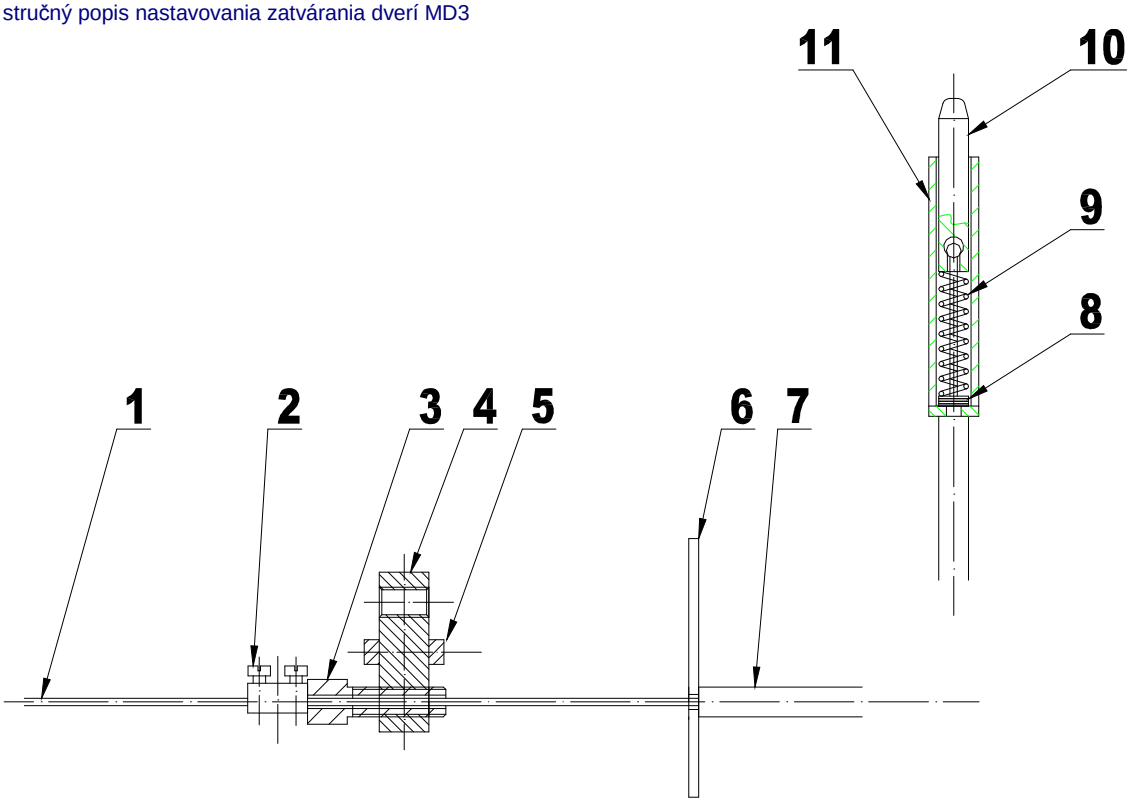
4.12. Tire inflation pressure

Pressure of main wheel 14x4:	180 + 20 kPa / 26,5 + 3 psi
Pressure of nose wheel 13x4:	180 + 20 kPa / 26,5 + 3 psi

Tire pressures are noted on placards located on the aircraft.

4.13. Door closing mechanism adjusting

Description of closing and locking door mechanism adjustment
stručný popis nastavovania zatvárania dverí MD3



1. **Bowden CABLE**
   lanko
2. **Saving lock -**„chocolate“ *(electric wires connection component)*
   zaisťovania čokoládka
3. **Adjusting screw-end**
   nastavovacia skrutka
4. **adjusting roller** *(fixed in hand lever pos.5)*
   valček nastavenia
5. **hand lever** *of door lock mechanism*
   ovládacia páka
6. **Composite frame in door casing**
   laminátová prepážka v ráme dverí
7. **bowden hose**
   bouden
8. **washer**
   podložka
9. **spring**
   pružina
10. **Saving pin**
    zaisťovací kolík
11. **guide-tube**
    vodiaca trubka

TECHNOLOGICAL ROUTING by adjusting of door lock closing:
postup pri nastavení zatvárania:

- **unscrew saving lock pos. 2** - povoliť 2
- **pull up saving pin 10 including spring 9** (be careful - not so much to leave positions 2,3,6 and7)
  vytiahnuť 10 a 9 (pozor nie príliš aby sa 1 nevytiahla z 2,3,6,7)
- **according to real need put in or out washer 8, cut from one side and after putting in set it by using pliers**
  podľa potreby vložiť alebo vybrať prestrihnutú 8 (prestrihnúť nasunúť na 1 stlačiť kliešťami)
- **put on spring 9 and pin 10** - nasunúť 9 a 10
- **stretch cable 1 and save by saving lock screws 2** - napnúť 1 zaistiť 2
- **adjust screw-end 3 to position, when PIN 10 is 1-2mm outstanding** (pushed out) **in position opened hand lever 5** - nastaviť 3 aby bola 10 jeden až dva mm vysunutá keď je 5 v polohe otvorené

4.14. Cleaning and care

4.14.1. Airplane care outlines

Use mild detergents to clean the exterior surfaces. Oil spots on the surfaces (except the canopy) may be cleaned with gasoline or strong detergents such as 409.
Upholstery covers can be removed from the cockpit, brushed or washed in lukewarm water with a laundry detergent. Dry the upholstery before reinstalling.

4.14.2. External surfaces cleaning

The external metal surfaces and fiberglass parts (cowlings, wingtips etc.) of the airplane are protected with weather-proof paint. Wash the airplane surface with lukewarm water and car wash type detergents. Then wash the airplane with water and sponge dry. It is recommended to protect painted external surfaces twice a year, by applying an automotive type polish. Use only on a clean and dry surface, and polish with a soft a soft flannel rag.

CAUTION

- Never wipe a dry surface – may be scratched by dusts and dirt
- Never apply any chemical solvents
- Repair a damaged painted surface as soon as possible to prevent corrosion

4.14.3. Interior cleaning

Keep in mind the following:

- Remove any loose objects from cockpit
- Vacuum the interior, upholstery and carpets
- Wipe the upholstery using a rag with in lukewarm water and mild laundry detergent. Then dry or remove the seat upholstery, side panels, carpet and clean with lukewarm water and/or carpet cleaners, upholstery cleaners. Dry thoroughly before reinstallation.
- Clean the cockpit canopy interior surface

4.14.4. Cockpit canopy cleaning

The canopy may be cleaned b washing it with lukewarm water and car or laundry type detergents Use a clean, soft cloth. Then use a suitable polisher on the canopy such as Meguire plastic polish.

CAUTION

- never clean dry canopy
- Never apply gasoline or chemical solvents
- Cover the canopy with a cover sheets

4.15. Winter operation

4.15.1. General

It is considered a winter operation, if outside temperature falls below 41℉ +5℃

4.15.2. Preparing the aircraft for winter operation

4.15.2.1. Aircraft airframe

- lubricate the aircraft per lubrication Chart(100hr. inspection) if the last inspection was not within 6 month
- Check and adjust rudder control cable prestress
- Check cockpit canopy rubber packing – replace if damaged
- Check fuel tank venting
- Check attachment of wing, ailerons, flaps and tail units, lubricate per lubrication Chart

4.15.2.2. Engine

- Refer to the engine manual for more details

The following should be done:
Add anti freeze to the cooling system as required (usually 50/50mix)
Change the oil
Check spark plug gaps
If low cylinder head or oil temperatures occur during operation under low outside temperature, then do the following:

- cover a portion of the radiator face using an aluminum sheet, insert it between the radiator and lower engine cowling
- cover the oil cooler face (or a part of face) using an aluminum sheet attached with a suitable adhesive tape
- Cover the Reduction gear unit by means of a car engine cover
- Cover the oil filter
- Cover the oil tank

Pre-heating engine and oil

It is permissible to start an engine without pre-heating if the outside air temperature is not below $+5^0$ C. Pre-heat the engine and oil if air temperature falls below 41^0 F ($+5\ ^0$ C). Use suitable air heater or a dryer.

WARNING
Never use open fire to pre-heat an engine!

Blow hot air from the front into the hole around the prop (engine covered with fiberglass cowlings). The temperature of the hot air should not exceed 212^0 F (100^0 C) at air heater output. Warm up the oil tank along with the oil in the engine. Pre-heat until cylinder head and oil temperatures exceed 68^0 F ($+20^0$ C).

Engine starting

1. Turn the propeller by hand **(ignition switched off!!!)**
2. Open the fuel valve
3. Set throttle lever to idle
4. Open the choke
5. Master switch to „ ON“
6. Switch on ignition to „ START“ after starting to „ BOTH“
7. Adjust engine RPM after starting
8. Close the choke
9. Warm up the engine

CAUTION
If the cylinder head and oil temperatures fall during parking. Start and warm up engine from time to time between flights. Do not open choke when starting a hot engine.

Parking and taxiing

Check wheel brakes for freezing when parked outside and temperature is below zero. Check wheels free rotation prior to taxing (Grasp the propeller and pull the airplane). Heat the brakes with hot air (to melt snow or ice). Frozen materials should not be removed by forced towing.

4.16. Necessary maintenance tools

No special tools are needed for the MD3 maintenance. Tools used for automobile maintenance are suitable.

4.17. Engine maintenance

Refer to the engine manufacturer s instructions for engine maintenance

4.18. Propeller maintenance

Refer to the propeller manufacturer s instructions for engine maintenance

5. Appendixes

Type	**MD3 RIDER**
Producer	
Serial number	
Matriculation	

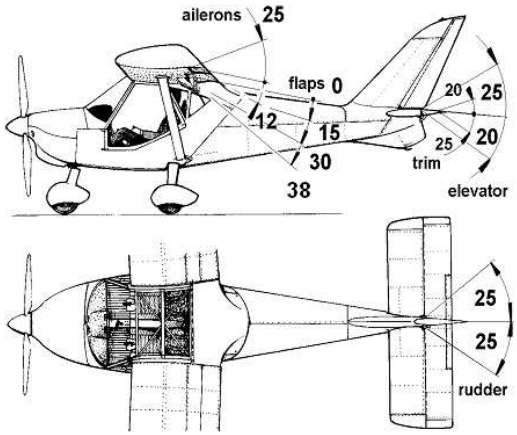
		demanded :	measured values :	
ELEVATOR	**up**	25 ° + 1.5 °		
	down	20 ° + 1.5°		
elevator TRIM	**up**	20 ° + 1.5 °		
	down	25 ° ± 2 °		
RUDDER	**to left**	25 ° ± 2 °		
	to right	25 ° ± 2 °		
AILERONS	**neutral**	0 °		
	ailerons up	25 ° ± 1 °		
	ailerons down	12 ° ± 1 °		
			left aileron	**right aileron**
FLAPS	**neutral**	0 °		
	Take-off	15 ° ± 1 °		
	landing	30 ° ± 1 °		
	Short LANDING	42 ° ± 1 °		
			left FLAP	**right FLAP**

MEASURING OF CONTROL SURFACES DEFLECTIONS :

- *The measuring of control surfaces deflections was made with help of common measuring jig, which consists from the pro- tractor with a clamp for clamping to the control surface and the plumb bob, which is clamped in the center of the protractor.*

- *Simpler way (for checking) is to use digital water level measurement, fixed or placed to aileron, flaps or elevator surface.*
  Make this measurement in place of (inside) control levers

- *The measuring of rudder deflection is possible to simplify so, that we measure a distance from the rudder trailing edge in the middle position to deflected on the surface of horizontal stabilizer (or elevator)*



Picture : Control surfaces

THE TENSION OF THE RUDDER CONTROL CABLES :

cable :	demanded :	**measured :**
left	100 + 30 N	
right	100 + 30 N	

VERIFICATION OF FUNCTIONAL ABILITY OF THE ALL CONTROLS :

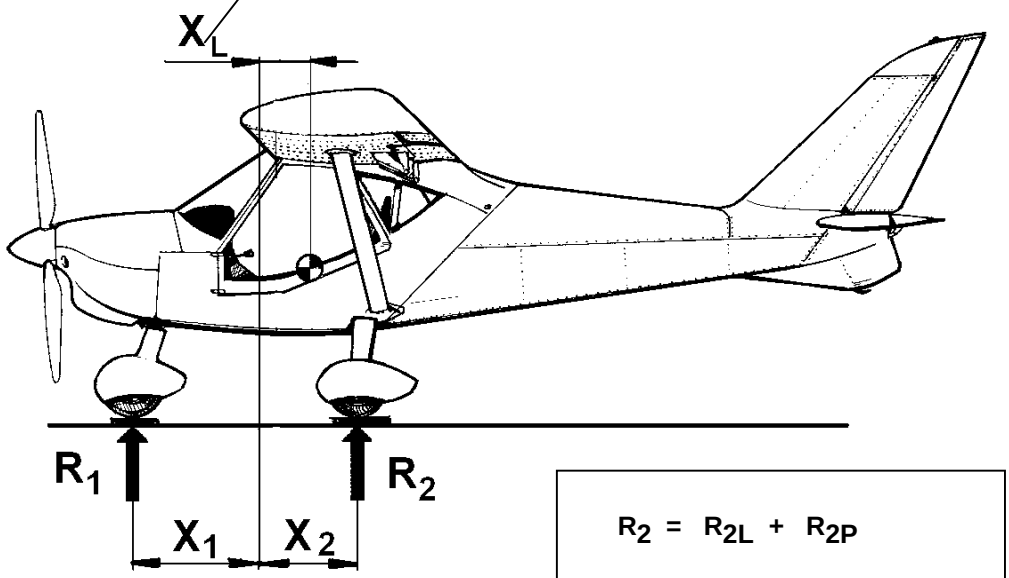
Date :

Technician worker :

Type :	**MD3 RIDER**
Producer :	
Serial number :	
Matriculation :	

ALL DIMENSIONS ARE IN MILIMETERS
THE WEIGHING WAS MADE ON THE WHEELS OF THE LANDING GEAR

REFERENCE PLANE - leading edge of profile in half of the wing span roughly
– **1 354** from root rib (1),
(ΔX_L = **70,9** from root rib for 3 °forward swept)



$R_2 = R_{2L} + R_{2P}$

$M_L = R_{2L} + R_{2P} + R_1$

A. VALUES DETERMINED BY WEIGHING :			
WEIGHTS		**DIMENSIONS**	Theoretical :
Reaction of the nose wheel	**R_1 = kg**	**X_1 = mm**	X_1 = 790 mm
Reaction of left main wheel	**R_{2L} = kg**	**X_2 = mm**	X_2 = 602 mm
Reaction of right main wheel	**R_{2P} = kg**	*(measured)*	
Basic weight of the airplane	**M_L = kg**		

BASIC WEIGHT CONTAINS :

a) weight of the airplane structure assembled by the technical specification

b) operating substances inclusive of inexhaustible fuel

B. VALUES DETERMINED BY CALCULATION	
Position of the airplane **center of gravity** regarding reference plane	**Center of the gravity position** of basic weight (position of the center of gravity regarding MAC - mean aerodynamic chord)
$X_L = \frac{(R_{2L} + R_{2P}) \cdot X_2 - R_1 \cdot X_1}{M_L}$	$\overline{X_T} = \frac{X_L \cdot 100\ \%}{b_{MAC}} = \frac{\quad \cdot 100\ \%}{\mathbf{1\ 152}}$
X_L = mm	**X_T = % MAC**

The weight of empty to full equipped airplane is normally **270 to 304 kg** , this weight would never extend **330 kg** or limits valid in specific country !

Centers of gravity positions of the BASIC WEIGHT would be in the range 20 to 23 % MAC

Fronter centers of gravity positions (under 20 % MAC) are the resource of bigger forces and force gradients to the controls.
Rearer centers of gravity positions (over 25 % MAC) are **INADMISSIBLE** for the holding of positive force gradients in the controls especially during higher flight speeds.

This center of gravity position of basic empty weight of the airplane accords with technical specification for **MD3 RIDER** airplane and secures the observance of specified operating centers of gravity positions from **19 to 30 % MAC** for approving range of the crew weight according to the flight manual.

Be careful in not typical using, and recalculate (with using the same calculation described above)
Your actual weighing – including crew, fuel, baggage and equipment before flight

Date :	**Technician worker :**

Flight Test Record

USA

TAKE-OFF WEIGHT 1270 *lbs* (576 kg)			Page: 1	Pages: 1
Model: **MD3 SportRider**	S/N:	Registration:		
Engine: R 912 S	S/N:	Hours flown:		
Prop.: Woodcomp SR 200	S/N:			

RESULTS: (Airspeeds are IAS)

Regime			Test
Meteorological conditions		On ground pressure QNH	
		On ground temperature QMU	
		Wind direction / velocity	
Engine check	Full throttle	Engine max. rpm	
		Oil temperature *122°F* (50°C)	
		Oil pressure 29 – 27.5 psi (2.0 – 5.0 bar)	
	Ignition check	4000 rpm R 912S (100 hp) RPM drop max 300 rpm with R or L off (max. 120 rpm difference)	
	Idle	Aprox. 1400 rpm	
Take-off and climbing to *3300 ft* **(1000 m ISA)**		Engine speed max. 5500 rpm	
		Oil pressure 29 – 27.5 psi (2.0 – 5.0 bar)	
IAS = 60 kts (75 mph)		Oil temp. Max. 266 °F (130 °C)	
		CHT max. 275 °F (135 °C)	
		Time to climb 1000–3000 ft ISA (300-1000m ISA)	
Stalling speed at idle		Landing configuration (flaps fully extended) v_{so} = **67** km/hour ***36*** *kts* (41 mph)	
		Cruise configuration v_{S1} = ***45*** *kts* (51 mph)	
Steep turns		max. 45°	
Never exceed speed		v_{NE} = **250** km/hour ***135*** *kts* **155** mph **IAS**	
		Engine speed max. 5800 rpm	
Cruising speed at engine speed: Altitude 1650 ft (500m ISA)		Airspeed at 5000 rpm	
4800- kts (mph) 5500- kts (mph)		Oil temp. 194-230 °F (90-110 °C)	
5200- kts (mph) 5500- kts (mph)		CHT max. 275 °F (135 °C)	
Max horizontal speed Altitude 1650 ft (500m ISA)		Airspeed: kts (mph)/rpm	
		Oil temp. 194-266 °F (90-130 °C)	
		CHT max. 275 °F (135 °C)	
Landing		Touch down speed kts or mph	

Date: Pilot's signature:

Report: Flight Test Results comply with Type Certificate

Record elaborated: Date:	Record approved: Date:	Change					