AIRPLANE MANUAL

KIS TR-1
S/N 032

EXPERIMENTAL

Revision 1 - 01.09.2001

Designer / Kit supplier: Tri-R Technologies
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Oxnard, CA 93030

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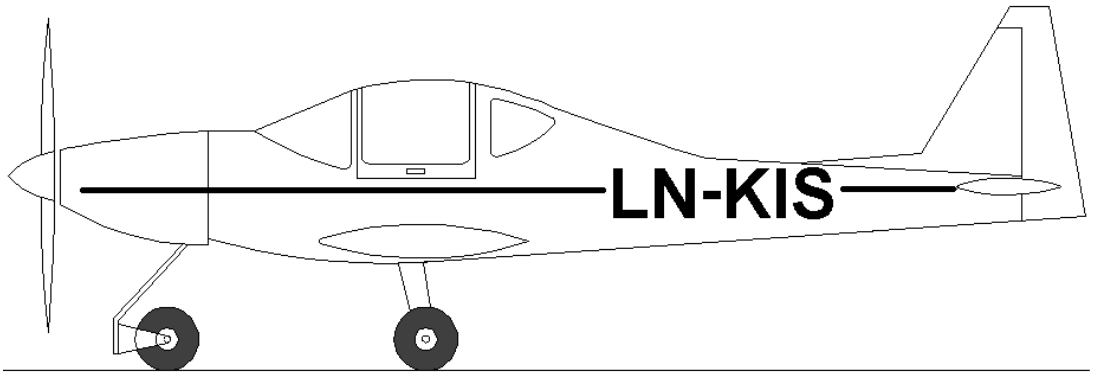
2010 Strømmen



Revision history:

Revision #	**Date**	**Reason for revision**
DRAFT	01.07.2000	Draft manual before test flying
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1. GENERAL

1.1 GENERAL DESCRIPTION

DIMENSIONS OVERALL		**FUSELAGE DIMENSIONS**	
Length	22 ft.	Frontal Area	9.0 sq. ft.
Wing Span	23 ft.	Cockpit Width	42 in.
Height (Top of tail)	7.25 ft.	Cockpit Height	39 in.
Height (Top of cockpit)	5.65 ft.	Cockpit Length	65 in.
WING DIMENSIONS		**TAIL DIMENSIONS**	
Wing Area	88 sq.ft.	Horizontal Tail Span	7.33 ft.
Chord	3.83 ft.	Horz. Tail Chord	2.08 ft.
Aspect Ratio	6	Horz. Stab. Mean Chord	1.33 ft.
Spar Location	30% of Chord	Elevator Mean Chord	.75 ft.
Airfoil	NACA 63(2)-215	Horz. Tail Area	15.2 sq.ft.
Dihedral (per panel)	2.5 degrees	Horz. Tail Aspect Ratio	3.5
Tip Wash Out	0 degrees	Horz. Tail Thickness	12 %
Wing Loading	16.5	Vertical Tail Height	4.09 ft.
FLAPS		Vertical Tail Mean Chord	.83 ft.
Flap Type	Plain	Dorsal Fin	.33 x 2.5 ft.
Area/Wing	12 %	Vertical Fin Thickness	10 %
Length (Each)	65 in.		
Chord	12.5 in. = 28% c		
CONTROL MOVEMENT		**PLACARDED IAS LIMITS**	
Elevator	+25 -16 degrees	Green Arc	40 to 136 kts
Ailerons	+12 -12 degrees	Yellow Arc	136 to 188 kts
Rudder	L 25 R 30 degrees	White Arc	40 to 96 kts
Flaps	0/12/28	Red Line	188 kts
LIMITATIONS			
Limit Load Factor	+4.4 G		
Design Limit Load Factor	-2.2 G		
V-Maneuver Speed	113 kts		
V-f Flap Ext. Speed	96 kts		
V-ne Never Exceed Speed	188 kts		
MAIN LANDING GEAR		**NOSE LANDING GEAR**	
Type	One Piece Alloy Alum.	Type	Fabricated Steel Free Swiveling
Wheels	Matco 6 x 6	Wheel	Matco 5 x 5 Alloy Alum.
Tires	McCreary 6 x 6 (13.5 in.dia.)	Tire	Lamb 5 x 5 (11.5 in. dia.)
Brakes	Toe Actuated Disk / Caliper Hyd.Piston		

1.1.1DIMENSIONS

Empty weight: 399 kg (885 lbs)
Max. Gross weight: 658 kg (1450 lbs)
Length: 22 ft (6.7 m)
Wing span: 23 ft (7.0 m)
Wing area: 88 sq.ft
Cord: 3.83 ft
Wing aspect ratio: 6
Airfoil: NACA 63(2)-215
Dihedral: 2,5 deg
Wing loading max: 16.5 psf
Horizontal tail area: 15.2 sq.ft

1.2 TECHNICAL DATA

1.2.1 AIRPLANE DATA

Type: KIS, TR-1
Serial no: 032
Category: EXPERIMENTAL
Kit Manufacturer: Tri-R Technologies
114 East Fifth Street
Oxnard, CA 93030

1.2.2 ENGINE DATA

Engine type: Continental IO-240-A-1-B
Serial no: 806103
Rated horsepower: 125 hp @2800 RPM

External oil cooler: Stewart Warner 8406R

External Oil filer: Airwolf Filter Corp type AFC-K008-X

El. Fuel pump: Weldon 8163-A, 21 p.s.i.

Spark plug: Champion RHM38E. Gap 0.016” to 0.021” . Torque to 300-360 in. lbs

1.2.3 PROPELLER DATA

Propeller type: Prince P-Tip
Serial no: 4141P62AT68LK
Diameter: 62”
Pitch: 68”

Prop extension: Woofter-Saber 2014 T-351 Part Number 4x6-0240E-3/8-thr-S2

Bolt torque: 19 ft lbs, (225 in lbs)

1.2.4 QUANTITIES (FUEL/OIL)

Fuel: 62.5 liter usable in each wing tank. 125 liter usable in total
(0.5 liter unusable in each tank, 126 liter total including unusable)

Oil: 6 U.S. quarts maximum, 3 quarts usable.
Recommended to never fly with less than 4.5 quart

1.2.3 FUEL SYSTEM

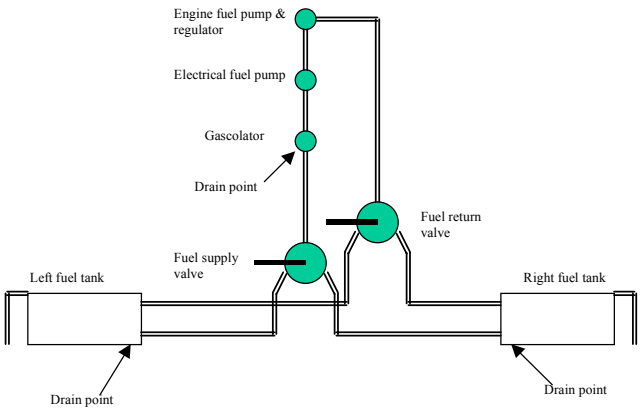
El. Fuel pump: Weldon 8163-A, 21 p.s.i.

Each wing contain a " wet" fuel tank forward of main spar. Fuel is fed from the fuel tanks to a selector valve. Fuel is then fed to a gascolator and an electrical fuel pump with integral by pass valve.

Fuel return from the injector pump returns to the tank (upper inner side of the tank) via a selector vale to route the return fuel to the same tank that is used to feed the engine.

The electrical fuel pump is used for priming and emergency use only. Throttle setting have to be fully open (2800 RPM) when using the electrical fuel pump during a failure of the main fuel pump. At full power; lean to read 14.5 psi fuel pressure.

Fuel system overview



Fuel flow vs. Fuel pressure reading:(data from IO-240-A Operator and installation manual)

psi	pph	Gal/h	L/h	% power
6.5	29	4.9	18.5	55 (lean)
7	33	5.6	21.1	65 (lean)
7.5	36	6.1	23.0	70 (lean)
8	39	6.6	25.0	75 (lean)
8.5	42	7.2	26.9	75 (rich)
9	44	7.5	28.2	75+ (rich)
10	48	8.2	30.7	80 (rich)
11	52	8.8	33.3	90 (rich)
12	56	9.5	35.8	95 (rich)
13	59	10.1	37.8	100

1.2.4 CONTROL SYSTEM

Rudder is activated by cables directly from the rudder pedals to the rudder.

Elevator control and Aileron control is via push/pull tubes from the control stick.

Control Movements:
Elevator: +25 -16
Ailerons: +12 -12
Rudder: L=25 R=30
Flaps: 0/12/28

1.2.5 ELECTRICAL SYSTEM

14 Volt DC system with engine mounted alternator.

Battery: Gill P/N G25

Voltage regulator: Electrosystems VR600A

Radio: ICOM A200
VHF antenna: Advanced Aircraft Electronics Inc. Model .
Antenna for the radio is mounted inside the vertical stabilizer.

Transponder: Bendix/King, KT-76A
Altitude Encoder: AK350
Transponder antenna: Advanced Aircraft Electronics Inc. Model L2

Intercom: SPA-400

ELT: ACK Technologies inc. Model E-01, serial no 025323

Strobe light and nav light: A600-PG/PR. One unit on each wing tip with Strobe, Red/Green, and rearward facing white light. One fuselage mounted power unit for strobe lights

1.2.6 INSTRUMENTATION

Air speed indicator: UMA 0-200 knot, P/N 16-311-200,
Altimeter: BG-3A, -1000 to 20000 ft,
Vertical Speed Indicator: UNTVSI
Tachometer: Mitchel P/N D1-112-5024,
Compass: AP2300 (wet type)
Turn Gyro: 1394T100 (electrical operated)
Clock: VDO
Fuel pressure: Westach K2A8-8MS
Oil pressure: Westach K2A8MS
Oil temperature: Westach 2A9-2, sender 399S1
Cylinder head temperature for cyl. No 1: Westach 2A1
EGT: probe for all four exhausts and selector-switch instrument reading
Voltmeter: WS2A5
Fuel level indicators: Sky Sports FPP1212S3 with dual Capacitance sensor in each tank.

1.2.7 LANDING GEAR

Main landing gear – single spring aluminum, Nose gear – hardened steel swivel type steering.
Tire type:
Main: McCreary 500x5 (13.5 in dia)
Nose: Lamb 11x4.0x5 (11.5 in dia)
Tire pressure: 35 psi
Brakes:
MATCO – hydraulic separate systems for each wheel. Master cylinders at brake pedals have integral reservoirs. Brake fluid is filled from brake end.

1.3 CONVERSION TABLES

1 NM = 1852 m
1 lb = 0.4536 kg
1 kts = 1.15 mile/hour
1 gal = 3.785 l
1 ft = 0.3045 m
1 in = 0.0254 m
1 C =(F-32)/1.8

Standard fuel and oil weight: (BSL D 1-5)
100LL: 0,71 kg/liter
Oil: 0,88 kg/liter

2. OPERATING LIMITATIONS

2.1 GENERAL / MANEUVERS

The aircraft is designed to operate in NORMAL category. Design load factor is 4.4G positive and 2.2G negative. Maneuvers must not exceed these limits. Spin testing have not been carried out for this aircraft, and intentional spins are prohibited.

Maximum number of occupants is 2, with a total weight of 180 kg (400 lbs). Maximum allowable baggage weight is 27 kg (60 lbs), provided the aircraft is loaded within its maximum allowed gross weight and within center of gravity limits (see chapter 2.5 and 6)

2.2 AIRSPEED LIMITATIONS

Never exceed (Vne):	188 kts (216 mph)
Vno:	136 kts (156 mph)
Maximum Flap Speed (Vfe):	96 kts (110 mph)
Maneuvering speed (Va):	113 kts (130mph)
Stall speed – no flap:	40 kts IAS (50 kts CAS)
Stall speed – flap:	40 kts IAS (50 kts CAS)

2.3 AIRSPEED INDICATOR MARKINGS

Green arc:	40 - 136 kts
Yellow arc:	136 – 188 kts
White arc.	40 – 96 kts
Red line:	188 kts

2.4 ENGINE OPERATION LIMITATIONS

Crankshaft Speed – RPM	
Rated Maximum continuos Operation	125 HP @ 2800
Recommended Max. For Cruising	94 HP @ 2550
Recommended Min for Idle	700±25
Maximum Take-off	Full Throttle
Maximum Continuos	Full Throttle
Fuel Grade:	100LL or 100
Oil Specification:	
All temperatures:	15W-50 or 20W-50
Below 40 F	SAE 30 or 10W-30
Above 40 F	SAE 50 or 20W-60
Oil Quantity:	
Sump capacity:	6 Quarts
Sump usable:	3 Quarts
Minimum before flight:	4.5 Quarts

Oil Pressure:	
Idle, minimum	10 psi
Normal operation	30 to 60 psi
Oil Temperature:	
Minimum for Take-off	75 F
Maximum allowable	240 F
Cruise	170 F to 200 F
Cylinder Head Temperature:	
Minimum for Take-off	200 F
Maximum allowable	460 F
Recommended Max at Cruise	380 F
Ignition timing:	22 deg

2.5 WEIGHT AND BALANCE LIMITATIONS

Max take-off weight:	658 kg (1450 lbs)
Max forward c.g:	STA 61.5 (inches)
Max aft c.g:	STA 65.6 (inches)

2.6 COCKPIT PLACARDS

The following placard shall be placed in the cockpit:

ADVARSEL

DET ER IKKE VERIFISERT AT DETTE
LUFTFARTØY FYLLER KRAVENE TIL
LUFTDYKTIGHET I NORMALKLASSE

3. EMERGENCY PROCEDURES

3.1 FAULTS IN POWER PLANT

ENGINE FAILURE AFTER TAKE-OFF

- Fuel valve – change tank
- If below 1000’ AGL land straight ahead on best field
- Perform Forced Landing

ENGINE FAILURE IN FLIGHT

- Fuel valve – change tank
- Mixture – rich
- Magneto switch – both
- Check fuel pressure reading, fuel boost pump if required
- Trim for best glide speed
- Perform Forced Landing

ROUGH ENGINE

- Engine instruments - check
- Fuel selector - other tank
- El. fuel pump - on
- Mixture - rich
- Magnetos - both on

If engine continues to run rough:

- Reduce power
- Land a.s.a.p.

LOSS OR LOW FUEL PRESSURE

- Engage electrical fuel pump.
- Throttle fully open.
- Adjust mixture to maintain 14,5 psi and 2800 RPM
- If flying is required for longer time, lean to lower fuel pressure reading and reduce throttle setting.

3.2 FAULTS IN ELECTRICAL SYSTEM

LOW VOLTMETER READING

1. Reset alternator circuit breaker

If malfunction still exists
2. Reduce electrical load

3.3 FIRE

ENGINE FIRE ON START-UP

- Fuel supply valve - off
- Vacate aircraft, bringing fire extinguisher.
- Extinguish fire

ENGINE FIRE IN FLIGHT

- Land as soon as possible
- As soon as safe landing area is found – turn off fuel supply, and master switch

ELECTRICAL FIRE / FIRE IN COCKPIT

- Master switch - off
- Open door

3.4 FORCED LANDING

Trim for 80 kts glide
Find landing field
Send distress call to air traffic service.

On short final:

- Fuel supply valve - off
- Master switch - off

- Use fire extinguisher if necessary

4. NORMAL OPERATING PROCEDURES

4.1 GENERAL

4.2 PREPARATION FOR FLIGHT

4.2.1 PRE-FLIGHT INSPECTION

- Remove tie-downs
- Remove stick lock
- Place flap full down
- Check ELT switch to ARM
- Check fire extinguisher gauge
- Check ignition off- remove key
- Check left flap and aileron hinges and control linkage
- Check left wing tip.
- Check left fuel tank content and cap
- Check pitot-static tube
- Check left main wheel brake and tire
- Drain left tank
- Drain fuel strainer
- Check air filter cleanness
- Check propeller and spinner for damage
- Turn propeller
- Check nose landing gear for cracks, bend.
- Check nose wheel tire
- Check oil quantity – minimum 4,5 quarts (5 longer flights)
- Check right main wheel brake and tire
- Drain right tank
- Check right fuel tank content and cap
- Check right wing tip
- Check right flap and aileron hinges and control linkage
- Check elevator hinges and control linkage
- Check rudder hinges and control wires
- Master switch on, check fuel quantity reading correspond to visual quantity
- Check nav. light and strobe lights.

4.2.2 STARTING THE ENGINE

CAUTION… Release starter switch as soon as engine fires. Never engage the starter while the propeller is still turning. It the starter has been engaged for 30 seconds and the engine has not started, release the starter switch and allow the starter motor to cool for 3 to 5 minutes before another starting attempt is made.

CAUTION … Oil pressure indication must be noted within 30 seconds in normal weather. If no pressure is noted within the specified time, stop the engine and investigate the cause.

Cold starts:
1. Engage master switch
2. Check indicated battery voltage
3. Select fuel from tank with lowest fuel, and return to same.
4. Place mixture control to fully rich
5. Place throttle control to 1" from closed position
6. Engage the electrical fuel pump until indicated metered fuel pressure reaches 4-6 psi, and switch off after 3-6 more seconds depending on required priming.
7. Engage starter until engine fires. If the engine was not primed enough engage electrical fuel pump as required. Do not run the starter motor for more than 30 seconds.
8. Check that oil pressure is indicated within 30 seconds.
9. Place alternator switch to ON, and check that voltage increases to 14-15 Volt
10. Allow at least one minute warm up at 900 to 1000 RPM. Do not exceed 1800 RPM with oil temperature less than 75 F, and CHT < 200 F
11. Place navigation lights and anti collision light on as required.
12. Before starting to taxi switch fuel supply and return to fullest tank

4.2.3 TAXING

Steering is accomplished by use of differential braking, and rudder deflection

4.2.4 ENGINE RUN UP

CAUTION….Oil temperature must be at least 75 F before engine run up.

Set RPM to 1700. Place magneto switch to R, and note drop in RPM. The drop shall be less than 150 RPM.

CAUTION … If the RPM does not drop, this is indicative of - either a failure to ground the magneto, or a significant difference in timing between the magnetos, and must be rectified before flight.

After noting the RPM drop, place the magneto switch back to BOTH, and note the RPM increase to 1700.

Place magneto switch to L, and note drop in RPM. The drop shall be less than 150 RPM, and the differential drop between R and L shall be less than 50 RPM.

Place the throttle to idle, and check that the engine does not stop, and that RPM is less than 900 RPM.

4.2.5 PRE TAKE-OFF

1. Visually check that both forward and aft door lock pins are properly engaged for both doors.
2. Check that seat harness is locked, and that fuel selector can be reached.
3. Check that all controls can be moved fully, with no interference with seat, clothes or any other items in cockpit.
4. Switch the transponder to ALT, if transponder is required.
5. Use no flap or half flap.
6. Check that compass is indication runway heading, - that oil pressure within limits, - that master and ALT switch is on, -that magneto switch is in Both position, - that fuel selector valve and return valve select fullest tank.
7. Check that oil temperature indicate more than 75 F and that CHT indicate more than 200 F

4.3 FLIGHT

4.3.1 TAKE-OFF

Advance the throttle to full open, and hold it firmly in. Check that the engine is running smoothly, and that RPM is indicating 2200 RPM +- 50 RPM
Accelerate while holding slight back pressure on the stick to limit loads on nose gear. Rotate at 60 kts IAS. As main wheels leave ground, carefully lower the nose to increase speed to at least 70 kts.

4.3.2 CLIMB

To clear an immediate hinder, keep 70 kts until clear. Otherwise climb at 80 kts for maximum rate of climb. Climbing at 90 kts give almost the same rate of climb as 80 kts, and 100 kts give also a good rate. At 500' AGL reduce power to read 10 psi fuel pressure.

4.3.3 CRUISE

At level off (below 3000'), reduce power to read 9 psi fuel pressure (approx 2500 RPM), and lean to read 8 psi. This procedure will give 75% power. For lower power settings refer to fuel pressure table.

4.3.4 GLIDE

Avoid long descents at low power setting which can result in excessive engine cooling. Do not permit cylinder temperature to drop below 300 F for periods exceeding 5 minutes.

80 kts produces the lowest descend rate, and best glide ratio at maximum weight. At low weights (no passenger or baggage) this speed is slightly lower (approx. 5 kts lower)

4.3.5 PRIOR TO LANDING

Before entering the landing pattern, ensure fuel is taken from the fullest tank, and that fuel mixture is set to rich.
Reduce power to 2100 RPM in the landing pattern to get speed down for the approach

4.3.6 BALKED LANDING (GO-AROUND)

Apply full power, and establish 80 kts. Retract flaps if extended.

4.3.7 NORMAL LANDING

Fly the base leg at 80 kts. Reduce to 70 kts on final, and use flap as necessary. For shortest landings, use full flap, and 65 kts at threshold.

Note that the rate of descend - especially at gross weight - increase as speed get lower than 80 kts. At gross weight, full flap, and 70 kts, the final approach should be with engine power added.

4.4 AFTER FLIGHT

4.4.1 AFTER LANDING

Retract flap, and switch off transponder.

4.4.2 STOPPING THE ENGINE

Switch lights and radio off.
Pull the fuel mixture to cut off.

4.4.3 AFTER STOPPING THE ENGINE

Main switch off, mag. Switch off, and remove key.

5. PERFORMANCE/OPERATIONAL DATA

Stall speed: 40 kts IAS (50 kts CAS)

Climb angle: 6.2 deg @70 kts and MTOW (see section 5.3)

Rate of climb: 850 (heavy) - 1200 (light) fpm @ 80 kts at sea level (see section 5.3)

Max speed in turbulent air: 136 kts

Glide data: best speed 80 kts IAS. 2 NM per 1000'.

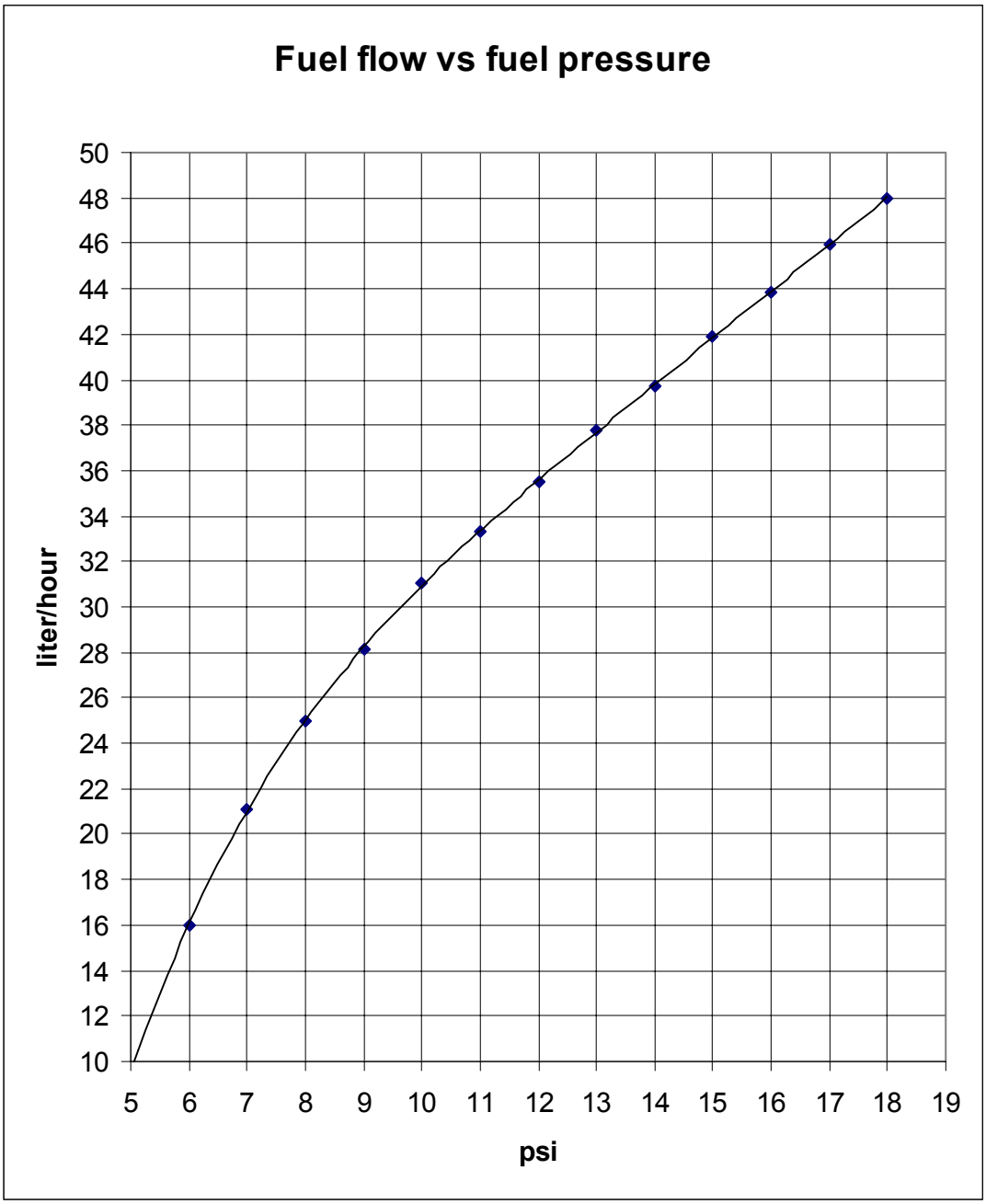
Approach speeds: 70-75 kts clean, 65-70 kts w/flap.

Take-off distances: 400 m / 650 m to clear 15 m (at MTOW and sea level)

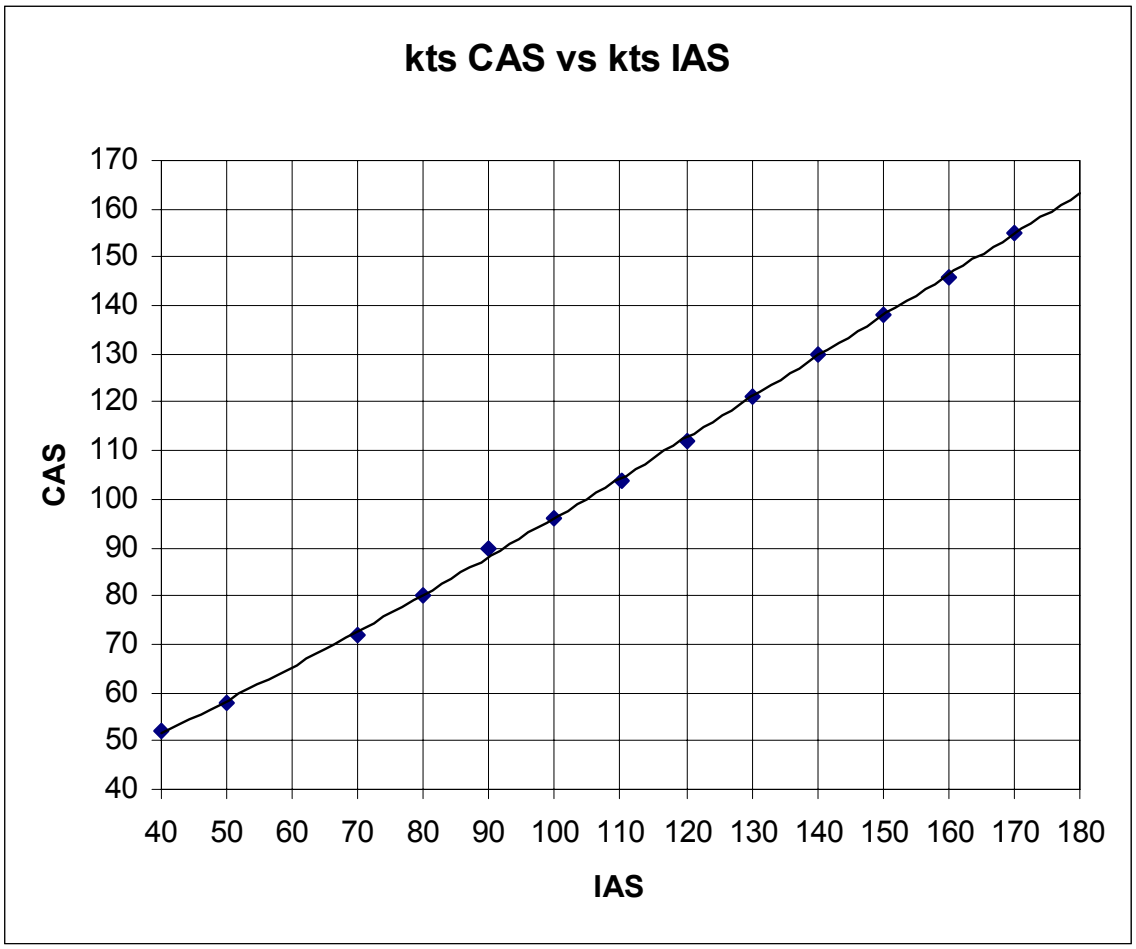
Landing distances: 400 m (at MTOW and sea level)

Fuel consumption: 24 liter/hour per flight time at 75% cruice.

5.1 Fuel flow vs fuel pressure

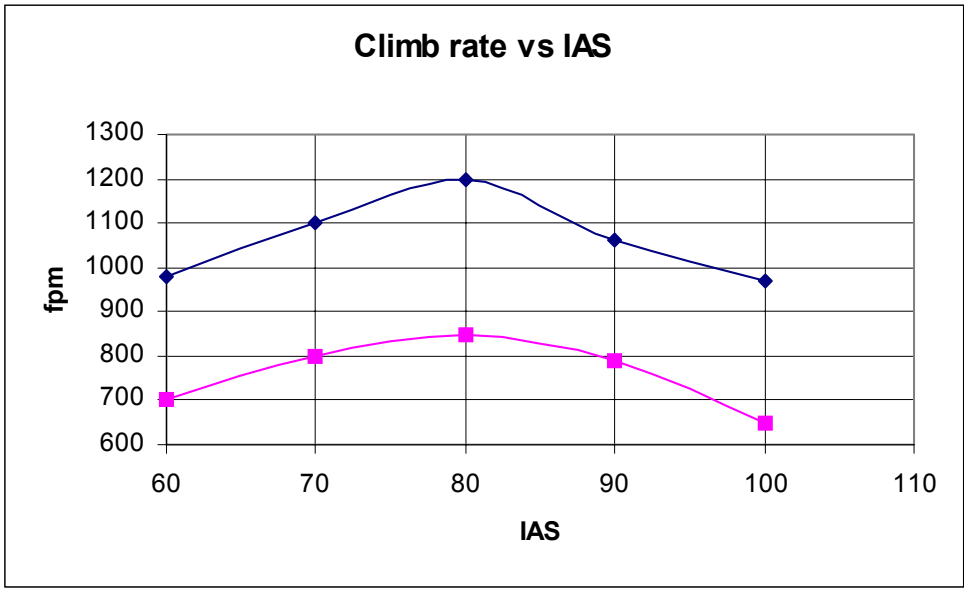


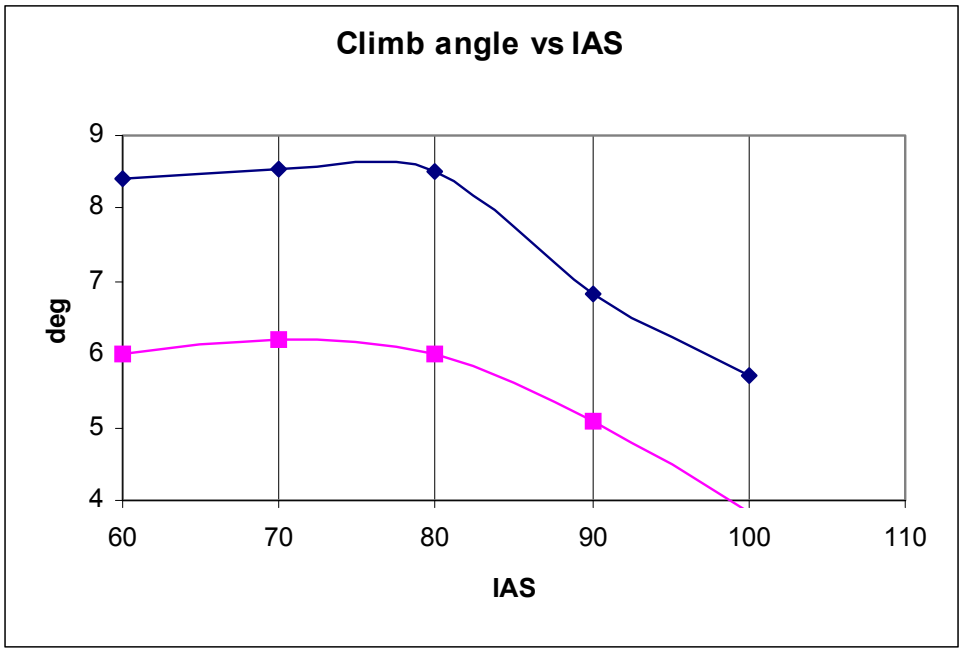
5.2 Airspeed calibration



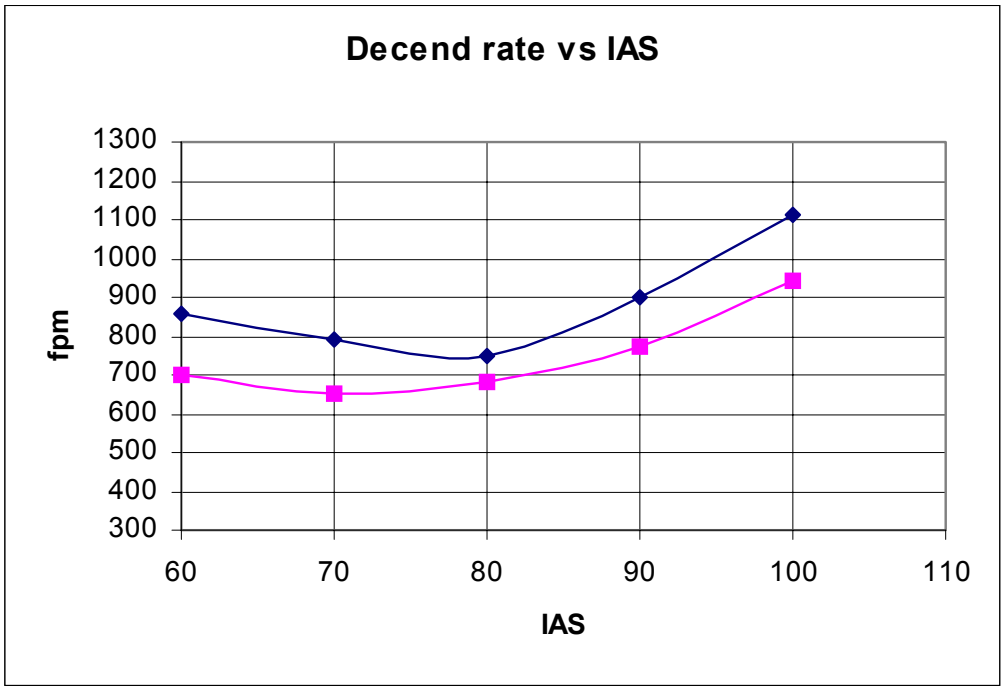
5.3 Climb and glide performance

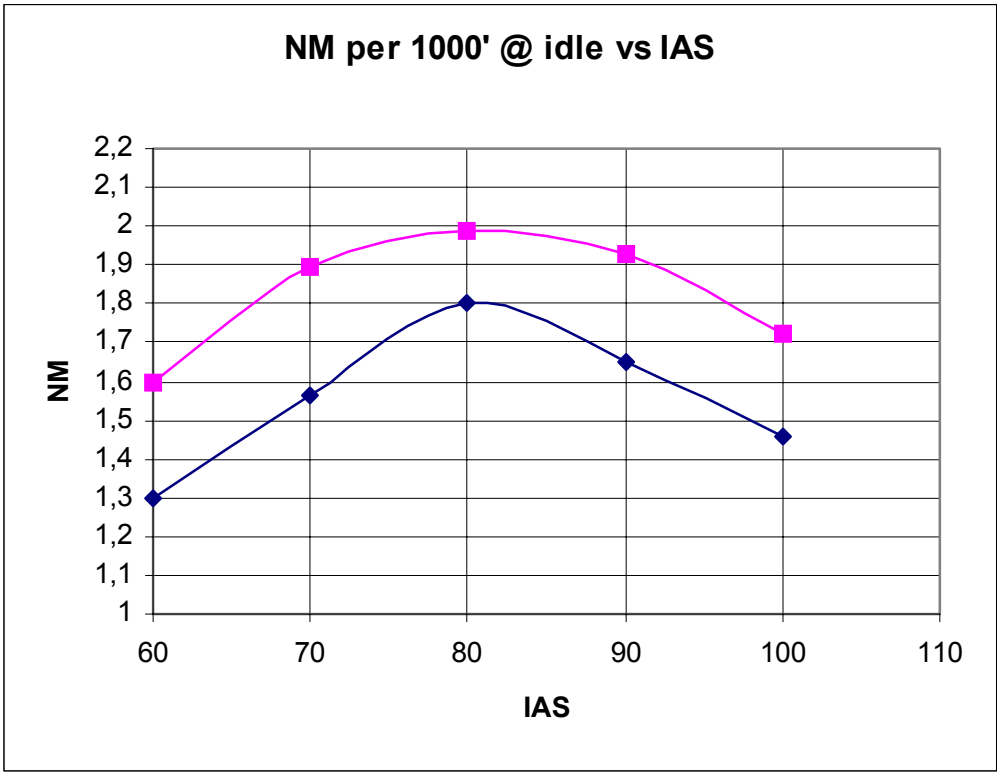
Climb rate at sea level for light (pilot+1/2 fuel) and heavy (MTOW) loaded aircraft:



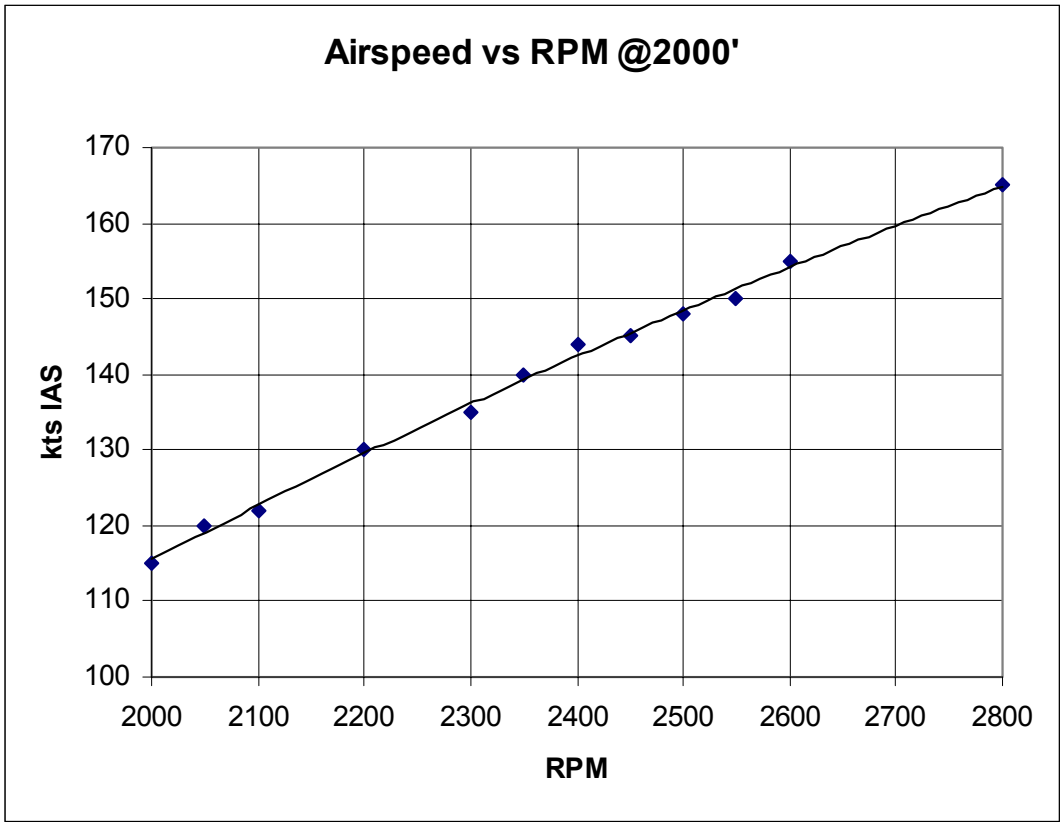


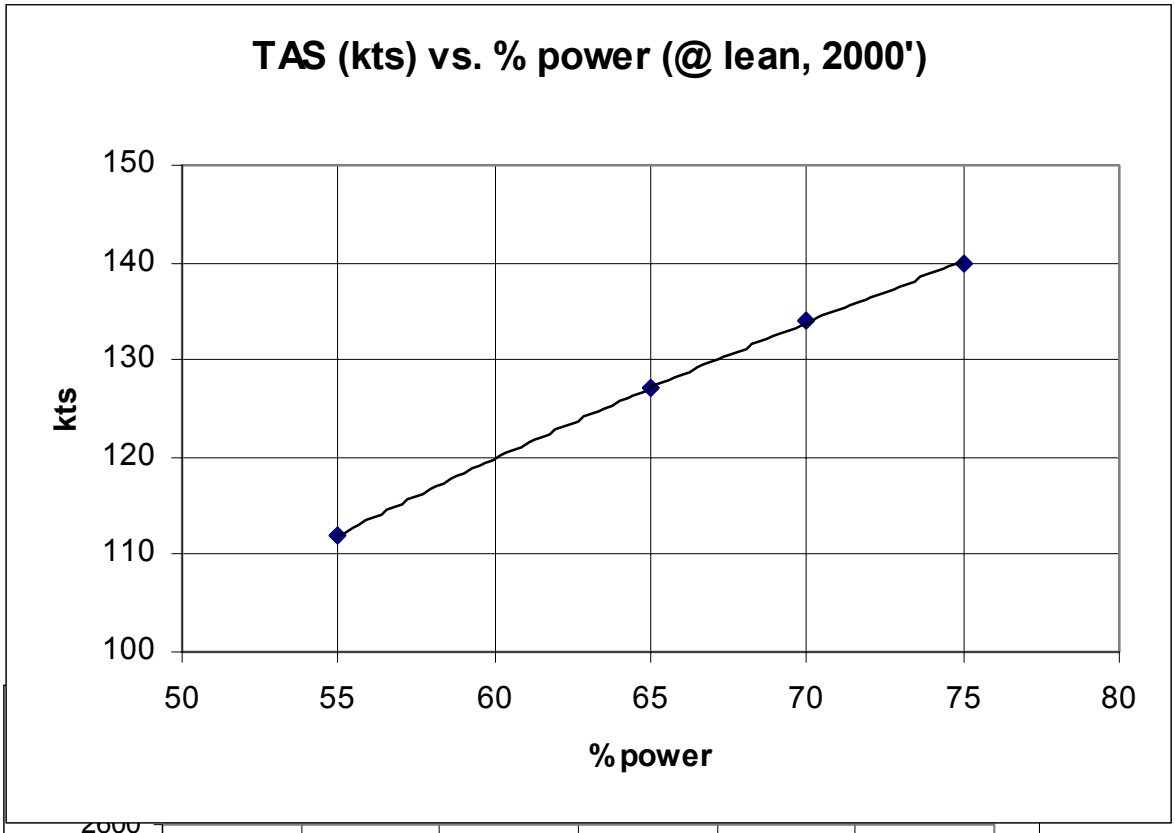
Glide performance at sea level for light (pilot+1/2 fuel) and heavy (MTOW) loaded aircraft:

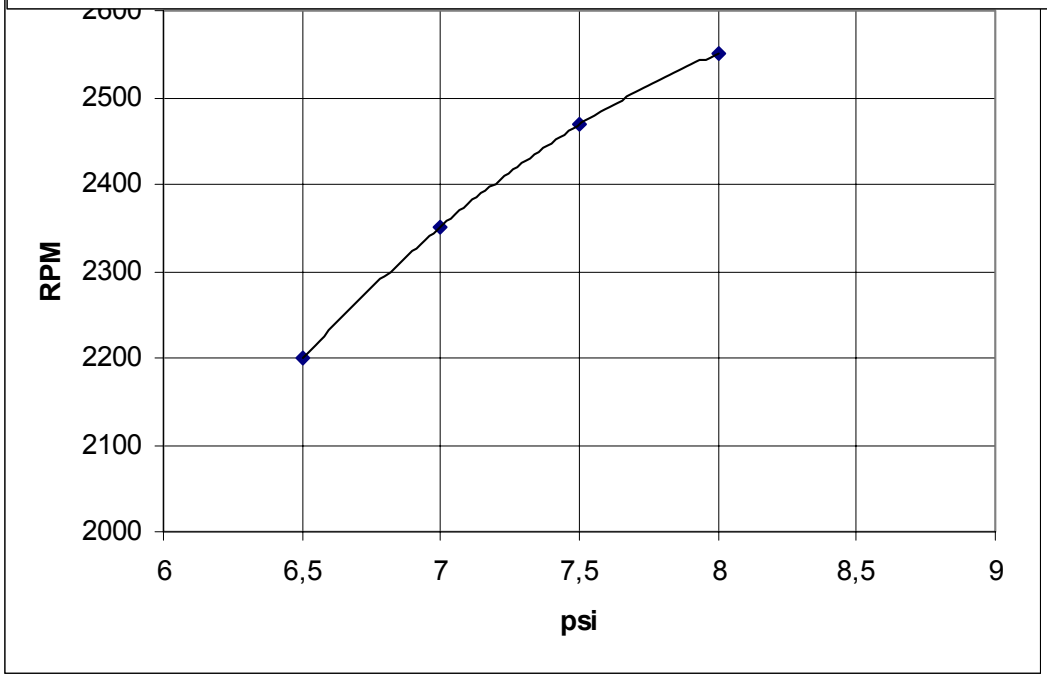




5.4 Cruice performance




TAS (kts) vs. % power (@ lean, 2000')
150
140
130
120
110
100
kts
50
55
60
65
70
75
80
% power

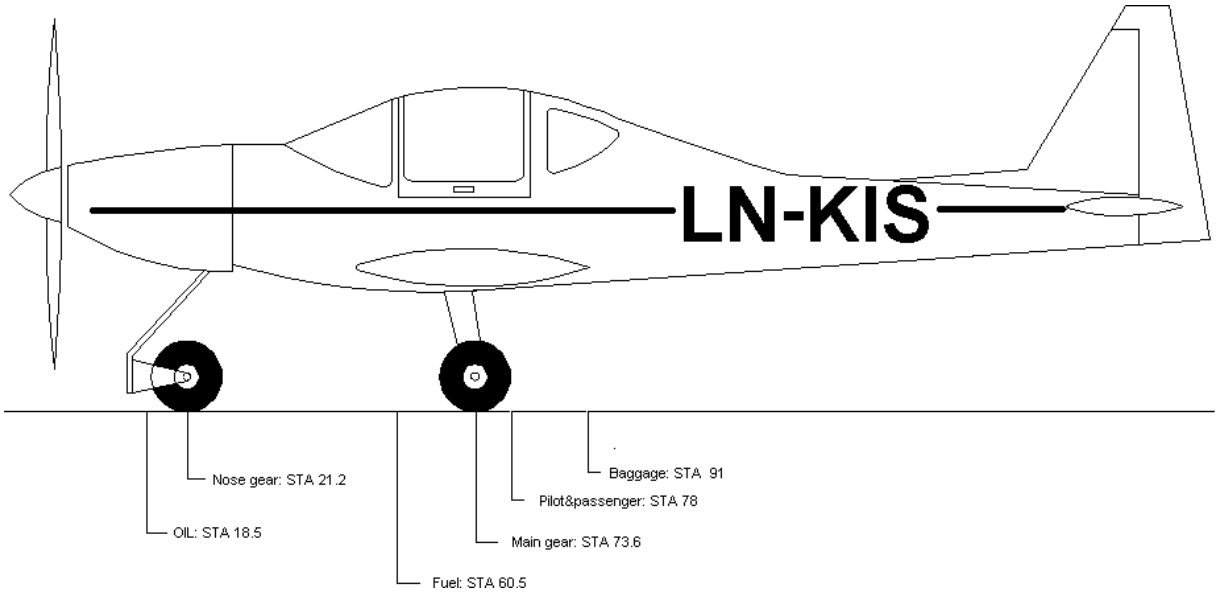

2500
2400
2300
2200
2100
2000
RPM
6
6,5
7
7,5
8
8,5
9
psi

6. WEIGHT AND BALANCE

Max take-off weight: 1450 lbs (658 kg)
Max forward c.g: STA 61.5 (inches)
Max aft c.g: STA 65.6 (inches)
Main wheels: STA 73.6
Nose wheel: STA 21.2

Empty weight (w/ 6 qts oil): 397,8 kg
Empty c.g: STA 57,7

Locations of load:


LN-KIS
Nose gear: STA 21.2
OIL: STA 18.5
Fuel: STA 60.5
Main gear: STA 73.6
Pilot&passenger: STA 78
Baggage: STA 91

Pilot/Passenger: STA 78
Fuel: STA 60.5
Baggage: STA 91
Oil: STA 18.5

Fuel: 0,71 kg/liter (BSL D 1-5)
Oil: 0,88 kg/liter (BSL D 1-5)

Loading example Max. Weight:

ITEM	WEIGHT (kg)	STATION (inch)	MOMENT (inch-kg)
Empty aircraft	399,4	58,8	23483,4
Pilot + Passenger	160	78	12480,0
Fuel (0,71 kg/l)	89,5	60,5	5412,3
Baggage	9	91	819,0
Total	658	64,1	42194,7

Loading example Max. Forward c.g (Full fuel-126 l, Light pilot, no passenger, no baggage):

ITEM	WEIGHT (kg)	STATION (inch)	MOMENT (inch-kg)
Empty aircraft	399,4	58,8	23483,4
Pilot + Passenger	71	78	6006,0
Fuel	89,5	60,5	5412,3
Baggage	0	91	0
Total	559,9	61,5	34433,7

Loading example Max. Aft c.g (30 l fuel, Heavy pilot & passenger, max baggage):

ITEM	WEIGHT (kg)	STATION (inch)	MOMENT (inch-kg)
Empty aircraft	399,4	58,8	23483,4
Pilot + Passenger	172	78	13728,0
Fuel	21,3	60,5	859,1
Baggage	27	91	2457,0
Total	619,7	65,6	40645,1

Total weight =

Empty weight + Fuel weight + Pilot + Passenger + Baggage

Center of Gravity =

Empty weight x 57,7 + Pilot&Pass. weight x 78 + Fuel weight x 60,5 +Baggage weight x 91

Empty weight + Pilot&Pass. weight + Fuel weight + Baggage weight

1 lb = 0.4536 kg
1 inch = 0.0254 m
1 gal = 3.785 l

7. SYSTEMS DESCRIPTION

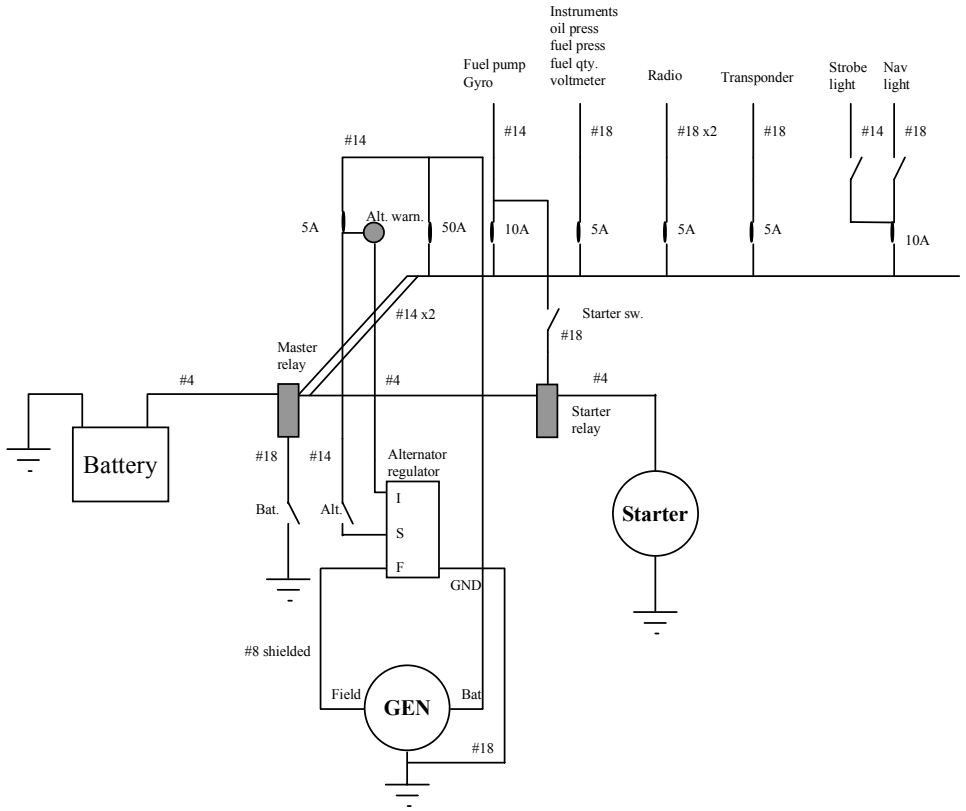


Figure 1 – Power wiring diagram

Wiring of Radio and Intercom LN-KIS

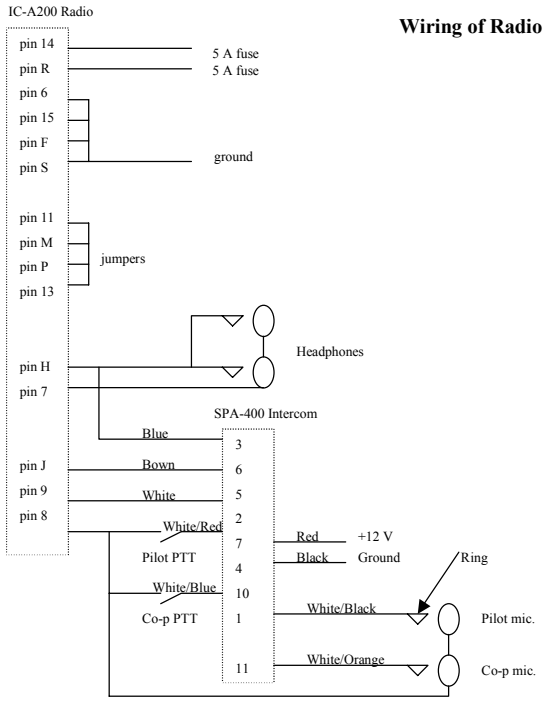


Figure 2 – Radio wiring diagram

8. MAINTENANCE

8.1 Airframe, and systems maintenance

8.1.1 Every 50 hours

Remove upper and lower cowls.
Remove inspection doors in wings below aileron bellcrank, and bottom wing to fuselage fairings. Remove wall behind baggage are.
Remove seat bottoms.

Propeller:
- ☐ Check propeller bolt torque 28 foot pounds, and safety wire bolts
- ☐ Inspect spinner condition

Airframe:
- ☐ Inspect all control linkage rod ends for secureness.
- ☐ Inspect rudder cable and cable feed-through
- ☐ Inspect all controls surface hinges.
- ☐ Check control surface movements.
- ☐ Inspect main and rear wing bolts
- ☐ Inspect door hinges, and door lock mechanism
- ☐ Inspect rudder pedals and brake cylinders
- ☐ Inspect brake tubing
- ☐ Inspect fuel tubing, and selector valves

Landing gear:
- ☐ Check brake pads for wear
- ☐ Check tires for wear, and damage
- ☐ Check tire pressure - 35 psi
- ☐ Grease wheel bearings.
- ☐ Grease nose gear swivel
- ☐ Inspect nose gear leg for cracks, damage, corrosion, and bending.

8.1.2 Annually

As 50 hour check, and in addition:
- ☐ Functional test of Tachometer (requirement ,BSL B3-2)
- ☐ Check ELT battery date. Replace batteries if date expires in less than one year. Replace with Duracell MN1300 batteries with expiration date only. When replacing the batteries mark the outside of the ELT battery case with the expiration date as indicated on the new batteries.
- ☐ Check the ELT battery voltage reading. Voltage must measure above 6.0 volt. Refer to ACK ELT manual for measuring points.

8.1.3 Biannually

As annually, and in addition:
- ☐ Functional test of altimeter (requirement ,BSL B3-2)
- ☐ Functional test of airspeed indicator (requirement ,BSL B3-2)
- ☐ Compass swing (requirement ,BSL B3-2)
- ☐ Change air filter
- ☐ Remove and clean fuel tank screens

8.2 Engine maintenance

8.2.1 TELEDYNE CONTINENTAL IO-240-A 50 HOUR INSPECTION

REFERENCED TO IO-240-A MAINTENANCE MANUAL P.N. X30621A.

Ignition system

- Check magneto drop, The magneto drop for left or right must not be greater than 150 RPM (@2200 RPM) and magneto spread not greater than 50 RPM with ignition timing at 22 deg BTC +/- 1 deg. If magneto drop is out of tolerance, check timing according to 72-10-04, Timing magnetos.
- Perform magneto off check with engine running.
- Visually inspect high tension ignition leads for chaffing, deterioration.
- Inspect magneto accessory drive adapters for secureness and oil leaks.

Fuel injection system

- Visually inspect all fuel system components, plumbing and connections for security, deterioration, leaks and chaffing.

Induction system

- Visually inspect induction manifold, and air throttle assembly for security safetying, leaks, cracks and chafing. Inspect all induction tube connections for security and wear. Inspect all induction hoses for deterioration.

Electrical charging system

- Visually inspect alternator and electrical connections for security and corrosion.
- Inspect area around alternator to crankcase for evidence of oil leakage.

Starter system

- Visually inspect starter to engine attaching hardware for security.

- Visually inspect for oil leakage at starter to accessory case gasket.

Accessory case

- Visually inspect accessories for security and all gasket areas for oil leaks.
- Visually inspect mounting studs for security.

Lubrication system

- Check oil pressure of 10 psi minimum, 30 to 60 psi normal operation, and 100 psi maximum (cold oil)
- Remove oil drain plug and drain oil (warm oil).
- Remove oil filter screen and inspect for foreign particles. If no foreign particles are present, rinse with clean stoddard solvent. If foreign particles are detected on filter screen, see section 72-10-04, oil screen.
- Using a new gasket re-install screen and tighten to 500 - 520 inch pounds torque. Safety wire.
- Re-install sump plug, tighten to 190 - 210 inch pounds torque. Safety wire.
- Change external oil filter.
- Refill engine with clean oil of proper grade
- Visually inspect oil sump to crankcase attaching hardware and oil sump drain plug for security and safetying.
- Visually inspect all lubrication system component gasket areas for oil leaks.
- Visually inspect all lubricant system components for cracks, dents, stripped threads, punctures and abnormal wear.
- Visually inspect oil pressure gage plumbing for oil leaks, security and deterioration.

Cylinder assembly

- Visually inspect cylinder to engine attaching hardware for security.
- Inspect cooling air fins for breakage.

- Inspect cylinder head, barrel fin, and root areas for corrosion, pitting and cracks.
- Inspect exhaust and intake flange areas for leaks.
- Inspect induction and exhaust tube attaching hardware for security and safetying.
- Inspect rocker cover to cylinder gasket area for evidence of oil leakage.
- Inspect pushrod housings at both ends for evidence of oil leakage.
- Visually inspect fuel injection and cylinder drain plumbing connections for security and evidence of leakage.
- Check spark plug and ignition connections for security.
- Check cylinder baffling for security, cracks, dents and wear from chaffing.

Crankcase

- Visually inspect accessories for security and all gasket areas for oil leaks.
- All accessory and cylinder mounting studs must de visually inspected for security.
- Safetying mechanism such as safety wire and locking tab washers must be inspected for proper installation and security.
- Inspect engine mount brackets for cracks and security.
- Inspect all areas of crankcase for cracks.

Engine Drive train

- Visually inspect the front crankshaft exit area for evidence of oil leakage and any obvious over stressing of the crankcase flange.
- Visually inspect the propeller and propeller extension for security.

PERFORM POST MAINTENANCE OPERATIONAL TEST AFTER 50/100 HOUR OR ANNUAL INSPECTION ACCORDING TO 72-75-01.

8.2.2 TELEDYNE CONTINENTAL IO-240-A 100 HOUR INSPECTION

REFERENCED TO IO-240-A MAINTENANCE MANUAL P.N. X30621A.

Ignition system

- Check magneto drop, The magneto drop for left or right must not be greater than 150 RPM (@2200 RPM) and magneto spread not greater than 50 RPM with ignition timing at 22 deg BTC +/- 1 deg. If magneto drop is out of tolerance, check timing according to 72-10-04, Timing magnetos.

- Perform magneto off check with engine running.

- Visually inspect high tension ignition leads for chaffing, deterioration.

- Inspect magneto accessory drive adapters for secureness and oil leaks.

- Remove and service spark plugs in accordance with section 72-10-04 Spark plug.

- Check point adjustments.

- Check internal timing of magnetos.

Fuel injection system

- Visually inspect all fuel system components, plumbing and connections for security, deterioration, leaks and chaffing.

- Remove fuel nozzles, clean and visually inspect. The nozzles must be cleaned by soaking in lacquer thinner, methyl ethyl ketone or acetone for several hours. Blow dry with compressed air. Apply 646943 anti seize lubricant (sparingly) to fuel nozzle threads (cylinder end), do not apply to 1st thread. Install nozzles with 55-65 inch pound torque.

- Re-install fuel lines on fuel nozzles.

CAUTION... Never use teflon tape on fuel injection fittings.

WARNING... Never clean nozzles with wire or other similar object. If nozzle jet is plugged and obstruction cannot be removed by solvent action REPLACE THE NOZZLE.

□ Check metered and unmetered fuel pressure using external, calibrated gauges connected to the fuel system as shown in section 72-75-03. Adjust according to the following:

Propeller RPM	Unmetered (Pump) pressure psi	Metered (Nozzle) pressure psi
675	6.25 (5.5 - 7.5)	4 (3.5 - 4.0)

Induction system

□ Visually inspect induction manifold, and air throttle assembly for security safetying, leaks, cracks and chafing. Inspect all induction tube connections for security and wear. Inspect all induction hoses for deterioration.

□ Inspect alternate air door operation.

□ Check and clean air filter.

Electrical charging system

□ Visually inspect alternator and electrical connections for security and corrosion.

□ Inspect area around alternator to crankcase for evidence of oil leakage.

□ Inspect alternator blast tube for obstruction and condition.

□ Record and compare alternator output and load specification.

Starter system

□ Visually inspect starter to engine attaching hardware for security.

□ Visually inspect for oil leakage at starter to accessory case gasket.

□ Inspect starter motor electrical connections for secureness and corrosion.

Accessory case

□ Visually inspect accessories for security and all gasket areas for oil leaks.

□ Visually inspect mounting studs for security.

Lubrication system

- Check oil pressure of 10 psi minimum, 30 to 60 psi normal operation, and 100 psi maximum (cold oil)
- Remove oil drain plug and drain oil (warm oil).
- Remove oil filter screen and inspect for foreign particles. If no foreign particles are present, rinse with clean stoddard solvent. If foreign particles are detected on filter screen, see section 72-10-04, oil screen.
- Using a new gasket re-install screen and tighten to 500 - 520 inch pounds torque. Safety wire.
- Re-install sump plug, tighten to 190 - 210 inch pounds torque. Safety wire.
- Change external oil filter.
- Refill engine with clean oil of proper grade
- Visually inspect oil sump to crankcase attaching hardware and oil sump drain plug for security and safetying.
- Visually inspect all lubrication system component gasket areas for oil leaks.
- Visually inspect all lubricant system components for cracks, dents, stripped threads, punctures and abnormal wear.
- Visually inspect oil pressure gage plumbing for oil leaks, security and deterioration.
- Remove, clean and inspect the oil pressure relief valve.
- Re-install pressure relief valve using a new gasket and tighten to 190 - 210 inch pounds torque.
- Safety wire pressure relief vale housing.

Cylinder assembly

- Visually inspect cylinder to engine attaching hardware for security.
- Inspect cooling air fins for breakage.
- Inspect cylinder head, barrel fin, and root areas for corrosion, pitting and cracks.

- Inspect exhaust and intake flange areas for leaks.
- Inspect induction and exhaust tube attaching hardware for security and safetying.
- Inspect rocker cover to cylinder gasket area for evidence of oil leakage.
- Inspect pushrod housings at both ends for evidence of oil leakage.
- Visually inspect fuel injection and cylinder drain plumbing connections for security and evidence of leakage.
- Check spark plug and ignition connections for security.
- Check cylinder baffling for security, cracks, dents and wear from chaffing.
- Perform compression test according to 72-55-02 Cylinder Compression Test.

Crankcase

- Visually inspect accessories for security and all gasket areas for oil leaks.
- All accessory and cylinder mounting studs must de visually inspected for security.
- Safetying mechanism such as safety wire and locking tab washers must be inspected for proper installation and security.
- Inspect engine mount brackets for cracks and security.
- Inspect all areas of crankcase for cracks.

Engine Drive train

- Visually inspect the front crankshaft exit area for evidence of oil leakage and any obvious over stressing of the crankcase flange.
- Visually inspect the propeller and propeller extension for security.

PERFORM POST MAINTENANCE OPERATIONAL TEST AFTER 50/100 HOUR OR ANNUAL INSPECTION ACCORDING TO 72-75-01.

8.2.3 TELEDYNE CONTINENTAL IO-240-A 500 HOUR INSPECTION

REFERENCED TO IO-240-A MAINTENANCE MANUAL P.N. X30621A.

Perform 100 hour inspection on all systems, and in addition perform the following:

Ignition system

- Magnetos must be disassembled and inspected in accordance with the applicable magneto service manual.