Manufacturer: POLSKIE ZAKŁADY LOTNICZE

WYTWÓRNIA SPRZĘTU KOMUNIKACYJNEGO

"PZL - WARSZAWA II"

E-83/74

APRIL 1974

SAILPLANE SPEEDOMETERS

PR-2508-B AND PR-4008-A

TECHNICAL DESCRIPTION

AND

MAINTENANCE INSTRUCTION

EDITION APRIL 1974

CONTENTS

LIST OF DRAWINGS

1. INTRODUCTION

1.1 The list of changes

All changes should be introduced to this document by the way of exchaning of the concerned pages .The place where the change is introduced is marked with the thick, vertical stroke on the left side of a text.

Page	N° and date of of the change	Contend of the change	Signature

1.2 General informations

1.2.1. Designation of types and range of indications

Designation of type	Ranges of indications		
	km/h	knots	mph
PR-250S-B	250	140	160
PR-400S-A	400	200	250

2. Designation of a design series and variation

For PR-250S-B

Designation of instrument	Variations		
	Coating of marks and pointer	Units of measurements	Type of the terminal for connection of pressure
PR-250S-B	s.l.p.p.o.	km/h	multi-conical
PR-250S-BB	s.l.p.t.o.	km/h	
PR-250S-BK	white paint	km/h	
PR-250S-BI	s.l.p.p.o.	mph	
PR-250S-BIB	s.l.p.t.o.	mph	
PR-250S-BIK	white paint	mph	
PR-250S-BG	s.l.p.p.o.	knots	
PR-250S-BGB	s.l.p.t.o.	knots	
PR-250S-BGK	white paint	knots	
PR-250S-BZB	s.l.p.t.o.	km/h	threaded 7/16"
PR-250S-BZK	white paint	km/h	
PR-250S-BIZB	s.l.p.t.o.	mph	
PR-250S-BIZK	white paint	mph	
PR-250S-BGZB	s.l.p.t.o.	knots	
PR-250S-BGZK	white paint	knots	

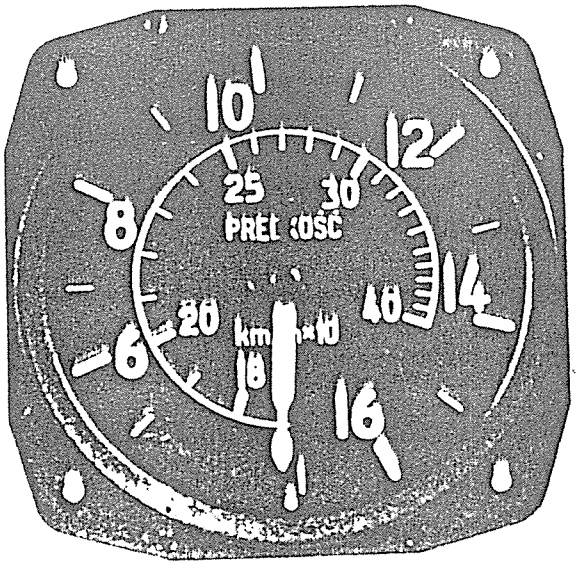
s.l.p.t.o. -self-lighting paint of the temporary operation
s.l.p.p.o. -self-lighting paint of the permanent operation

Egz. nr .....4..... 2004 -02- 06

b/ For PR-4008-A

Designation of the instrument	Variations		
	Coating of marks and pointer	Units of measurements	Language version
PR-4008-A	s.l.p.p.o.	km/h	polish
PR-4008-AB	s.l.p.t.o.	km/h	
PR-4008-AK	white paint	km/h	
PR-4008-AAG	s.l.p.p.o.	knots	english
PR-4008-APP	s.l.p.t.o.	knots	
PR-4008-AOZ	white paint	knots	
PR-4008-AAJ	s.l.p.p.o.	mph	
PR-4008-AOX	s.l.p.t.o.	mph	
PR-4008-AOY	white paint	mph	

Speedometer PR-2508-B



Speedometer Pr-400-A

Fig.1 General view.

2. TECHNICAL DESCRIPTION

2.1. Application.

The speedometers are designed for measurement of speed of sailplanes and powered sailplanes.

2.2. Technical data

a/ Accuracy.

PR-2508-B

Speed	Units	Permissible errors of indications			
		+20°C	+50°C	-45°C	-60°C
50,60,80,100,120, 140,160	km/h	+/-3	+/-4	+/-5	+/-8
180,200,220,250		+/-5	+/-6	+/-8	+/-10
30,40,50,60,70	KNOTS	+/-1.5	+/-2	+/-3	+/-4.5
80,90,100,120,140		+/-2	+/-3.25	+/-4.5	+/-5.5
30,40,50,60,70,80	mph	+/-2	+/-2.5	+/-3	+/-5
90,100,120,140,160		+/-2.5	+/-3.75	+/-5	+/-6

PR-4008-A

Speed	Units	Permissible errors of indications		
		+20°C	+50°C and-45°C	-60°C
60,80,100,120,140, 160,180,200	km/h	+/-4	+/-8	+/-12
250,300,400		+/-10	+/-10	+/-15
30,40,50,60,70, 80,90,100	KNOTS	+/-2.2	+/-4.3	+/-6.5
120,140,160,200		+/-5.4	+/-5.4	+/-8
30,40,50,60,70, 80,90,100,120	mph	+/-2.5	+/-5	+/-7.5
140,160,200,250		+/-6.2	+/-6.2	+/-9.3

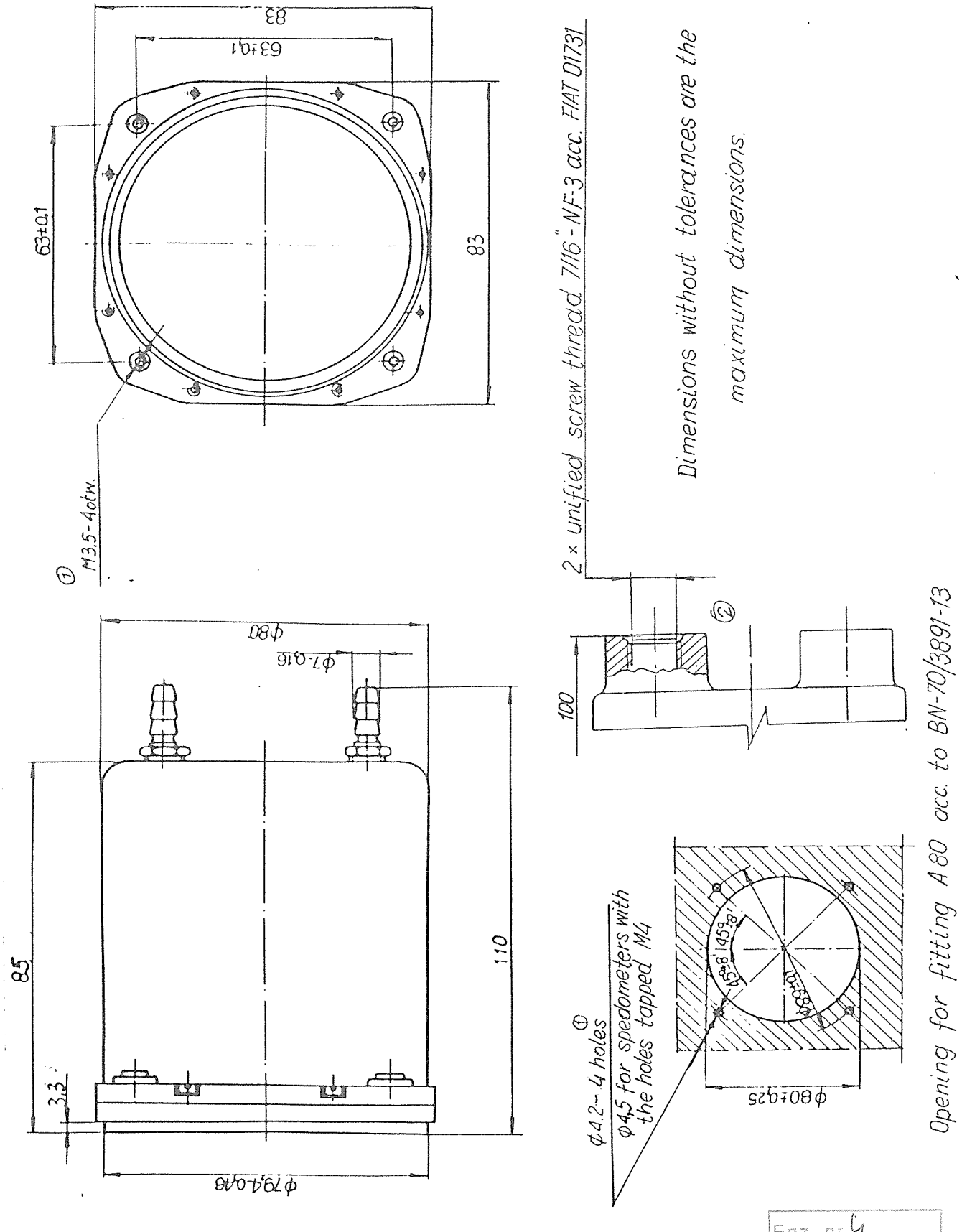


Fig.2 Overall dimensions

b/.Working temperature -60°C to +50°C

c/.Resistance to impacts up to 4g

d/.Hysteresis of indications:

PR-250-B max.5km/h, 3knots, 3mph

PR-400-A max.4km/h, 3.2knots,3.75mph

e/.Weight max. 400 g

f/.Short-lasting overloading max. 50km/h

2.3.Description of design and the principle of operation

The speedometers are membrane, direct action instruments. A total pressure, which is a sum of the dynamic pressure ($\rho v^2/2$) and the static pressure,is fed through a terminal marked "C" inside a membrane capsule, while a stratic pressure through a "S" terminal is fed inside the instrument case. A difference of the total and static pressures causes a distorsion of the membrane capsule. The distorsion through a crank and gear mechanism moves a pointer.

2.4.Limitation of use.

The instrument must not be used in conditions outside the limits defined in p.2.2 of this description.

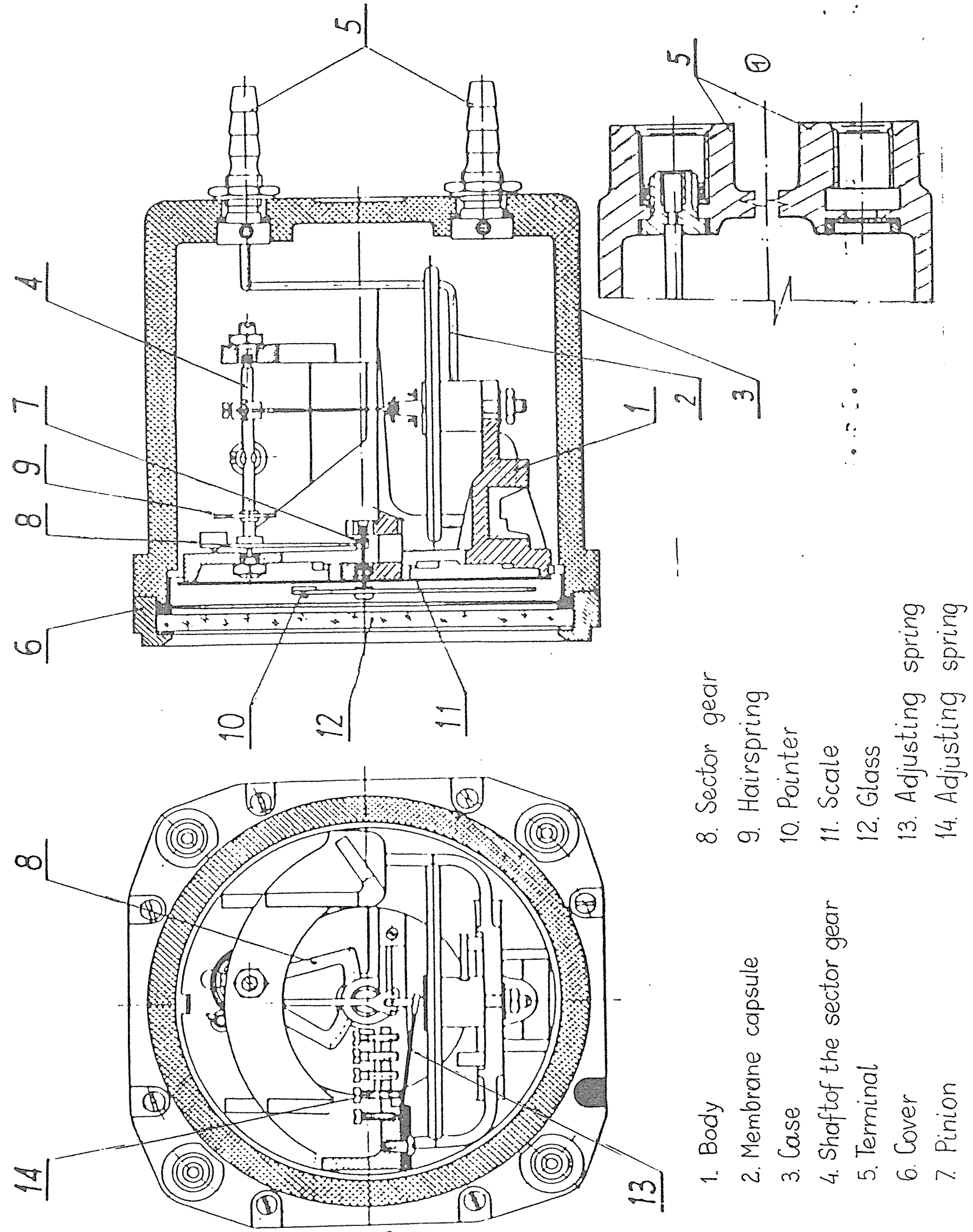
2.5.The delivered set.

Speedometer	1 pc
Hose L=250mm	2 pcs.(for the instruments with multiconical terminals)
Fixing screw M 3.5 or M 4	4 pcs.

2004 -07- 06

PCV hose L=85mm	1 pc.	(for the instruments with multiconical terminals)
Certificate	1 pc.	
Plug	2 pcs.	(for the instruments with threaded terminals).

Fig.3. Principal design.



3 MAINTENANCE INSTRUCTION.

3.1. Checking before fitting on a sailplane.

3.1.1. Appearance.

The outside surfaces should not have mechanical damages caused in transportation or unproper storage.

The wire cloth in terminals should not be damaged, dirty or clogged.

Remark: Do not blow in the terminals, because it can impair the instrument.

3.1.2. Checking of errors of indications, hysteresis, smoothness of the pointer movement.

Connect the terminal "C" with a source of pressure, setting the pressures equivalent to the speeds acc. to p.2.2 of this instruction. Keep each the set pressure by one minute (and for the top speed - by 15 minutes). If after cutting off the pressure source (by the means of a valve) the instrument indications decreases, it means untightness of the instrument or of a test stand.

After checking the errors check smoothness of the pointer movement in the whole range of measurement.

3.2. Fitting of the instrument on a sailplane.

The instrument is adapted for fitting on a cushioned instrument panel, using four M 3.5 screws.

Dimensions and positioning of the openings for fitting are given on Fig. 2.

After fitting connect the instrument terminals with the pressures sender of a sailplane.

3.3. Checking after fitting on a sailplane..

Using a portable test device check the instrument and connections tightness and smoothness of the pointer movement in the whole range of measurements.

3.4. Periodic maintenance schedule.

3.4.1. Checking before the flight.

Check fixing of the instrument to the instrument panel and its appearance.

3.4.2. Checking after 100 hours of flight or after each 6 months

Check tightness of the total and static pressure spaces of the instrument . Then check:

a/. errors of indications

b/. hysteresis

/b. smoothness of the pointer movement.

3.4.3. Checking after 500 hours of flight or after 2 years

Demount the instrument from the instrument panel and check acc. to p.3.1 of this instruction.

If the instrument does not meet the requirements defined in p. 2.2. of this instruction it should be sent to a repair workshop.

3.5. The overhaul life.

The verhaul life of the instrument is 1500 hours of flight.

3.6. Storage conditions.

The instruments should be stored in the manufacturer packing in rooms with temperature +10°C to +30°C and humidity 30 - 80%.

In the time of the transportation and storage both terminals should be interconnected with the PCV hose, delivered with the instrument , to protect the instrument against befouling.

3.7. Troubleshooting

Kind of the defect	Cause	Method of repair
Flawed glass	Mechanical	Change the glass
The pointer movement is not smooth	Stoppage	Change the instrument
No indications	Hoses are not connected, clogged or damaged.	Connect or change the hoses.
Erratic indications	The instrument is not connected properly	Check connections, connect properly
	The total pressure space is not tight.	Change the instrument