M.I.C.M. - C.N.I.A.R.
INTREPRINDEREA DE CONSTRUCTII AERONAUTICE
2200 B R A S O V

MANDATORY SERVICE BULLETIN

IS-28M2/CO-4

APPROVED BY : DEPARTMENT OF CIVIL AVIATION
with No. 14970 / 04.08.1979.

PRODUCT : IS-28M2 Motor glider

OBJECT : Improvement of the landing gear position warning device.

COMPLIANCE : Revision Record Card no.247.

Date: 11.07.1979

1. PLANNING INFORMATION

A. Applicability

The modification is applied to the IS-28M2 motor gliders until 30.08.1979.

B. Reason

Increasing the reliability.

C. Description

The modification consists in introducing a green warning lamp om the instrument panel, which will indicate that the landing gear is extended and locked.

D. Compliance

Revision Record Card no.247.

E. Accomplishment

To the motor gliders under servicing, the modification shall be applied by the user. To the motor gliders under manufacturing or non-delivered, this bulletin shall be applied by the manufacturing plant.

F. Material - Cost and Availability

The materials necessary to apply the modification are given in chapter 3 "Material information" and are delivered by the manufacturing plant together with the present Service Bulletin.

G. Tooling

The tools in the framing of an aircraft maintenance and repair work-shop shall be used.

H. Weight and Balance

None.

I. References

To apply the modification see the drawings on page 8-11/11.

J. Documents affected

The following pages are amended: 02; 03; 04; 05; 1.7; 1.8; 3.3; 3.11; 3.12; 4.7; 4.13; 4.23; 4.24 - from the Flight and Maintenance Manual and 11, 12, 13 from the Spare Parts Catalogue.

DATE: 11.07.1979

2. USING INSTRUCTIONS

A. Work preparation

The work is performed in an aircraft maintenance or repair work-shop.

Uncouple the minus (-) terminal from the storage battery.

Lift the motor glider on two jacks forward and a corresponding support backward.

B. Application

(1) Dismount the cover on the instrument panel upper side, removing the screws on its contour.

(2) Mount the green warning lamp (17S) on the instrument panel (page 9/11).

- position the lamp mounting hole
- execute the lamp mounting hole
- attach the warning lamp on the instrument panel, using the nut from the lamp unit.
- stick the label 28M2.F14.165 under the lamp with adhesive and the identification part no.(17S) at the rear of the instrument panel, near the lamp.

(3) Dismount the cover from the radio cut in the instrument panel.

Uncouple the conductor "112-2E1" (thin conductor) from the terminal 2 of the general switch"1I" (item 22 page 1.7A - Flight and Maintenance Manual) and cut the shoe to its end.

Insulate the end of the conductor with PVC tube of 6 mm.dia

Connect the terminal 2 and protect with the existing rubber sleeve.

(4) Dismount the damped panel including the flight control anemobarometric instruments from the instrument panel (page 1.7A - Flight and Maintenance Manual).

- Remove the damped panel from the instrument panel without disengaging the instruments anemobarometric connections.
- Remove the electric wiring from the rear of the damped panel and rapid couplings of attachment to structure and cut its Panduit clamps.

- Uncouple or remove the electric connections from the red warning lamp "16S", the test button "BT", the fuse "2E" (item 33; 34; 7; page 1.7A - Flight and Maintenance Manual) the acoustic warning device "AV" (item AV; page 8/11) and the micro switch "1K" (item 1K page 8/11).

(5) Remove the aluminium protective duct of the electric cables towards the landing gear microswitch "2K" from the clamps of attachment to the motor glider floor and from the Panduit clamps of attachment to structure.

Dismount the landing gear microswitch"2K" from the attachment screws page 11/11 and remove the electric conductors connected to it.

Remove the Panduit clamps of the electric wiring towards the microswitch "1K" from the air brake.

Remove the electric wiring of the units "2E", "AV", "ET", "16S", "1K", "2K", recuperating the electric wiring with inscription "AV" - ground.

(6) Position the new manufactured wiring (page 10/11) and fix it to structure and at the rear of the instrument panel following its old line (page 8/11).

The electric wiring is grouped with Panduit SST-1B clamps (page 6/11) and then is fixed with the existing rapid couplings.

(7) Engage the electric wiring to the units mentioned above by soldering or attachment with shoes (see the electrical system schematic diagram, page 4.23B; page 11/11). The solderings are protected by PVC tube of 3 and 4 mm.dia (page 6/11).

(8) Fix the microswitch "2K" (page 11/11) in the handing gear retracting handle support, then fix the protective duct (wiring guard 28M2-F05.9) to the floor with the existing clamps and POP rivets (page 6/11).

(9) Check if the mounting was properly executed according to the new modification (page 8/11).

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(10) Engage the minus (-) conductor to the storage battery and check the operation of the landing gear audio-visual warning device.

(11) Check the operation pf the landing gear audio-visual warning device.

Couple the general switch "1I".
When pressing the test button, independent of the landing gear position, the green lamp on the instrument panel will go on.
If the air brake for retracted landing gear is unlocked, the red lamp and the acoustic warning device will operate.
For extended and locked landing gear the green lamp will go on independent of the air brake position. If necessary, execute new adjustments of the microswitch "2K" and "1K" for the system good operation.

(12) The adjustments necessary for driving the microswitch "1K" and "2K" (page 11/11):

- the microswitch "1K" - for the microswitch correct operation adjust the tension of the spring under the set screw (page 11/11) to the air brake handle, so that the microswitch is actuated at the moment of air brake control passing over the dead point.

- the microswitch "2K" - for the microswitch correct operation, adjust the microswitch position to the landing gear driving handle, from the fixing screws and elastic shim, so that for extended and locked landing gear (the locking stud is at the end of the locking channel), this is actuated (the green warning lamp shall go on). When removing the locking pin by max. 1.5 mm (page 4.13.2A - Flight and Maintenance Manual) the green lamp shall go out or the acoustic warning device shall sound and the red lamp shall go on (with unlocked air brake).

3. MATERIAL INFORMATION

A. INSTRUMENTS AND MATERIALS LIST

No.	Description	Type	Qty	Length	Inscription	Observation
1	Identification part no.	-	1	-	17S	for the warning lamp LC-8 (green)
2	Label	28M2.F14.166	1	-	Extended locked landing gear	-"-
3	Pop rivet	TLP/D-BS-419	3	-	-	for fixing the wiring guard 28M2.F05.9
4	PVC tube 3 mm. dia	STAS 8399-69	1	0.5 m	-	soldering protection
5	PVC tube 4 mm.dia	-"-	1	0.5 m	-	-"-
6	Clamp	SST-1B	25	-	-	for wiring grouping
7	Manufactured wiring	-	1	-	-	for landing gear warning system

MANUFACTURED WIRING

1	Warning lamp	LCO-8 DU.01.242.001	1	-	-	green
2	Bulb A1 (2d)	1330	2	-	-	12 V/4W
3	Shoe 4 mm.dia	H260 F4	3	-	-	for "AV-ground
4	Shoe 4 mm.dia	1.320.551-3	1	-	-	for thermic fuse (3M)
5	Shoe 3 mm.dia	1.320.016-1	1	-	-	for the warning lamp 16S
6	PVC tube 6 mm.dia	STAS 8399-69	1	1.5 m	-	for wiring protection
7	Conductor	1604A-0.38	1	2 m	2E2-2K2	
8	-"-	-"-	1	2.5 m	2K3-17S1	
9	-"-	-"-	1	0.8 m	2E3-BT1	
10	-"-	-"-	1	1.6 m	BT2-1K2	
11	-"-	-"-	1	1.4 m	1K1-AV1	
12	-"-	-"-	1	0.4 m	AV1-16S1	
13	-"-	-"-	1	0.2 m	2E1-3M1	
14	-"-	-"-	1	0.15 m	17S2-ground	
15	-"-	-"-	1	0.4 m	17S1-BT3	
16	-"-	-"-	1	2 m	1K2-2K1	

B. Tooling list

Use tools from the framing of an aircraft maintenance and repair work-shop.

C. Supply indications

The materials are delivered together with this bulletin by the manufacturing plant.

4. IDENTIFICATION

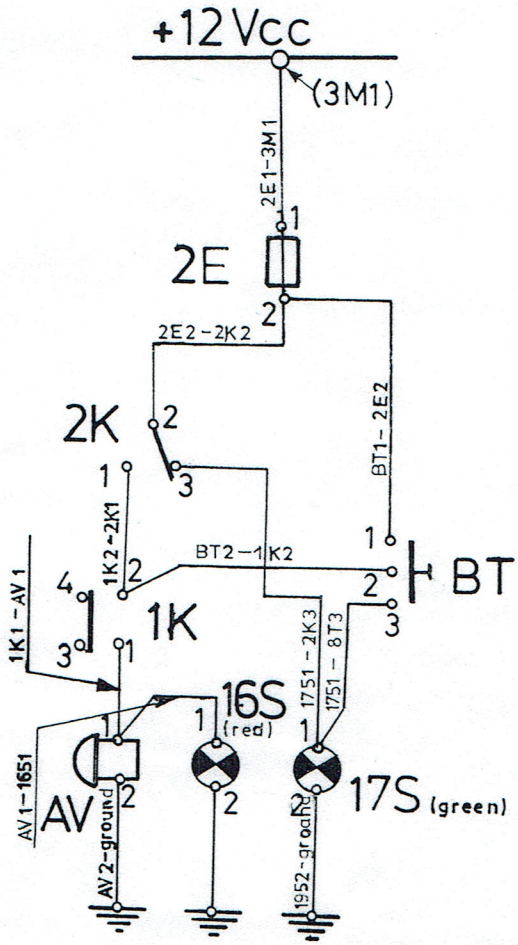
The application of the present Service Bulletin shall be mentioned in the motor glider logbook.

5. APPENDICES:

Pages: 0.2E; 0.3A; 0.4F; 0.5; 1.7A; 1.8A; 3.3A; 3.11A; 3.12B; 4.7B; 4.13A; 4.13.1A; 4.13.2A; 4.23B; 4.24B; from the Flight and Maintenance Manual and pages 11, 12, 13 from the Spare Parts Catalogue.

Instruments and materials set according to chapter 3A from the Mandatory Service Bulletin IS-28M2/CO-4.

LANDING GEAR WARNING SYSTEM (Schematic diagram)

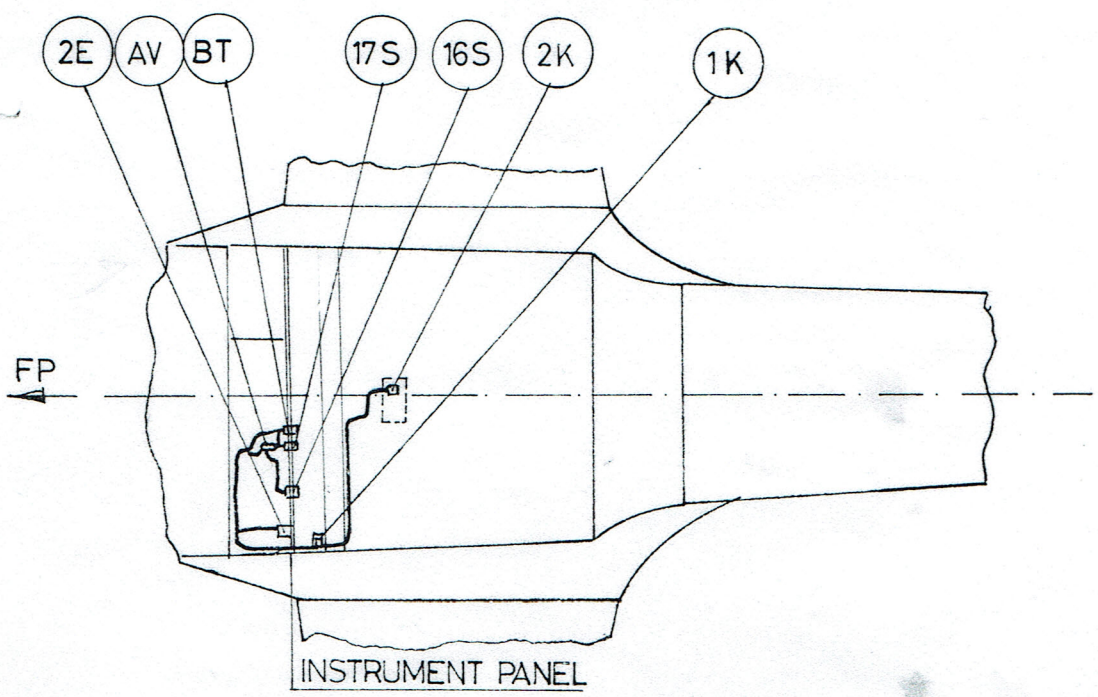


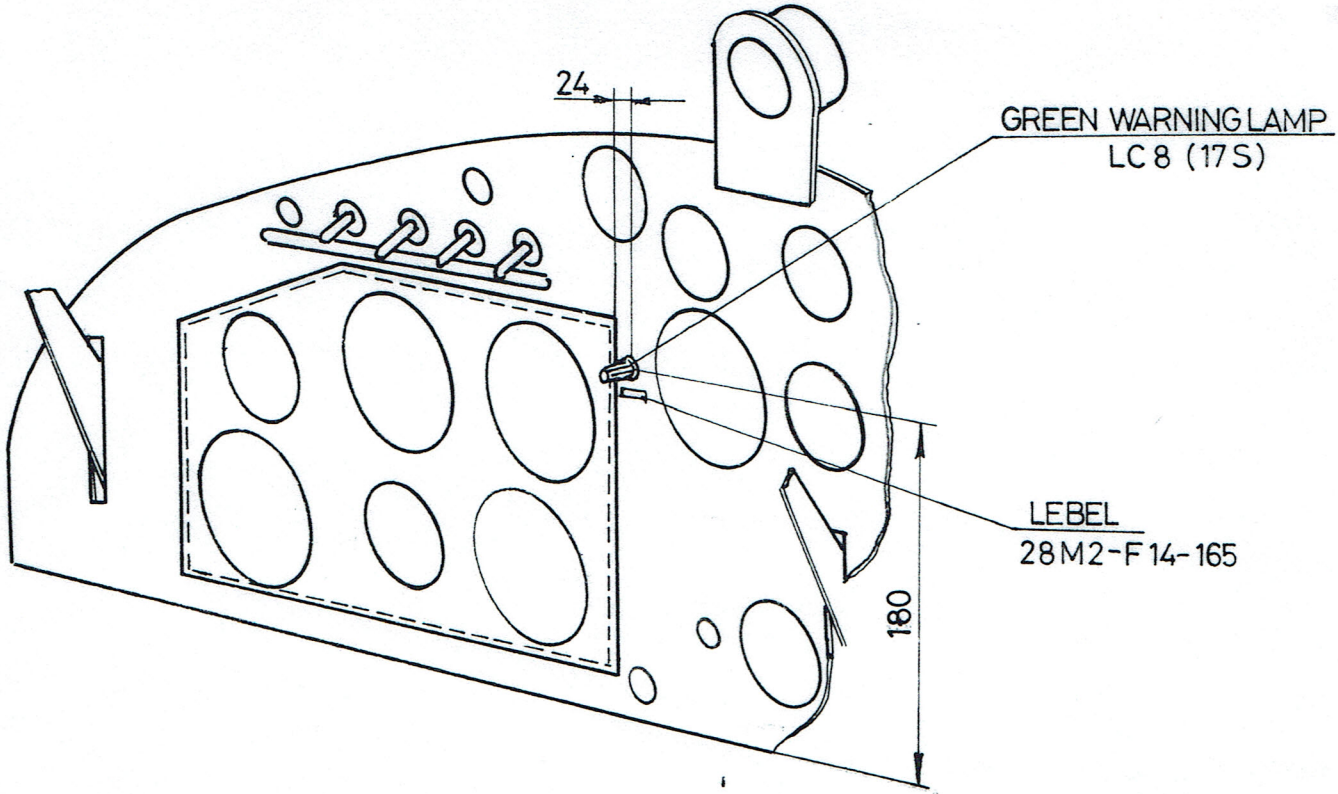
LEGEND
CONTACTS 1K AND 2K

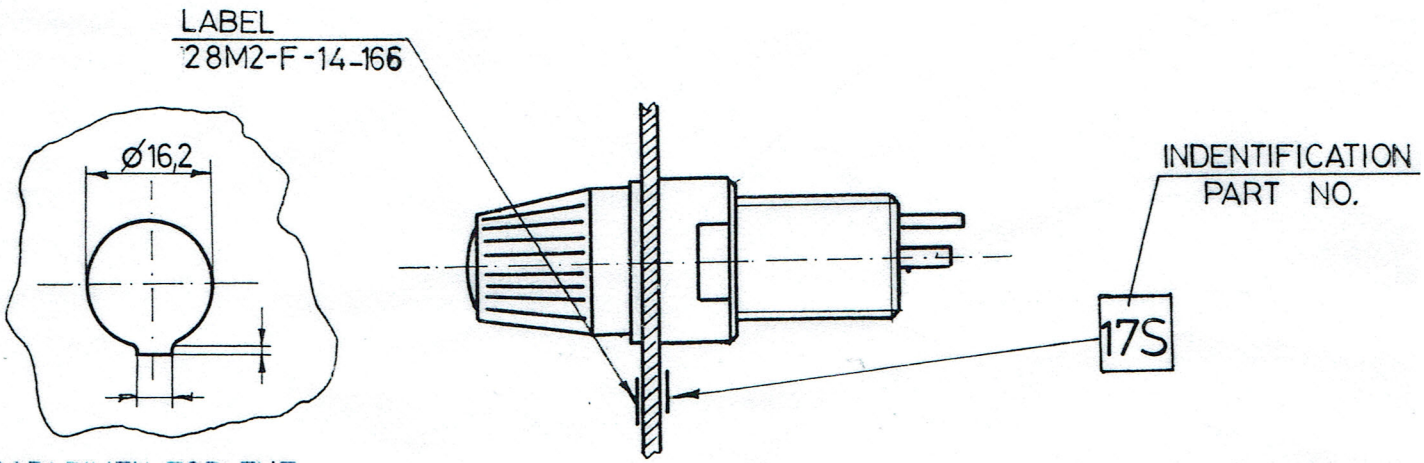
2K
- 2-3 EXTENDED LANDING GEAR
- 2-1 RETRACTED LANDING GEAR

1K
- 2-1 EXTENDED AIR BRAKE
- 4-3 RETRACTED AIR BRAKE

Wiring diagram



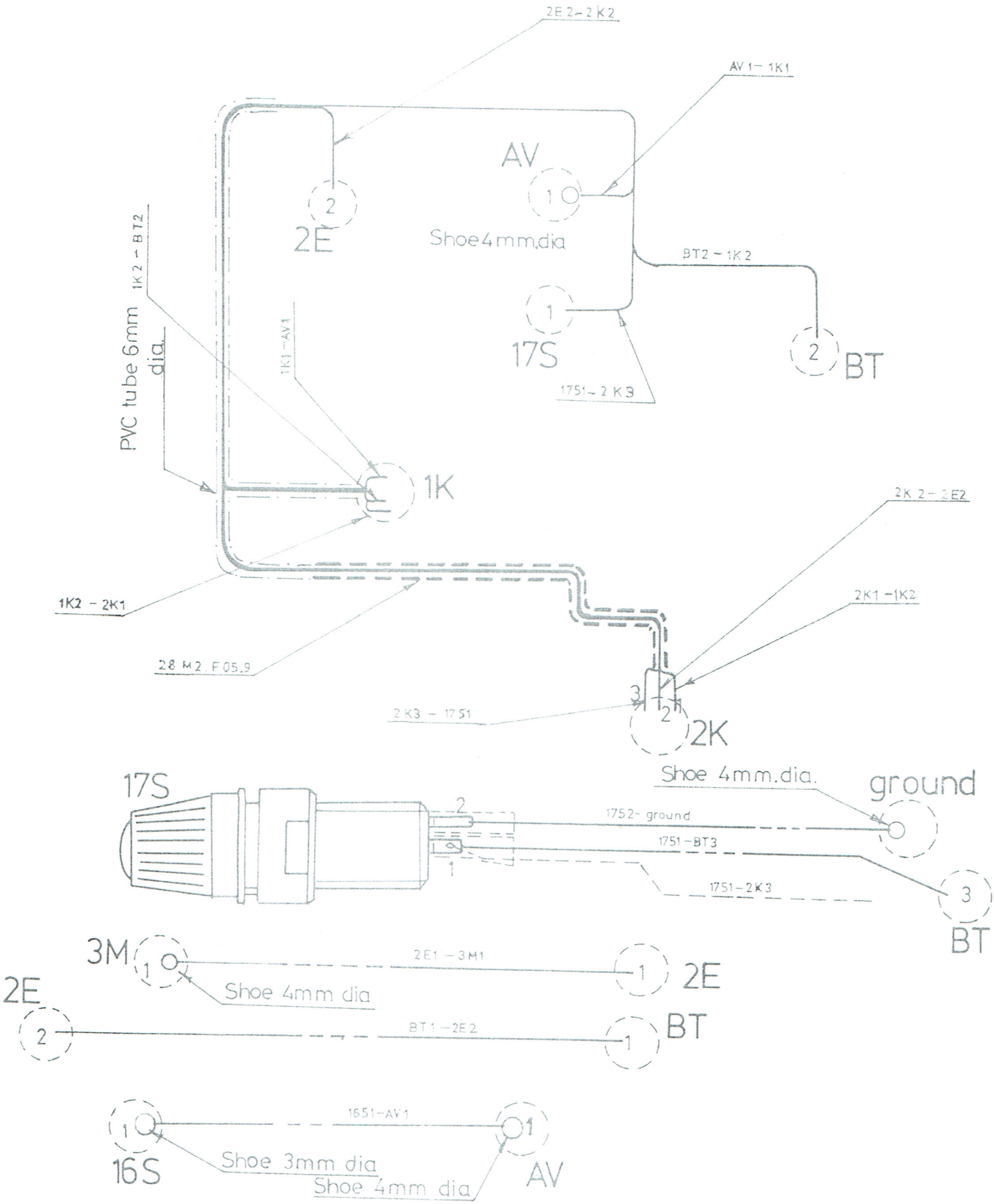


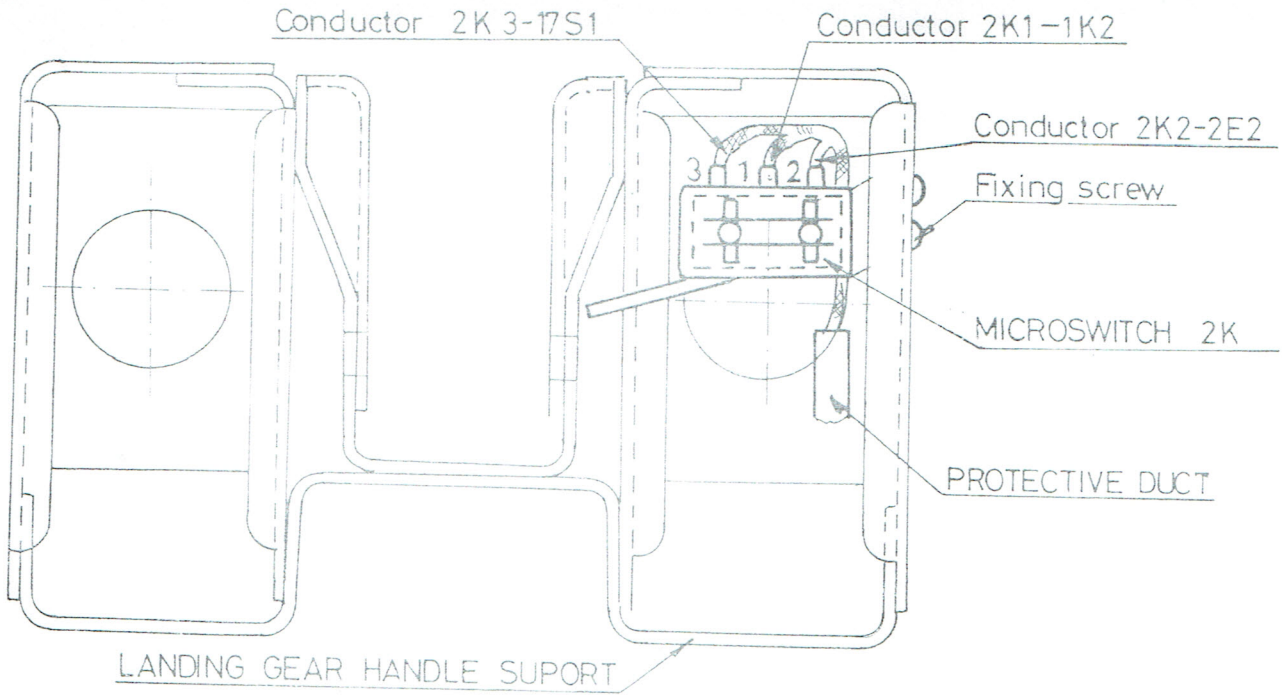


CAPABILITY FOR THE WARNING LAMP (17S)

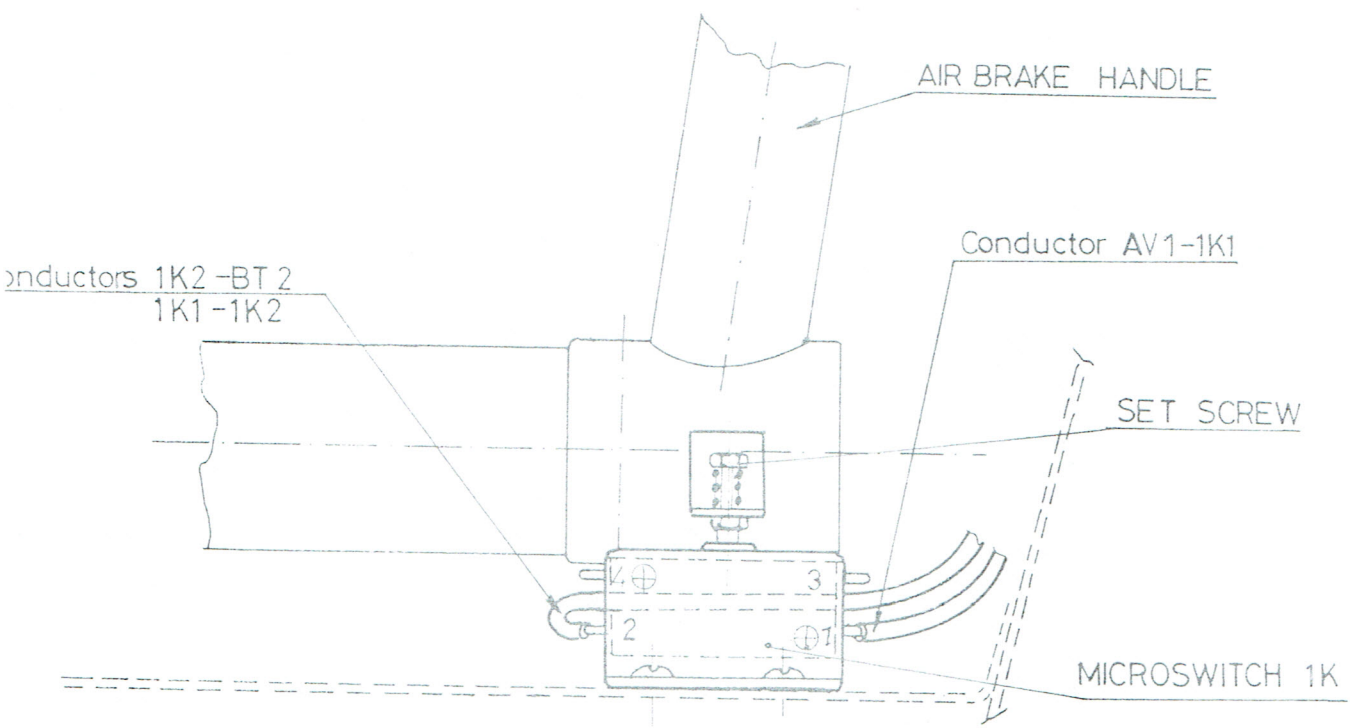
WARNING LAMP (17S) MOUNTING

MANUFACTURED WIRING





Electric connection to the landing gear microswitch (2K)



Electrik connections to the air brake microswitch (1K)

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1 exemplar
fără calculator
101

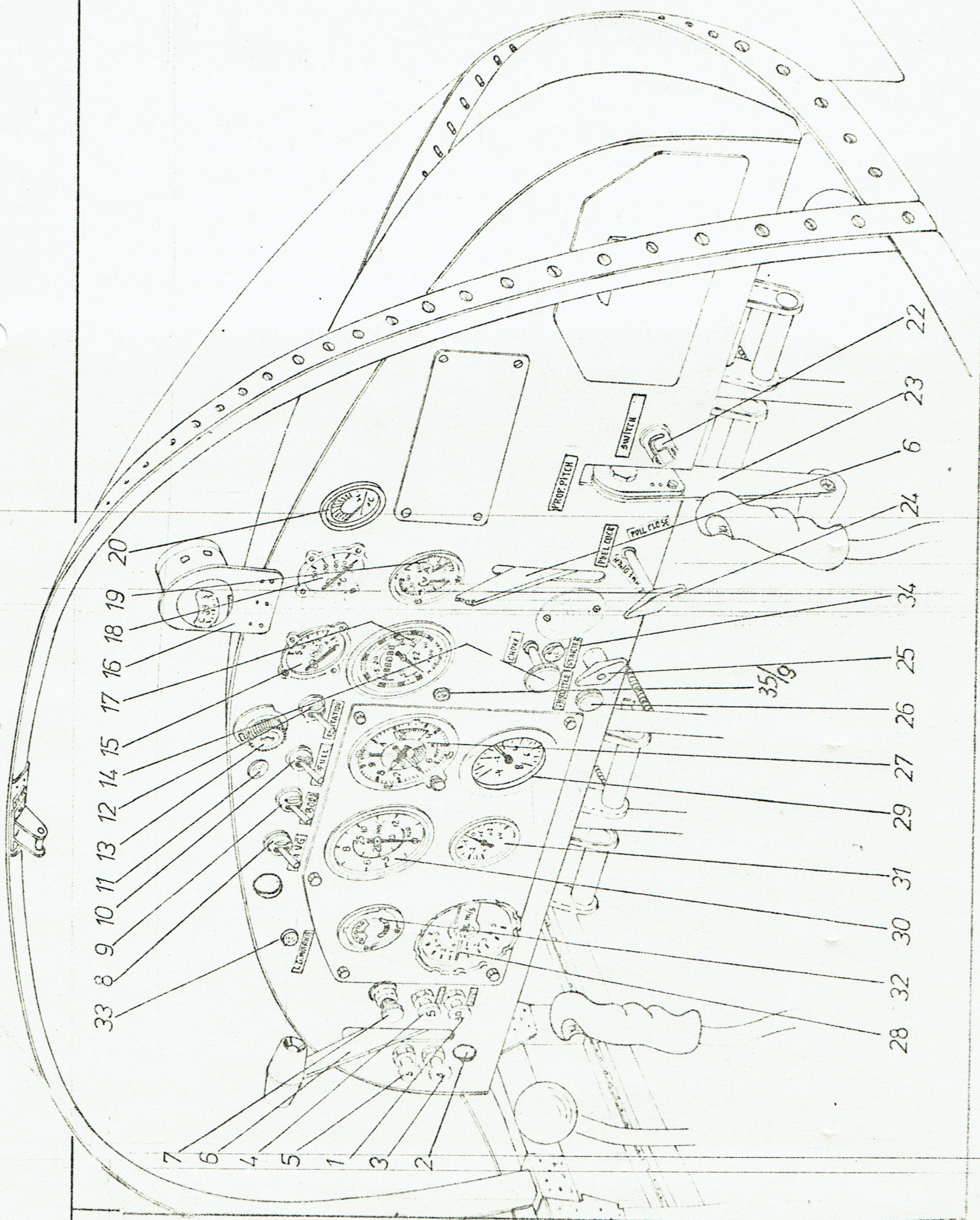
RECORD OF REVISION

All the amendments inserted in the text are indicated by a marginal line, corresponding to the referance number in the tabel below:

Ref. No.	Revised page	Description of Revision	DATE of Approval	DATE of Insertion in the Manual	Signature
1.	2.6.A 0.2A	Max.cylinder head temperature	29.03.1978	31.03.1978	
2.	4.23.A; 4.24.A; 0.4.A;	Instruments switch	29.03.1978	31.03.1978	
3.	4.12.A; 4.28.A; 0.4.B;	Introduction Trim Tab control limiters	29.03.1978	31.03.1978	
4.	2.10.A 0.2.B	Standard equipments	29.03.1978	31.03.1978	
5.	5.14 - 5.24 0.4C	Radio installation (optional)	10.05.1978		
6.	0.2C;2.9A; 4.2A;4.3A; 4.16A;04D; 4.29A;	Constructive improvements Fire extinquisher support (optional)	19.08.1978	21.08.1978	
7.	04.E; 5.26-5.37	DITTEL FSG-40S Radio installation(optional)	18.11.1978		
8.	0.2D;2.1A; 2.9B;2.10B 2.11A;3.12A 4.7A;4.8A;	Servicing indications	02.02.1979	06.02.1979	
9.	0.2E;0.3A; 0.4F;1.7A; 1.8A;33.A; 3.11.A; 3.12.B; 4.7.B; 4.13.A; 4.13.1.A; 4.13.2.A; 4.23.B; 4.24.B;	Improvement of the landing gear position warning system	04.08.1979	08.08.1979	

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1.4. INSTRUMENT PANEL



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1.4.- Instrument Panel

1. Temperature fuse (excitation)
2. Reserved
3. Temperature fuse (gasoline supplementary pump)
4. Temperature fuse (generator)
5. Temperature fuse (aircraft instruments)
6. Gas lever
7. Temperature fuse (landing-gear alarm)
8. Turn indicator toggle switch
9. Aircraft instruments toggle switch
10. Gasoline supplementary pump toggle switch
11. Yellow pilot lamp for gasoline supplementary pump operation
12. Generator (alternator) excitation toggle switch
13. Magneto contact
14. Choke lever (mixture enrichment on starting)
15. Oil pressure indicator
16. Navigation compass
17. Engine speed indicator (tachometer)
18. Oil temperature indicator
19. Voltampere-meter
20. Cylinder cover temperature indicator
21. Reserved
22. Battery general switch
23. Propeller pitch control lever
24. Fuel cock control
25. Starter (starter operating lever)
26. Gas brake
27. Altimeter
28. Variometer ± 5 m/s
29. Variometer ± 30 m/s
30. Airspeed indicator
31. Accelerometer
32. Turn and skidding indicator
9| 33. Landing-gear pilot lamp (red)
34. Landing-gear test push button
9| 35. Warning lamp for extended landing gear (green)

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3.1.2.- Preflight Check

- Check if the daily inspection has been effected
- Check oil level and fuel supply. The preflight minimum fuel supply should be 10 l.
- Check if the cocks are removed and all the controls are properly and smoothly operating.
- Check the proper operation of the acoustic and luminous warning system of the landing gear lock.

  Turn right the general contact wrench. When the test button is pressed, the green lamp on the instrument panel goes on, independant of the landing gear position; if the air brake is unlocked the red lamp goes on and the acoustic warning device sounds (this check can be also performed during flight).

9

- Check the landing gear lock in "down" position; if the general contact wrench is on the right side, the green lamp must go on.

  NOTE: In case of green lamp damage, the landing gear lock can be checked by unlocking the air brake. If the landing gear is locked in 'down' position the red lamp must not go on and the acoustic warning device must not sound.

3.1.3.- Inspection before Engine Starting

- Check the presence of the brake blocks. Engine hand start requires brake blocks.
- Check if the propeller area is free and there is no opportunity of involving foreign bodies which could damage the blades.
- Place the motor glider so that the propeller wake should not disturb other activities (dust in the hangar, gliders or airplanes in the propeller wake area, etc.)
- Actuate the pitch lever (23), lifting it up half its stroke and then move it down in order to ensure that the propeller should not be on steep pitch. In this way the propeller will be set on take-off position (small pitch).
- Check if all the temperature fuses (1-5) of the electric system are coupled.
- Open the gasoline cock.
- Check if all the contacts are off, the magneto key in 0 position, the general contact on the left, toggle switches down.
- Rotating the general contact (22) on the right (battery contact) special key, check the accumulator charging (reading the voltampere-meter indication (19) which shall indicate 12 V,) and all the electrical instrument readings as well.
- After these checks, start the engine according to the instructions in § 3.1.4.

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3.1.12.- Stopped Engine Flight

- After the engine stop (propeller in horizontal position on feathering pitch) check again if the generator excitation is switched off.
- The battery general contact can be left on , if the pilot wants to use one of the instruments connected to the board electric supply (radio, turn indicator, etc.), but he must take it into account the fact that, for a safe restart the battery current should not be uselessly consumed.
- For thermalling circling it is recommended to set the flap in +2 (20°) position, the optimum speed being 85 - 90 km/h (46 - 48.5 knots).
- Stopped engine turns the motor glider into a glider. The possible delay or unsuccessful engine restart as well as the impossibility of actuating the engine at maximum output (see 3.1.11) force the pilot to be always sure that he can get to a suitable landing field by glinding.

3.1.13.- Landing-gear Extension

The motor glider landing-gear extension can be performed at any admited speed. With this end in view, the landing-gear control lever is unlocked and then pulled back up against the aft limiter. Lever locking is automatic in 'open' position and is warned by the green lamp on the instrument panel, which goes on.

In case of green lamp damage, the landing gear lock can be checked by unlocking the air brake. If the landing gear is locked in 'down' position the red lamp must not go on and the accustic warning device must not sound.

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a) Landing with engine running

- Start the supplementary fuel pump (the yellow bulb above the switch lights)
- Extend the landing-gear;
- Inspect the locking in „down" position by unlocking the air brake (in this case the acoustic warning shall not be heard and the red bulb shall not light). 8
- Set the propeller on small pitch.
- Reduce the speed at 95 - 100 km/h (51 - 54 knots)
- Extend and lock the flaps in the desired landing position (the shortest landing is performed in +3 flap setting).
- A descent in straight line on the approach slope shall be performed at an aprox. speed of 90 - 100 km/h (48.5 - 54 knots).
- In the end, stop the gas and perform all the air intake adjustments actuating the air brakes.

b) Landing with engine off

- Approach and landing are performed as in the glider case.
- Extend the landing-gear at an altitude higher than 150 m (492 ft) and check if locking is properly performed in this position. The landing-gear warning system operates even if the general contact is switched off. 9
- Then proceed as for point (a) (landing with engine running)

CAUTION: Note that the landing gear extension accentuates the approach slope by increasing the drag.

3.1.15.- Landing

- Perform the recovery gently waiting for a gradual reduction of speed.
- Touch down is carried out by means of wheels and tail skid, actuated simultaneously.
- After landing completely open the air brakes and keep the stick pulled till the motor glider stops.
- During taxiing, the rudder is maintained by moving the rudder bar gently.

- if both air flaps of the carburetter are closed and opened gradually and no jammings occur;
- if there is enough damping oil in the carburetter.

Remove the upper filling plug and, if required, refill the tank. The plug shall be screwed and tightened.

Propeller

The check shall be performed after 50 hours in accordance with the HO-V-62R/L160T Propeller Manual (APPENDIX 2)

Landing-gear

Inspect it when the motor glider is empty (on ground or on jacks). Inspect:

- the landing-gear mechanism and the wheel housing cleaning;
- the proper passing over the landing-gear main arms dead point (landing-gear locking in open position).
- landing-gear lock in "down" position (see chapter 3.1.2.);
- the proper operation of the accustic and luminous warning system of the landing-gear (see chapter 3.1.2.)
- the absence of cracks, blows, clearances etc. in landing-gear and retraction control components; locks condition;
- pressure lubricating of landing-gear and cockpit control shaft greasers;
- the automatic lock of landing-gear handle in "down" and locked position of landing-gear;
- landing-gear rubber shock-absorbers (rubber and metallic disks condition).

CAUTION: Surfaces between the rubber disks shall be dry and without grease residues. For a proper operation the rubber sides shall not slip on the metallic disks.

- tyre condition main landing-gear wheels (2.6 atm) and the tail skid pressure (2.5 atm). Ground check on empty aircraft.

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4.4.4. Flap Control

Control power transmission operated by means of metallic rods. The lubricating areas are indicated im the figure, and the riggings can be effected to the rods (14 and 5).

See the figure on page 4.17.

4.4.5. Diving Brake Control

Control power transmission is operated by means of metallic rods. The lubricating areas are indicated in the figure. Riggings can be effected to the following components:

- in the fuselage the rod (21)
- in the wing the rods (20) (right and left wing)

See the figure on page 4.19.

4.4.6. Landing-gear Brake Control

Brake rigging can be effected by means of lever (1), fastening it on the shaft with mouse teeth, and by Bowden rigging screws (2) located on the wheel bracket.

See the figure on page 4.18

4.4.7. Landing-gear Retraction Control

The main landing-gear retraction is mechanical. System maintenance consists of greasing and check of the assembly and its parts.

See the figure on page 4.20.

The warning system maintenance operations consist in checking the electric wiring connecting the microswitches and executing again the mechanical adjustments for microswitches drive from the air brake and landing gear lock handle.

Adjust tje spring tension (item 3 fig. 4.20.1) to the air brake handle, so that the microswitch is actuated when the air brake control passes over the dead point.

Adjust the microswitch position to the landing gear driving handle, from the fixing screws (item 4, fig. 4.20.2) so that for extended and locked landing gear (the locking pin is at the end of the locking channel) the microswitch is actuated.

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9 When removing the locking pin by max. 1.5 mm, the acoustic warning device shall sound and the red lamp shall go on (the air brake being unlocked),

4.4.8. Propeller Pitch Control

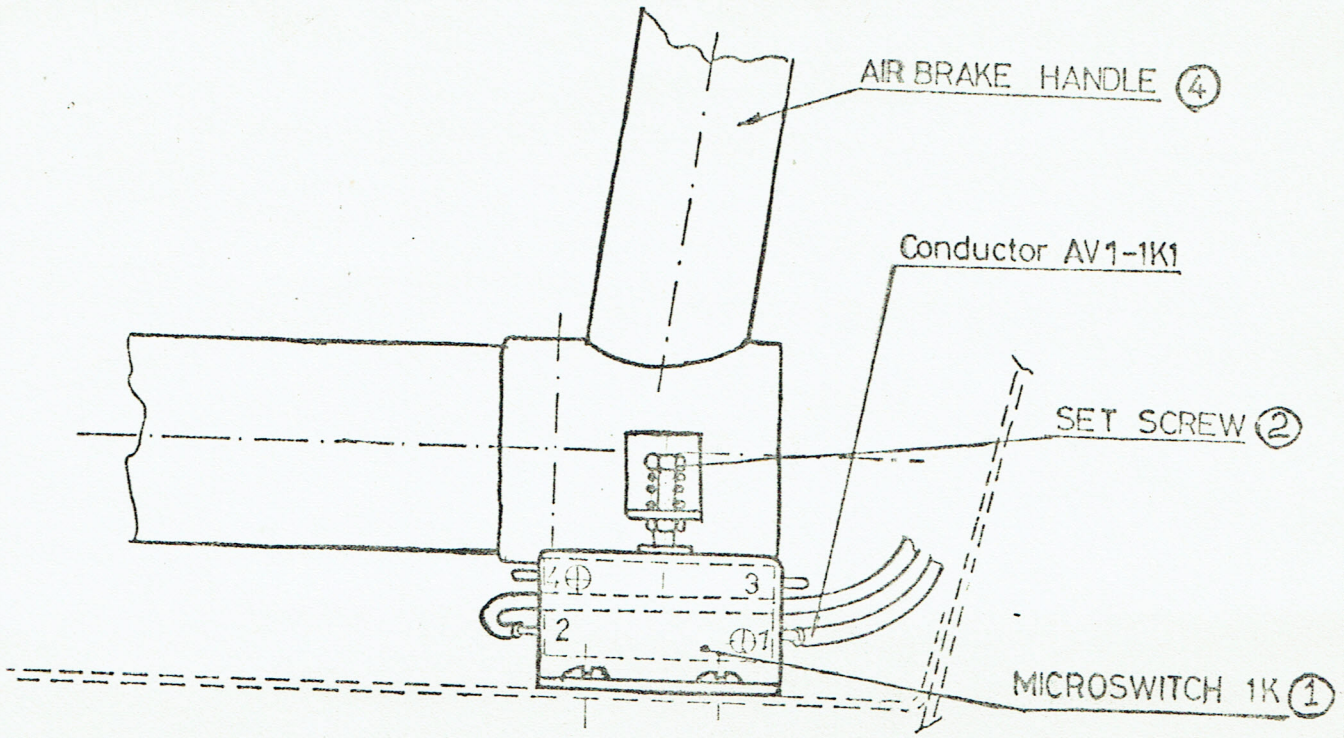
Propeller pitch control is mechanical and its maintenance consists of greasing the cable and, if necessary, of laying it. Rigging is effected to the components (29 and 28) in figure 4.4.8. on page 4.21.

4.4.9. Engine Controls

Engine controls are mechanical.

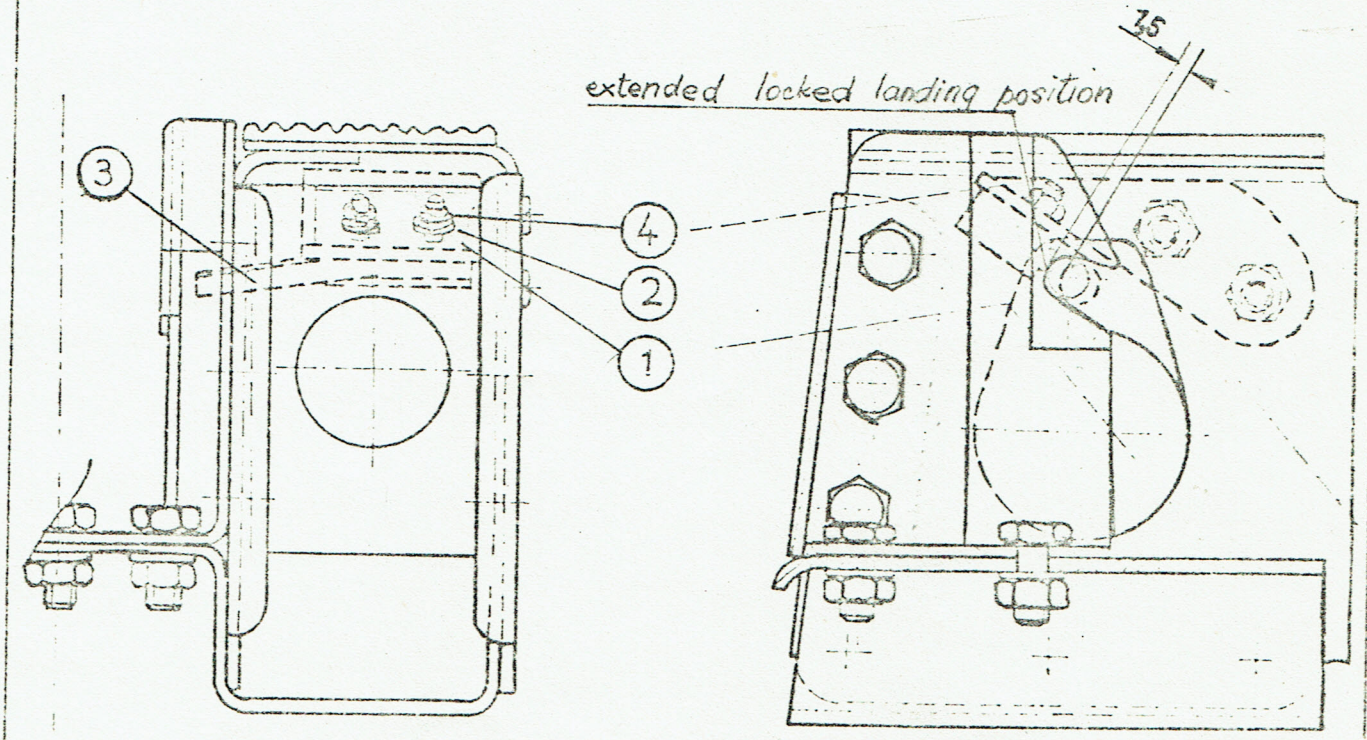
- Fuel mixture control (by means of a cable);
- Gas control (by means of a metallic rod);

Maintenance is simple and it consists of inspecting and greasing.



Electrik connections to the air brake microswitch (1K)

4.20.1.

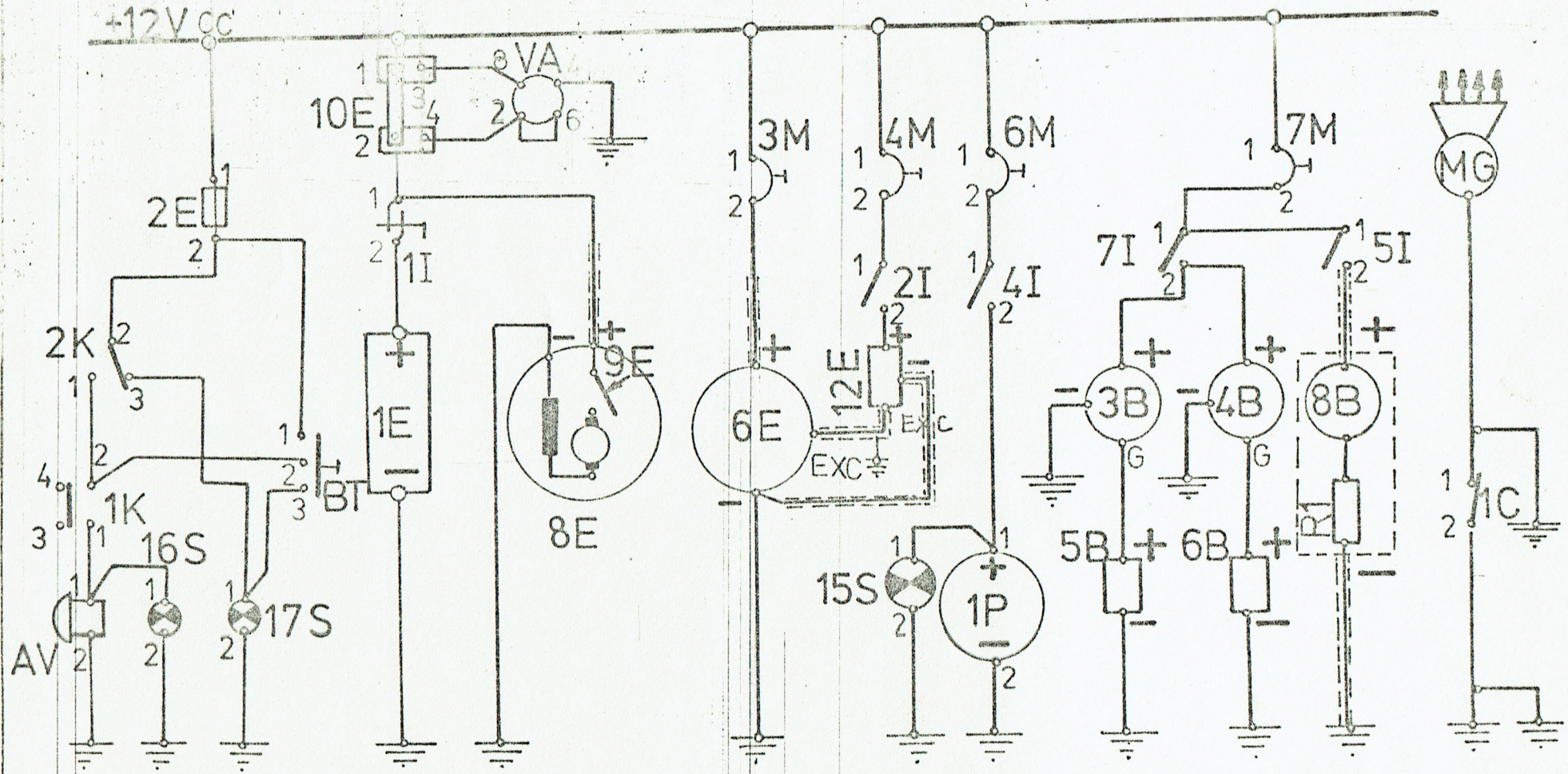


1. Microswitch support
2. Microswitch. (2K)
3. Elastic shim
4. Microswitch fixing screw and nut.

Electric connection to the landing gear microswitch (2K)

4.20.2.

9 ELECTRICAL SYSTEM SCHEMATIC DIAGRAM

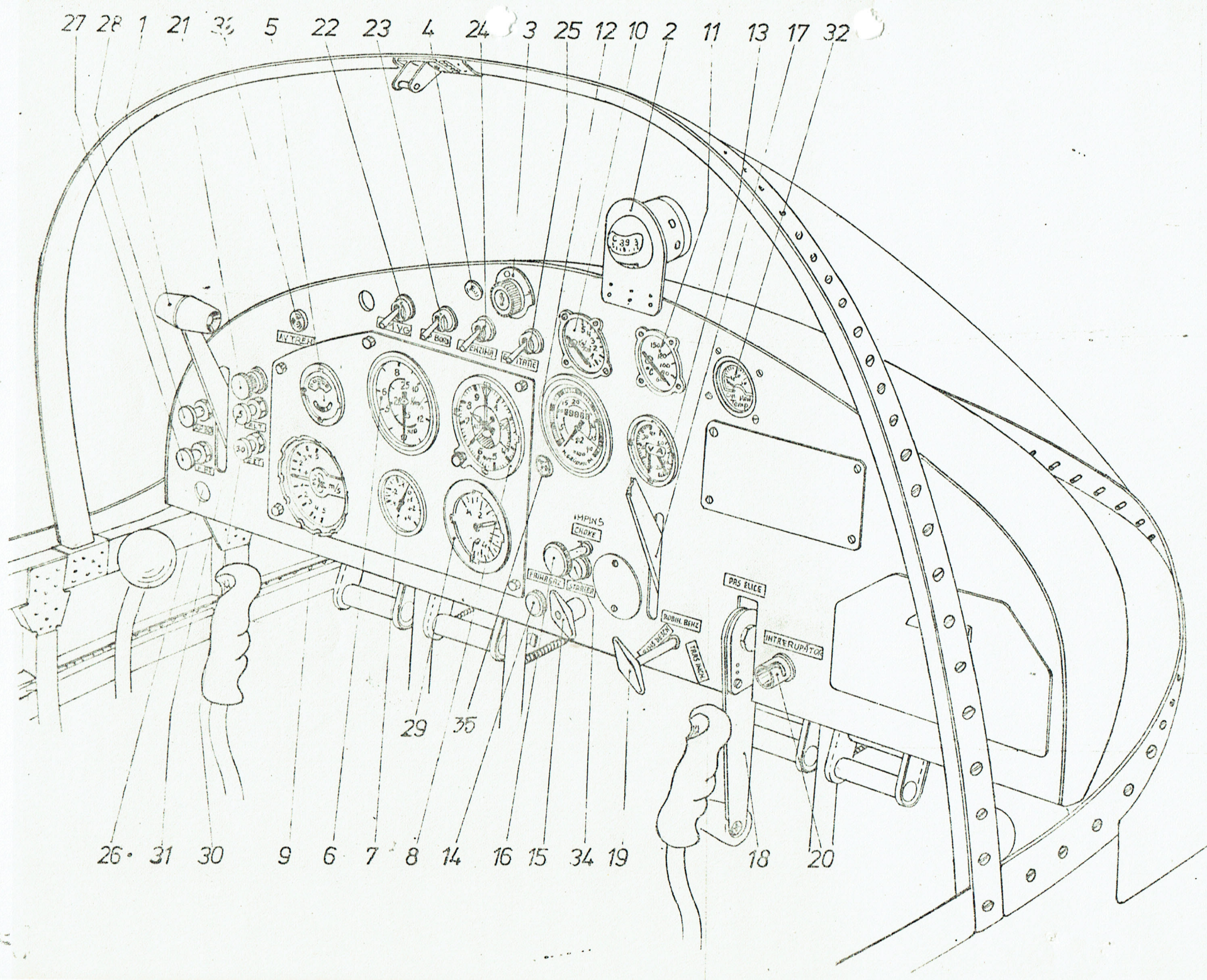


Landing gear fuse	Test button	Shunt	Voltamperemeter	Alternator	Regulator relay	Gasoline pump	Oil pressure	Oil temp.	Turn and Bank Ind.	Magneto
Acoustic warning device	Warning lamp	Accumulator	Starter		Warning lamp					
Warning lamp										

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4.4.11.- Electrical Diagram Specification

1E	Accumulator, type VARTA 12V - 15 AH 65 A
2E	Langing-gear control fuse 2-5 A
6E	Alternator, type DUCELLIER 7532-12V/22A
8E	Starter, type FIAT 76-05/12V/22A
9E	Starter mechanical switch
10E	Shunt
12E	Voltage regulator, type DUCELLIER 506/14V
1C	Magneto contact key
1I	General switch
2I	Alternator excitation switch 5A
4I	Gasoline pump switch
5I	Turn-skidding indicator switch
3M	Alternator automatic fuse 30A
4M	Alternator excitation automatic fuse
6M	Gasoline pump automatic fuse 5A
7M	Panel instruments automatic fuse 5A
15S	Gasoline pump alarm lamp
3B	Oil pressure indicator
4B	Oil temperature indicator
5B	Oil pressure transducer
6B	Oil temperature transducer
8B	Turn-skidding indicator
1P	Gasoline pump, type HARDI 2212
MG	Magneto, type SLICK 4030
V/A	Voltamper-meter, type LUN 2715
2K	Landing-gear position microswitch
1K	Diving brake position microswitch
AV	Landing-gear position alarm
BT	Landing-gear alarm test button
16S	Landing-gear alarm lamp.
7.I.	Instruments switch
17S	Warning lamp for extended and retracted landing gear. (green)
R1	Fuse


27 28 1 21 33 5 22 23 4 24 3 25 12 10 2 11 13 17 32
ICA BRASOV
AVYTREN
AVC
BORA
BENZINA
TRATTE
IMPINS
CHOKE
TRIMARE
STARTER
PAS ELICE
RUBIN BENZ
TRAS INCH
INTRERUPATOR
29 35
26 31 30 9 6 7 8 14 16 15 34 19 18 20

INSTRUMENT PANEL

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Part No.	Description	Part Number	Units/ Assy	Price
1.	Handle Gas LH	28M2.M02.010	1	
2.	Compass	PZL/KI-13 (Poland)	1	
3.	Magneto Key	Bendix USA 10.357290-1	1	
4.	Yellow Bulb	1306-AL1		
5.	Elecrtical Turn and Bank Indicator	STAS 7080/2-70 PZL/DZ53 (Poland)	1 1	
6.	Air Speed Indicator	PZL/PR250S (Poland)	1	
7.	Accelerometer	LUN 1722-1 (S.R.C.)	1	
8.	Altimeter	PZL W10S (Poland)	1	
9.	Blade Variometer	PZL/WR-5D (5934.PA.-1)	1	
10.	Oil Pressure Indicator	VDO/350.271.031.001 FRG	1	
11.	Oil Temperature Indicator	VDO/310.274.082.001 FRG	1	
12.	Tachometer	VDO/1540601 FRG	1	
13.	Voltamperemeter	LUN/2715 SRC	1	
14.	Gas Brake	28M2-F01-0190	1	
15.	Starter	28M2-M02-011	1	
16.	Handle Choke	28M2-M02-024	1	
17.	Handle Gas RH	28M2-M02-018	1	
18.	Propeller Pitch Control Lever	28M2-M02-022	1	
19.	Fuel Cock Control	28M2-F10-05	1	
20.	Battery General Switch	034.100.1001 Bosch FRG	1	
21.	Retraction Horn Fuse	2A-P42620 (Romania)	1	
22.	Turn Indicator Toggle Switch	ECE 610/France	1	
23.	Aircraft Instruments Toggle Switch	ECE 610/France	1	
24.	Gasoline Pump Toggle Switch	ECE 610/France	1	
25.	Generator Excitation Switch	ECE 610/France	1	
26.	Substitute			
27.	Fuse Gasoline Pump	ECE 21/01F/France	1	

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Part No.	Description	Part Number	Units/ Assy	Price
28.	Fuse Aircraft Instruments	ECE 21701F/France	1	
29.	Variometer	PZL/WR$_s$-300 (P.Z.L. Poland)	1	
30.	Excitation Temperature Fuse	ECE 21701F/France	1	
31.	Alternator Temperature Fuse	ECE 21707/France	1	
32.	Cylinder Head Temperature	270A12 - (U.S.A)	1	
33.	Landing Gear Signalling lamp	1306-AL-1. (STAS 7080/2-70)	1	
34.	Landig Gear Testing Buttob	205 K (USSR)	1	
35.	Extended landing gear warning lamp	1330-AL-2(d) STAS 7080/2-70 (Romania)	1	