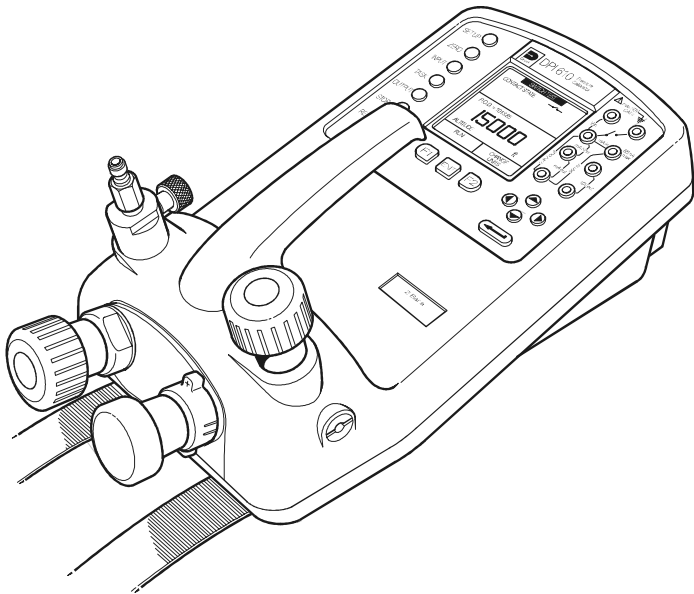


GE
Measurement & Control Solutions

Druck DPI 610

Portable Pressure Calibrator
Aeronautical version

User manual - K0237



Safety

The manufacturer has designed this equipment to be safe when operated using the procedures detailed in this manual. Do not use this equipment for any other purpose than that stated.

This publication contains operating and safety instructions that must be followed to ensure safe operation and to maintain the equipment in a safe condition. The safety instructions are either warnings or cautions issued to protect the user and the equipment from injury or damage.

Use suitably qualified * technicians and good engineering practice for all procedures in this publication.

Pressure

Do not apply pressures greater than the safe working pressure to this equipment.

Maintenance

The equipment must be maintained using the procedures in this publication. Further manufacturer's procedures should be carried out by authorized service agents or the manufacturer's service departments.

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For technical advice contact the manufacturer.

* *A qualified technician must have the necessary technical knowledge, documentation, special test equipment and tools to carry out the required work on this equipment.*

Symbols



This equipment meets the requirements of all relevant European safety directives. The equipment carries the CE mark.



This symbol, on the instrument, indicates that the user should refer to the user manual. This symbol, in this manual, indicates a hazardous operation.



This symbol, on the instrument, indicates do not throw-away in domestic bin, hazardous material, dispose correctly in accordance with local regulations.

Specification

Safe working pressure

2 x full-scale

Ranges

Altitude -3000 to 50,000ft
Airspeed 0 to 600 knots

Precision

over the airspeed range:
200 knots ± 3 knots
400 knots ± 0.7 knots
over the altitude range:
sea level ± 14 ft
10,000ft ± 18 ft
30,000ft ± 36 ft

Precision includes linearity, hysteresis and repeatability, 12 months measurement stability

Temperature Effects

$\pm 0.004\%$ of reading/ $^{\circ}\text{C}$ (averaged over -10° to $+40^{\circ}\text{C}$ w.r.t. 20°C)
 $\pm 0.002\%$ of reading/ $^{\circ}\text{F}$ (averaged over $+14^{\circ}$ to 104°F w.r.t. 68°F)

Power supply

Batteries 6 x 1.5 V C cells, alkaline (up to 60 hours nominal use at 20°C)
Rechargeable NiCad battery pack (20 hours nominal use) supplied with charger/
adaptor, supplies power to instrument while charging batteries.

Environment

Operating Temperature: -10°C to 50°C ($+14^{\circ}\text{F}$ to 122°F)
Calibrated Temperature: -10°C to 40°C ($+14^{\circ}\text{F}$ to 104°F)

Sealing

Sealed to IP54 (NEMA 4)

Physical

Size: 300 x 170 x 140 mm (11.8" x 6.7" x 5.5")
Weight: 3 kg (6.6lb)

For further general specification and functionality details refer to the standard DPI 610/615 Series Portable Calibrator data sheet.

Contents

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Introduction (Figure C1)

This 2 bar absolute (59 inHg absolute) version of the DPI 610 provides manual generation of pressure and vacuum for testing of aircraft Pitot and Static systems. It has a special pneumatic manifold and output port assembly, the regulated output of the hand-pump prevents overpressure/vacuum of the aircraft's Pitot and Static systems.

The generated pressure or vacuum vents to atmosphere through the vent port, the user controls the vent rate to protect the aircraft's systems and instruments using the release valve.

A manual let-down valve, fitted directly in the output port, allows the system to be manually vented (returned to ground level) by the user when the pressure or vacuum has vented to a safe operational level i.e. < 1500 ft. The aeronautical option (AERO) can be accessed only from the TASK menu. All other functions and tasks of the DPI 610 are available on this version of the DPI 610 instrument.

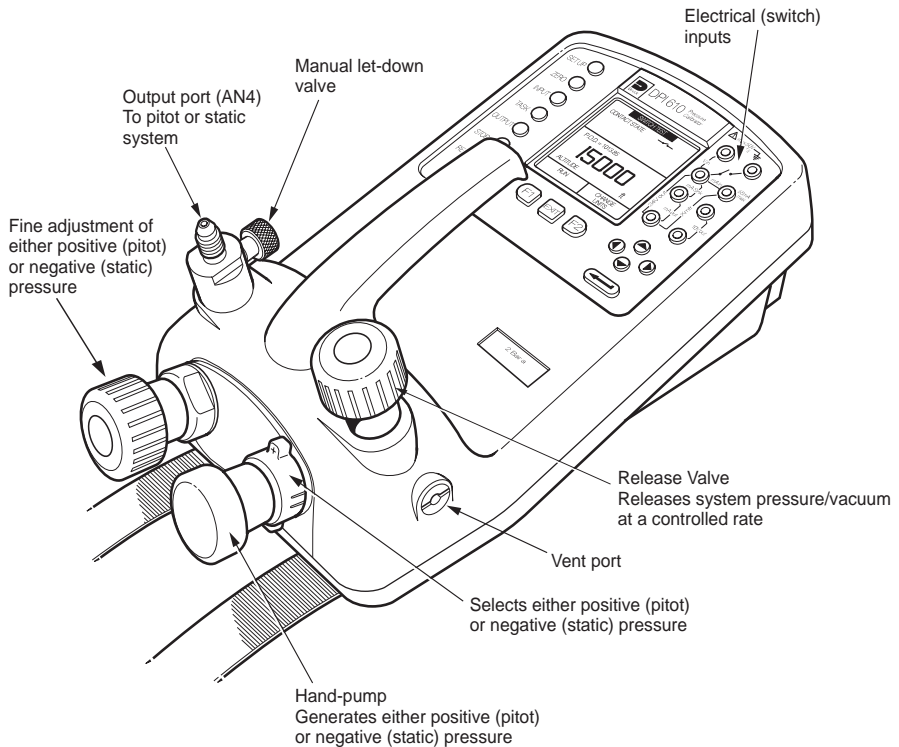


Figure C1 Aeronautical Option Controls

Pneumatic Controls (Figure C2)

An AN4 connector provides the output connection.

Note: *The instrument is designed to operate with 5 metres of 6mm bore pipe attached.*

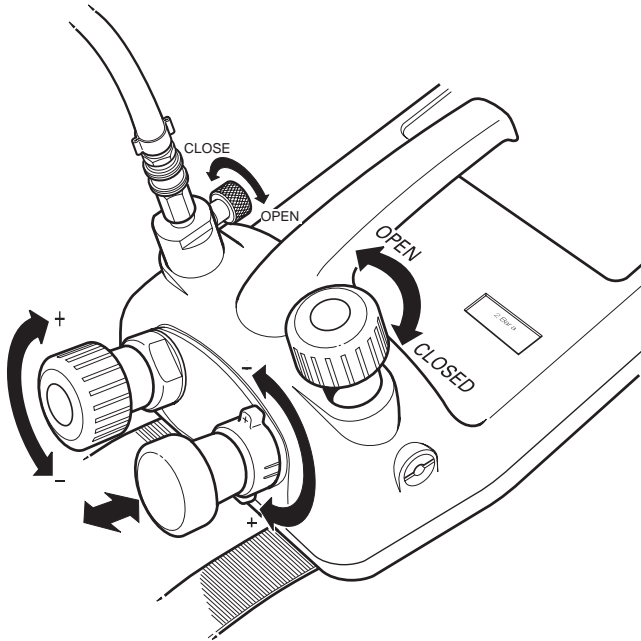


Figure C2 - Pneumatic Controls

Electrical Connections

Refer to publication K0415 pages 6 and 7 for the fitting of batteries and the charging of batteries.

Maximum Instrument Ratings

The following table shows the maximum measurement ratings of the standard instrument that should not be exceeded. Pressure over range (120% of FS) is indicated by a flashing pressure display. Voltage or current over range (110% of max) causes either the voltage or current display to flash.

PRESSURE	120% FULL SCALE
VOLTAGE	50V dc
CURRENT	55mA dc

Note: *When the AERO task is selected, the display flashes if the voltage or current input over ranges by 110% of the above maximum values. The pressure display flashes at altitudes below -3000 ft and above 50,000 ft or at airspeeds greater than 600 knots, depending on the mode selected.*

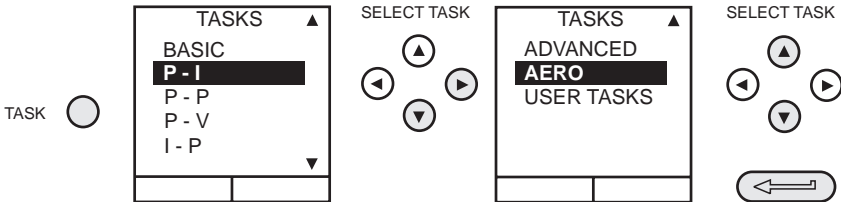
Operation

Using this version of the DPI 610 instrument, a switch test and leak test can be carried out on an aircraft pitot or static system.

WARNING:

OBSERVE SAFETY PRECAUTIONS STATED IN LOCAL ORDERS AND THE AIRCRAFT OR EQUIPMENT SERVICING PROCEDURES.

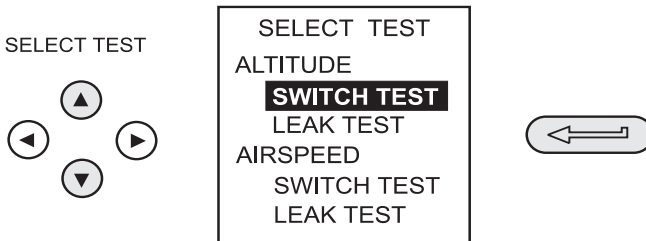
To select the aeronautical option from task menu, proceed as follows:



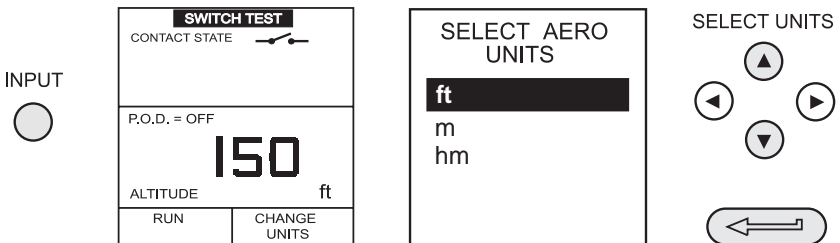
Altitude Switch Tests

Select TASK, AERO:

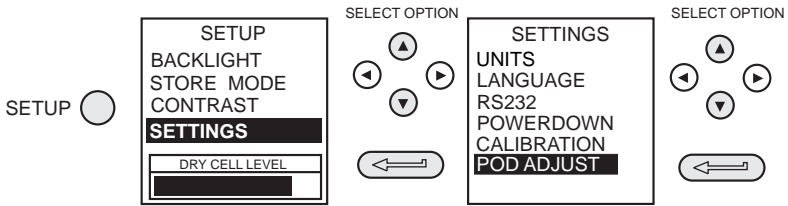
- Select ALTITUDE, SWITCH TEST as follows:



- If necessary, SELECT AERO UNITS as follows.

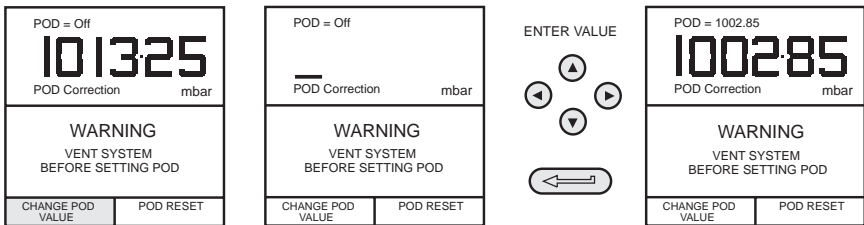


- ▣ If required, apply pressure of the day correction (POD), by selecting POD ADJUST as follows:



- ▣ Apply QFE pressure reading as POD correction as follows:

Note: The display can show either: POD = Off or POD = current value (QFE pressure reading). The POD RESET key (F2) sets the current POD correction to Off.



Method (accessible switch contacts)

- (1) Connect the instrument to the static system and connect the altitude switch as shown. Ensure that the pitot system is vented to atmosphere before starting the test:
Note: Contacts must be potential free.

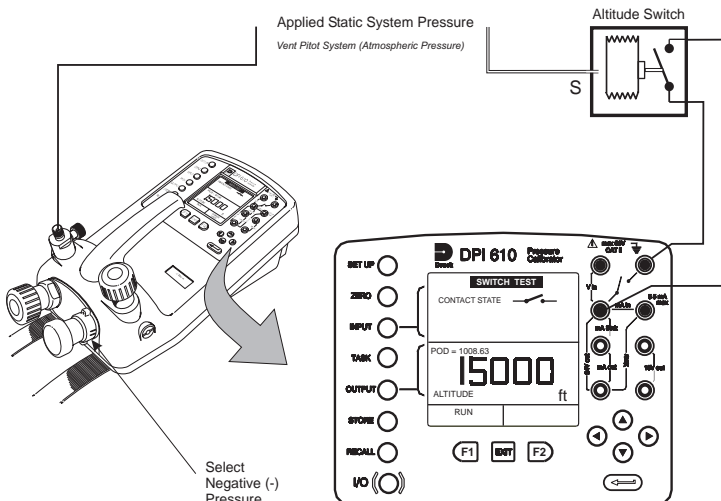





Figure C3 - Altitude Switch Test Connections

- (2) Select negative pressure and close the release valve.

- (3) Close the manual let-down valve.
- (4) Press the RUN key (F1) and operate the hand-pump, continue until the switch operates:

SWITCH TEST	
CONTACT STATE 	
POD = Off	
150	
ALTITUDE ft	
RUN	


SWITCH TEST	
CONTACT STATE 	
CLOSED AT 5550 ft	
POD = Off	
5550	
ALTITUDE ft	
STOP	MANUAL OPERATION

SWITCH TEST	
CONTACT STATE 	
CLOSED AT 5550 ft	
OPENED AT 5325 ft	
HYSTERESIS 225 ft	
POD = Off	
5325	
ALTITUDE ft	
STOP	MANUAL OPERATION


- (5) Carefully open the release valve and allow altitude to decrease until the switch operates again. The display shows the operating pressures and hysteresis.
- (6) Record the displayed operating data.
- (7) Allow the indicated altitude to decrease until it is below 1500ft.
- (8) Slowly open the manual let-down valve to return the system to ground level.
- (9) To perform another switch test press RUN (F1).
- (10) To cancel switch test mode, press TASK.

Method (non-accessible switch contacts)

When the altitude switch contacts cannot be connected to the instrument, an external indicator or annunciator must be used as the indication of pressure switch operation. The user, on receipt of an indication of switch operation, presses the MANUAL OPERATION (F2) key:

SWITCH TEST	
CONTACT STATE 	
POD = Off	
150	
ALTITUDE ft	
RUN	

SWITCH TEST	
CONTACT STATE 	
CLOSED AT 5550 ft	
POD = Off	
5550	
ALTITUDE ft	
STOP	MANUAL OPERATION

SWITCH TEST	
CONTACT STATE 	
CLOSED AT 5550 ft	
OPENED AT 5325 ft	
HYSTERESIS 225 ft	
POD = Off	
5325	
ALTITUDE ft	
STOP	MANUAL OPERATION

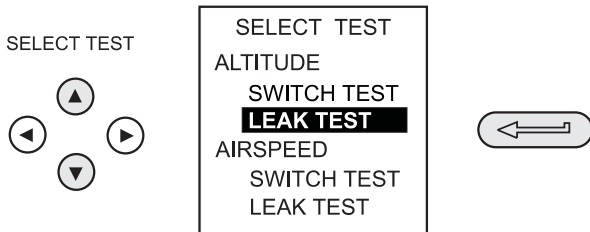
- (1) Connect the instrument to the static system. Ensure that the pitot system is vented to atmosphere before starting the test:
- (2) Select negative pressure and close the release valve.
- (3) Close the manual let-down valve.
- (4) Press the RUN key (F1) and operate the hand-pump, continue until indication of switch operation and immediately press (F2).
- (5) Carefully open the release valve and allow the altitude to decrease until the indication of switch operation and immediately press (F2).

- (6) Record the displayed operating data.
- (7) Allow the indicated altitude to decrease until it is below 1500ft.
- (8) Slowly open the manual let-down valve to return the system to ground level.
- (9) To perform another switch test, press RUN (F1).
- (10) To cancel switch test mode, press TASK.

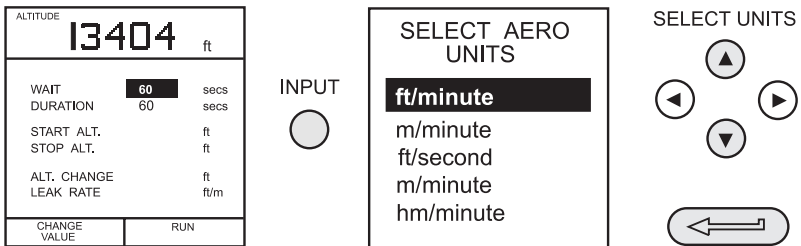
Altitude Leak Tests

Select TASK, AERO:

- ▣ Select ALTITUDE LEAK TEST:

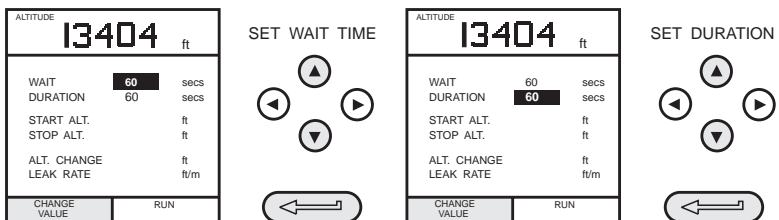


- ▣ If necessary, SELECT AERO UNITS:



Method

- (1) Connect the instrument to the static system and, if required, apply a pressure correction value of the pressure of the day (POD) as detailed on page 6.
- (2) Close the release valve and manual let-down valve, using the hand-pump, generate the required altitude.
- (3) Set WAIT and DURATION of the leak test times:



- (4) When ready, press the RUN key (F2):

POD = 1002.85	
13355	
ALTITUDE	ft
WAITING 5	
	STOP

POD = 1002.85	
13353	
ALTITUDE	ft
TIMING 55	
	STOP

ALTITUDE		
13304 ft		
WAIT	60	secs
DURATION	60	secs
START ALT	13354	ft
STOP ALT	13322	ft
ALT CHANGE	-32	ft
LEAK RATE	-32	ft/m
CHANGE VALUE	RUN	

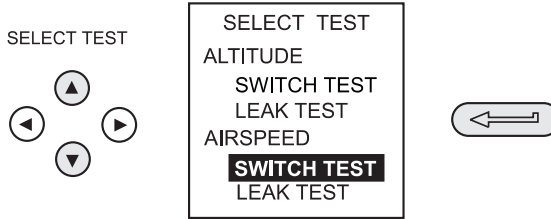
Initially, the WAIT period counts-down, followed by the TIMING period. The START ALT is recorded as soon as the timing period starts. At the end of the test the display shows the complete details of the test.

- (5) Record the displayed operating data.
- (6) To perform another leak test, use the hand-pump to generate a new system altitude and press RUN (F2) again.
- (7) On completion of the test, allow the altitude to decrease until it is below 1500 ft.
- (8) Slowly open the manual let-down valve to return the system to ground level.
- (9) To exit or cancel leak test mode, press TASK.

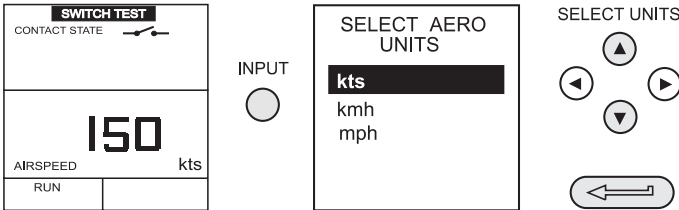
Airspeed Switch Tests

Select TASK, AERO:

- Select AIRSPEED SWITCH TEST:



- If necessary, SELECT AERO UNITS:



Method (accessible switch contacts)

- Connect the instrument to the pitot system and connect the airspeed switch as shown: Ensure that the static system is vented to atmosphere before starting the test.

Note: *Contacts must be potential free.*

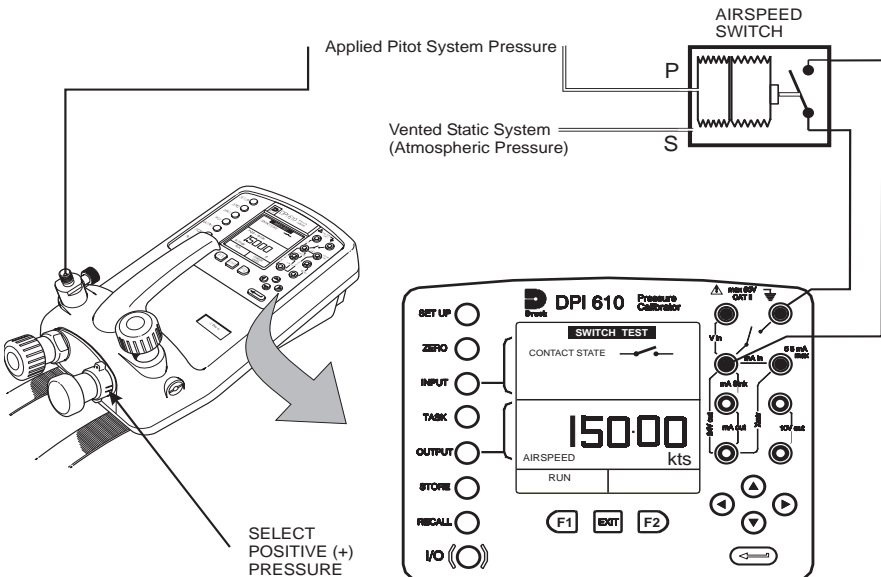
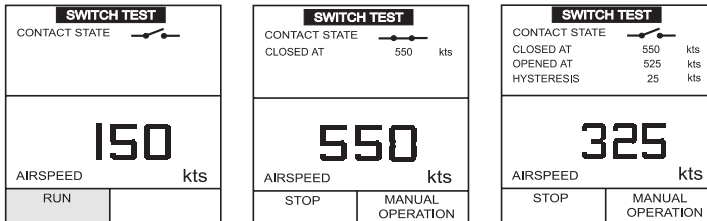


Figure C4 - Airspeed Switch Test Connections

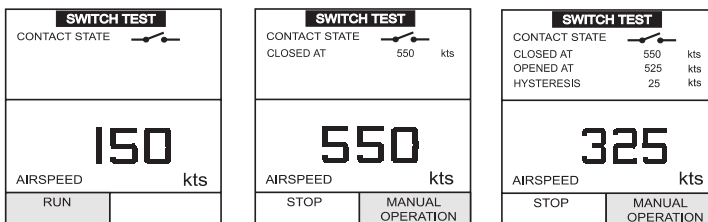
- (2) Ensure that positive pressure is selected and close the release valve.
- (3) Close the manual let-down valve.
- (4) Zero the airspeed reading by pressing the ZERO key.
- (5) Press the RUN key (F1) and operate the hand-pump, continue until the switch operates:



- (6) Carefully open the release valve and allow airspeed to decrease until the switch operates again. The display shows the operating airspeeds and hysteresis.
- (7) Record the displayed operating data.
- (8) Allow the airspeed to decrease until it is below 80 kts.
- (9) Slowly open the manual let-down valve to return system to zero (ground level).
- (10) To perform another switch test, press RUN (F1) and repeat the above procedure.
- (11) To cancel switch test mode, press TASK.

Method (non-accessible switch contacts)

When the airspeed switch contacts cannot be connected to the instrument, an external indicator or annunciator must be used as indication of airspeed switch operation. The user, on receipt of an indication of switch operation, presses the MANUAL OPERATION (F2) key:



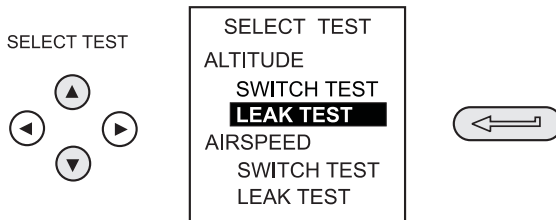
- (1) Connect the instrument to the pitot system as shown in Figure C4. Ensure that the static system is vented to atmosphere before starting the test.
- (2) Ensure that positive pressure is selected and close the release valve.
- (3) Close the manual let-down valve.
- (4) Zero the airspeed reading by pressing the ZERO key.

- (5) Press the RUN key (F1) and operate the hand-pump, continue until the switch operates and immediately press (F2).
- (6) Carefully open the release valve and allow the airspeed to decrease until the switch operates again and immediately press (F2). The display shows the operating airspeeds and hysteresis.
- (7) Record the displayed operating data.
- (8) Allow the airspeed to decrease until it is below 80 kts.
- (9) Slowly open the manual let-down valve to return system to zero (ground level).
- (10) To perform another switch test, press RUN (F1).
- (11) To cancel switch test mode, press TASK.

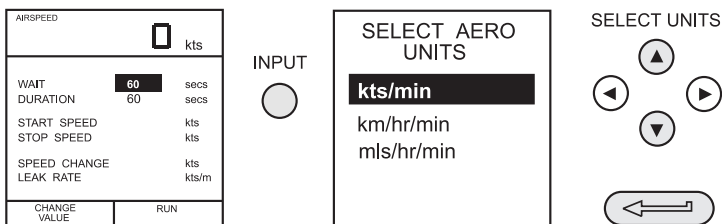
Airspeed Leak Tests

Select TASK, AERO:

- ▣ Select AIRSPEED LEAK TEST:



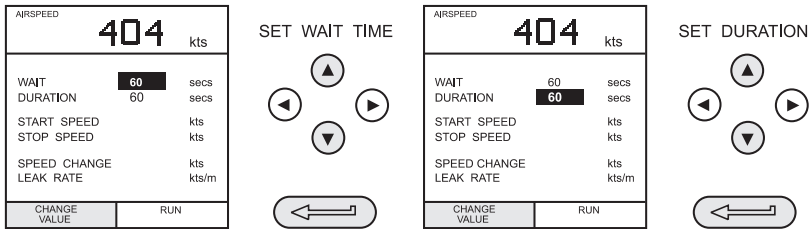
- ▣ If necessary, SELECT AERO UNITS:



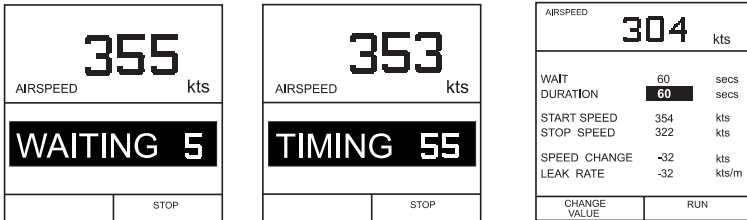
Method

- (1) Connect the instrument to the pitot system as shown in Figure C4. Ensure that the static system is vented to atmosphere before starting the test.
- (2) Close the release valve and manual let-down valve and, using the hand-pump, generate the required airspeed.

- (3) Set WAIT and DURATION of leak test times:



- (4) When ready, press the RUN key (F2):



Initially, the WAIT period counts down, followed by the timing period. The START SPEED is recorded as soon as the timing period starts. At the end of the test the display shows the complete details of the test.

- (5) Record the displayed operating data.
- (6) Allow the airspeed to decrease until it is below 80 kts.
- (7) Slowly open the manual let-down valve to return the system to zero (ground level).
- (8) To perform another leak test, use the hand-pump to generate a new airspeed and press RUN (F2) again.
- (9) To exit or cancel leak test mode, press TASK.

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