Sensistor ILS500

Leak Detection System

Operating Instructions

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Content

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1. General

The Sensistor ILS500 is an all-in-one tracer gas leak detection system with all necessary functions integrated in one very compact housing.

The purpose of this equipment is to make it possible to set up a fully automatic leak test system in a very short time, at minimal cost, and requiring no special skills. The ILS500 contains everything you need, except the tooling (i.e. mechanical fixture and connectors to the object under test).

The ILS500 has all the functions needed for tracer gas leak testing and leak location, such as:

- tooling control
- gas injection
- pressure control/monitoring
- gross leak test
- gas detection
- gas evacuation
- statistics, etc.

All functions are accessible and programmable using an easy-to-use touch panel, a pc or via the internet. To set up the system requires no PLC programming skills, nor pneumatics or control expertise.
The test sequence is controlled by an integrated controller. The test sequence can be started:
- manually
- by a switch in the test fixture
- by a master controller.

The different parameters of the test sequence, such as timers, pressures etc. are accessed and adjusted using the touch panel menu system.

Up to eight different sets of parameters can be saved. Each set forming a specific recipe for a specific test object.

Sensistor ILS500 F is available in six versions:

• ILS500 standard version is used for the most common type of tracer gas leak detection.
• ILS500 V is used when the need exists to provide a vacuum at a lower pressure.
• ILS500 HP is used when a higher trace gas pressure is needed.
• ILS500 CP is used when a combination of automatic gas leak test and manual leak detection is wanted.
• The C and PV models can be combined.
• The CP and HP models can be combined.

The purpose of this manual is to:

• Describe the working principles of the ILS500 and its different parts
• Show examples of different types of test stations
• Teach the reader how to set up the ILS500 for different test purposes

The alphabetical parameter index is included for quick access to information of the respective parameter.

Read the manual carefully before putting your IL500 into service.

Pay extra attention to the **Safety section**.

For technical reference including test cycle optimisation, specifications and maintenance, see separate Technical Manual.

2. Safety

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The tracer gas used is a mixture of 5% Hydrogen (H_2) in 95% Nitrogen (N_2). This mixture is absolutely safe. It is environmentally friendly, non-poisonous and non-flammable. The normal risks associated with all compressed gases must however be considered.

Before connecting tracer gas: confirm that the connectors or test fixture is designed for working at the test pressure.

Compressed gases contain a great deal of stored energy. Always carefully secure gas bottles before connecting pressure regulator.

NOTE! The ILS500 has no internal emergency stop circuit. ILS500 is prepared for integration into an external emergency stop circuit.

An internal emergency stop circuit can be ordered separately.

Check that all relevant legislation and safety standards are complied with before putting the ILS500 into service! See further information under Installation.

WARNING! Pressurising objects at too high pressures can result in a burst object. This in turn can result in serious injury or even death. Never pressurise objects that have not previously been burst tested or otherwise approved for the chosen test pressure.

INFICON can not take any responsibility for the consequences arising from the inpropriate use of certain test pressures. The ILS500 must never be introduced to pressures higher than that approved for the object to be tested and never beyond the ILS500 specification.

HAZARD
The tracer gas mix contains no oxygen.
Releasing large amounts of gas in a confined space may lead to asphyxiation

HAZARD
Never pressurise system or object above approved pressure.
Too high pressure can result in death or serious injury!

Never transport gas bottle with pressure regulator fitted.

3. Contents of delivery

When receiving the equipment, check that it has not been damaged during transport. Check that all the following items are included:

- **ILS500**
- **Hand Probe P50**
- **Probe Cable C21 - 3 m**
- **Power Cable**
- **Screw Terminal Connectors for external I/O signals (total of 6)**
- **Thread Converter Set (ISO to NPT conversion)**
- **Hose Connection Kit**
- **Operating Instructions Sensistor ILS500 (this manual)**
- **User Manual H2000 PLUS**
- **CD with Technical Manual and other relevant manuals.**

4. Technical Description

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4.1 Design

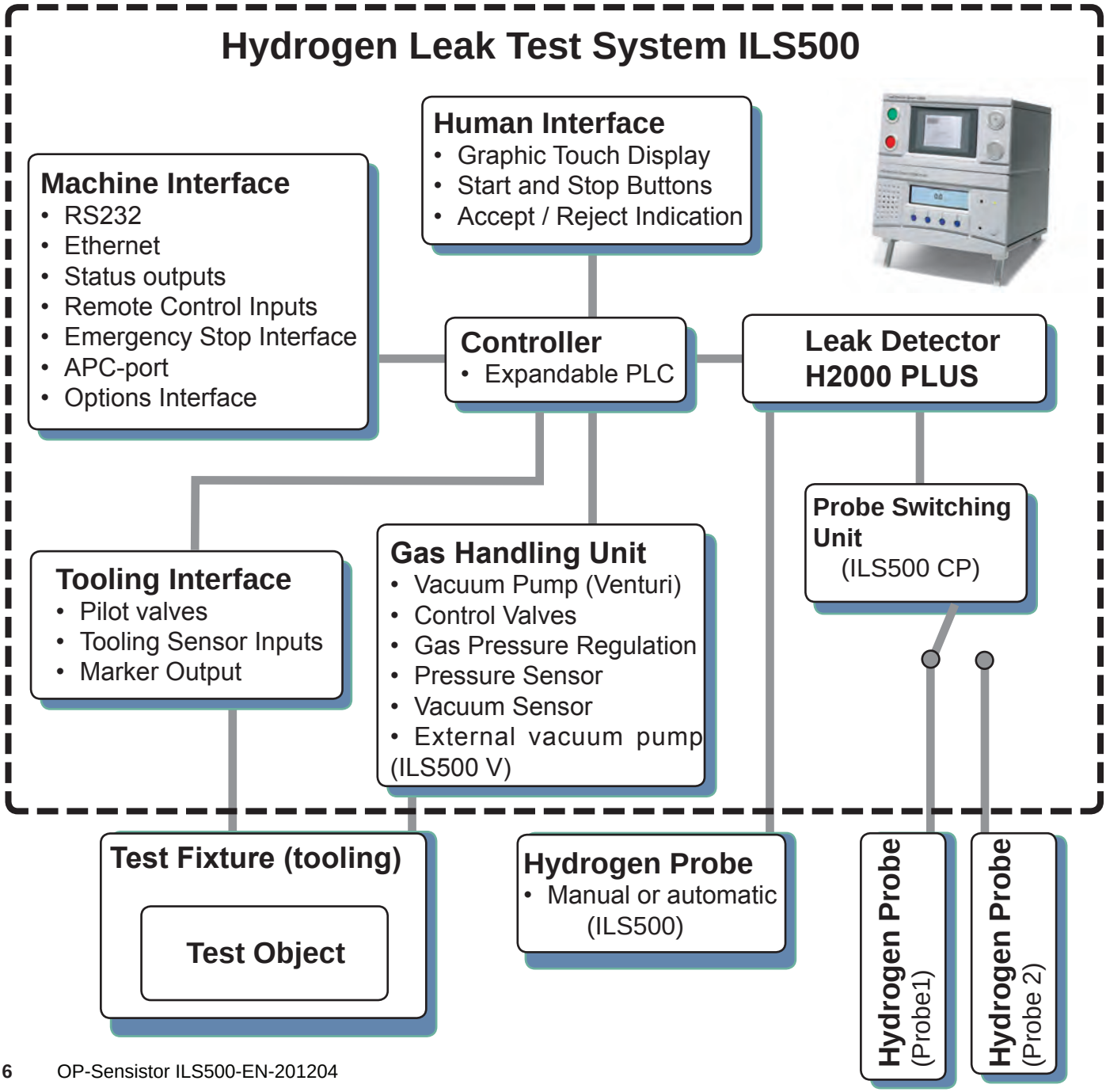
The units within the dashed box below are integrated in the ILS500/ILS500 CP.

ILS500 is built around a programmable controller that communicates with and controls the different modules.

The ILS500 CP has a Probe switching Unit which makes it possible to connect and switch between an Active Probe and a Passive Probe.

Customer specific programs are offered on request.

It is also possible to expand the number of inputs and outputs.



4.2. Test Cycle

The following list shows the individual main steps of a complete test sequence.

Several of the steps are optional and can be turned off as explained in Section 8.3.

1. Standby. ILS500 is idle waiting for Start signal.

2. Tooling Connection. Four air valves and four proximity switch inputs can be easily set up to control moderate test fixtures. Controller can be expanded for more demanding fixtures.

3. Pre Evacuation and Evacuation Test. The air is evacuated from the test object and a first gross leak test is made simultaneously. Evacuation is often necessary to ensure that the tracer gas reaches all parts of the tested object.

4. Vacuum Decay Test. Optional medium sensitivity leak test. Can be used to reveal leaks before filling with gas. This minimises spillage from gross leaks.

5. Gas Filling. Tracer gas filling before gas test.

6. Blockage Test. Reveals internal blockages in tested object. Practical for testing e.g. capillaries etc.

7. Pressure Decay Test. Optional medium sensitivity leak test performed in parallel with tracer gas test. This test can for example be used for integral testing in parallel with a more sensitive gas test at selected points. Such differential testing is very cost effective, when applicable.

8. Tracer Gas Test. The main leak test. This test can be manual using a hand probe or fully automatic using an active sampling probe.

9. After Evacuation. Evacuation of tracer gas for minimised spillage. This can also include a very efficient air purge.

10. Tooling Disconnection. Disconnection of test fixture.

5. Installation

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For a trouble free installation and operation of the ILS500 we strongly recommend that you read through the entire Installation section.

Minor things that you do not consider important can make a big difference.

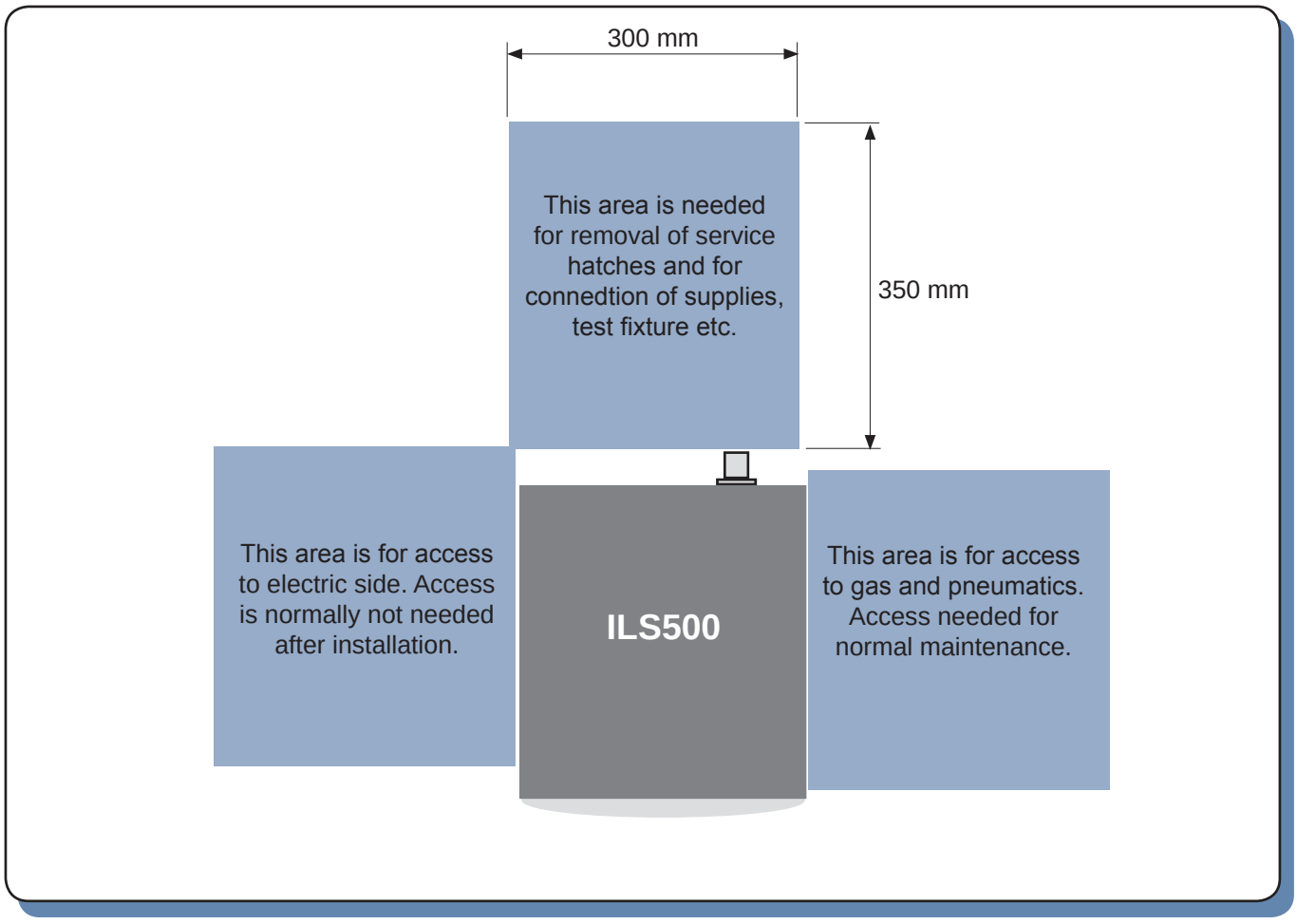
5.1 Placement of the ILS500

Place the ILS500 as close as possible to the test fixture. In this way it will minimise the length of the tubing required for filling and evacuating gas in the object and thereby reduce the time involved in test cycles.

The ILS500 can be placed on any suitable flat surface. Note that the front feet under the ILS500 can be flipped out to raise the front of the ILS500 for a better viewing angle.

The ILS500 can also be panel mounted. To do this you need a mounting kit. Using this the HMI (operators interface) and the detector can be placed in comfortable reach of the operator while at the same time positioning the main unit for easy maintenance access (and close to the test fixture). Dimensions etc for panel mounting can be found in the mounting kit instructions.

Some free space must be provided around the ILS500 to enable maintenance and service access. This is described in the figure below.



5.2 Electrical connections

Power Cable

Simply plug the cable into the nearest power outlet. The connector on the ILS500 is a std PC inlet (C13 socket).

Probe Cable

Connect the Hand Probe H50 to the probe connector on the rear panel of the ILS500. Use the 3 m C21 cable delivered with the ILS500.

Standard length is 3 m. Several different cable lengths are available.

Align the red mark on the cable contact with the red mark on the panel contact and push it straight in. The contact will snap in and lock.

To disconnect, hold around the knurled part of the connector and pull straight out.

N.B. Connection and disconnection of the sensor cable must be done with power off. Sensor can be damaged if power is on!

If you have purchased another type of probe refer to the manual for that probe. There may be other connections in addition to the probe cable.

Emergency Stop

The ILS500 has no built-in emergency stop circuit. ILS500 is prepared for integration in an external emergency stop circuit. Internal emergency stop circuit can also be ordered separately.

The ILS500 will not start testing unless an emergency circuit has been installed.

You have the following three options to prepare the ILS500 for start:

1. Connect the ILS500 through an external emergency stop relay.

2. Install the **Remote Control with Emergency Stop** which includes a plug-and-play emergency stop relay.

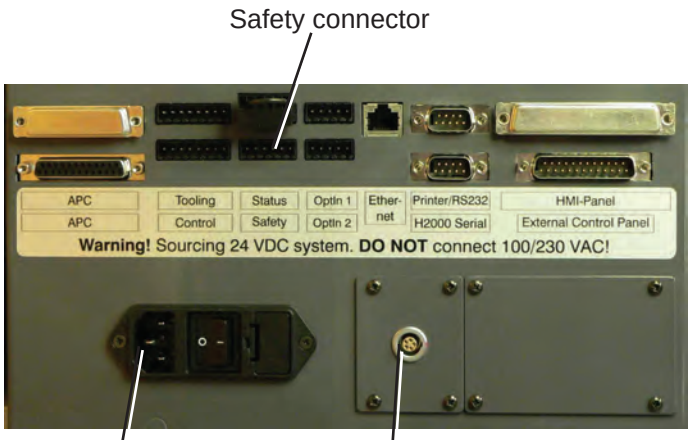
3. Short circuit the **SAFE SPLY** terminal to "+24 V" on the **Safety** connector.
   N.B. This is **not** recommended and should only be made for preliminary testing before connecting compressed gases or test tooling with moving parts!

Check that you comply with all relevant legislation and safety standards before putting your ILS500 into service!

Status and Control Signals

The ILS500 can be controlled manually or by a master controller. Available interfaces to external controllers are described in Technical Manuals.

All available Status signals are also described in the same Technical Manuals.



All connections are described in the Technical Manual

5.3 Pneumatic connections

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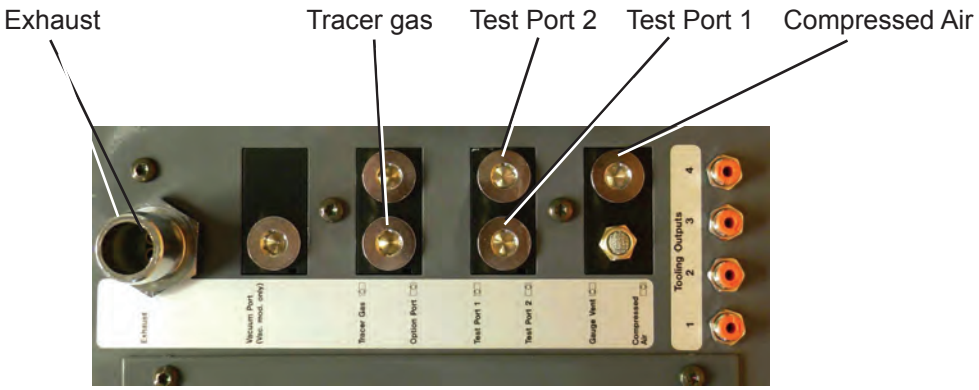
Type	Specification	Port thread
Compressed Air	Pressure range*: 0.35 – 0,7 MPa (50 – 100 psi) (Decreased vacuum capaity below 0.5 MPa (70 psi) Oil free and filtered to 5 µm. Dew point: Max 10°C (50°F) *HP models: 0.5 – 0.7 MPa (70 - 100 psi)	BSP 3/8” (ISO 228/1-G3/8) NPT 3/8“ adaptor included
Tracer gas	5% Hydrogen / 95% Nitrogen mix. Pressure*: 0.005 – 1.0 MPa (0.72 – 145 psi) *HP models: 0.02 – 4.5 MPa (3 - 652 psi)	BSP 3/8” (ISO 228/1-G3/8) NPT 3/8“ adaptor included
Exhaust	**Warning!** Refer to Safety section. Connect to ventilation duct.	Barb Fitting: ID 25 mm (1”) **N.B.: Do not use smaller tubing! Max length 10 m.**
Test Object (Test Port 1 Test Port 2)	Min capacity in duct: 30 m^3/h (1000 SCFH). Use Test Port 1 and plug Test Port 2 for single port connection.	BSP 3/8” (ISO 228/1-G3/8) NPT 3/8“ adaptors included

All pneumatic ports are plugged upon delivery. Store the removed plugs. They are used for future hardware testing.

Note! Do not remove the Vacuum and Option port plugs!



All connections are described in the Technical Manual

5.4 Compressed Air

Compressed air is used to drive the Venturi pump (ejector), gas valves and the four tooling valves.

For reliable operation and minimised maintenance of the ILS500, it is essential that the compressed air is adequately filtered.

Make sure to install a 5 µm filter immediately ahead of the ILS500. Supply pressure is specified to point after the filter position during peak consumption (see figure above). Using a low capacity filter will result in reduced evacuation and thereby longer test cycles.

Important

Make sure that compressed air is dry, well filtered and oil free!

Recommended filter grade is 5 µm or finer.

Inadequate filtering will result in increased maintenance.

5.5 Tracer gas supply

The tracer gas (5% Hydrogen / 95% Nitrogen) is best ordered from your regular gas supplier. It costs typically 5 USD per 1000 litre. Much cheaper in bulk delivery or if delivered from a Liquid Nitrogen tank with hydrogen mixer.

Do not order the mix from a special or medical gas supplier, and do not order the gas with a certificate of analysis, as this will make the gas up to ten times more expensive.

Pressure of tracer gas should be: 0.005 – 1.0 MPa (0.72 – 145 psi). For HP model 0.02-4.5 MPa (3-352 psi).

Hazard

Never pressurise system or objects above approved pressure. Too high pressure can result in death or serious injury!

Connecting the Tracer gas

1. Secure gas cylinder safely.
2. Open the cylinder valve briefly to blow out dirt that may have collected in the outlet.
3. Install gas regulator on cylinder. See further below for regulator recommendations.
4. Turn regulator fully counter clockwise for zero output pressure.
5. Connect a regular welding gas hose or similar between the Tracer gas port and the pressure regulator. Check that the hose is certified to withstand the maximum output pressure of the regulator.
6. Open cylinder valve and set regulator to desired pressure. See warning banner!
7. Open regulator outlet valve (if any).

5.6 Pressure regulator

A simple, single stage regulator has pronounced input pressure dependence. The output pressure can increase considerably (double the set pressure or more), as the bottle pressure decreases.

The best way of avoiding this kind of problem is to buy a good two-stage regulator. They do not exhibit such pressure dependence.

Warning

Pure Hydrogen is a flammable gas. Use only ready-made mixtures of 5% Hydrogen in Nitrogen. This is a standard, industrial gas mixture used in various industrial applications.

5.7 Exhaust

The exhaust gas should be directed out of the building. It is best placed on the roof of the building far away from the fresh air intake of your test station.

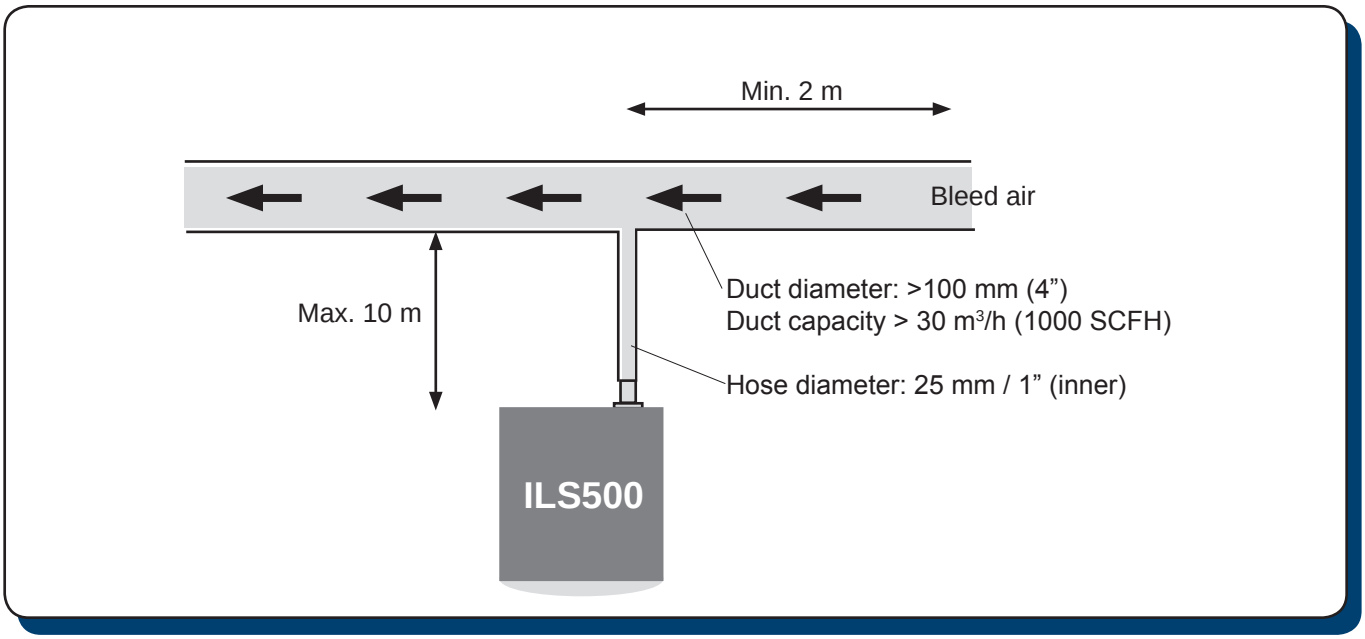
It is generally not a good idea to use the general ventilation system to ventilate the exhaust. If the ventilation system is equipped with energy recirculation there is a big risk that large amounts if tracer gas will be carried back to the test room thus disturbing your testing.

We recommend that a dedicated duct is installed. Install an electric duct fan and an optional wind extractor.

Diameter of exhaust duct must in all cases be at least 100 mm.

Connection of the ILS500 to this duct is made through a 25 mm ID (1”) hose. This hose should not be more than 10 m (30 ft) long.

Recommended exhaust design



Important

Inadequate exhaust installation is the most common reason for problems with tracer gas leak testing.

Important

Too narrow or too long exhaust line will result in reduced evacuation capacity and thereby increased cycle time!

5.8 Common hydrogen sources

Except for poor tracer gas exhaust installation, theese hydrogen sources can affect the leak testing:

• **Leaking connectors.** Leaking connectors is the most common interference. A gas connector can be designed whereby ventilation is introduced between a double seal arrangement. This very safe approach is not possible with the pressure decay method.

• **Combustion engines.** Vehicles, both inside and outside of your building can produce large amounts of hydrogen. It is common for such exhaust gases to be carried into the general ventilation system. Do not take fresh air from ventilation systems.

• **Lead battery charging stations.** Charging of lead acid batteries develops hydrogen. Locate any such charging station and evaluate the risk for interference.

• **Aluminium machining.** A freshly cut aluminium surface will oxidise quickly. The oxidising process involves splitting water into oxygen and hydrogen. The hydrogen thus formed is released as hydrogen gas. The machining of aluminium creates large areas of fresh metal that will oxidise.

• **Compressed air system.** It is quite common that the shop air contains hydrogen. This can come from a nearby lead battery charging station, but can also stem from corrosion in air systems.

• **Cigarette smoke.** Incomplete combustion of organic materials result in the production of Hydrogen.

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5.9 Fresh air

For a stable and reliable leak test it is important that the test area and especially the sample point is kept free of hydrogen contamination. A small but stable hydrogen background is generally no problem. Quick changes in concentration as well as high background levels, however, will effect the leak test.

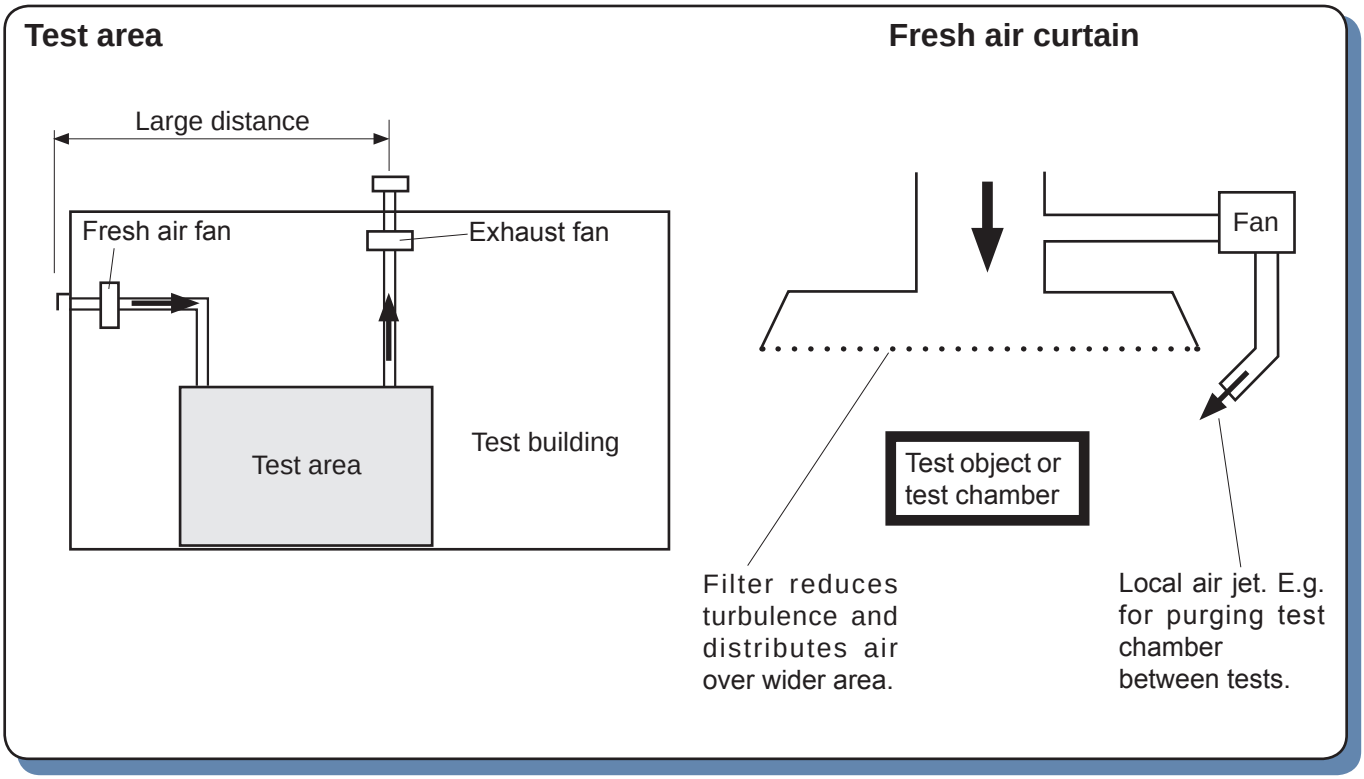
Fortunately, the hydrogen mix is very easy to control. The gas is light and will readily be blown away by even the smallest air movement.

The best way of creating a stable environment is to create of fresh air curtain around the test area. This is easily done by letting a slow but wide stream of fresh air, flow down over the test area.

It is also wise to keep the general hydrogen concentration in the ambient of the test area low. Even a perfectly designed fresh air curtain will “leak” when the operator moves in and out of the curtain.

Important
Industrial compressed air often contains varying and substantial amounts of hydrogen.
Up to 50 ppm is common. Do not use compressed air as fresh air supply.

General design of exhaust and fresh air supplies



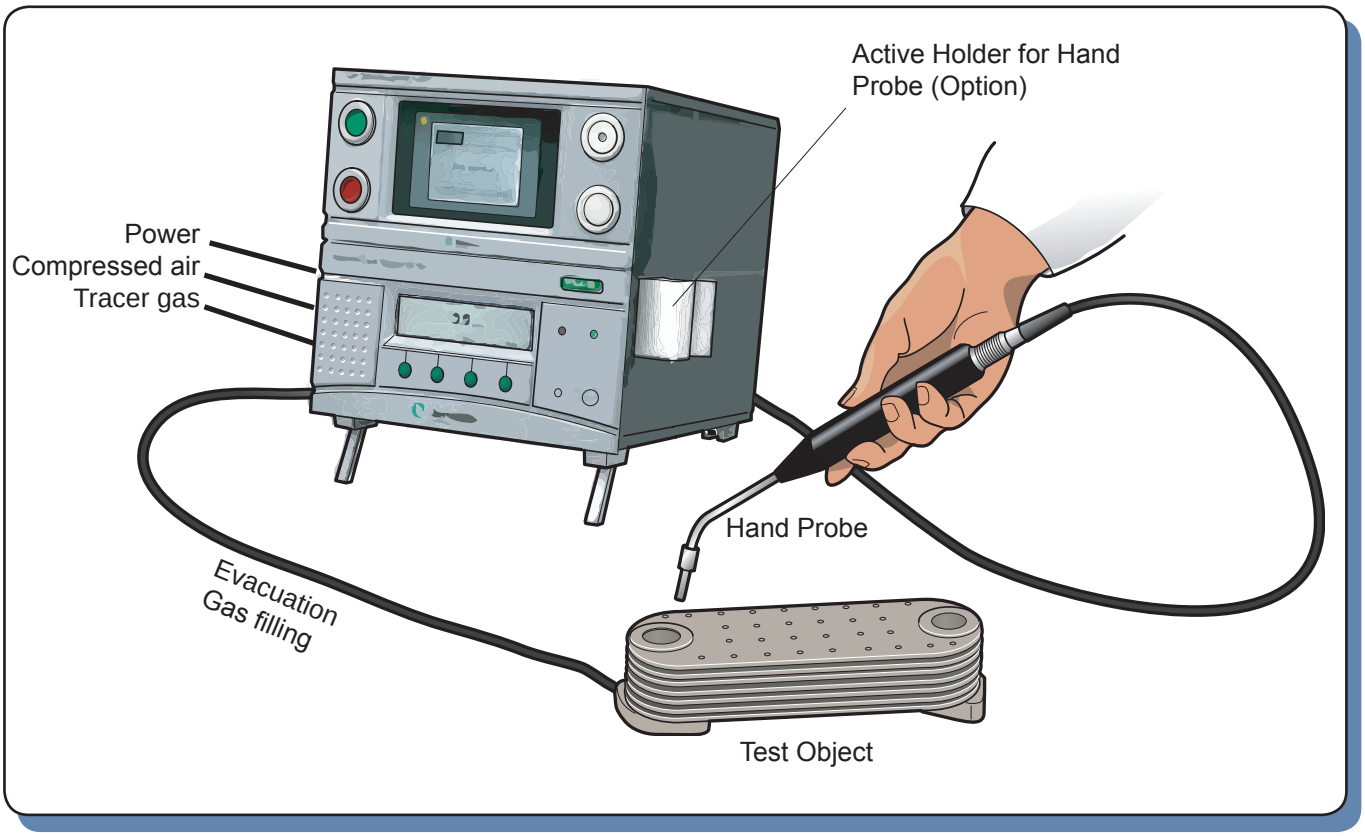
Design hints for fresh air curtain:

- Place fresh air intake on outer wall of building.
- Place air intake far away from cargo bays and tracer gas exhaust.
- Try to create a laminar flow over the test area.
- Curtain should cover the entire test area (test hood or sample point) and extend at least 0.5 meters outside the area.
- Air speed in curtain should be rather low, typically 0.1 m/s.
- Additional small fan(s) can be set up within the curtain for directional purging of test chamber etc.

6. System Examples

ILS500 is equipped with a large number of functions for connection and leak testing of different kinds of objects. It is therefore possible to build a leak test station that suits the tested object and the requirements on testing speed etc.

Three examples of test stations are given in this sections.



6.1 Simple Hand Probe System

This system is using a manual Hand Probe (e.g. H50) for the leak test. The test fixture (tooling) is manual.

ILS500 ensures that the tracer gas correctly fills the entire object.

Filling and gross leak test (if desired) are performed automatically and the gas leak test is conducted manually by the operator.

An Active Holder for Hand Probe (Option) can be used to ensure that the selected minimum test time is used.

ILS500 will indicate LEAK if any of the tests fails.

6.2 Automatic Chamber Test

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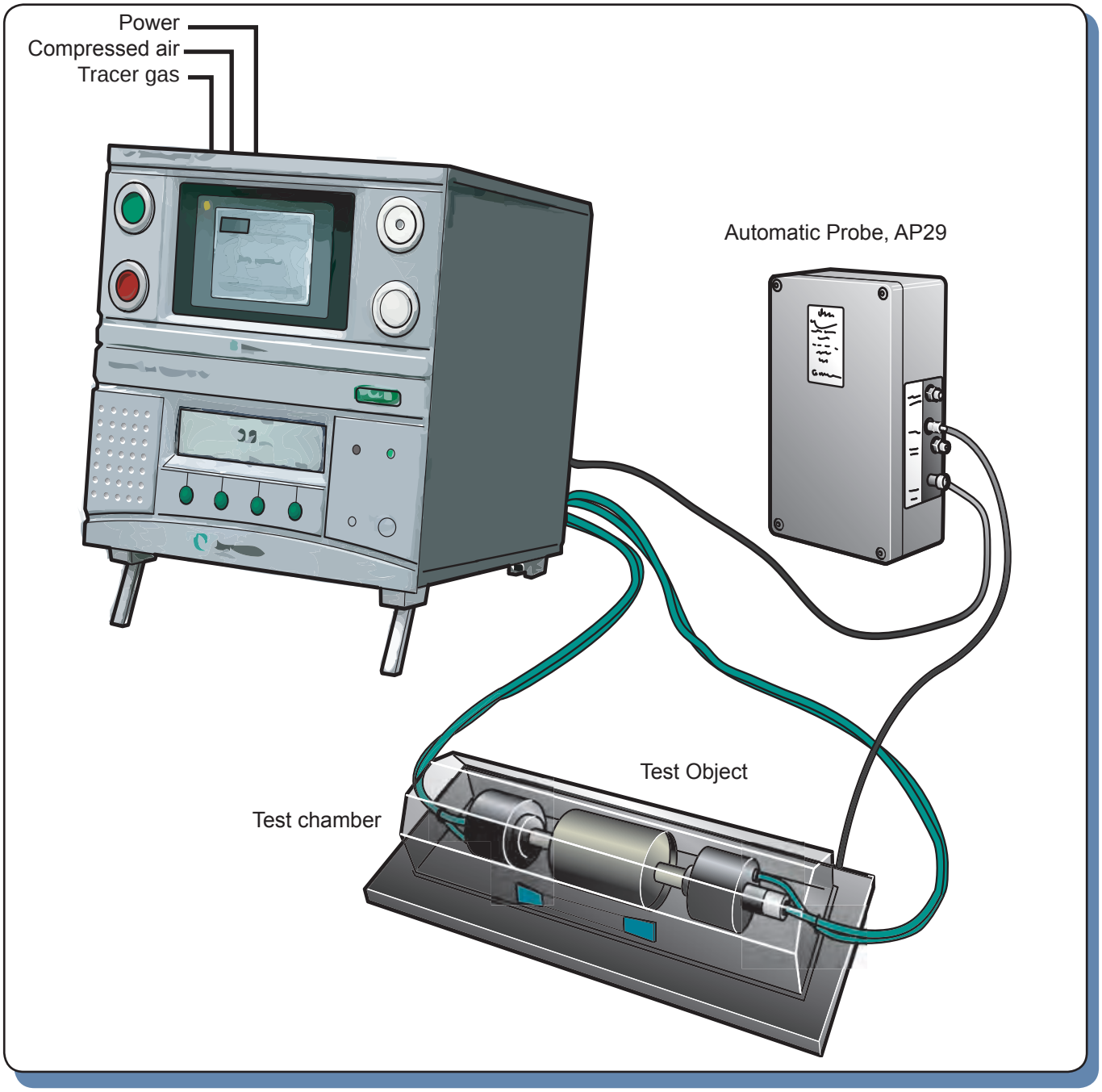
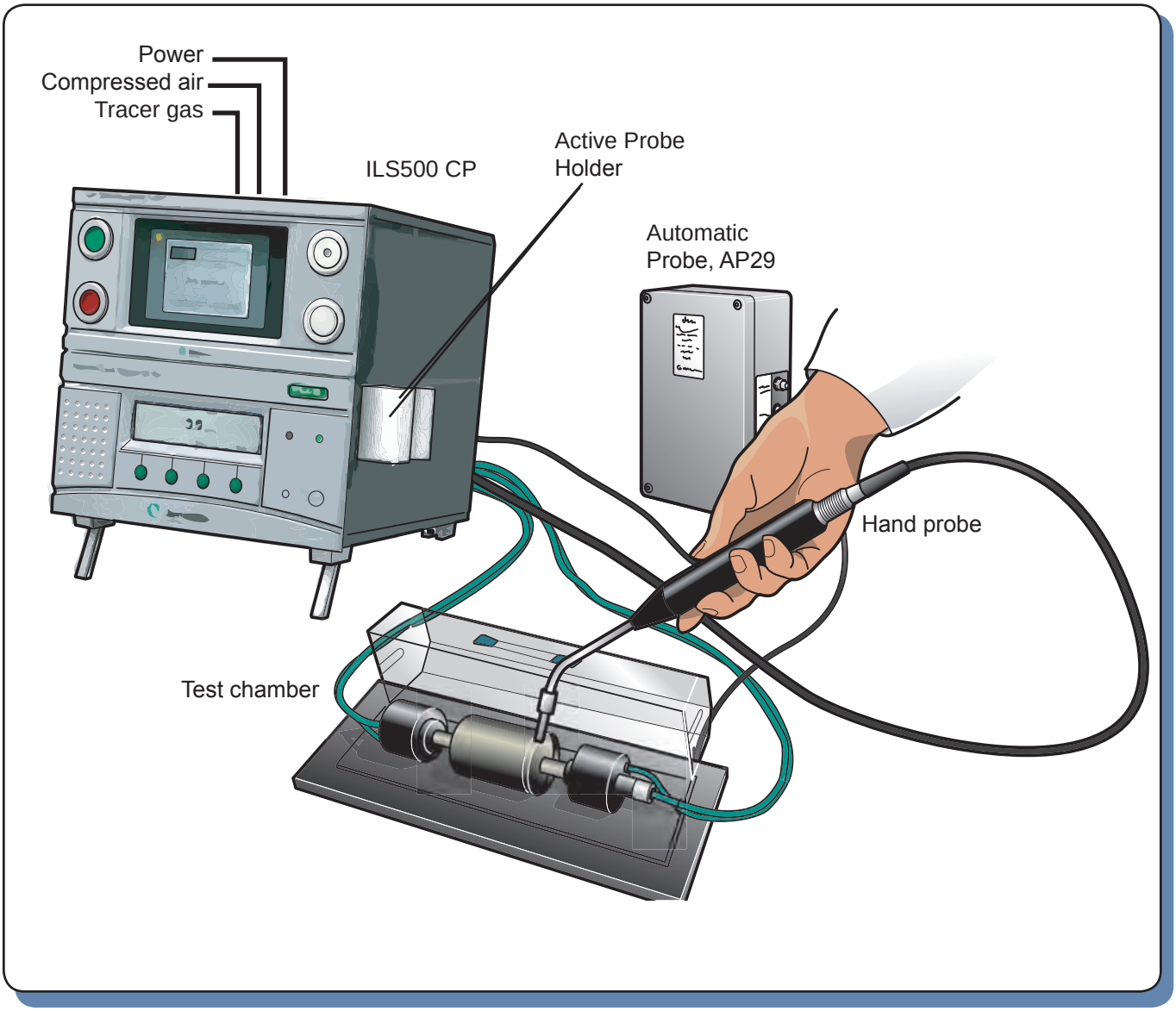


This example is using the integrated tooling system for automatic connection of the tested object. ILS500 will subsequently automatically, completely fill the object with tracer gas, and maintain the correct pressure.

An automatic gas leak test is performed after filling and accumulation of leaking gas in the test chamber. The gas test is made using the Sampling Probe AP29 (an active probe). ILS500 will signal LEAK if leakage above the set limit is registered.

The tracre gas is automatically removed after the test and the tooling system disconnects the test fixture.

6.3 Chamber Test with Leak Locating Option



The ILS500 CP (Combi Probe) includes an Active Holder for Hand Probe and a Hand Probe.

This enables you to combine a Leak Test with a Sampling Probe with Leak Locating with a Hand Probe.

The active probe first measures within the chamber. The extra Hand Probe will be automatically activated if a leak is detected and the operator can immediately open the chamber and locate the leak.

The Detector automatically switches over to Detection Mode when the probe is lifted from the holder.

The gas in the object under test is automatically removed when the probe is replaced in the holder.

The operator can skip the locating process by pressing STOP instead of lifting the probe.

7. Controls

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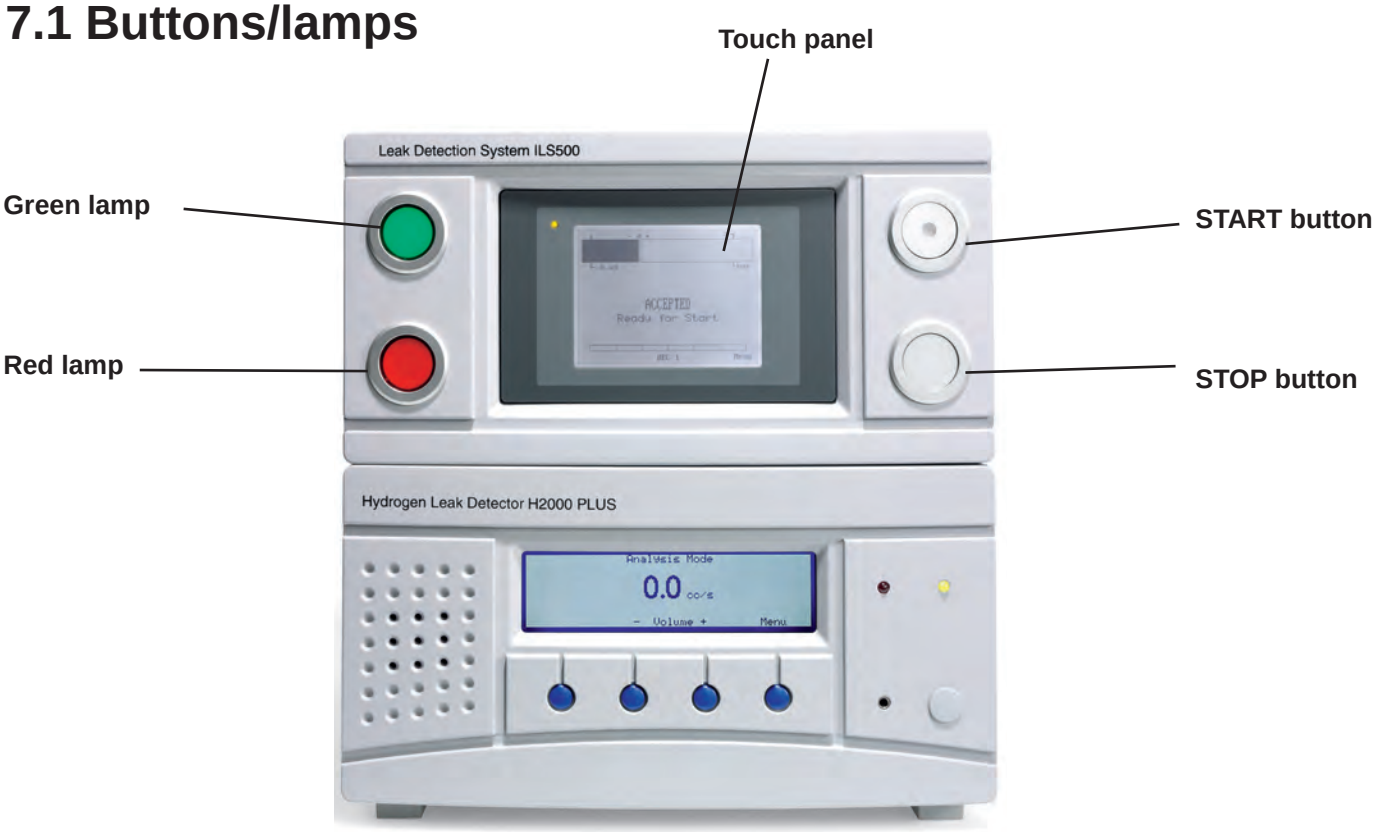
ILS500 is manually controlled using the START and STOP buttons and the menu system of the touch panel. The screen also shows the steps of the test sequence graphically and in plain text.

7.1 Buttons/lamps



Green lamp
Indicates that the test sequence is over and the tested object accepted.

Red lamp
Indicates:
- Tested object rejected.
- General error.

Specific error message on screen.

START Button
Yellow lamp indicates that the test sequence is running. Yellow flashing lamp means ILS500 is waiting to start. Sequence will proceed when the H2000PLUS detector is ready for the next test.

STOP Button
Terminates test sequence. Test object will be evacuated if previously filled with gas. The STOP button is also used to acknowledge leaks.

Emergency Stop
ILS500 can be equipped with an integrated emergency stop relay and a remote control with emergency stop button. See under Accessories Section 10.

ILS500 can also be connected to external emergency stop circuit.

7.2 Main display

The display shows how the test cycle is progressing using bar graphs, texts and numeric values.

Graphic representation

The left part of the upper bar indicates the negative pressure (vacuum) during evacuation. The right part indicates the tracer gas filling pressure.

The lower bar shows the progress of the individual steps of the test sequence.

Text and metric values

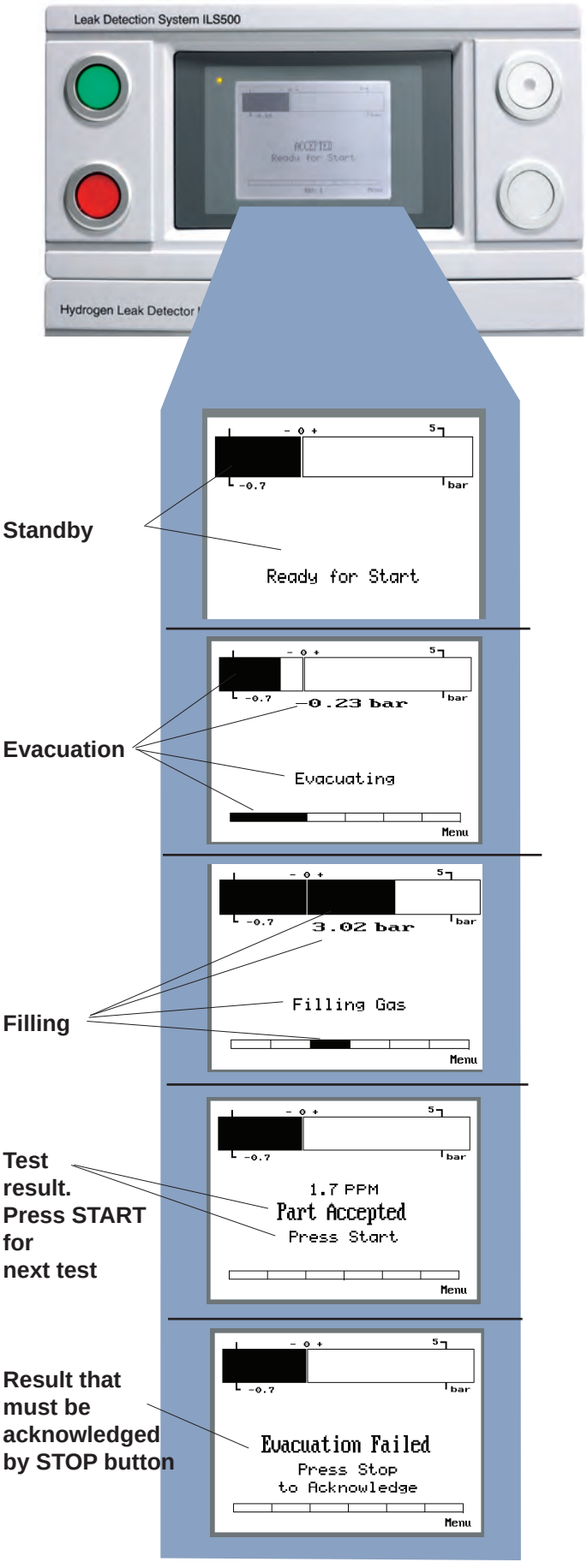
The current pressure and the name of the running step is indicated in plain text.

Test result

The test result is shown after completion of the test cycle.

The STOP button must be pressed for acknowledgement that the test was aborted or failed for reasons other than normal leak test failure. The screen will indicate if this is necessary.

ILS500 can be set to demand leak acknowledgement also for normal leak test failure.



8. Menu System

EN In the menu system you can choose type of testing, set test parameters, display statistics etc.

• Press **Menu** on the start screen or main test screen to enter the menu system (see below).

• Press the desired button, e.g. [Setup] to open the next menu.

• Select options by pressing the box to mark it: ✓.

• Press **Previous** to go to previous screen.

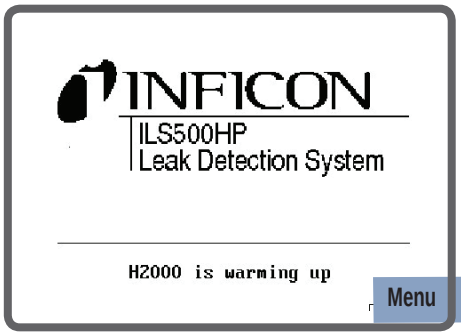
• Press **Main** to go to main test screen.

• Press **Next** to go to next screen.

• Press **Activate** to download parameters to the H2000PLUS detector.

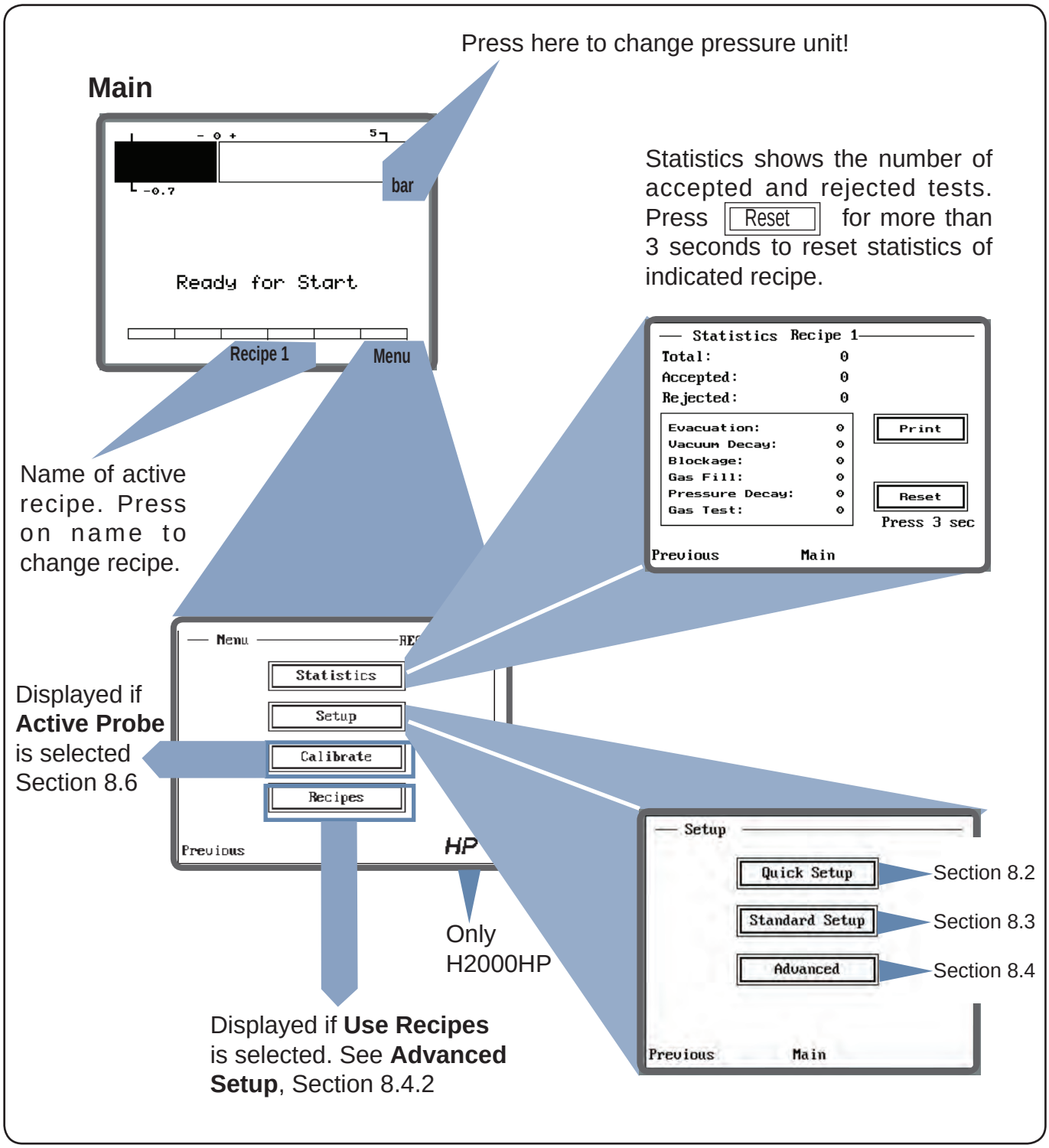
8.1 Menus

The menus are described below step by step beginning with the Main Test Menu.
When switching on, the following screen will be displayed while the detector is warming up.

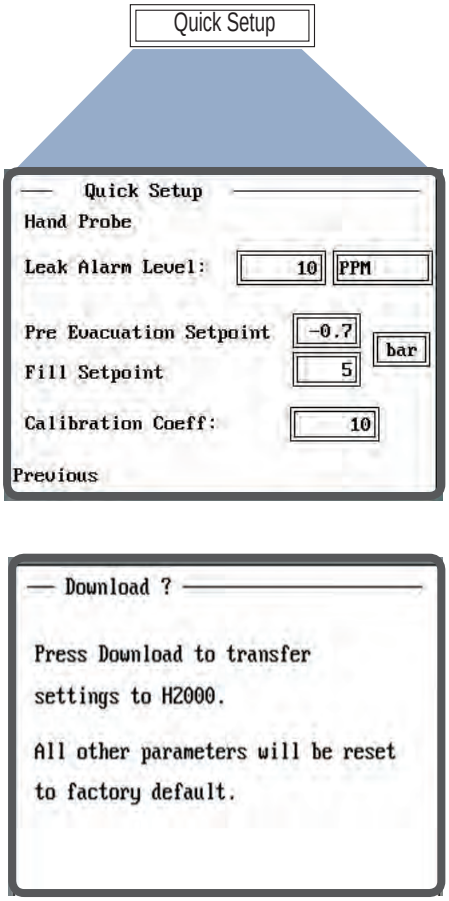


Wait for **Main Test Menu**. This will be displayed automatically when the detector has warmed up or, press **Menu** to go directly to the menu system.

Note! The settings shown in the screen examples are just that and should *not* be considered as a recommendation.


Main
Press here to change pressure unit!
bar
Ready for Start
Recipe 1
Menu
Name of active recipe. Press on name to change recipe.
Statistics shows the number of accepted and rejected tests. Press Reset for more than 3 seconds to reset statistics of indicated recipe.
Statistics Recipe 1
Total: 0
Accepted: 0
Rejected: 0
Evacuation: 0
Vacuum Decay: 0
Blockage: 0
Gas Fill: 0
Pressure Decay: 0
Gas Test: 0
Print
Reset
Press 3 sec
Previous
Main
Menu
Statistics
Setup
Calibrate
Recipes
Previous
HP
Displayed if **Active Probe** is selected Section 8.6
Only H2000HP
Displayed if **Use Recipes** is selected. See **Advanced Setup**, Section 8.4.2
Setup
Quick Setup
Standard Setup
Advanced
Section 8.2
Section 8.3
Section 8.4
Previous
Main

8.2 Quick Setup



Quick Setup can be used to set up a manual leak test station using a simple hand probe (e.g. H50).

Leak Alarm Level: This is the value and unit of your leak test specification. E.g.: 5E-03 cc/s or 25 PPM.

Pre Evacuation Setpoint: The object will be evacuated to this level before gas is filled.

Fill Setpoint: This is the tracer gas pressure. ILS500 regulates the pressure to this level. (If “External Gas Regulation” is selected this is the setpoint of the fill pressure alarm)

Pressure unit: The general pressure unit can be changed by pressing the unit after the pressure setpoints. All pressure setpoint values will be automatically recalculated to the new unit. You can also change the unit by pressing on the unit in the main screen. See previous page.

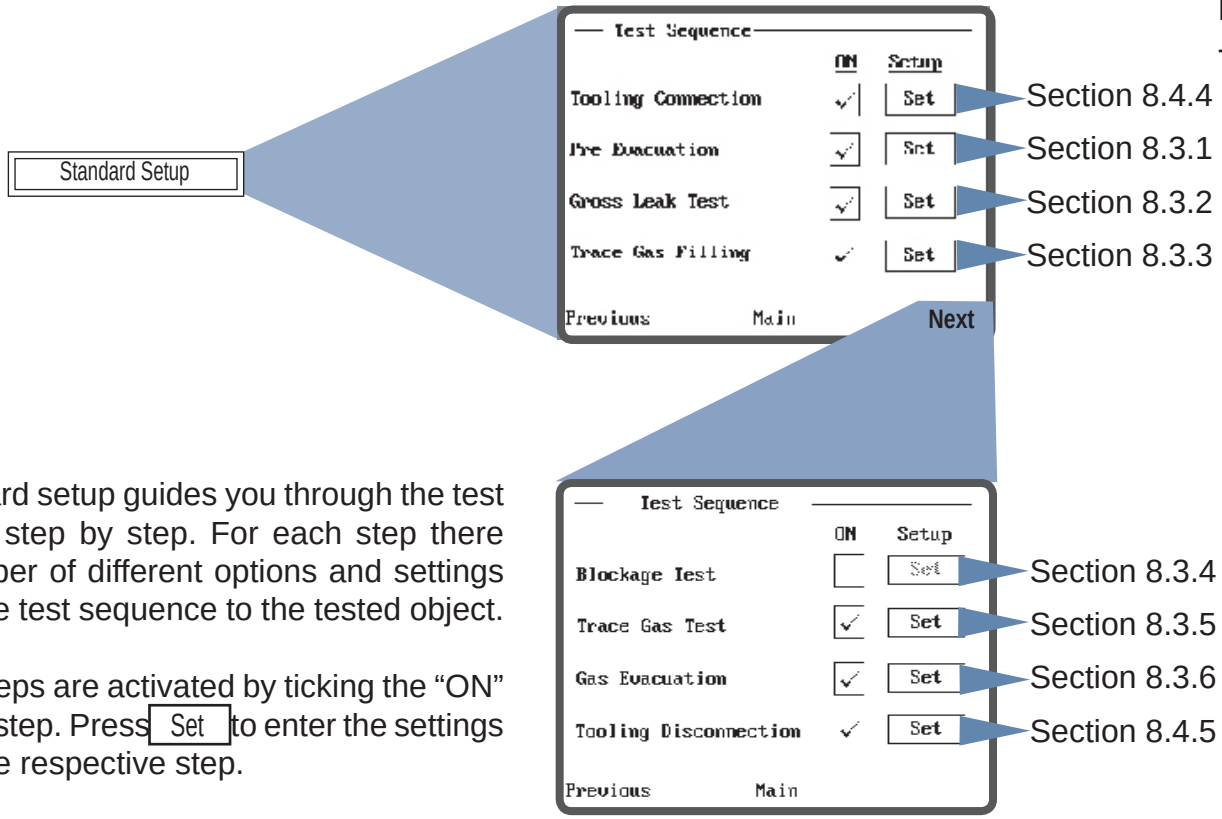
Calibration Coefficient: This is the calibrated leak rate or concentration of your calibration reference. See also H2000 PLUS Manuals.

Important: The **Calibration Coefficient** must be given in the same unit as the **Leak Alarm Level** above.

Press **Download** to transfer the settings to the H2000 PLUS detector.

N.B. All other parameters in the current recipe will be reset to factory default when Quick Setup is activated.

8.3 Standard Setup



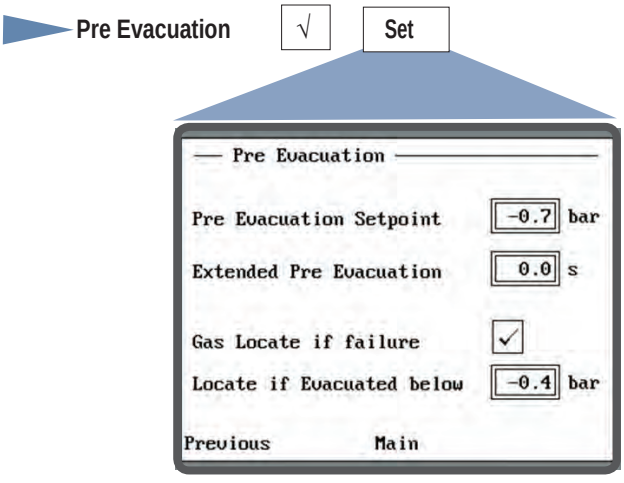
The standard setup guides you through the test sequence, step by step. For each step there are a number of different options and settings to adopt the test sequence to the tested object.

Optional steps are activated by ticking the “ON” box of that step. Press Set to enter the settings menu of the respective step.

8.3.1 Pre Evacuation

For complete filling with tracer gas it is often necessary to evacuate the air in the object before filling with gas.

This is especially important for low fill pressures (<1 atm) and for elongated objects such as pipes.



Pre Evacuation Setpoint: Set desired level of pre evacuation. -0.7 bar (70% vacuum) is adequate for most applications.

Extended Pre Evacuation: Long and narrow objects may require extended evacuation time for proper evacuation. Evacuation will continue for a set time after the Evacuation Level has been attained.

Gas Locate if failure: Allowes gas filling to a choosen pressure (**Locating Pressure**, Section 8.3.5), even if pre evacuation failed. This can be used to locate the leak with a hand probe.

Locate if Evacuated below: Gas will be filled only if pre evacuation reached at least this value. Set this limit to restrict gas spillage through gross leaks.

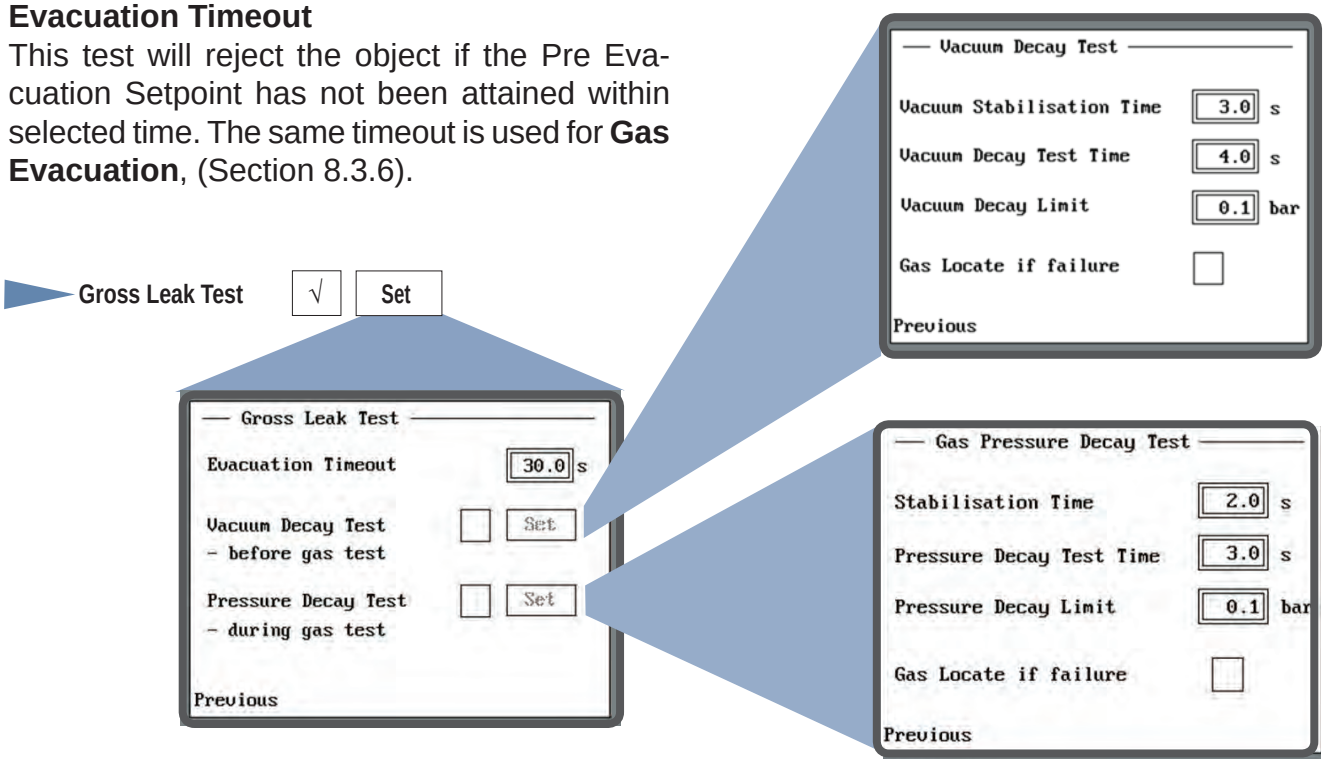
EN

8.3.2 Gross leak test

The test consists of **three** parts and will detect larger leaks by pressure changes during pre evacuation and gas filling.

Evacuation Timeout

This test will reject the object if the Pre Evacuation Setpoint has not been attained within selected time. The same timeout is used for **Gas Evacuation**, (Section 8.3.6).



Vacuum Decay Test: (before gas test)

Vacuum Stabilisation Time: Delay time before Vacuum Decay test begins.

Vacuum Decay Test Time: Time during which pressure rise is recorded.

Vacuum Decay Limit: Allowed pressure rise during test time.

Gas Pressure Decay Test: (during gas test)

This test is performed in parallel with the gas test after the tracer gas has been filled.

Pressure Stabilisation Time: Delay time before Pressure Decay test begins.

Pressure Decay Test Time: Time during which pressure drop is recorded.

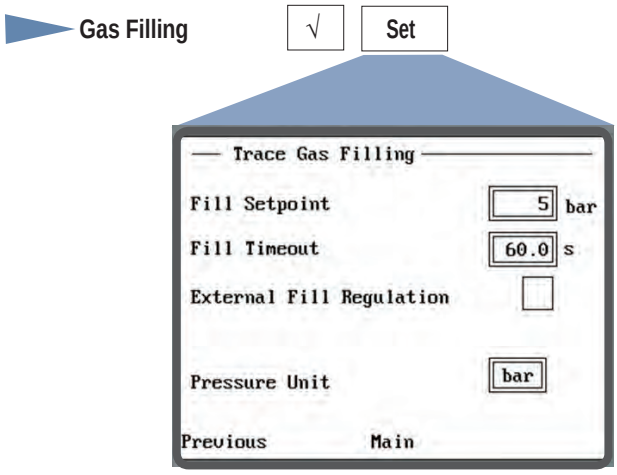
Pressure Decay Limit: Allowed pressure drop during test time.

Gas Locate if failure: Allows gas filling to a choosen pressure (**Locating Pressure**, Section 8.3.5), even if test failed. This can be used to locate the leak with a hand probe.

8.3.3 Gas Filling

The object is filled with tracer gas.

For optimisation of filling regulation parameters see the Technical Manual.



Fill Setpoint: Set the desired tracer gas fill pressure.

If **External Gas Regulation** is selected this is the setpoint of the fill pressure alarm.

Fill Timeout: The object will be rejected if the Pressure Setpoint has not been attained within this time.

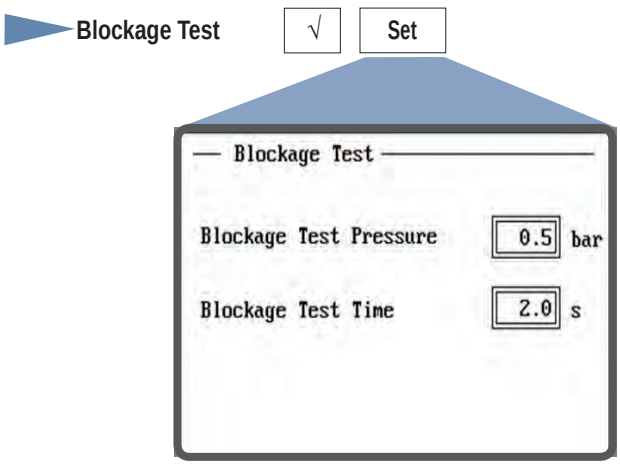
External Fill Regulation: The internal pressure regulation is disengaged and pressure will be that of the gas supply line. ILS500 checks that fill pressure is above Pressure Setpoint before proceeding to gas test step.

Pressure Unit: Select desired unit.

8.3.4 Blockage Test

The purpose of this test is to:
- reveal internal blockage in the tested object,
- ensure that connection lines and test fixture are correctly connected

The object is filled through Test Port 1 while the pressure is recorded in Test Port 2.



Blockage Test Pressure: Minimum pressure to be attained at Test Port 2 during Blockage Test time.

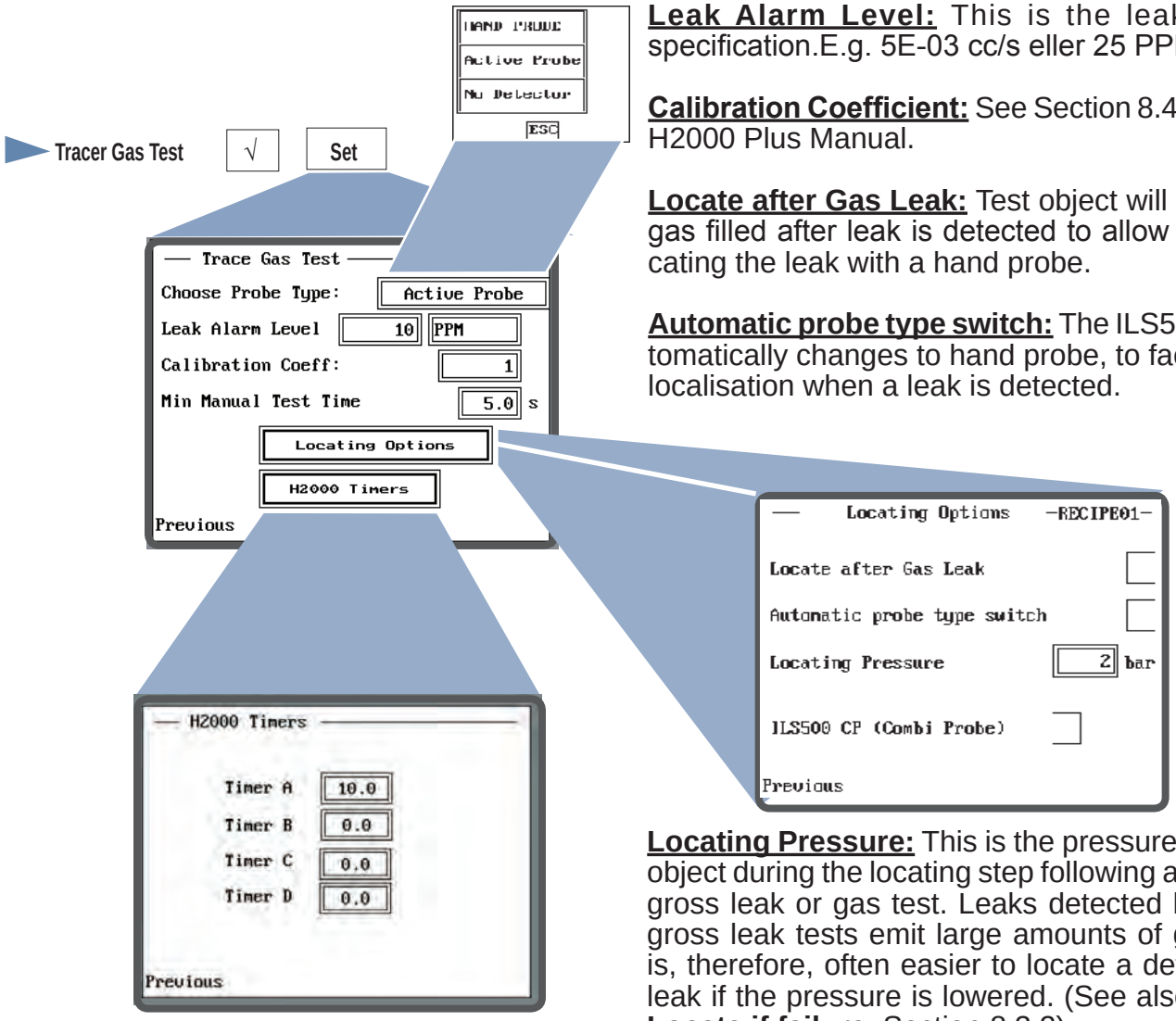
Blockage Test Time: Time within which the Blockage Test Pressure must be attained at Test Port 2.

N.B. This test can only be performed if both test ports are connected to the tested object. The two ports should be connected on either side of the possible blockage to be detected.

EN

8.3.5 Tracer Gas Test

The tracer gas leak test can be carried out fully automatic or manually.



Choose Probe Type: Select type of probe.
- **Hand Probe** for manual probes such as H50 and AP57.
- **Active Probe** for automatic probes such as AP29, AP55 etc.
- **No Detector** if the ILS500 is to be used without Detector.

Leak Alarm Level: This is the leak rate specification.E.g. 5E-03 cc/s eller 25 PPM.

Calibration Coefficient: See Section 8.4.1 and H2000 Plus Manual.

Locate after Gas Leak: Test object will be left gas filled after leak is detected to allow for locating the leak with a hand probe.

Automatic probe type switch: The ILS500 automatically changes to hand probe, to facilitate localisation when a leak is detected.

Locating Pressure: This is the pressure in the object during the locating step following a failed gross leak or gas test. Leaks detected by the gross leak tests emit large amounts of gas. It is, therefore, often easier to locate a detected leak if the pressure is lowered. (See also **Gas Locate if failure**, Section 8.3.2).

Min. Manual Test Time: This is the minimum time requested for manual checking the test object for leaks. This function requires the Active Holder for Hand Probe.

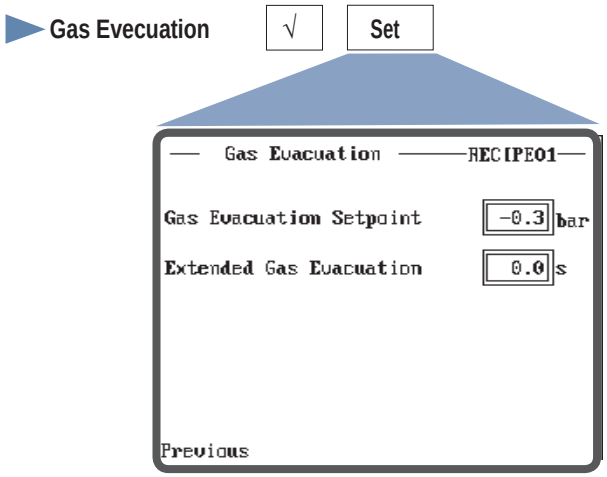
The timer starts when the object is filled and the operator lifts the hand probe out of the Active Holder. The test will not be approved and ends if the hand probe is parked in the holder before the set time has elapsed.

Probe Switching Unit (ILS500 CP only): The Probe Switch Unit makes it possible to connect an extra Hand Probe for locating leaks after e.g. a failed chamber test. Only one sensor or probe can be used at a time, never both at the same time.

H2000 Timers: Only visible if Active Probe is selected. Timers for active probes can be set here and subsequently downloaded to the H2000 PLUS detector. Refer to the probe manual for specific names and functions of the different timers.

8.3.6 Gas Evacuation

Removal of tracer gas after completion of gas test.

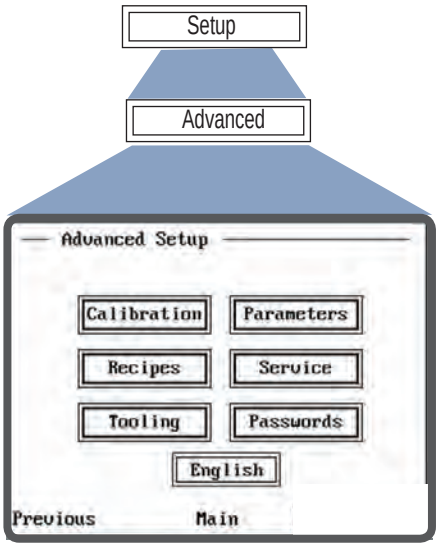


Gas Evac. Setpoint: Set desired level of Gas Evacuation. -0.3 bar (30% vacuum) is adequate for most applications.

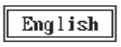
Extended Gas Evacuation: Extends time for gas evacuation, after evacuation setpoint has been reached.

8.4 Advanced Setup

Under Advanced Setup you will have access to every parameter of the ILS500 including those reached from the Quick and Standard Setup menus.



Section 8.4.1
Section 8.4.2
Section 8.4.3 - 5
Section 8.4.6
Section
Section 8.4.11



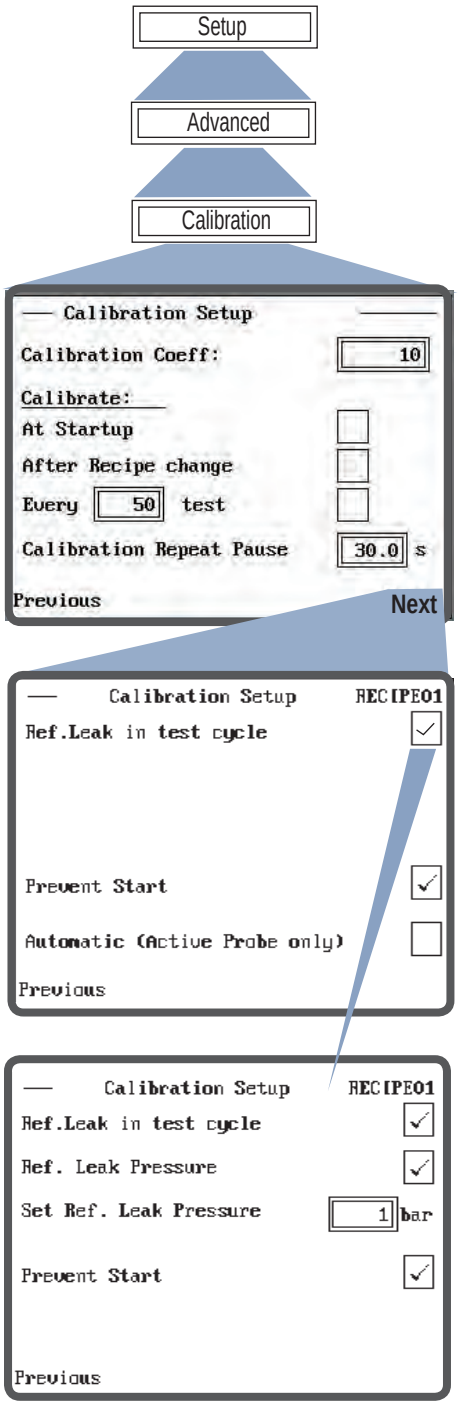
Select ILS500 language here.

EN

8.4.1 Calibration setup

The calibration setup handles the calibration of the gas detection sensitivity.

Here you can set the Calibration Coefficient of the H2000 PLUS detector and the rules for calibration intervals. Automatic calibration can be set for active probes. For hand probe systems the ILS500 will instead display a reminder that the system is due for calibration.



Calibration Coefficient: This is the calibrated leak rate or concentration of your calibration reference.

Important:
The Calibration Coefficient must be given in the same unit as the Leak Alarm Level.

Calibrate:
At Startup: Calibration is performed or requested whenever the power is switched on.

After Recipe Change: Calibration is requested every time another recipe is selected.

Every XX test: Set number of tests between calibration requests.

Calibration Repeat Pause: Min. time between calibrations. (Recovery time for sensor).

Ref. Leak in Test Cycle: Tick this box if your reference leak is integrated in a test object or in the chamber wall. A complete test cycle will be performed during calibration. (Active Probes only). When *Ref. Leak in Test Cycle* is selected a new menu opens making it possible to enter a desired calibration pressure.

Prevent start: Test cycle can not be started if calibration is not valid.

Automatic (Active Probe only): The active probe will be automatically calibrated at intervals set on previous screen.

Max Attempts: Maximum number of recalibration attempts if calibration fails. System will stop trying after this number of attempts and instead display the manual calibration button. This option is only visible if Automatic Calibration is selected.

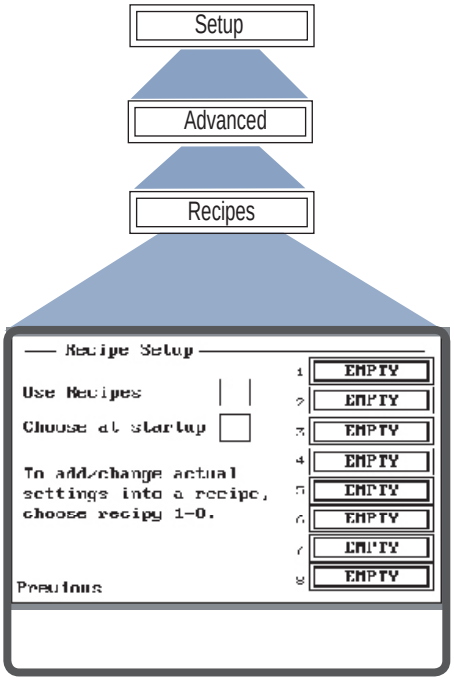
8.4.2 Recipes

A recipe is a collection of settings suited for a particular test setup. This is used to have different settings for different tested objects.

A recipe holds all settings including leak limit and tooling etc.

Up to eight different recipes can be stored.

The recipe name is shown on the right side at the top of the screen.



Follow these steps to add or change a recipe:

a. Adjust all ILS500 settings for the new recipe.

b. Open the recipe handling menu.

c. Press the button of the recipe you want to add or change.

d. Check/change the name of the recipe on the right side of the screen.

e. Press 

Use Recipes: Tick this box to activate the recipe handling.

Choose at startup: When power is switched on the ILS500 prompts the operator to choose recipe.

Keep Pressure: Retains gas pressure between two recipes.

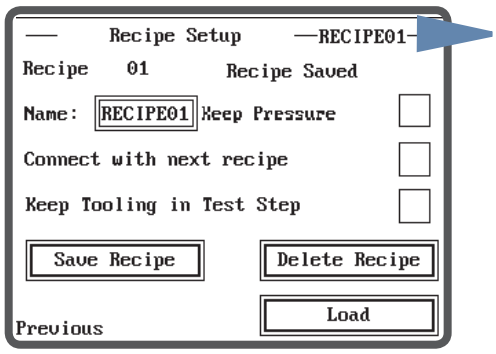
Connect with next recipe: Connects two recipes to form one test cycle. Recipe 1 + 2, 3 + 4, 5 + 6, and 7 + 8 can be connected.

Keep Tooling in Test Step: Excludes the disconnection step in the first recipe when two recipes are connected as described above.

Save Recipe: Saves the current settings under the recipe name given above.

Delete Recipe: Deletes the current recipe (name shown above).

Load: Loads the parametres of the latest, saved recipe.



Recipe name

The easiest way to build a new recipe is to modify a similar existing recipe:

a. Select the old recipe.

b. Adjust the ILS500 to suit the new recipe.

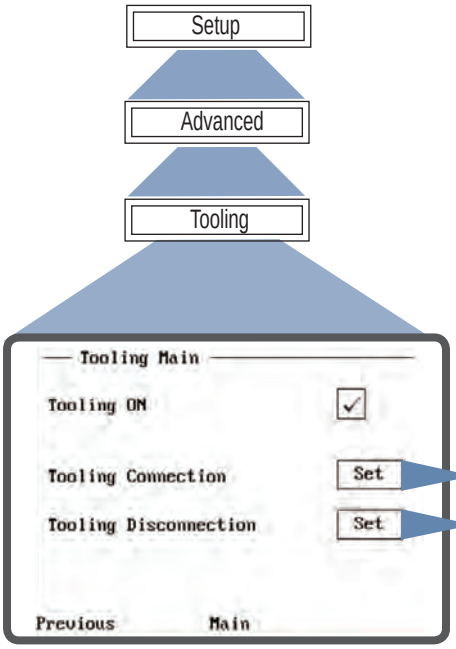
c. Enter the menu handling menu again and enter the name of the new recipe.

d. Press 

8.4.3 Tooling

EN

The tooling setup menus can be reached either from the **Standard Setup** menu or from the **Tooling** menu under **Advanced Setup.**



Section 8.4.4

Section 8.4.5

The tooling function can be used for automatic connection of the tested object, closing of a test chamber etc.

ILS500 has **four tooling valve outputs** to which air cylinders in your test fixture can be connected.

There are also **four inputs for connecting proximity switches** in the fixture. This can be a switch detecting that a cylinder has moved into the correct position or simply a switch detecting that the object to be tested is in place.

You can set up a sequence of up to four connection steps and another independent sequence of four disconnection steps.

The tooling sequences are specific for each recipe.

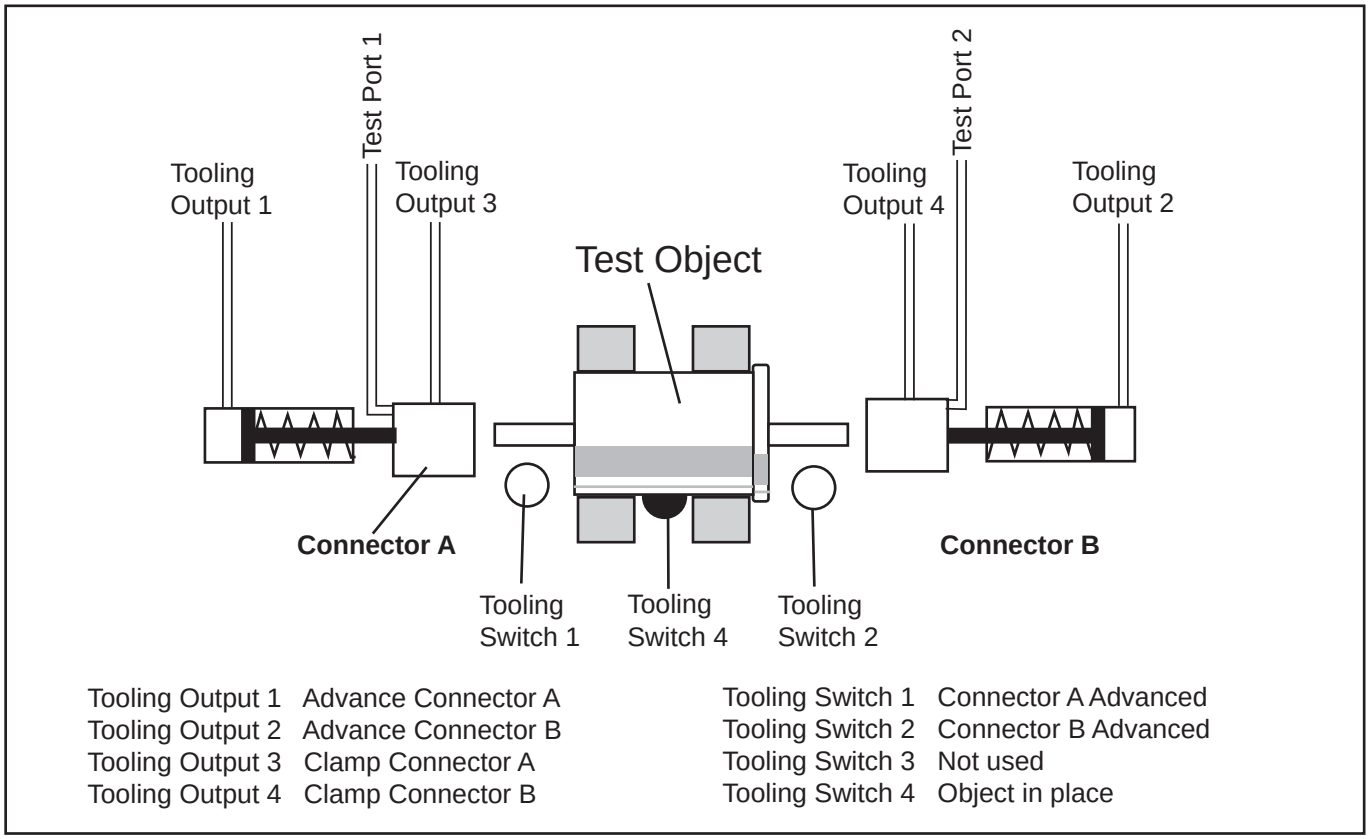
Purge Object

Object will be purged with air after the evacuation setpoint has been achieved. This function requires that tooling is activated and that the correct tooling disconnection step is set to activate on “Air Purge”, Section 8.4.5.

ILS500 will continue to evacuate for the set time. The tooling should be programmed to open the object so that air can be pulled through the object into Test Port 1. See further under Tooling.

8.4.4 Tooling Connection

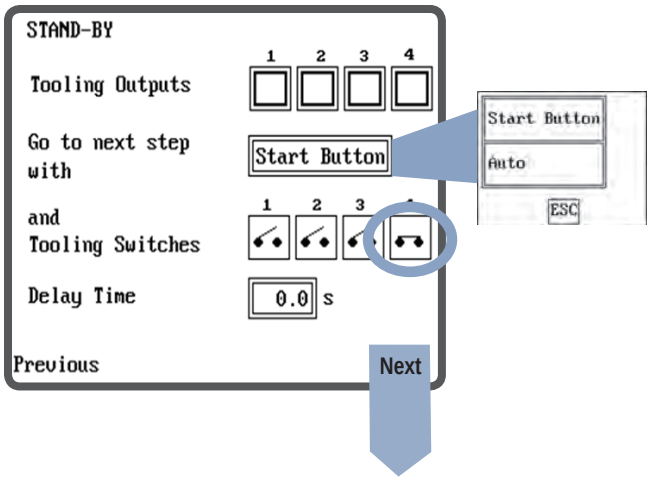
Up to four connection steps can be programmed. This example shows how the programming is carried our.



Tooling Output 1	Advance Connector A	Tooling Switch 1	Connector A Advanced
Tooling Output 2	Advance Connector B	Tooling Switch 2	Connector B Advanced
Tooling Output 3	Clamp Connector A	Tooling Switch 3	Not used
Tooling Output 4	Clamp Connector B	Tooling Switch 4	Object in place

Stand-by

Mark the tooling valves that will be activated in STAND-BY (between tests). In this example no tooling outputs are activated.



Decide how to go to next step. In this example Start Button and Tooling Switch 4 are selected.

The test sequence will continue when Start Button is pressed and Tooling Switch 4 indicates that the test object is loaded.

In this example no delay time is selected.

Press **Next** to go to Connection Step 1 setup.

EN

Connection Step 1

Activate tooling outputs for step 1. In this example Tooling Outputs 1 and 2 (advance connector A and B).

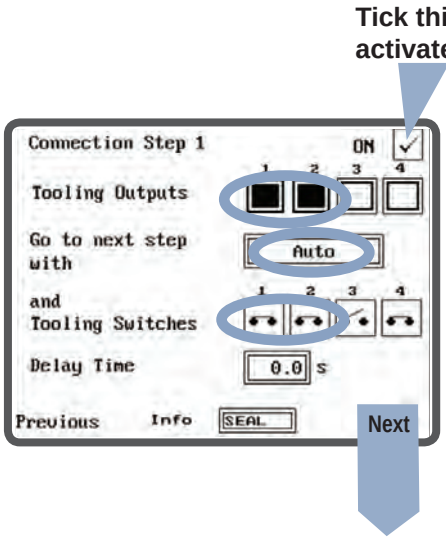
Decide how to go to next step. In this example Auto and Tooling Switches 1 and 2 are selected.

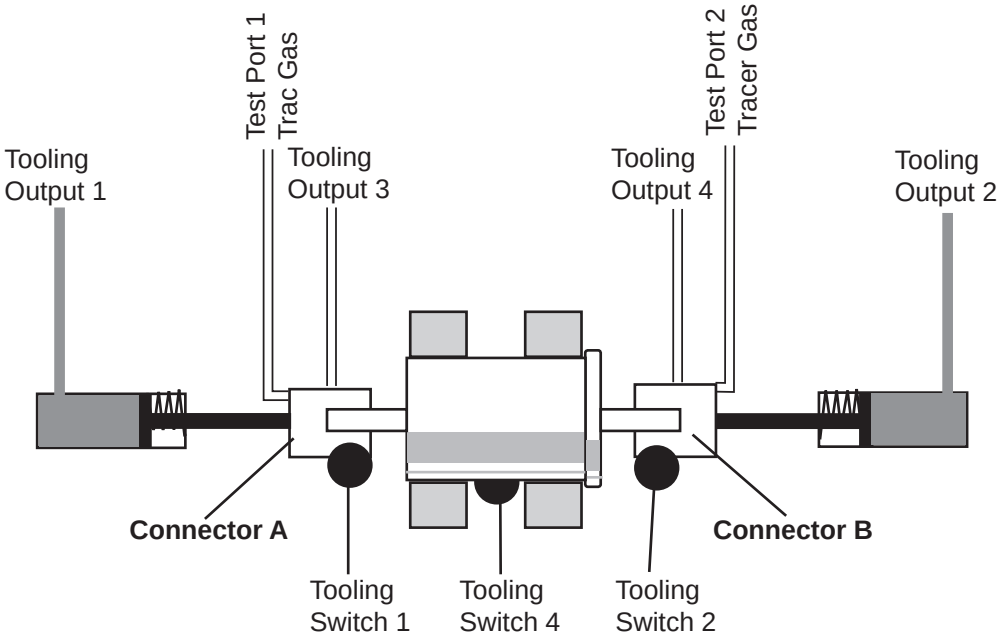
The test sequence will continue automatically when Tooling Switch 1 and 2 indicates that the Connectors A and B have advanced (switch 4 must also be closed).

In this example no delay time is selected.

Set an 'info' text (name) for the step. In this example the step is named SEAL. Max length for info text is 6 characters. This text is displayed in main display during this step. Text is useful if sequence stops when, for instance, a tooling switch has not closed.

Press **Next** to go to Connection Step 2.





After Connection Step 1 the Connectors A and B have advanced and activated Tooling Switches 1 and 2.

Connection Step 2 and 3
The set up of Connection Steps 2 and 3 work exactly the same way as Connection Step 1. Steps 2 and 3 are not used in this example.

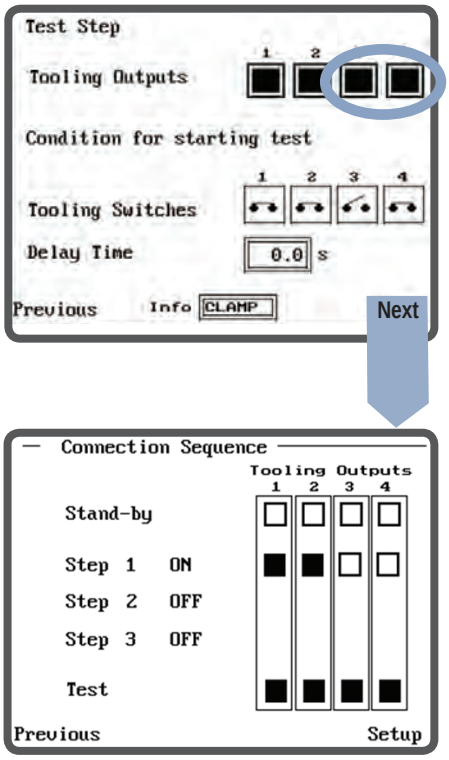
Press Next - Next to get to Test Step

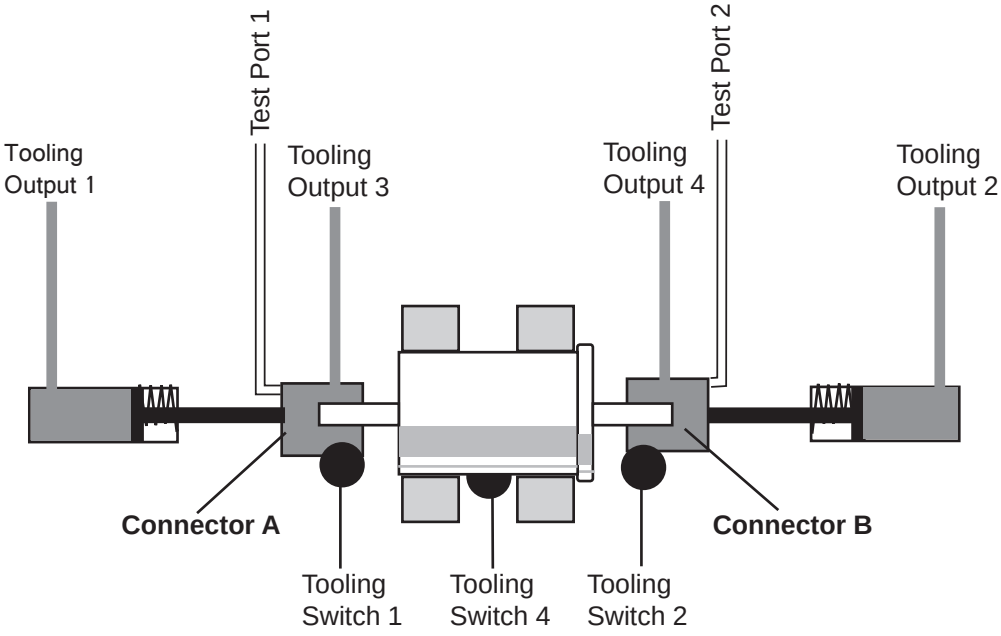
Test Step
Activate tooling outputs for Test Step. In this example Tooling Outputs 3 and 4 (clamp connector A and B). Outputs 1 and 2 are left active from previous step.

The sequence will proceed to test if tooling switches 1, 2 and 4 are still closed and 3 is open.

Step is named CLAMP.

When Next is pressed, the Connection Sequence menu shows a general view of the steps.





During the Test Connectors A and B are clamped around the openings of the test object.

8.4.5 Tooling Disconnection

This controls the disconnection of the test fixture after completion of test. Up to four disconnection steps can be used.

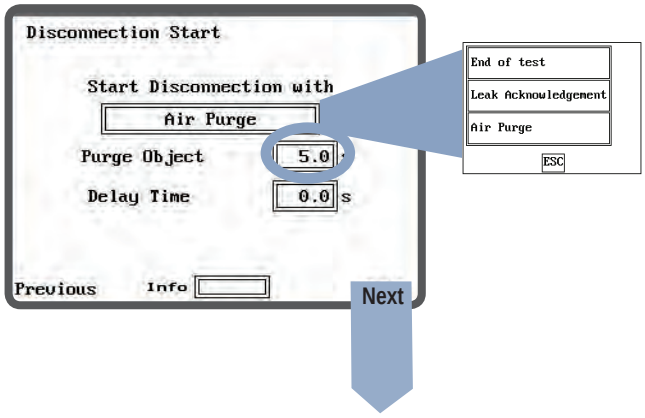
The disconnection can start in three ways:

- **End of test**: Start disconnection sequence at end of leak test Disconnection will start even if operator has not confirmed a detected leak. A detected leak must, however, be confirmed before starting next test.

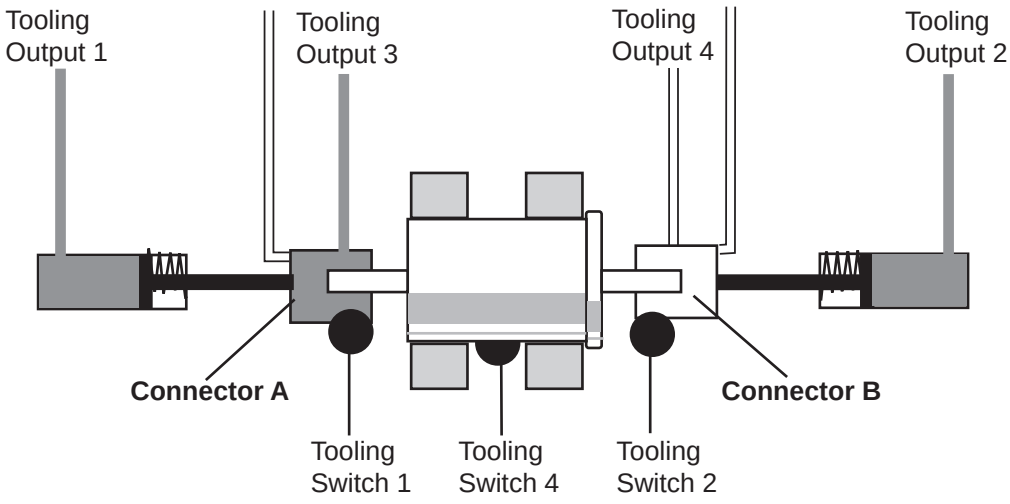
- Leak Acknowledgement: If a leak is detected, the disconnection will start when operator acknowledges the leak by pressing STOP. Disconnection will start automatically at end of test if no leak is detected.

- Air Purge: Disconnection sequence starts at end of test with air purge function. Venturi pump will draw air into Test Port 1 during this time (here 5.0 s) after the Gas Evacuation step is completed.

N.B. Purge object timer is only visible if **Air Purge** is selected. Air purge function requires that both test ports are used and that the tooling sequence is setup to open an air path during purging. See further under **Disconnection Step 2** below.



In this example no delay time and no information text is entered before proceeding to **Disconnection Step 1**.

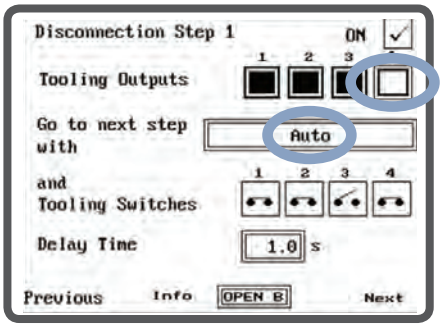


After the Tooling Disconnection Step 1 the Connector Clamp B is released.

Disconnection Step 1
First step of disconnecting the test object from the test fixture. In this example clamp B (Tooling Output 4) is released first. Disconnection continues automatically as **Auto** is selected in this example.

Tooling Switches 1, 2 and 4 must still be closed. Delay Time is set to 1.0 s to allow the clamp B to open fully before proceeding.

Step is named OPEN B

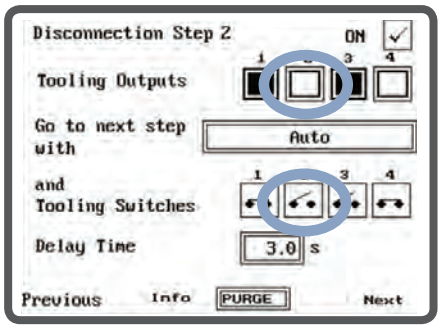


Disconnection Step 2
The disconnection setup is very similar to the connection setup. In this example the disconnection shall continue with the retraction of connector B (Tooling Output 2). This happens when the air purge timer starts as specified in the previous display.

The sequence will proceed automatically (Auto) when Tooling Switch 2 has opened.

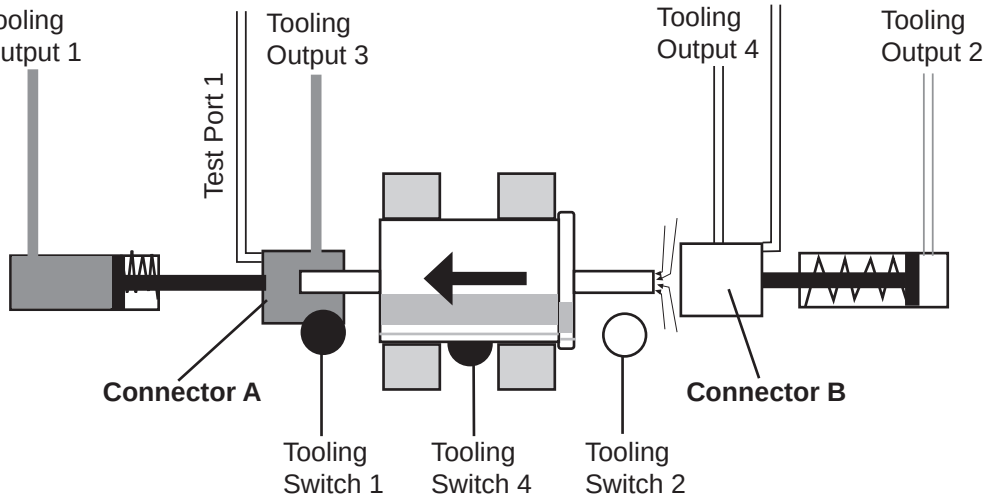
There is a 3 seconds Delay Time to allow the Air Purge to pull in air through the opened connector, through the object and into Test Port 1.

N.B. The Air Purge timer only decides how long the Venturi pump will stay on. The tooling sequence must still be setup to hold the air path open during the purge time.



The Air Purge will effectively remove all tracer gas from inside the test object.

Step is named ”PURGE”. Max length for info text is 6 characters.

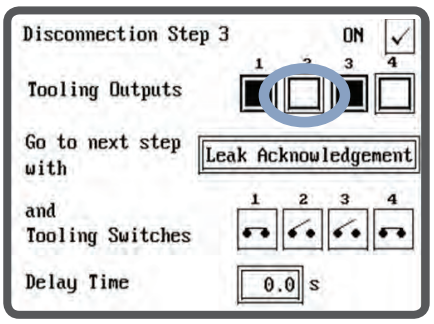


After the Tooling Disconnection Step 2 the Connector B is retracted from the test object.

EN

Disconnection Step 3

Release clamp A (output 2).



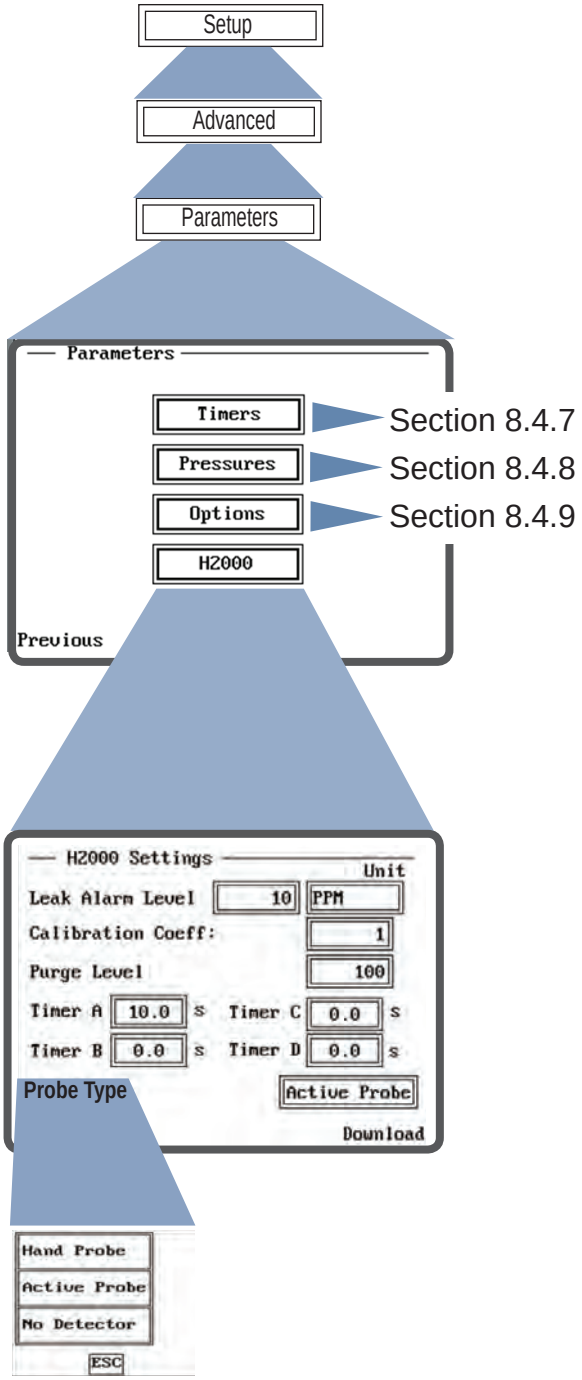
If a leak is detected, wait for operator to press STOP to acknowledge before proceeding.

Sequence will proceed automatically if no leak is detected.

Proceed to Stand-by mode if switch have not changed.

N.B. Stand-by was earlier set to turn all outputs off. This means Connector A will also retract when sequence proceeds to Stand-by mode.

If connection or disconnection fails, press STOP for 3 seconds to abort and reset to stand-by position.



8.4.6 Parameters

All Timer, Pressure and Option settings (except for Calibration and Tooling) can be selected from the Parameters Menu. Some of them (with a reference number) are also found in the Quick and/or Standard Setup menus.

These settings make it possible to optimize the test cycle.

Timers

All timers in the ILS500 can be viewed and adjusted in the four Timer screens.

Pressures

All pressure set-points in the ILS500 can be viewed and adjusted in the three Pressure screens.

Options

All parameters that are not set as a numeric value can be found under options.

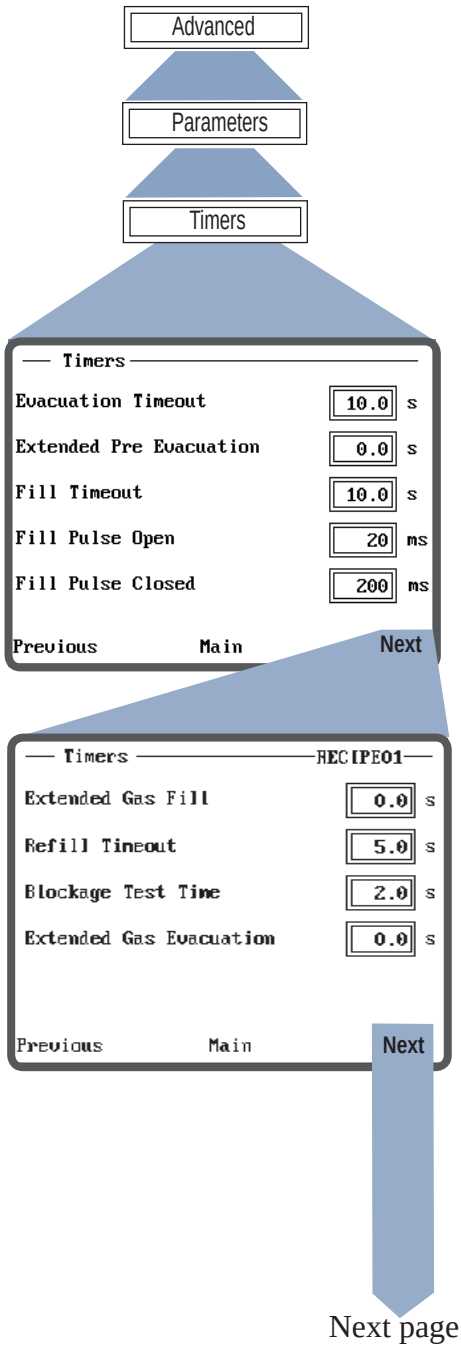
H2000 Settings

Parameters in H2000 PLUS which are controlled by ILS500. See also the H2000 PLUS Manual.

Hand Probe: selects probe type Hand Probe in H2000 PLUS.

Active Probe: selects installed driver in H2000 PLUS (right hand choice under APC Settings/ Probe Type.

No Detector: sets ILS500 to work independant of H2000 PLUS detector when gas test is to be performed at another time or location.



Next page

8.4.7 Timers

Evacuation Timeout: Section 8.3.2

Extended Pre Evacuation: Section 8.3.1

Fill Timeout: Section 8.3.3

Fill Pulse Open: Open time for gas fill valve during pulsed part of pressure regulation.

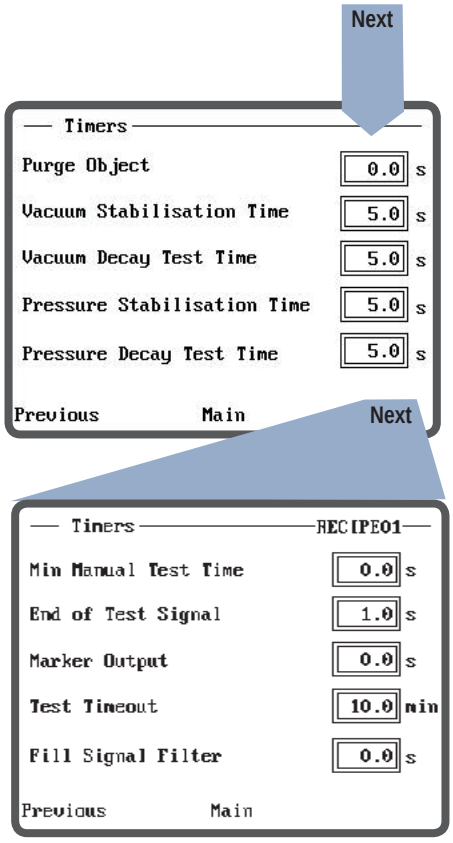
Fill Pulse Closed: Closed time for gas fill valve during pulsed part of pressure regulation.

Extended Gas Fill: Extends filling after the fill setpoint has been reached.

Refill Timeout: Maximum time for refill before object is rejected. Refill occurs if pressure drops below **Fill Setpoint** minus **Refill Hysteresis**.

Blockage Test time: Section 8.3.4

Extended Gas Evacuation: Section 8.3.6



Purge Object: Section 8.4.5

Vacuum Stabilisation Time: Section 8.3.2

Vacuum Decay Test Time: Section 8.3.2

Pressure Stabilisation Time: Section 8.3.2

Pressure Decay Test Time: Section 8.3.2

Min. Manual Test Time: Section 8.3.5

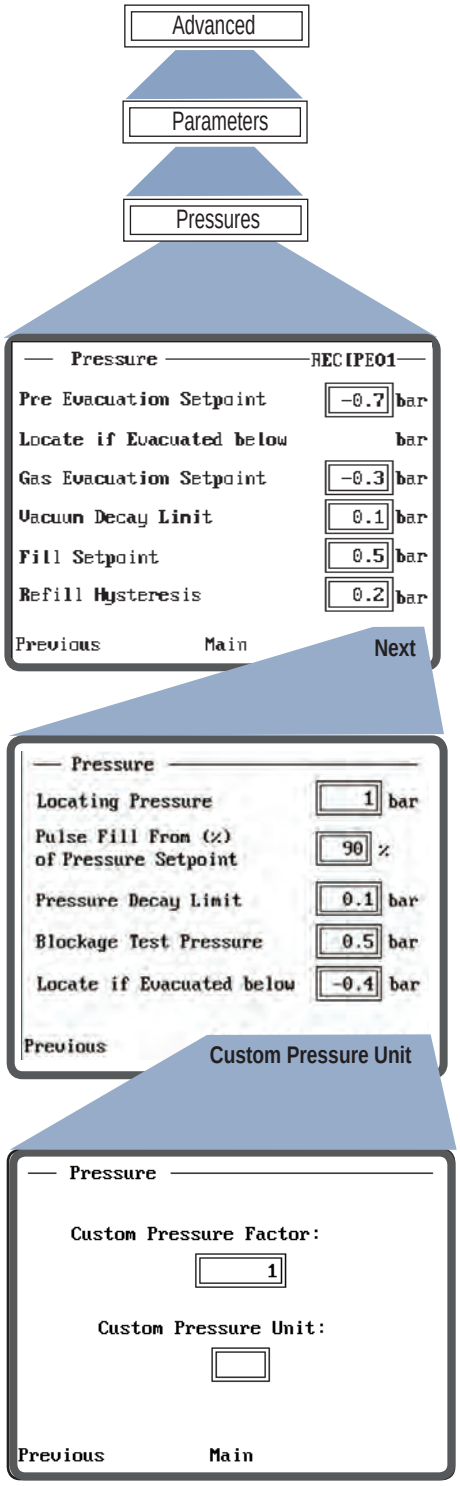
End Of Test Signal: Sets the length of the *End of Test* signal. *Status – pin 5* must be set to *End of Test*. This signal can be connected to a beeper alerting the operator that the test is ready.
N.B. This parameter is global and not part of specific recipes.

Marker output: Marker pulse length.

Test Timeout: General test timeout. Test will be terminated if unit is idling in tracer gas step for more than the set time.

Fill Signal Filter: Ignores the pressure sensor signal for 0 – 2 seconds after the fill valve is opened.

Useful if high feeding pressure to the ILS and a large test object cause an early, incorrect signal from the pressure sensor.



8.4.8 Pressures

Pre Evacuation Setpoint: Section 8.3.1

Gas Evacuation Setpoint: Section 8.3.6

Vacuum Decay Limit: Section 8.3.2

Fill Setpoint: Section 8.2, 8.3.3

Refill Hysteresis: Hysteresis for gas refill. Gas refill will start if pressure drops below setpoint minus Refill Hysteresis.

Locating Pressure: Section 8.3.5

Pulse Fill From (%) of Pressure Setpoint: Fill function will switch from continuous filling to pulsed filling at this level.

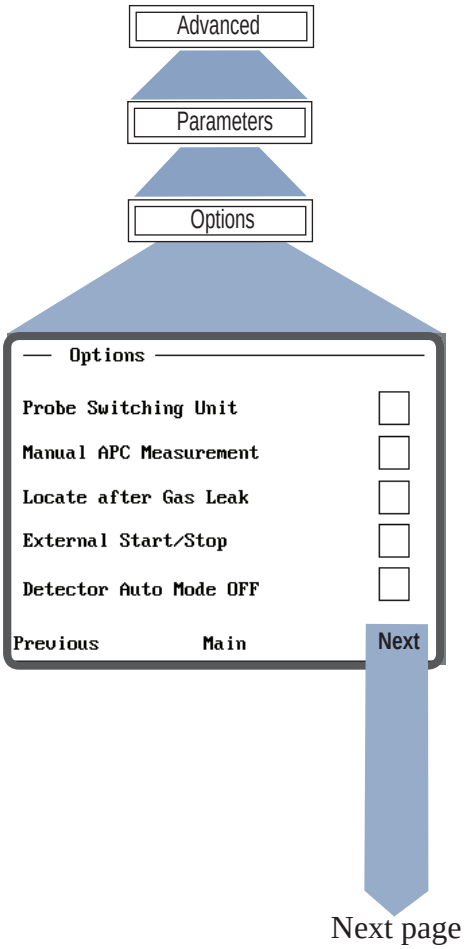
Pressure Decay Limit: Section 8.3.2

Blockage Test Pressure: Section 8.3.4

Locate if evacuated below: ILS500 can be set to fill gas even if pre evacuation fails. This is to allow location of the leak. Gas filling is allowed if pre evacuation attained this level. Section 8.3.1.

Custom Pressure Factor: Conversion factor for non-listed pressure unit. Factor should de given as units/bar (e.g. 1000 hPa/bar). See *Custom Pressure Unit* below.

Custom Pressure Unit: Desired non-listed pressure unit (e.g. hPa). See also Custom Pressure Factor above.



Next page

8.4.9 Options

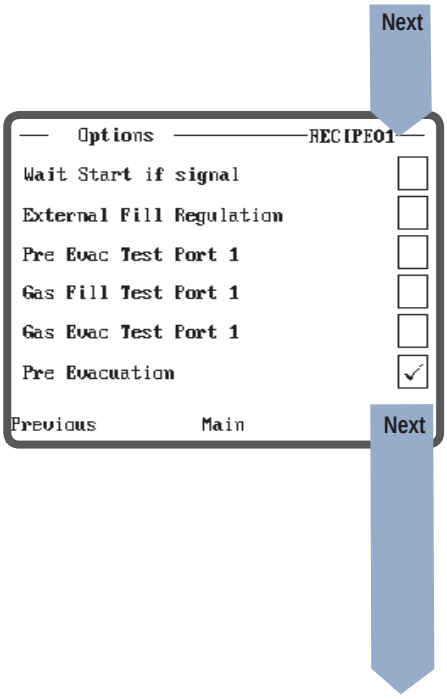
Probe Switching Unit: This box should be ticked if you have an ILS500 CP Unit. The Probe Switch Unit allows the connection of an extra Hand Probe to the Combi Probe version ILS500 CP. The extra hand probe is used for locating leaks in automated tests such as chamber tests.

Manual APC Measurement: (Only with Active Probe.) The ILS500 will not order the H2000 PLUS to take a sample. Sampling must be ordered manually. See H2000PLUS Manual for setting up this function in the H2000 PLUS. The ILS500 rests in Tracer Gas step recording ACCEPT and REJECT signals from manually ordered samples. Test is terminated by pressing STOP (or sending STOP signal). Test will be rejected if one or more samples resulted in REJECT.

Locate after Gas Leak: The operator can use a hand probe to locate leak if object has been failed. The tracer gas pressure will be reduced to *Locating Pressure* level.

External Start/Stop: High if external control panel is used. Automatically set if external panel is connected. Must be manually reset to reactivate START and STOP buttons on front panel.

Detector Auto Mode OFF: Turns off automatic control of H2000 PLUS mode, allowing operator to manually switch between Detection and analysis Mode.



Next page

Wait Start if Signal: The ILS500 normally will not start if the H2000 PLUS detector shows a signal above zero. If this option is selected you can press start even if the detector shows a signal above zero. ILS500 will wait until detector shows zero and then proceed with test cycle.

External Fill Regulation: Section 8.3.3

Pre Evac. Test Port 1: Pre evacuation through Test Port 1 only (standard is port 1 + 2). This is an alternative method of performing a blockage test. Evacuation pressure will be measured in Test Port 2. N.B. This option can only be used if both test ports are connected.

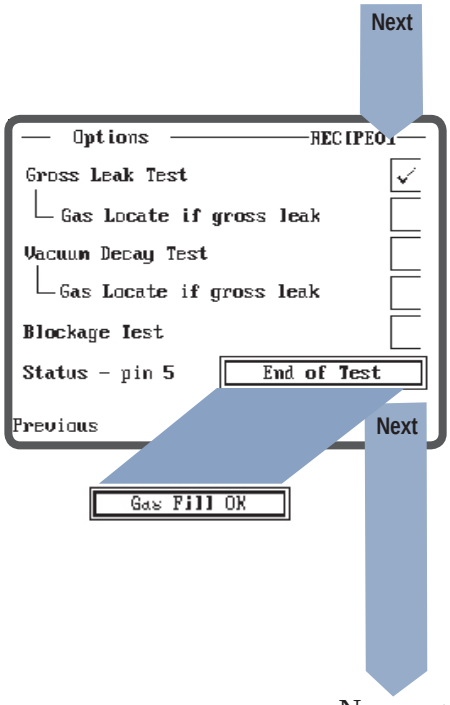
Gas Fill Test Port 1: Filling through Test Port 1 only. Fill pressure will be measured in Test Port 2.

N.B. This option can only be used if both test ports are connected.

Gas Evac. Test Port 1: Gas evacuation through Test Port 1 only. Evacuation pressure will be measured in Test Port 2.

N.B. This option can only be used if both test ports are connected.

Pre Evacuation: Section 8.3.1



Nex page

Gross Leak Test: Section 8.3.2

Gas Locate if failure: Section 8.3.1

Vacuum Decay test: Section 8.3.2

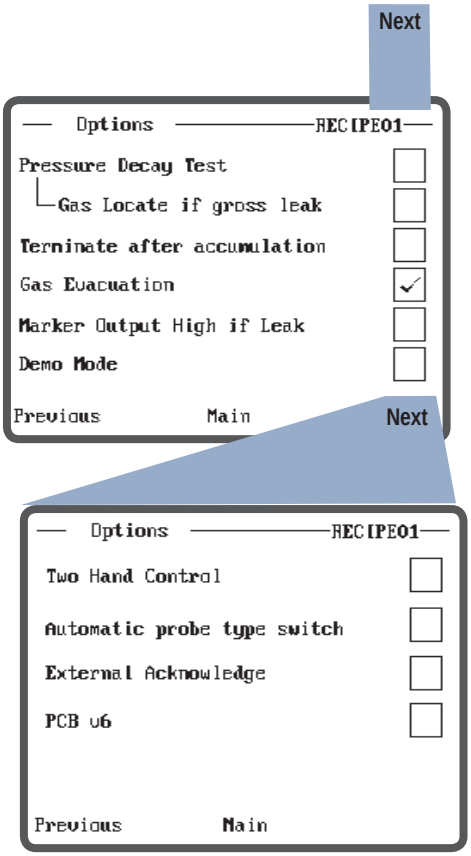
Gas Locate if Failure: Section 8.3.2

Blockage Test: Section: 8.3.4

Status - pin 5: Sets the function of the EOT/ FILLED status output. Connect a beeper or lamp to use this function. Plug-and-play light tower is available.

End of Test: The output will come on for a short period at the end of the test cycle. This can be used to give audio alarm to operator.

Gas Fill OK: The output comes on when test object is filled with gas. This can be used to signal that the operator can start searching for leaks with the hand probe.



Pressure Decay Test: Section 8.3.2

Gas Locate if gross leak: Section 8.3.2

Terminate after accumulation: As default, gas evacuation starts when gas test result is received from H2000 PLUS detector. Selecting this option, the gas evacuation starts when APC accumulation is ready. Use this option to optimise test cycle.

Important: Evaluate your test fixture design and consider the effects of having a negative pressure in the test object when the gas sample is taken.

Gas Evacuation: Section 8.3.6

Marker Output High if Leak: Select this to mark Rejected objects. Standard is to mark Accepted object.

Demo Mode: This option is for sales demonstration purposes only. **This must not be selected!**

Important: If selected the ILS500 will simulate the test cycle. The test object will appear to be filled even if tracer gas and/or compressed air is not connected. Contact your supplier if Demo Mode is ticked.

Two Hand Control: Activates the two hand start function, to ensure the safety of the operator, when test cycle contains dangerous movements. Two hand relay (optional) is required.

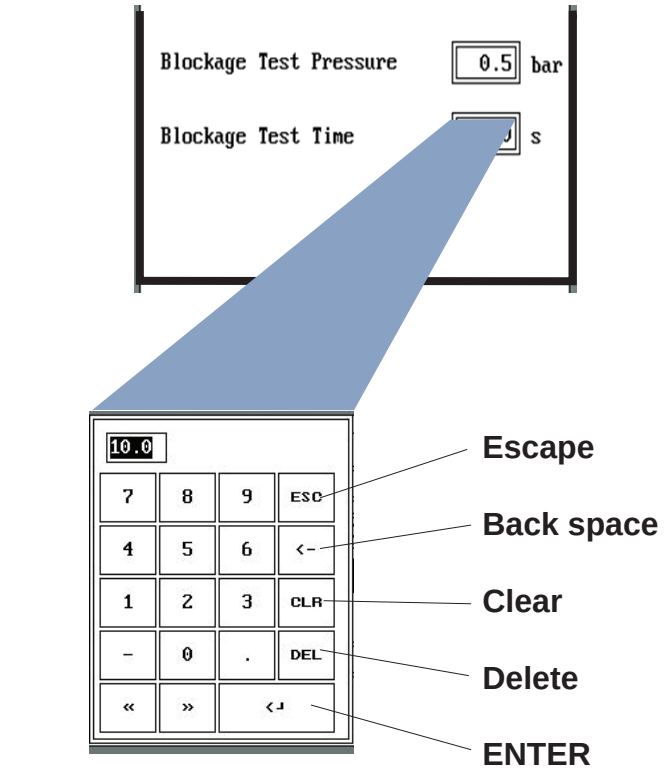
Automatic probe type switch: ILS500 will automatically change from active probe to hand probe, see Section 8.4.9, *Probe Switching Unit*.

External Acknowledge: Used when external button is used to acknowledge a leak. In this case the Stop button can not be used for leak acknowledgement.

PCBv6: For future function.

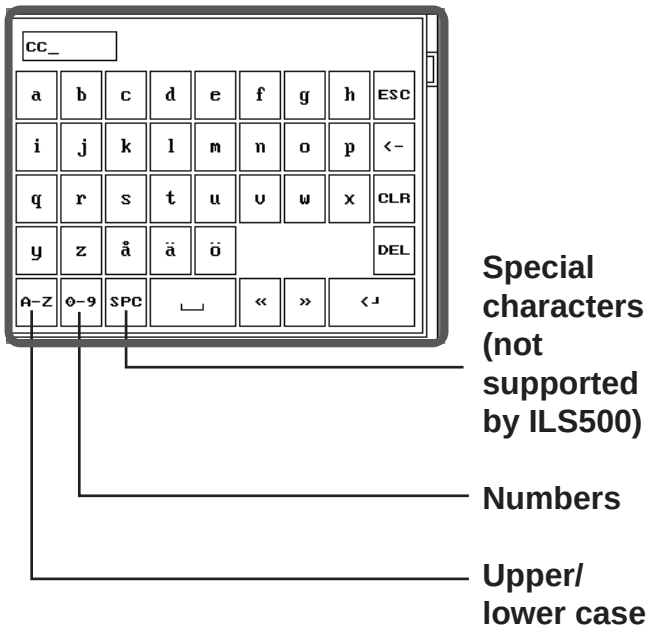
8.4.10 Entering numbers and text

To change a value, press on the value. The numeric or alphanumeric input menu will open.



To change a value:
- Press the desired digits or characters.
- Press ENTER to store the new value.

When entering text — press a-z (A-Z) to switch between lower and upper case.



8.4.11 Password protection

EN

The settings of the ILS500 can be protected with 5 different passwords levels. Each of the levels locks the access to a given part of the settings. ILS500 does not support individual operator ID passwords.

ILS500 is delivered with all levels open.

The Password administration menu can be found under the Advanced Setup menu.

When you try to enter this menu you will be prompted for the Level 6 password.

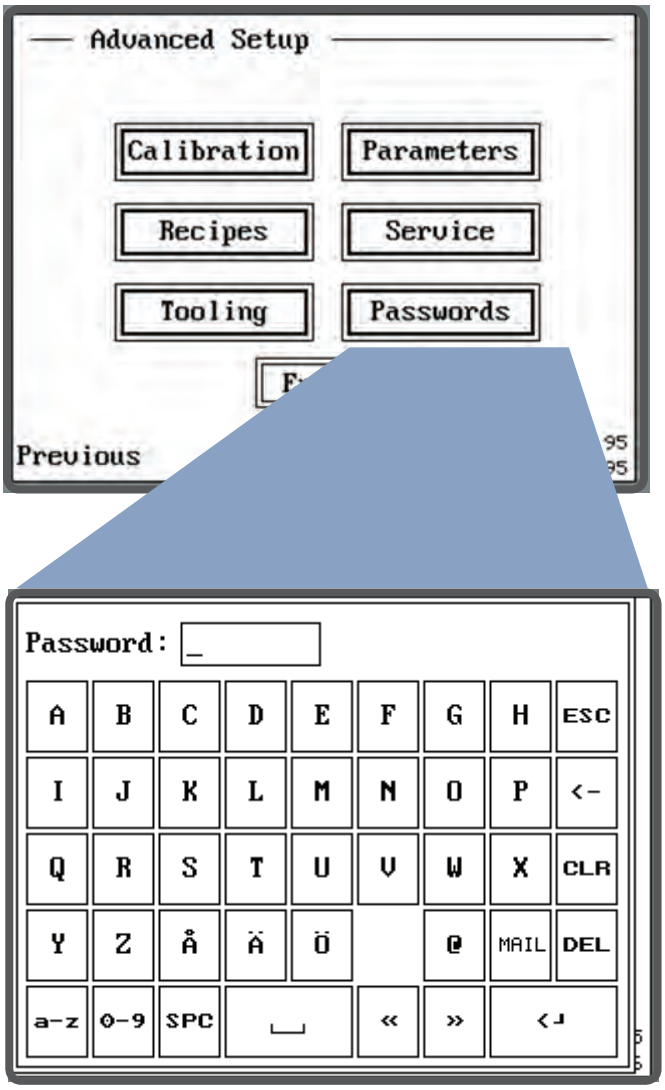
This is set to “F” from the factory.

After entering the password you will have to press Password again to enter the menu.

Keep the Level 6 password in a safe place. This is your Supervisor’s password.

If you lose this password you will need the Level 7 password to retrieve it. Contact your supplier if this is the case.

The passwords are set to the following when the ILS500 is delivered:

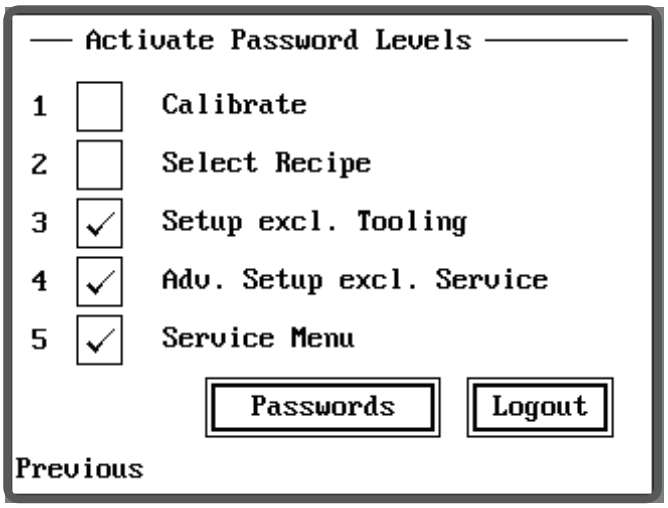


Level 1	A
Level 2	B
Level 3	C
Level 4	D
Level 5	E
Level 6	F

Tick the box for the Level you want to password protect. All higher levels will be automatically selected.

To open a level again press on the box once more.

If you activate Level 1 (highest protection) the operator can only run regular test using the current recipe. Calibration can not be performed.



Level	Password	Allowed functions if level not protected.
1	A	Start of calibration.
2	B	Selection of recipe.
3	C	Quick and Standard Setup excluding Tooling Setup
4	D	Tooling and Advanced Setup excluding Service Menu
5	E	Service Menu
6	F	Password Administration (always protected)

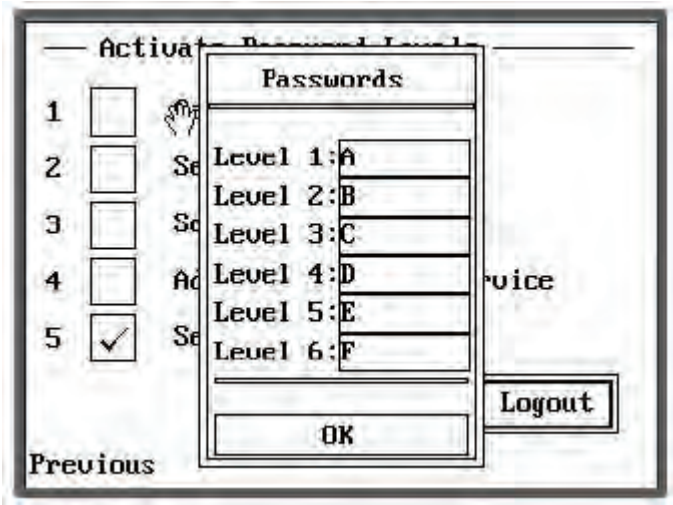
After logging in to the password administrations menu you will remain logged on for 20 minutes. We recommend that you log out when you are ready in order to prevent unauthorised changes to the system.

To change a password, press the Passwords button and then press on the respective password. Set the new password and press OK.

Remember to change the passwords of **all** levels you want protected. Anyone with access to this manual can open the system if you leave the factory setting for a higher password to be inserted.

Keep the Level 6 password in a safe place. This is your Supervisor's password.

If you lose this password you will need to contact your supplier to get the Level 7 password to retrieve it.



8.5 Parameter Index

EN

All parameters are listed below in alphabetical order with factory default setting and page reference.

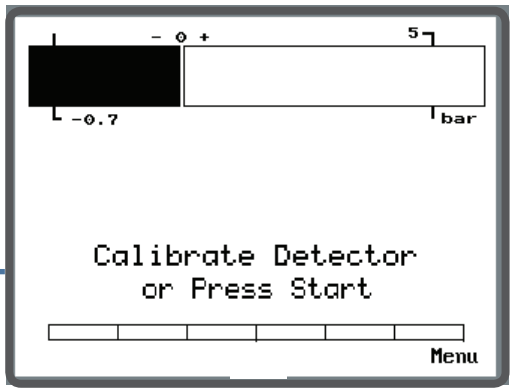
Parameter	Factory setting	See section
Automatic (Active Probe only)	OFF	8.4.1
Automatic probe type switch	OFF	8.4.9
Block Test Pressure	0.5 bar	8.3.4
Blockage Test Time	2 s	8.3.4
Blockage Test	OFF	8.3.4
Calibrate: After recipe change	ON	8.4.1
Calibrate: At startup	OFF	8.4.1
Calibrate: Every __ test	50 / OFF	8.4.1
Calibration Coefficient	10	8.4.1
Calibration repeat pause	20 s	8.4.1
Choose at startup	OFF	8.4.2
Choose Probe Type	Hand Probe	8.3.5
Custom Pressure Unit		8.4.8
Custom Pressure Factor		8.4.8
Demo Mode	OFF	8.4.9
End of Test Signal	1 s	8.4.7
Evacuation Timeout	10.0 s	8.3.2, 8.4.7
Extended Gas Evacuation	0 s	8.3.6, 8.4.7
Extended Gas Fill	0 s	8.4.7
Extended Pre Evacuation	0 s	8.3.1, 8.4.7
External Acknowledge	OFF	8.4.9
External Gas Regulation	OFF	8.3.3, 8.4.9
External Start/Stop	OFF	8.4.9
Fill Pulse Open	20 ms	8.4.7
Fill Pulse Closed	200 ms	8.4.7
Fill Setpoint	5 bar	8.2, 8.3.3, 8.4.8
Fill signal filter	0.0 s	8.4.7
Fill Timeout	10 s	8.3.3
Gas Evacuation	ON	8.3.6
Gas Evac. Setpoint	-0.3 bar	8.3.6
Gas Evac. Test Port 1	OFF	8.4.9
Gas Fill Test Port 1	OFF	8.4.9
Gas Locate if failure (pre evacuation)	OFF	8.3.1
Gas Locate if failure (vacuum decay)	OFF	8.3.2
Gas Locate if failure (pressure decay)	OFF	8.3.2
Locate after Gas Leak	OFF	8.3.5, 8.4.9
Locate if evacuated below	-0.4 bar	8.3.1, 8.4.8
Locating Pressure	2 bar	8.3.5, 8.4.8

Parameter	Factory setting	See section
Manual APC Measurement	OFF	8.4.9
Marker output	0 s	8.4.7
Marker Output High if Leak	OFF	8.4.9
Min. Manual Test Time	0 s	8.4.7
PCB v6	OFF	8.4.9
Pre Evac Test Port 1	OFF	8.4.9
Pre Evacuation	ON	8.3.1, 8.4.9
Pre Evacuation Setpoint	-0.7 bar	8.3.1, 8.4.8
Pressure Stabilisation Time	5 s	8.3.2
Pressure Decay Limit	0.1 bar	8.3.2
Pressure Decay Test	OFF	8.3.2
Pressure Decay Test Time	5 s	8.3.2
Pressure Unit	bar	8.1, 8.2
Prevent Start	OFF	8.4.1
Probe Switching Unit	OFF	8.3.5, 8.4.9
Pulse Fill from (%) of Setpoint	90 %	8.4.8
Purge Level	100	8.4.6
Purge Object	0 s	8.3.6, 8.4.7
Ref.Leak in test cycle	OFF	8.4.1
Ref. Leak Pressure	OFF	8.4.1
Refill Hysteresis	0.2 bar	8.4.8
Refill Timeout	5 s	8.4.7
Reminder on display	OFF	8.4.1
Set Ref. Leak Pressure	1 bar	8.4.1
Status - pin 5	End of Test	8.4.9
Terminate after accumulation	OFF	8.4.9
Test Timeout	10 min	8.4.7
Timer A	10 s	8.3.5
Timer B	0 s	8.3.5
Timer C	0 s	8.3.5
Timer D	0 s	8.3.5
Tooling Connection	OFF	8.4.4
Tooling Disconnection	OFF	8.4.5
Two-Hand Control	OFF	8.4.9
Use Recipes	OFF	8.4.2
Vac. Stabilisation Time	5 s	8.3.2, 8.4.7
Vacuum Decay Limit	0.1 bar	8.3.2, 8.4.8
Vacuum Decay Test	OFF	8.3.2
Vacuum Decay Test Time	5 s	8.3.2, 8.4.7
Wait Start if signal	OFF	8.4.9

8.6 Calibration

EN

The Calibration Coefficient of the H2000 PLUS detector and the rules for calibration intervals are set in *Calibration Setup*, Section 8.4.1.



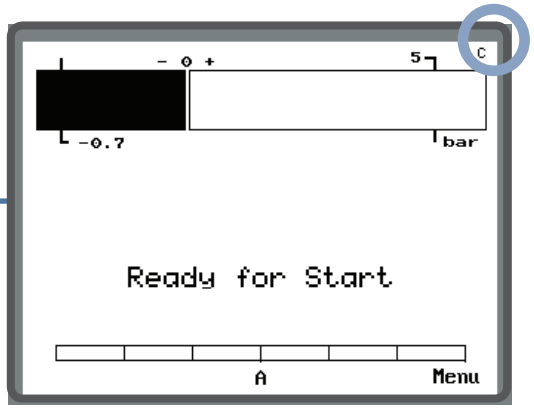
8.6.1 Calibration of Hand Probe

ILS500 shows this message when it is time to calibrate:

When using a hand probe you must manually start a calibration from the H2000 PLUS panel (see H2000 PLUS Manual). You must calibrate before proceeding if you have selected **Prevent Start** in the calibration setup. Otherwise you can ignore the calibration reminder and press START for next test. If a calibration is not performed, the calibration request will be shown before every start until the calibration is carried out.

A successful calibration is indicated by the letter ”C” .

The indication disappears when a new calibration is due to calibration setup (Section 8.4.1) or after a failed manual calibration.



8.6.2 Manual calibration of Active Probe

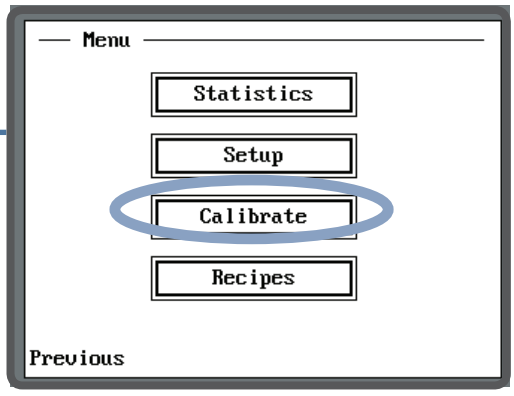
The calibration of active probes is handled from the touch display.

The operator can perform a calibration whenever necessary.

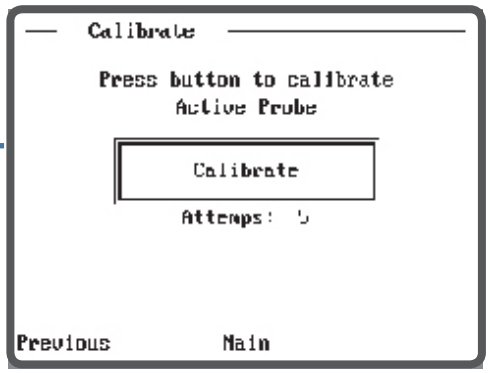
Press **Menu** to show the menu screen:

Press **Calibrate** to start the calibration.

Note: Recipes button is only visible when **Use Recipes** is activated.

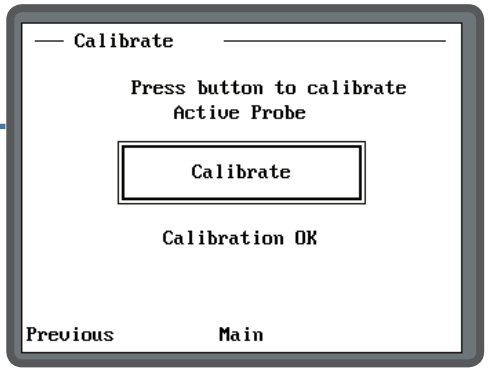


If there is no successful calibration saved, for example after a failed calibration, this message is displayed:



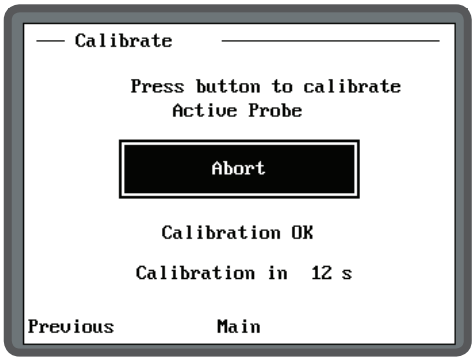
Attempts indicates the number of unsuccessful calibration attempts.

If there is a successful calibration saved, this message is shown:



The **Calibration Pause** timer is activated after each calibration attempt. This is used to make sure that the sensor is given enough time to recover after a previous calibration. The timer is set in **Calibration Setup**. Default is 20 seconds which gives approximately 30 seconds resting time.

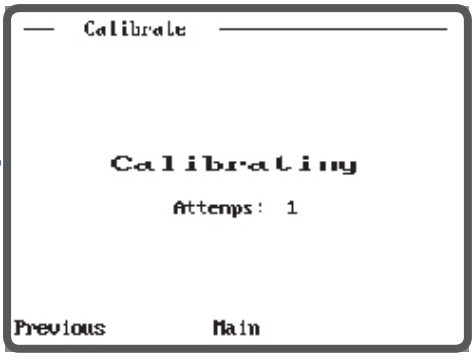
The following message will be shown if calibration is ordered before the **Calibration Pause** time has elapsed:



Calibration will start automatically when the timer has counted down to zero.

To interrupt the calibration — press **Abort**.

This message is shown during the calibration of H2000 PLUS:

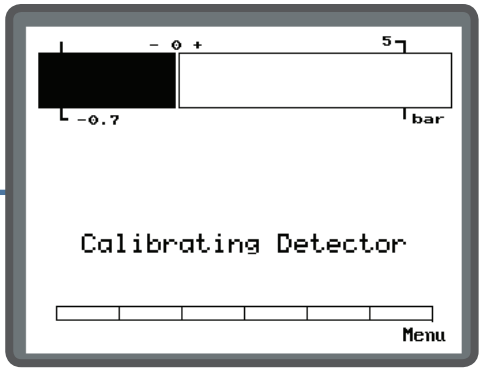


8.6.3 Automatic Calibration of Active Probe

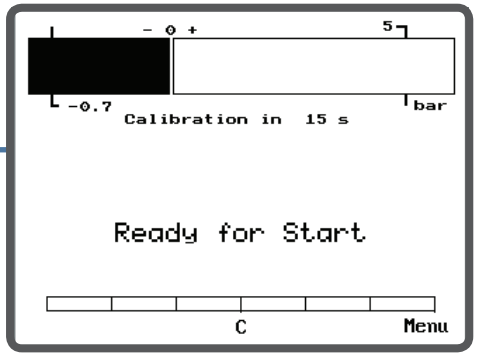
ILS500 can be set up to perform automatic calibration of active probes.

This choice and other rules for calibration can be found under **Calibration Setup**, Section 8.4.1.

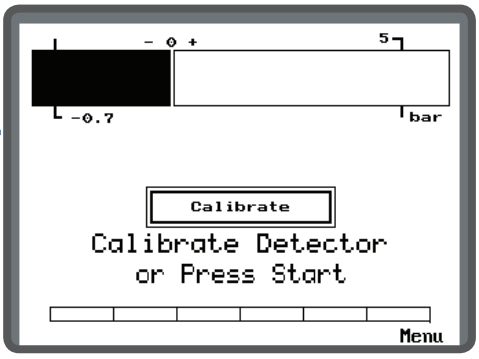
This message is shown during automatic calibration:



The system will attempt to calibrate again if calibration fails. The calibration pause timer is displayed while the ILS500 is waiting for the next calibration attempt:



If the automatic calibration fails for more than the maximum number of calibration attempts the system will give up and display the **Calibrate** button in the main screen. You can go on using the system, but be aware that calibration factor from the last successful calibration is being used.



The maximum number of automatic calibration attempts is selected in the Calibration Setup menu, Section 8.4.1.

9. Test Cycle Details

The following list shows the individual main steps of a complete test sequence.

Test steps in *Italics* are optional and turned off as default.

The test steps are described on the following pages. The descriptions are completed with pictures and diagrams.

9.1 Detailed Description of Test Cycle

EN

The following pages presents a typical test cycle in more detail.

N.B. The following description is an example for illustration only. The design of the text fixture, the use of probe(s) and tooling functions etc should be adopted to suit your particular application.

The tested object in the example is a fuel filter cartridge. The object has two openings that the test fixture connects to. The connectors are fitted by pneumatic cylinders.

Several of the test steps described require that both openings of the object are connected to the ILS500.

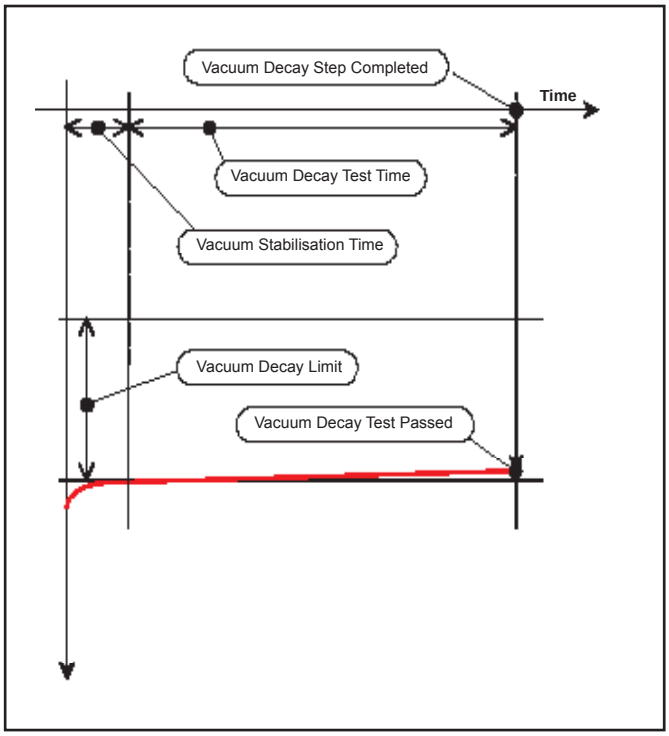
The example illustrates:

• How the different parameters affects the test sequence.

• How the parameters can be adjusted to adapt the sequence to your particular test object.

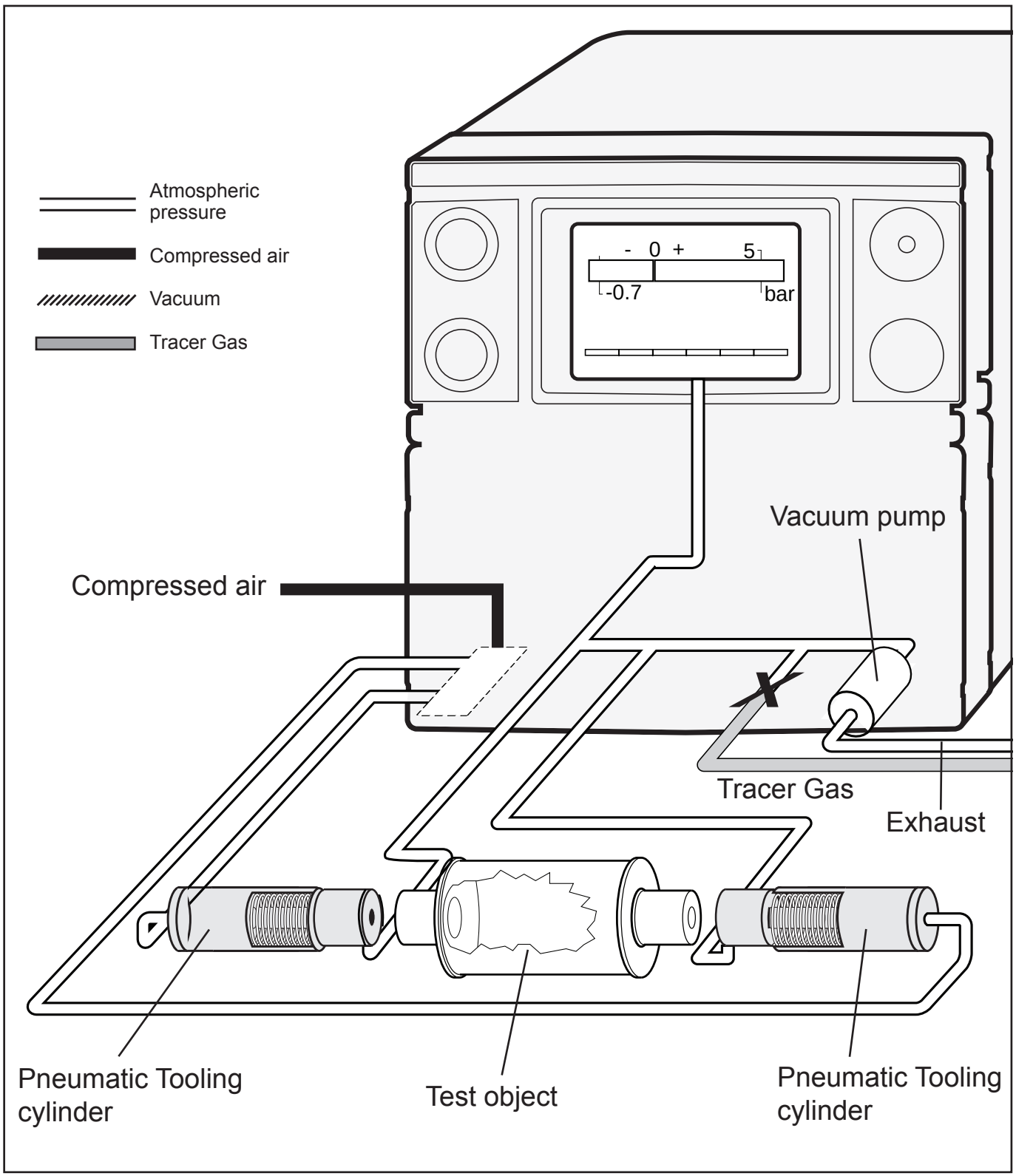
Most of the steps are optional. Each step is set to be included in the test sequence by ticking the box next to the name of each step in the *Standard Setup* menus.

The description essentially follows the same order as the Standard Setup menus.



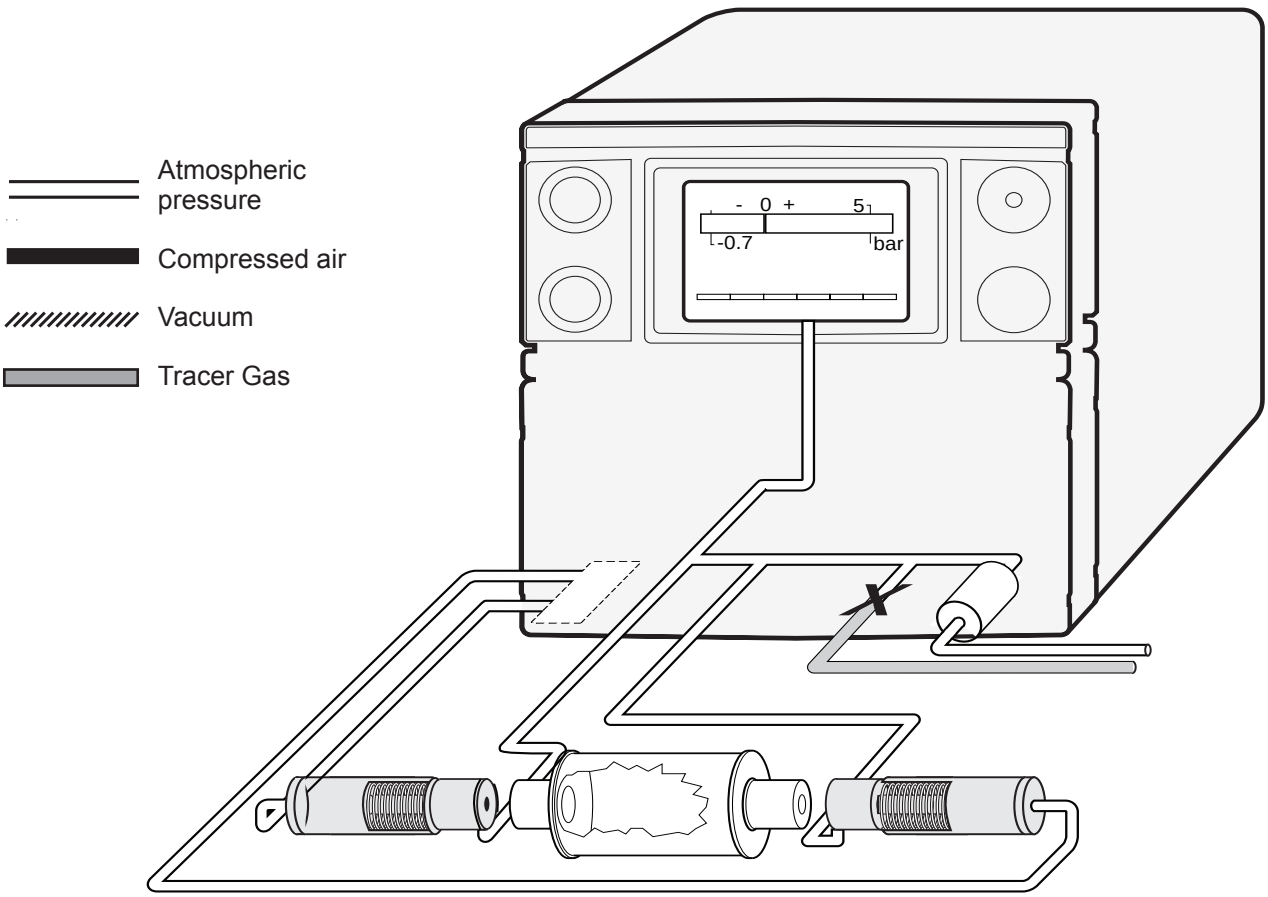
The pressure graphs illustrate the pressure changes in the test object during all steps.

Adjustable parameters are given in *italics*. Detailed description of each parameter can be found in Section 8. For quick reference to each parameter — use the Parameter index, Section 8.5.


Atmospheric pressure
Compressed air
Vacuum
Tracer Gas
- 0 +
5
-0.7
bar
Vacuum pump
Compressed air
Tracer Gas
Exhaust
Pneumatic Tooling cylinder
Test object
Pneumatic Tooling cylinder

9.2 Stand by

EN



All tooling outputs are set to OFF in stand-by mode in this example.

The operator puts the test object in the fixture.

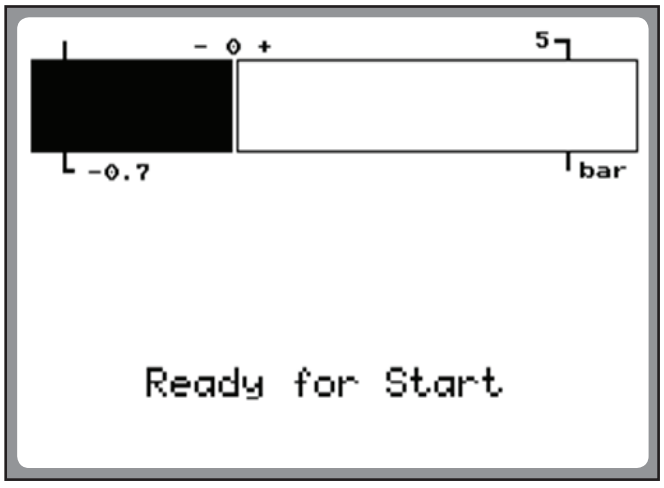
The test cycle can be started by either of the following “signals”:

• START button is pressed manually.

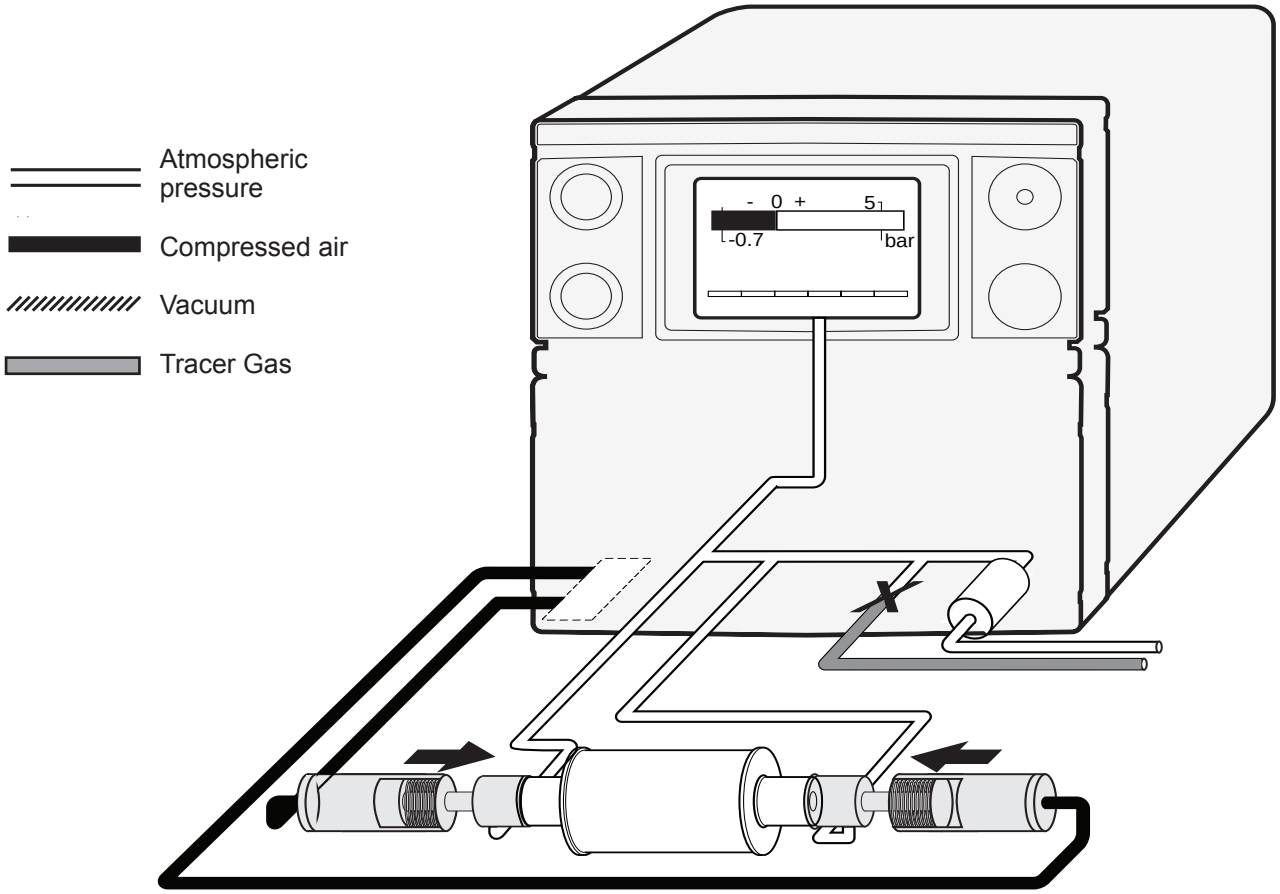
• Automatically by the signal from a proximity switch in the fixture indicating that the object is in place.

• A start signal is sent from another computer over the RS232 interface.

The ILS500 will then start the tooling connection sequence.



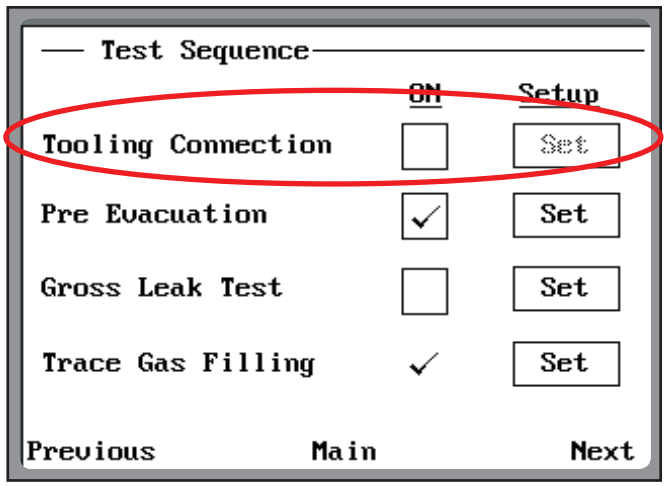
9.3 Tooling Connection



This step controls the test fixture.

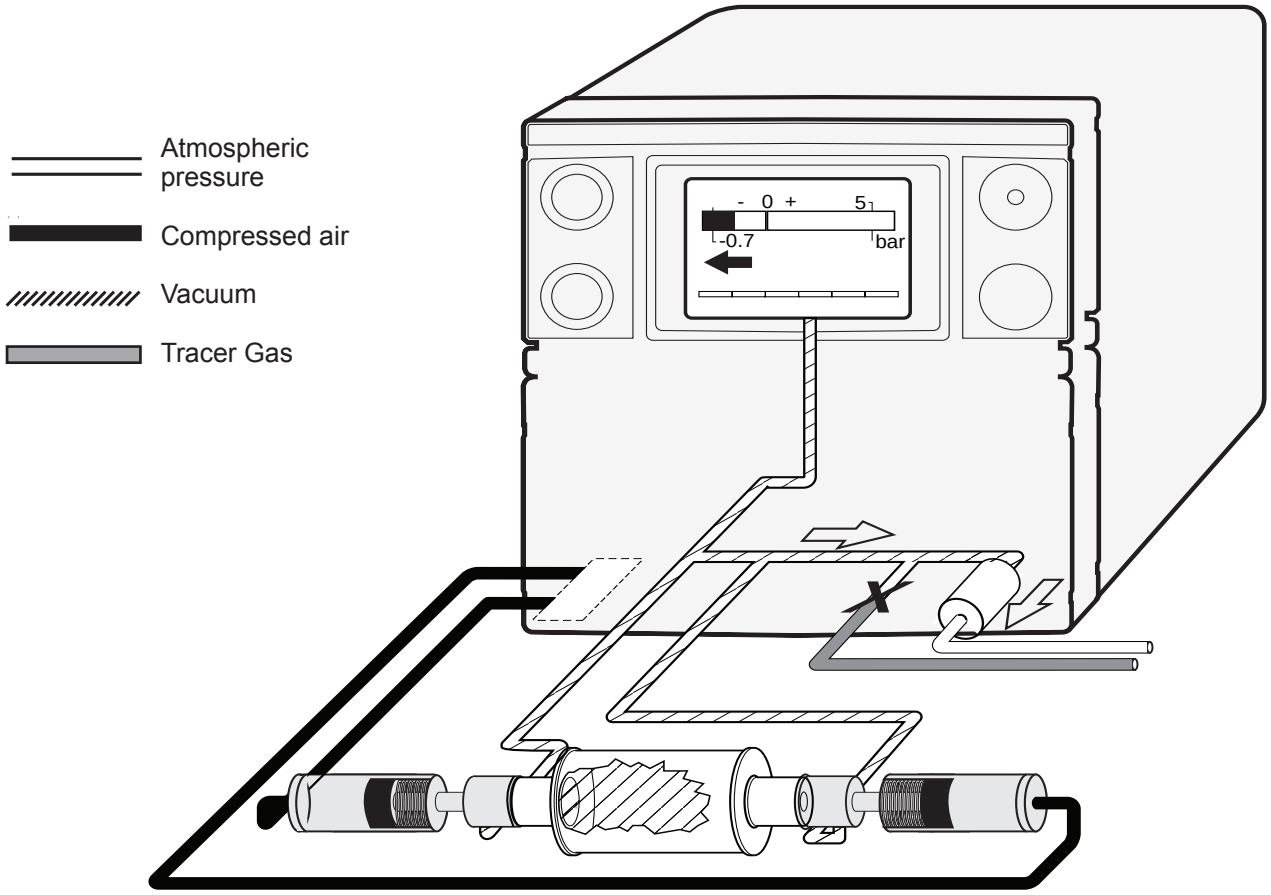
In this example, two tooling outputs are activated making the two pneumatic cylinders advance to connect to the test object.

The specific connection sequence is set in the **Tooling Connection** Menues. If the connection fails for some reason, you can abort and reset to standby by pressing STOP for 3 seconds.



9.4 Pre Evacuation

EN

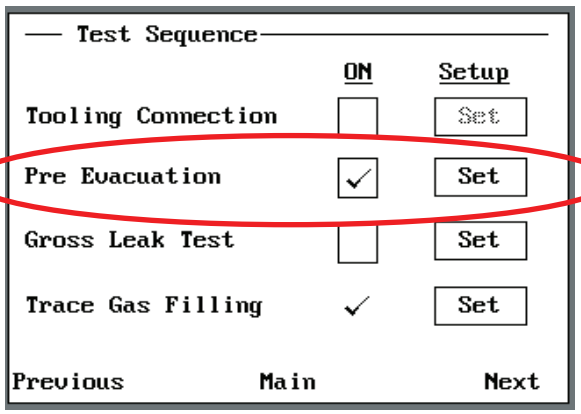


The air in the object is evacuated to the **Pre Evacuation Setpoint** to ensure proper filling of tracer gas. See further under **Optimising Pre Evacuation** In the Technical Manual.

Default evacuation is made through both Test Port 1 and 2. If desired you can set the ILS500 to evacuate through Test Port 1 only. This is done in the **Advanced/Options** menu. Choose this option if you are testing long pipes etc.

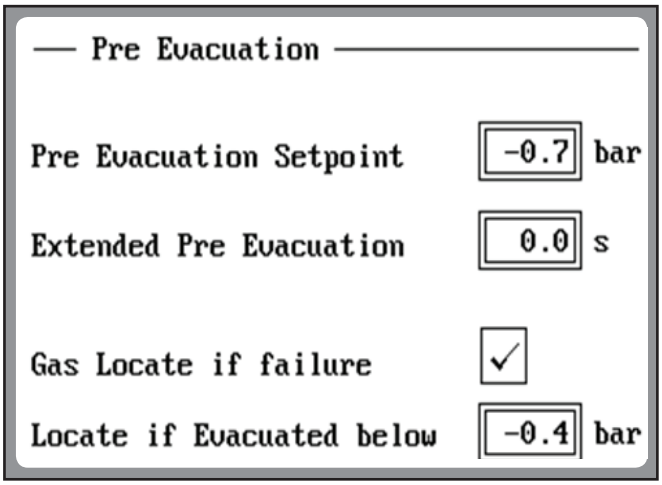
If the **Pre Evacuation Setpoint** is not attained within the **Evacuation Timeout** the object will be failed. The red lamp will come on and the display will show **"Pre Evacuation Failed"**. This is the first of three selectable gross leak tests. See 9.5.

By ticking the **Gas Locate if Failure box** you can make the ILS500 proceed to the gas locating step. The object will then be filled to the **Locating Pressure**, Section 8.3.5, and a hand probe can be used to locate the leak.

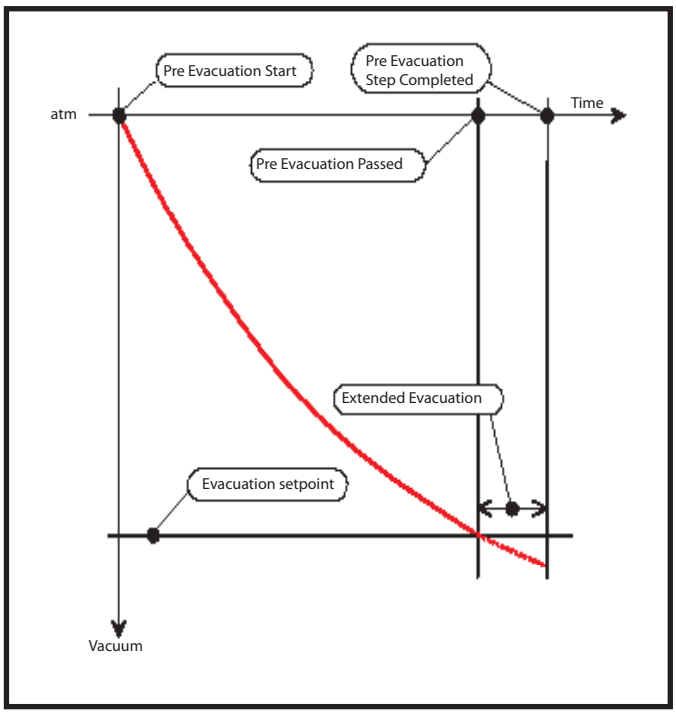


N.B. The locating feature requires a Hand Probe. The ILS500 CP (Combi Probe) allows you to simultaneously connect both an Active Probe and a Hand Probe.

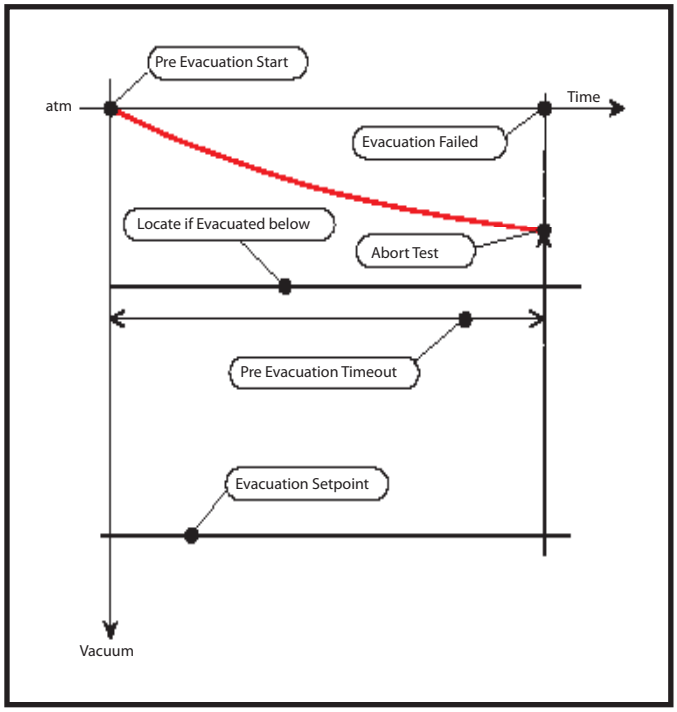
Pre Evacuation Menu.



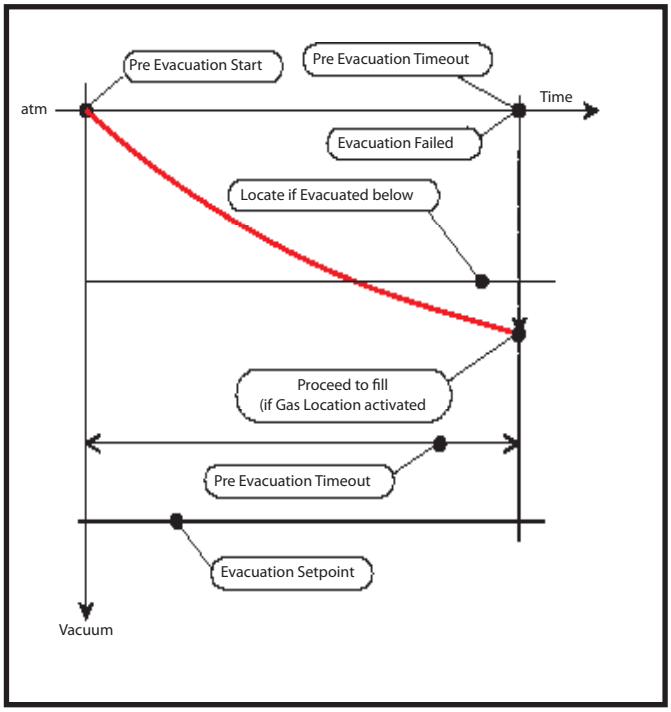
Successful Pre Evacuation.



Failed Pre Evacuation. Locating with gas not allowed.



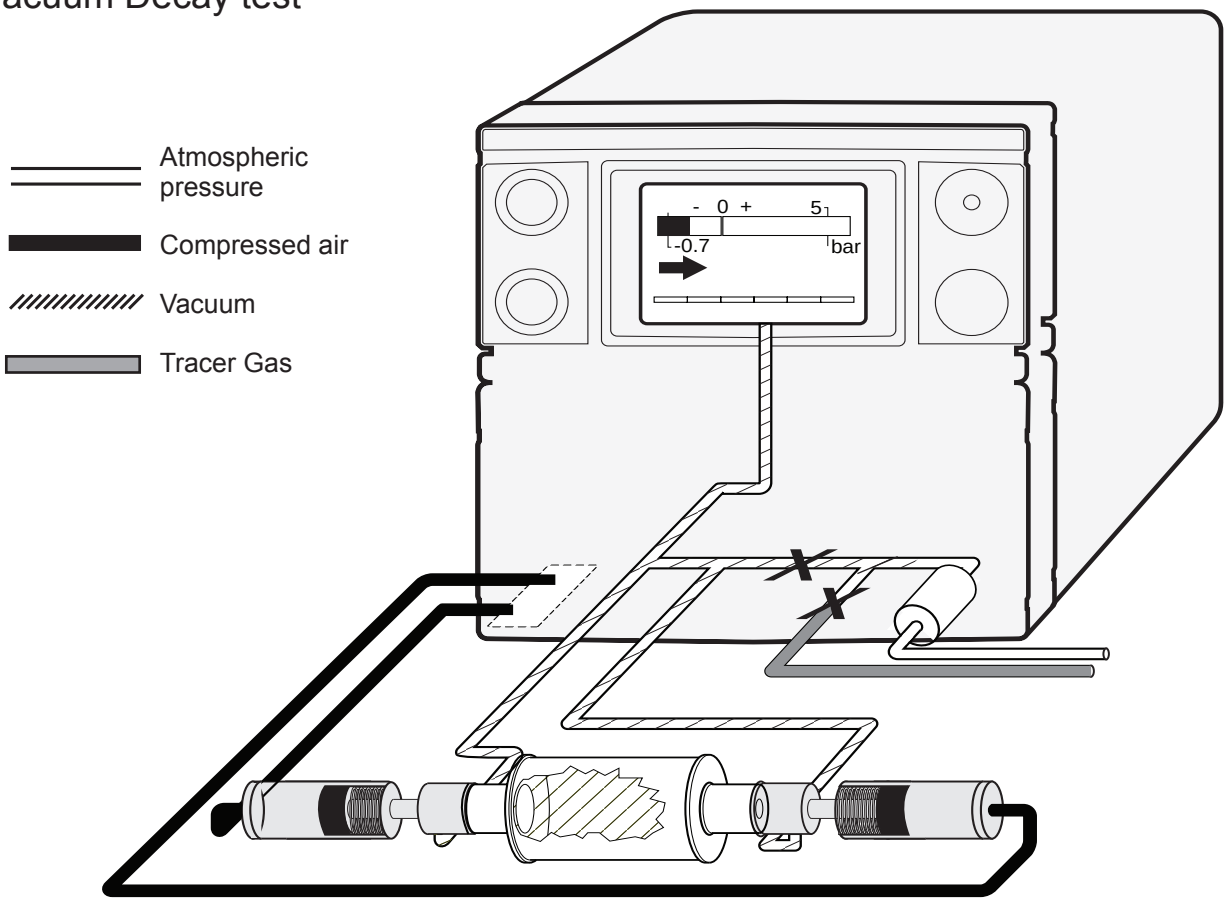
Failed Pre Evacuation. Locating with gas allowed.



EN

9.5 Gross Leak Test

Vacuum Decay test



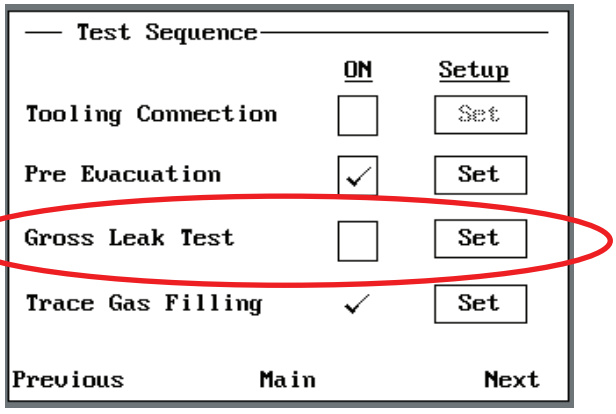
The **Gross Leak Test** comprises of up to three different tests:

- The **Evacuation Test** performed during pre evacuation. See 9.4.
- The **Vacuum Decay Test** performed after the pre evacuation.
- The **Pressure Decay Test** performed during the tracer gas test.

Vacuum Decay Test

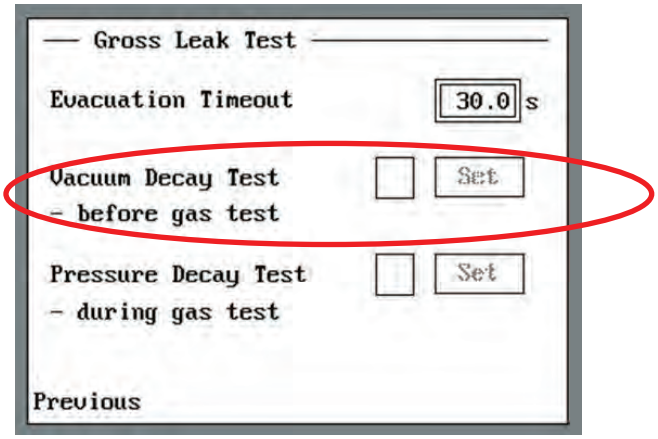
The **Vacuum Decay Test** checks that the pressure does not increase after the pre evacuation. The object is isolated when the **Pre Evacuation Setpoint** is reached. The pressure is allowed to stabilise during the **Vacuum Stabilisation Time** and the system then checks that the pressure does not increase more than **Vacuum Decay Limit** within the **Vacuum Decay Test Time.**

By ticking the **Gas Locate if Failure** box you can make the ILS500 proceed to the gas locating step. The object will then be filled to the **Locating Pressure** , see Section 8.3.5.

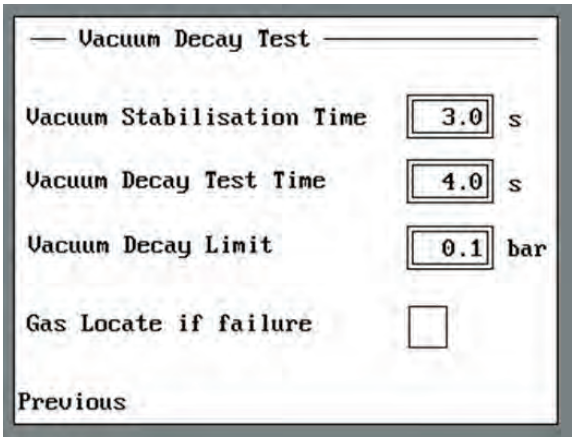


N.B. The locating feature requires a Hand Probe. The ILS500 CP (Combi Probe) allows you to simultaneously connect both an Active Probe and a Hand Probe.

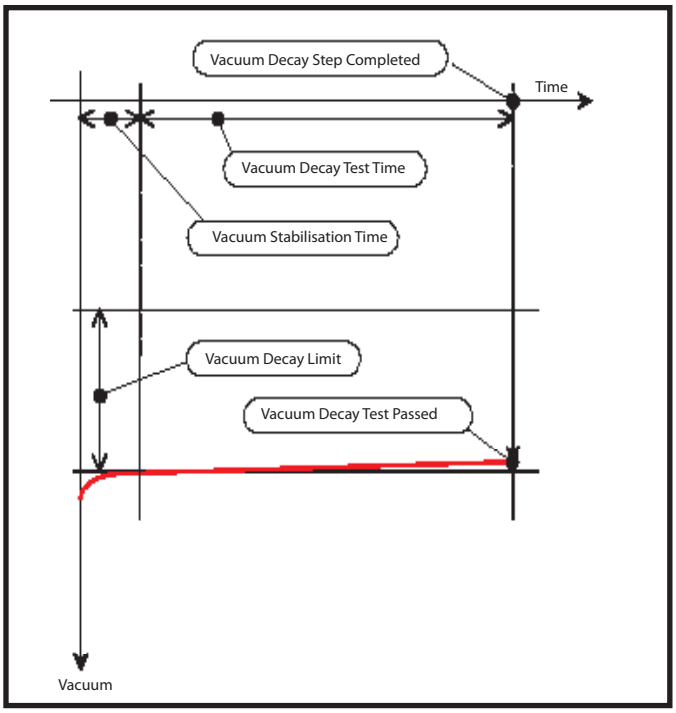
Gross Leak Test Menu.



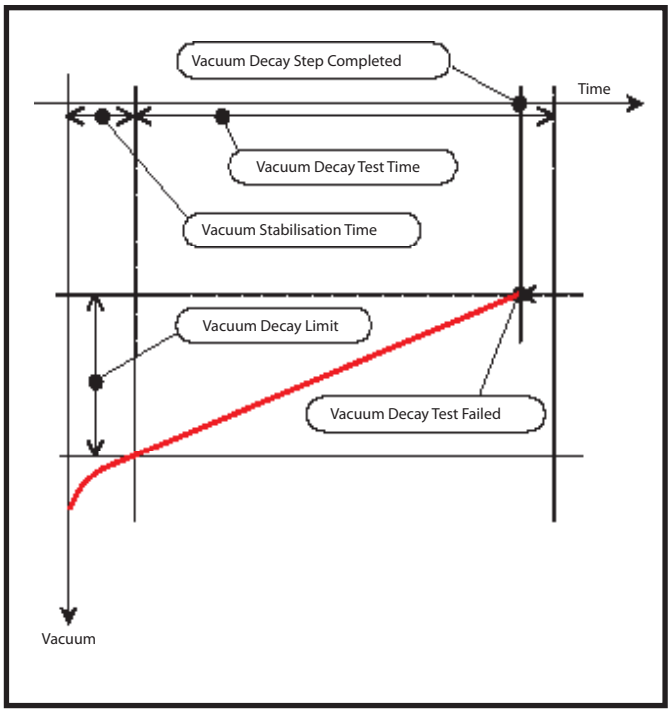
Vacuum Decay Test Menu.



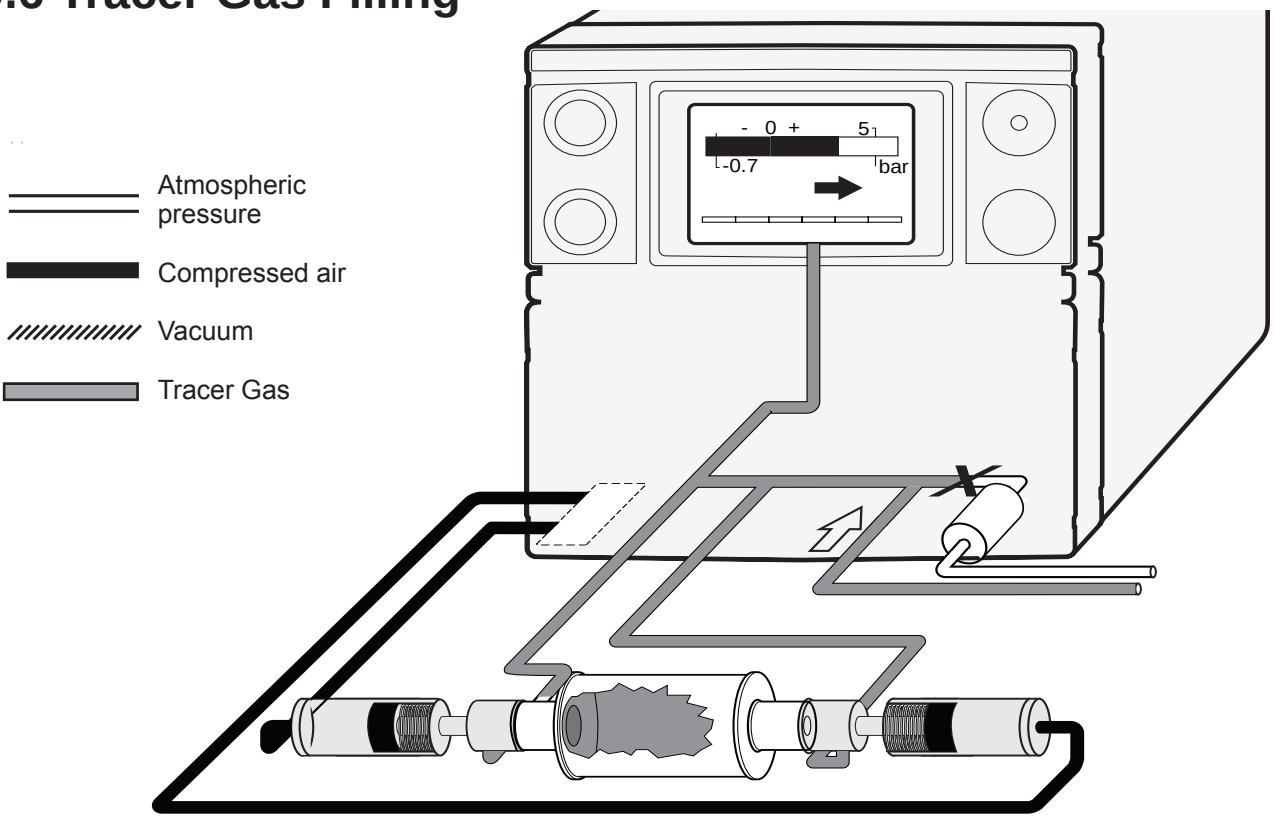
Vacuum Decay Test. No Leak Detected.



Vacuum Decay Test. Leak Detected.



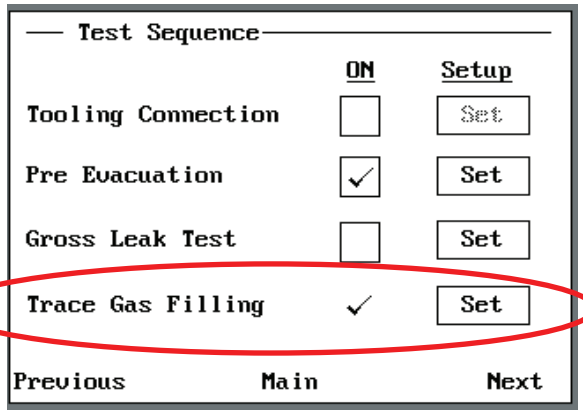
9.6 Tracer Gas Filling

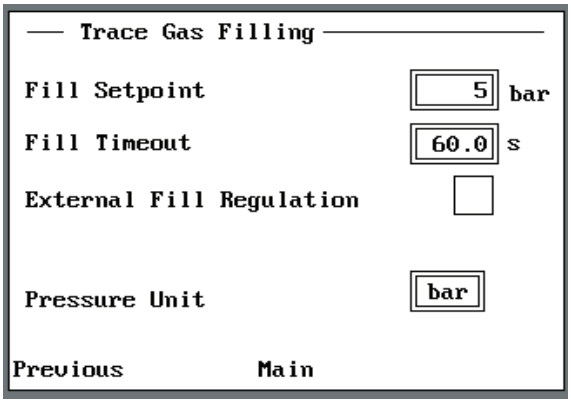


The test object is filled with gas to the **Fill Setpoint.**

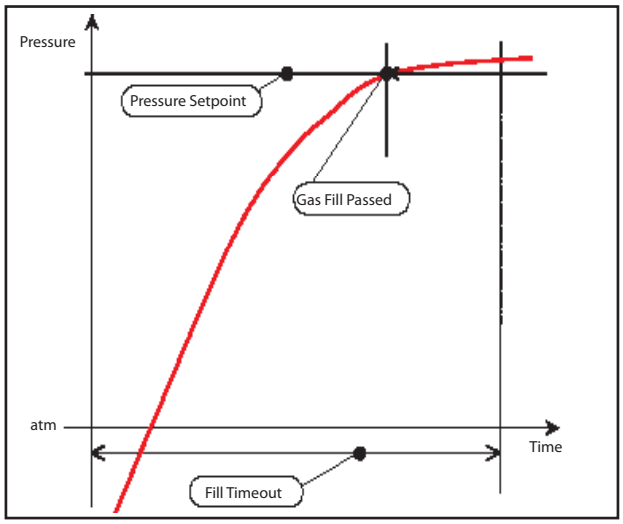
It may be necessary to adjust the regulation parameters to make the filling work smoothly. This is needed especially if fill pressure is low or object is small. See Optimising tracer gas filling further in the Technical Manual.

If **External Gas Regulation** is selected the object will be filled to the pressure of the tracer gas supply line. The ILS500 will then simply check that the pressure is equal to or above the **Fill Setpoint.**

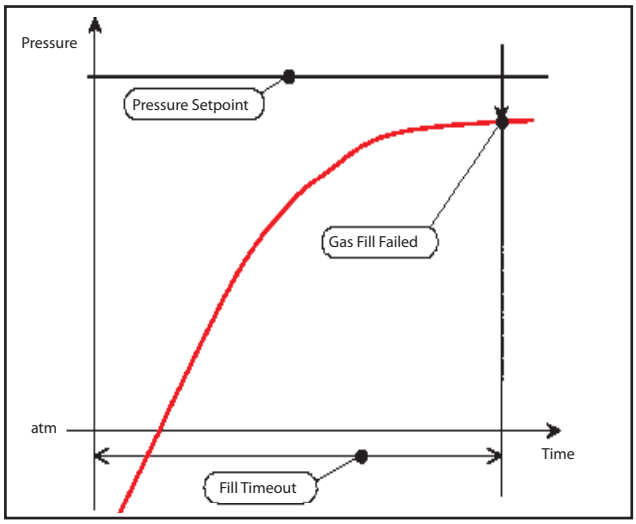




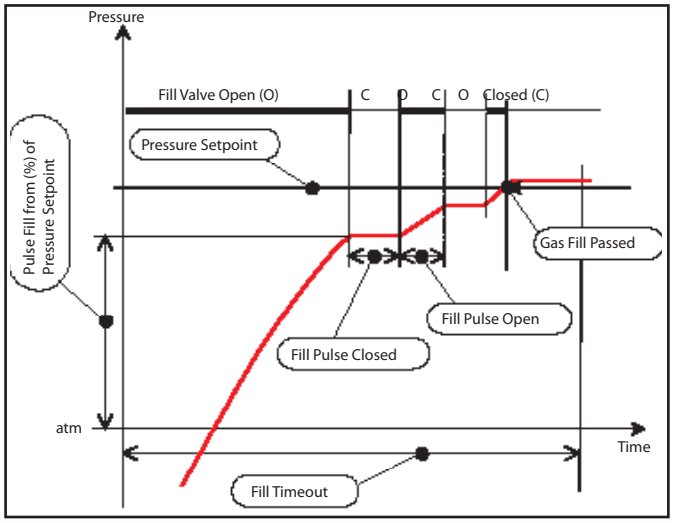
Gas Fillling. Passed External Regulation.



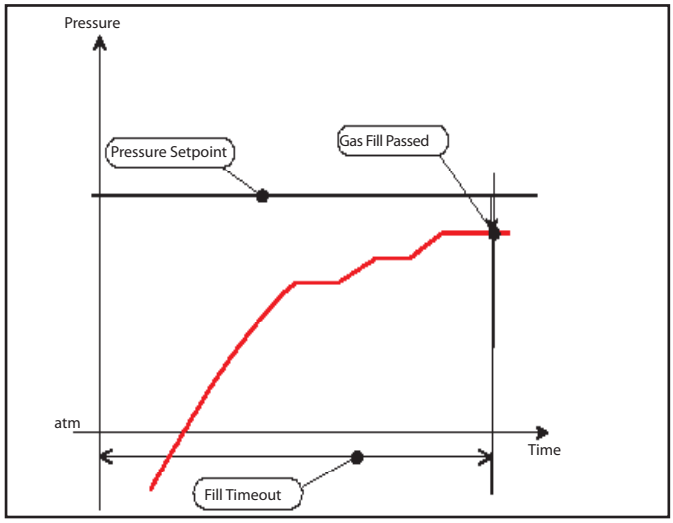
Gas Fillling. Failing External Regulation.



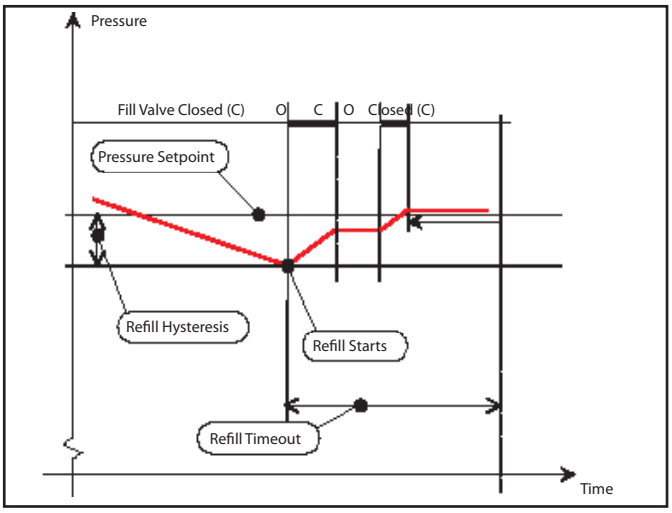
Gas Fillling. Passed Internal Regulation.



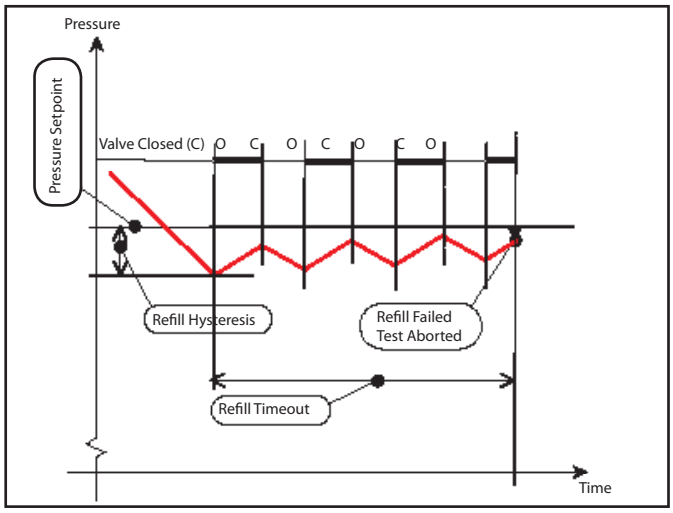
Gas Fillling. Failed Internal Regulation.



Internal fill pressure regulation. Successful refill after pressure drop.

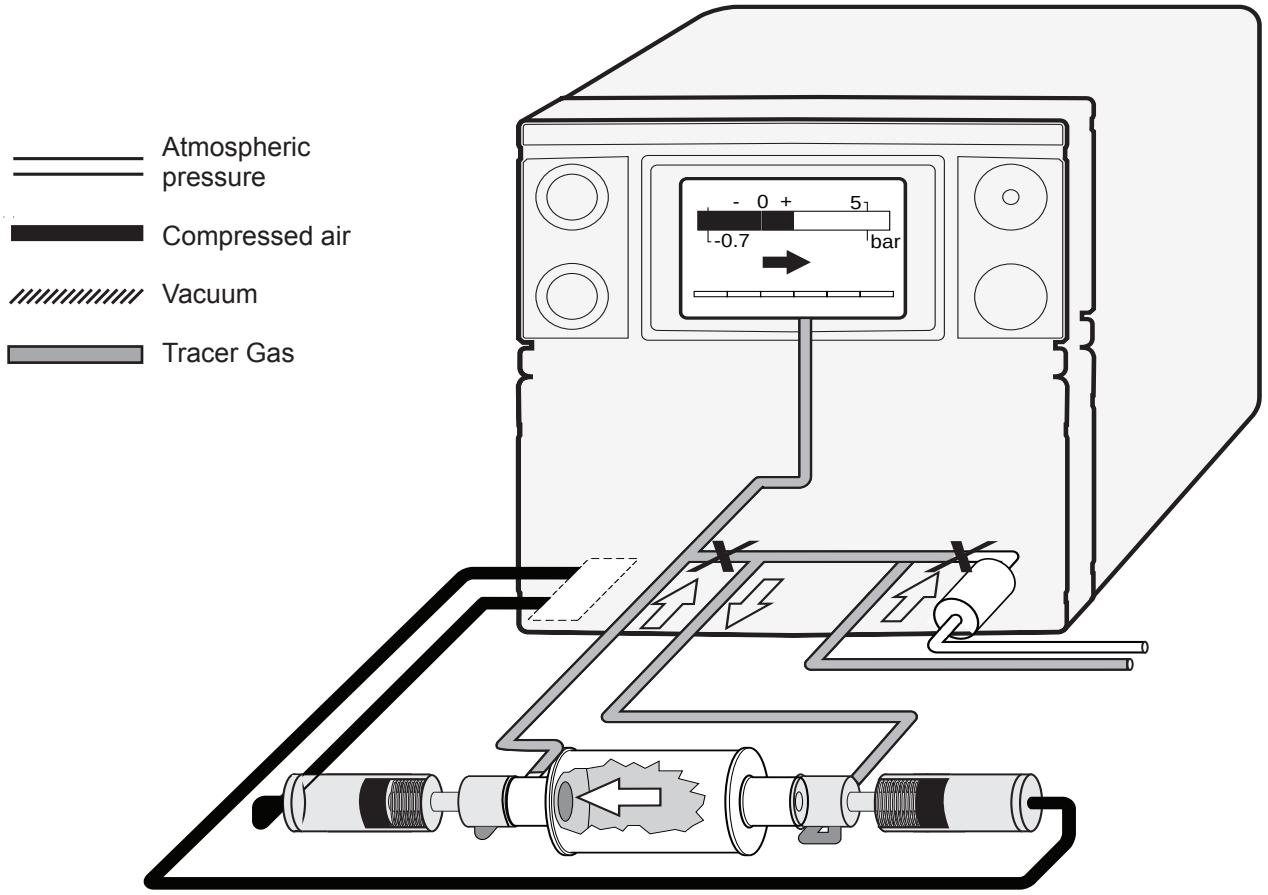


Internal fill pressure regulation. Failing refill after pressure drop.



9.7 Blockage Test

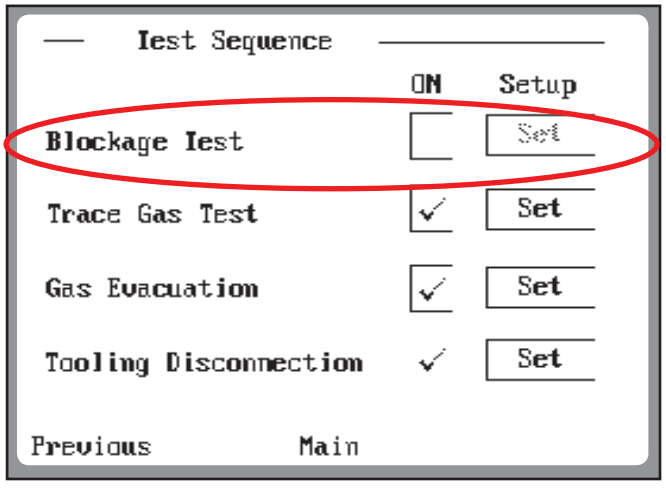
EN



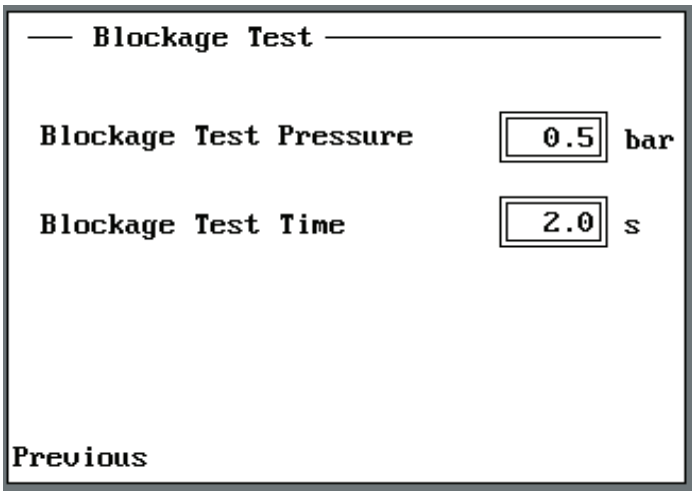
The **Blockage Test** checks that gas is flowing out of Test Port1, through the object and back into Test Port 2 (both ports must be connected). This can reveal a blockage or severe restriction in the object or connection lines.

The test checks that the pressure in Test Port 2 goes above the **Blockage Test Pressure** within the **Blockage Test Time.**

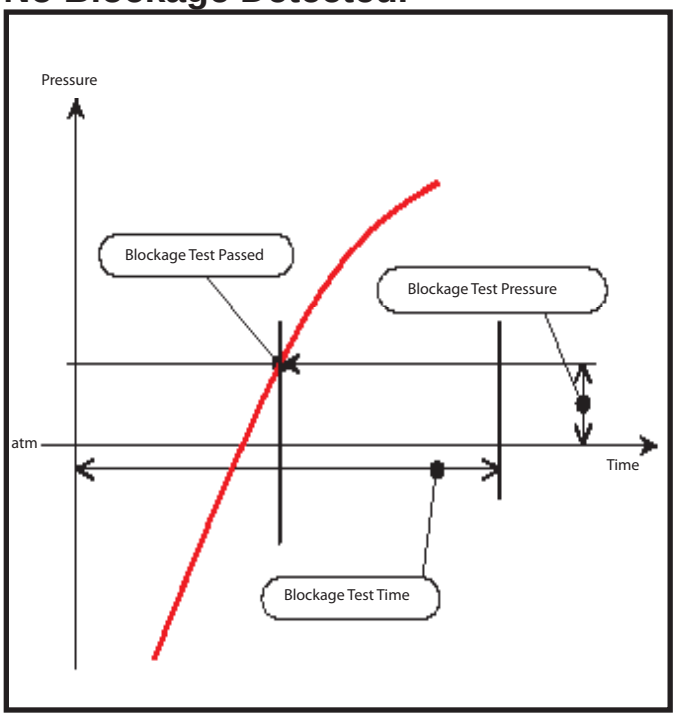
Use this test also if you are using self closing quick connectors for multiple fixtures. The test checks that the fixture and object are actually connected.



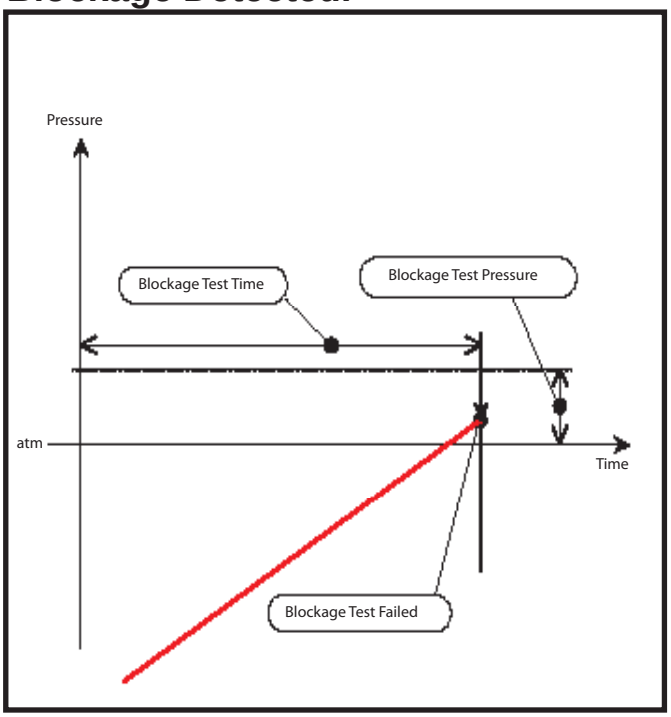
Blockage Test Menu



Blockage Test.
No Blockage Detected.



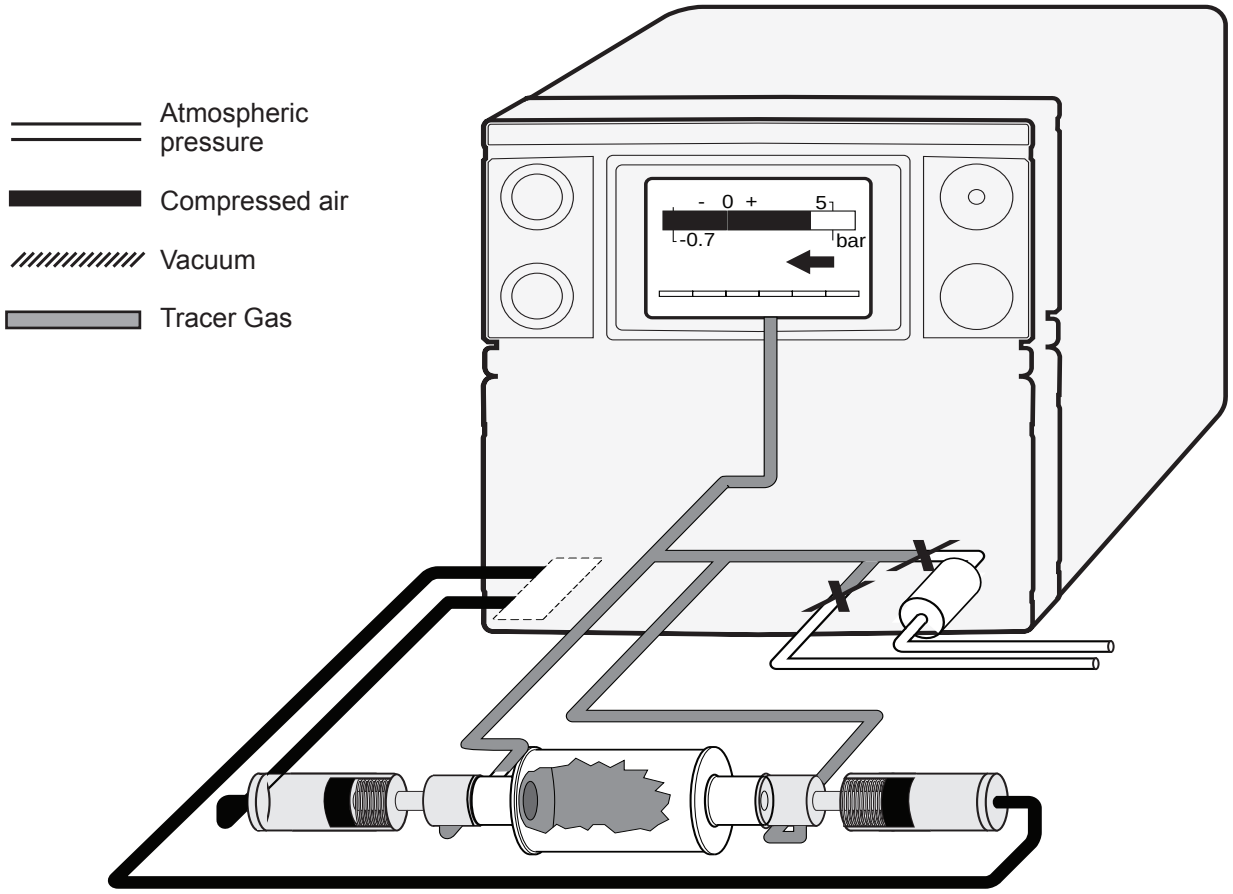
Blockage Test.
Blockage Detected.



EN

9.8 Gross Leak Test

Pressure Decay test

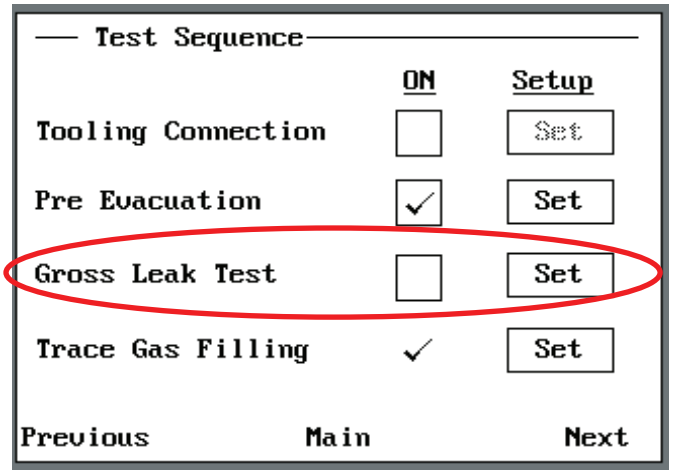


Pressure Decay Test is the third of the selectable gross leak tests.

The **Pressure Decay Test** is performed during the tracer gas test.

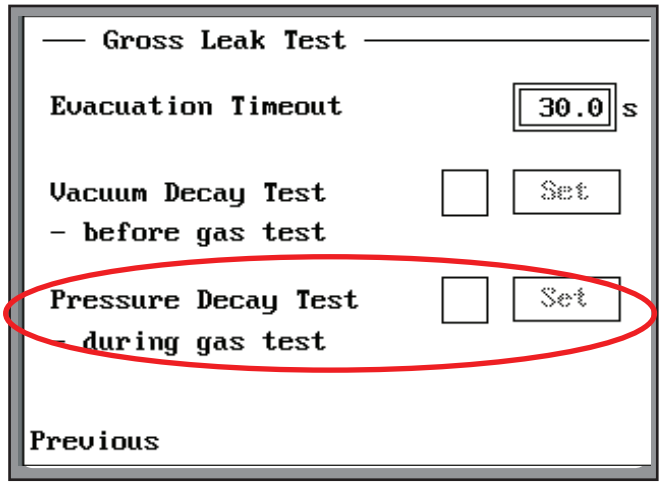
The object is isolated when the **Fill Setpoint** is attained. The pressure is allowed to stabilise during the **Pressure Stabilisation Time** and the system then checks that the pressure does not drop more than the **Pressure Decay Limit** within the **Pressure Decay Test Time.**

By ticking the **Gas Locate if Failure** box you can make the ILS500 proceed to the gas locating step. The pressure in the object will then be reduced to the **Locating Pressure**. Section 8.3.5, and you can use your hand probe to locate the leak.

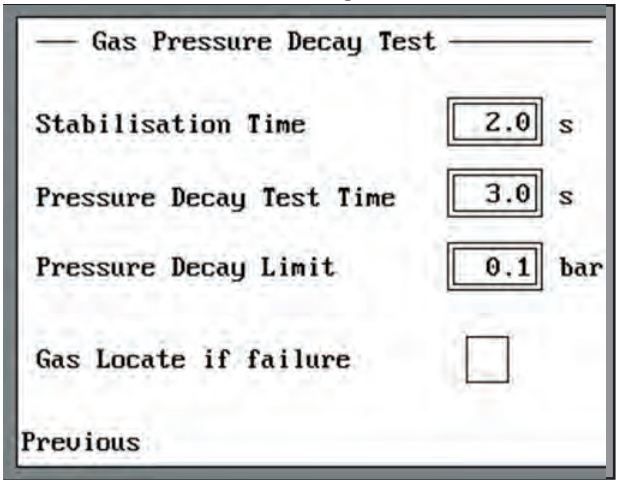


N.B. The locating feature requires a Hand Probe. The ILS500 CP (Combi Probe) allows you to simultaneously connect both an Active Probe and a Hand Probe.

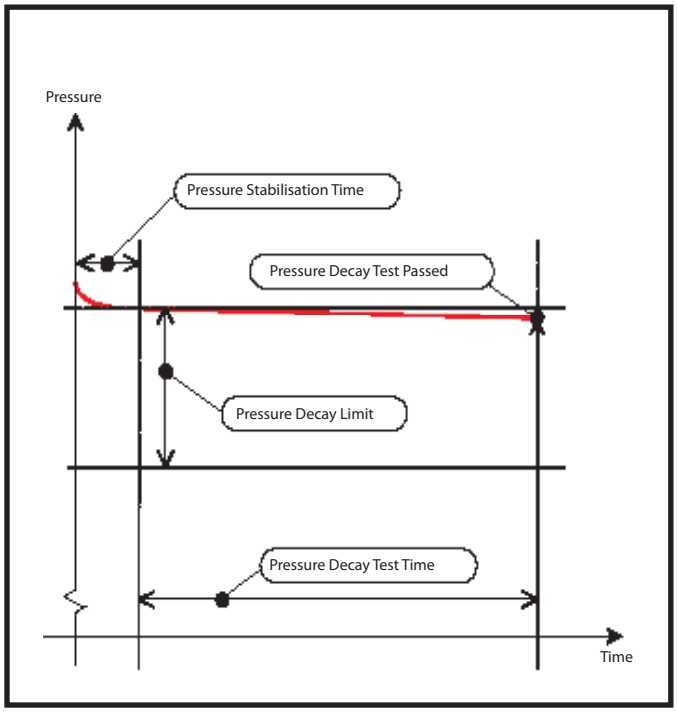
Gross Leak Test Menu.



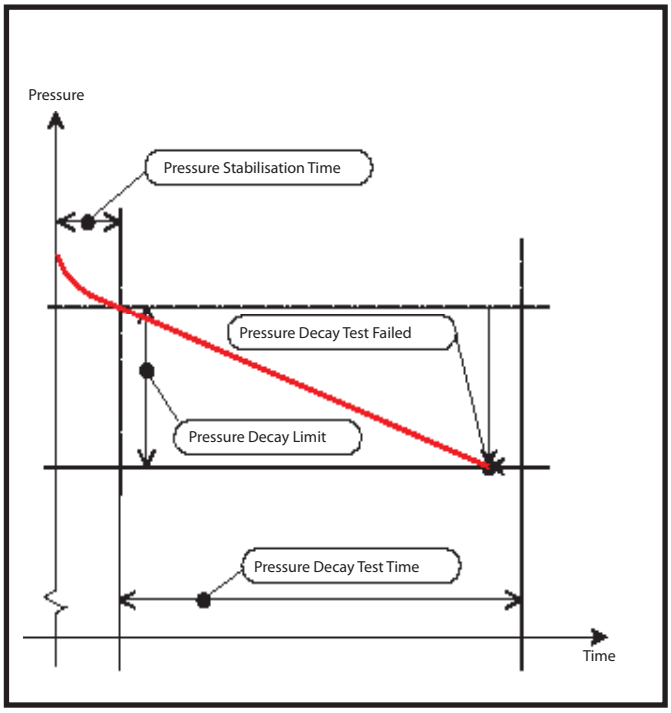
Gas Pressure Decay Test Menu.



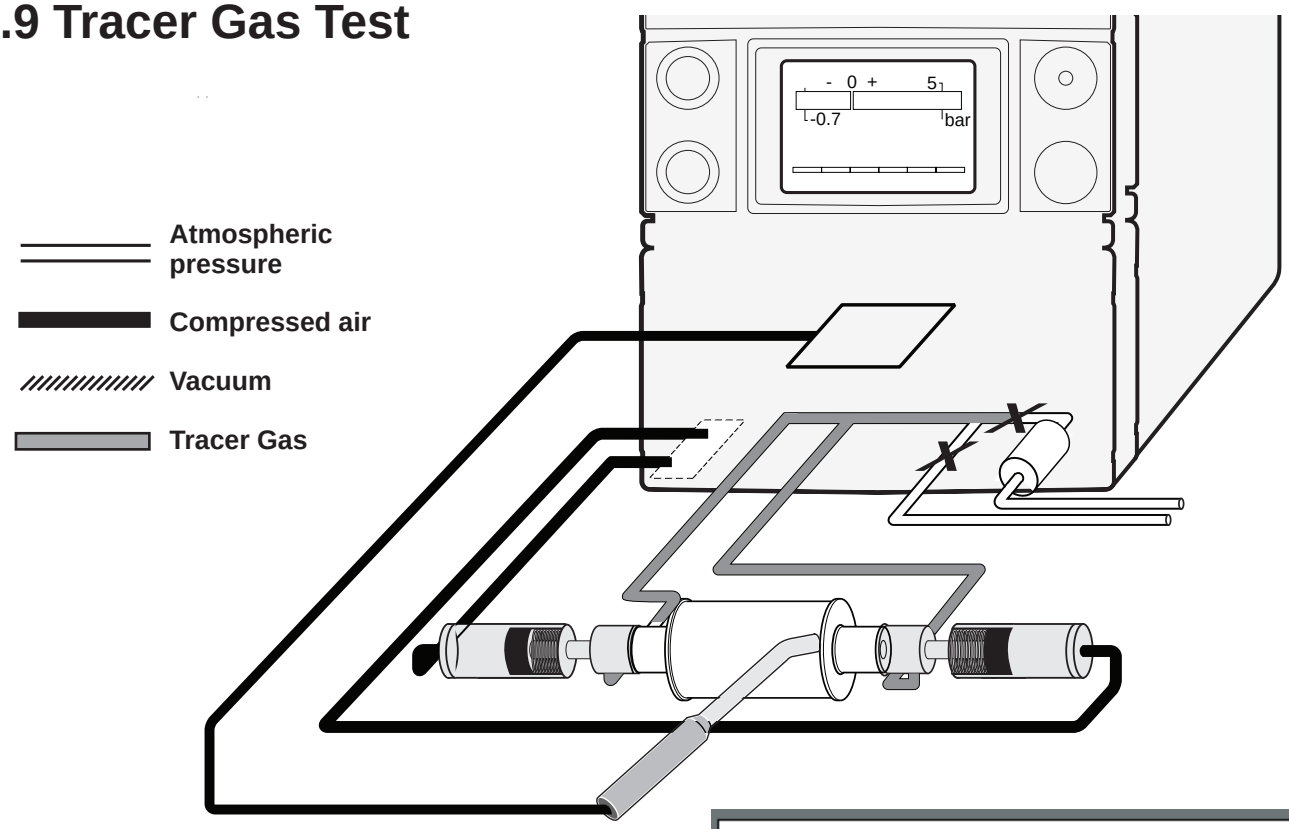
Pressure Decay Test. No Leak Detected.



Pressure Decay Test. Leak Detected.



9.9 Tracer Gas Test



This is the main and most sensitive leak test. This can be performed either manually, using a handheld probe, or automatically using, for example, a sampling probe.

Manual Gas Test:

- If no leak above **Leak Alarm Level** — the ILS500 will show **Object Accepted** (green lamp), remove the gas and end the test.

- If a leak was detected – ILS500 will show **Object Rejected** (red) and then evacuate the gas and end the test.

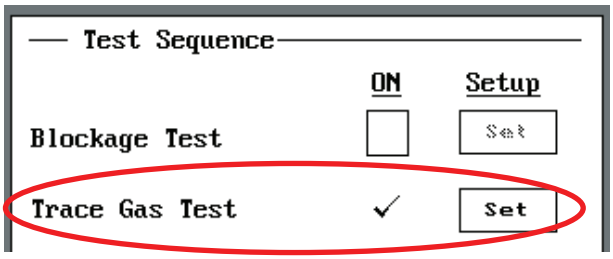
The gas filling status is available on the STATUS connector (pin 5) on the back of the unit. Connect to a lamp for easy notification of “ready to test” status.

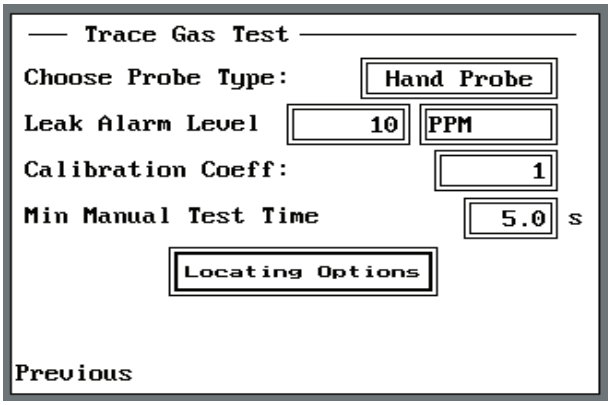
The output must be configured to “Gas Filled. See further under Advanced/Options Section 8.4.9.

Automatic Gas Test:

• Connect and press Start.

• The ILS500 will run through the whole test sequence automatically.



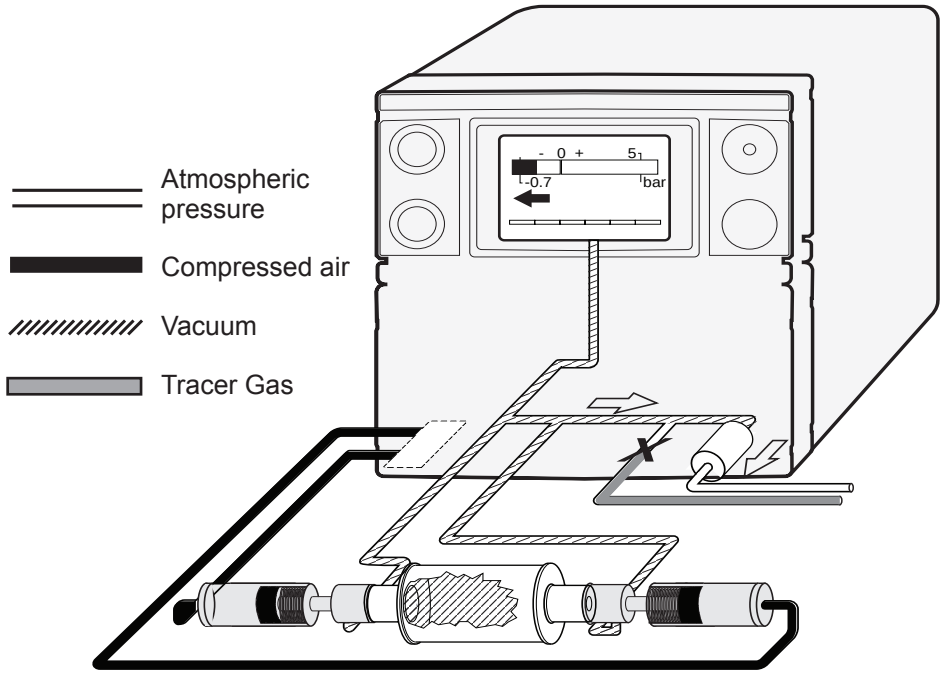


• When ready – Check the result on the screen and lamps:

- If no leak above **Leak Alarm Level** — the ILS500 will show **Object Accepted** (green lamp).

- If a leak is detected – ILS500 will show **Object Rejected** (red lamp).

9.10 Gas Evacuation



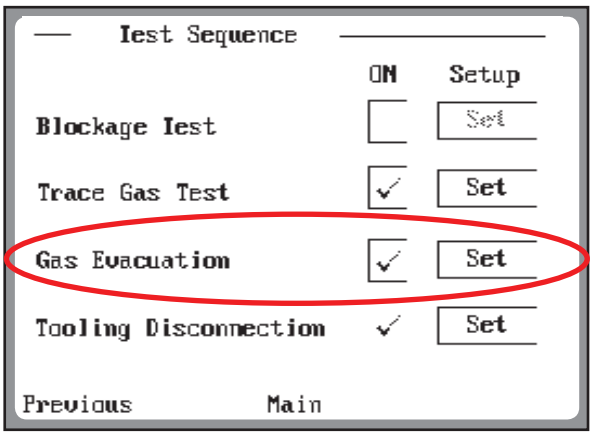
The gas in the object is evacuated to the **Gas Evacuation Setpoint** to minimise possible disturbance from an increased background of tracer gas.

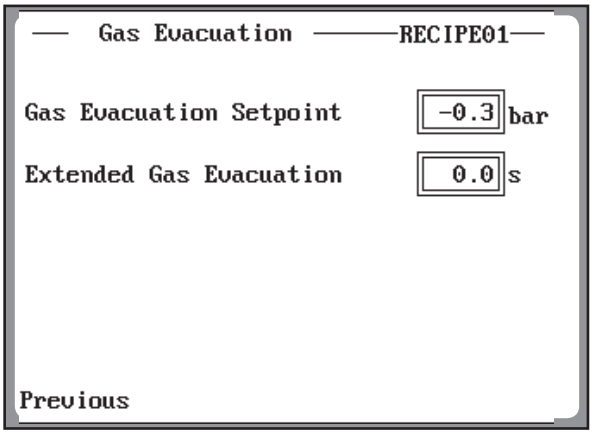
You can set the **Extended Gas Evacuation** timer to enhance the evacuation of gas from pipes etc.

The test sequence will proceed to **Tooling Disconnection** if the **Gas Evacuation Setpoint** is not attained within the **Evacuation Timeout.**

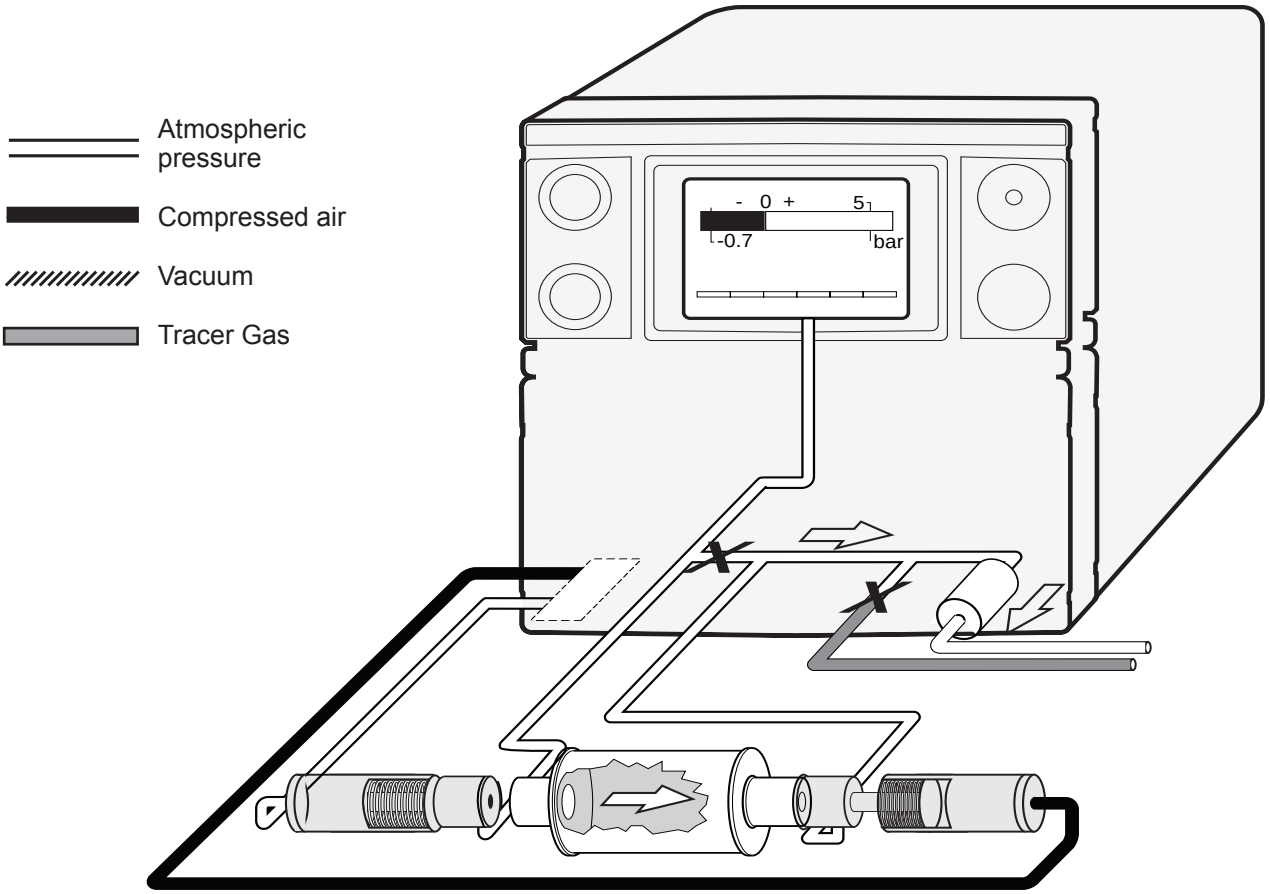
As default evacuation is made through both Test Port 1 and 2. If desired you can set the ILS500 to evacuate through Test Port 1 only.

See further under **Purge Object** below and under **Optimising after evacuation** in the Technical Manual.





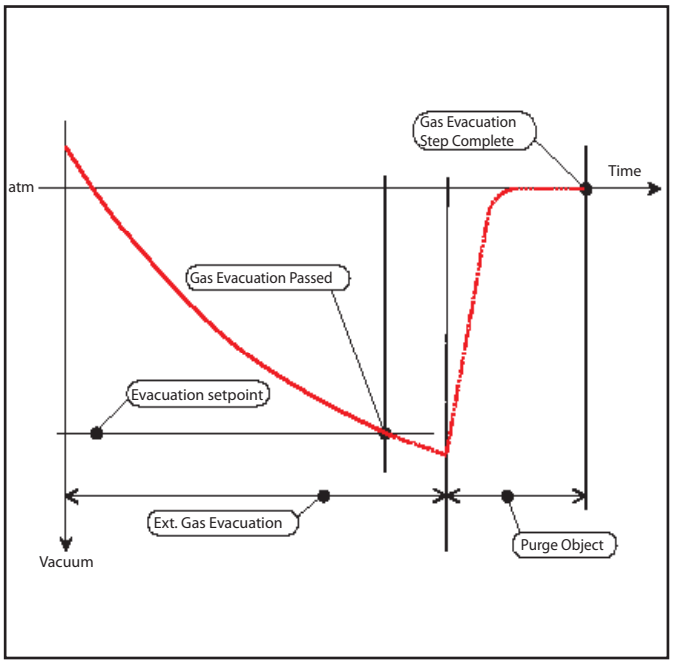
Purge Object



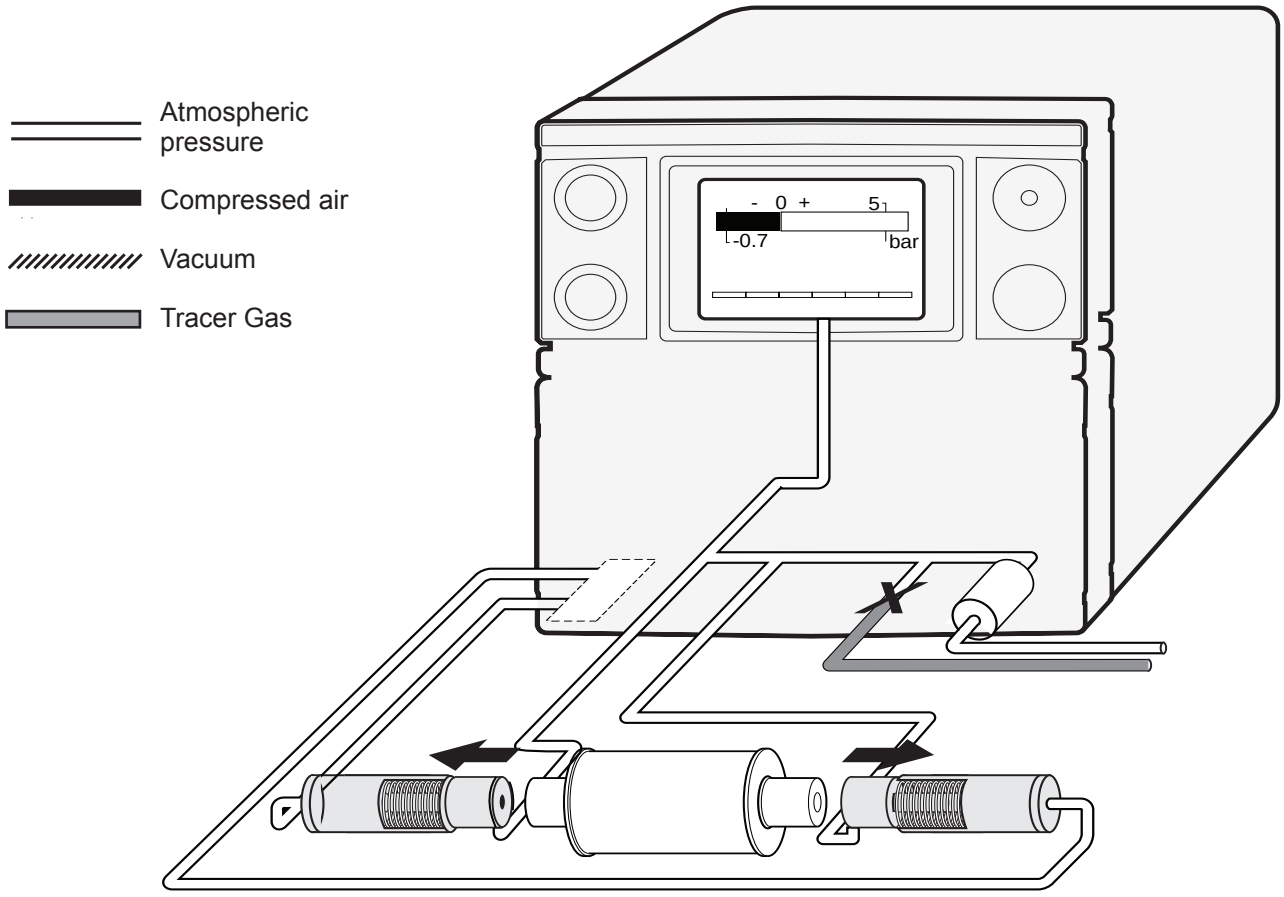
The most efficient and often quickest way to clean out the tracer gas is to use the **Air Purge** function. This function requires that the tooling function is used and that you are using both test ports. See **Tooling**, Section 8.4.3 for details.

The tooling is set to open one connector while pulling air through the other connector. In this way ambient air will be pulled in through the open end of the object, pass through the object into the ILS500 and out to the exhaust. Purging time is set by the **Purge Object** timer in the **Tooling** Setup.

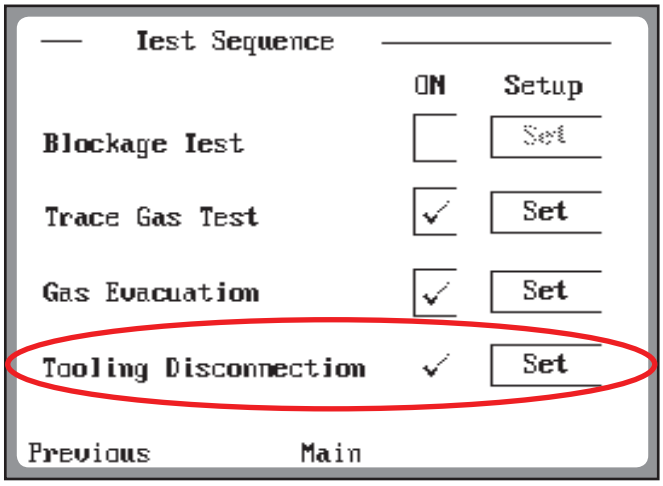
After Evacuation including purging of object.



9.11 Tooling Disconnect



The leak test is completed and the tooling is disconected. If the disconnection fails for some reason, you can abort and reset to standby by pressing STOP for 3 seconds.



10. Accessories and Spare Parts

EN

External Control Panel

Plug-and-play pushbutton box with Accept and Reject indicator lamps. Used for starting and stopping test sequence at convenient location.

Part no: 590-650

External Control Panel with Emergency Stop

Plug-and-play pushbutton box with Accept and Reject indicator lamps and emergency stop. Includes plug-and-play emergency relay.

Part no: 590-670

Part no: 590-660

No-Stop Maintenace Kit (model F)

Part no: 590-680

No-Stop Maintenace Kit (Model HP)

Part no: 590-680

The kit include:
1 pc. Venturi
4 pc. Fill valve
1 pc. Pilote valve
2 pc. Fuse
neccesary tools

Hand Probe PK50	**Part no: 590-930**
Hand Probe PK50 Flex	**Part no: 590-940**
Hydrogen Sensor	**Part no: 590-292**
C21 Probe Cable 3 m	**Part no: 590-161**
C21Probe Cable 6 m	**Part no: 590-175**
C21 Probe Cable 9 m	**Part no: 590-165**

11. Support by INFICON

11.1 How To Contact INFICON

For Sales and Customer Service contact nearest INFICON Service Center. The address is found on the website: www.inficon.com

If you are experiencing a problem with your instrument, please have the following information readily available:

• The serial number and firmware version for your instrument,

• A description of your problem,

• An explanation of any corrective action that you may have already attempted, and the exact wording of any error messages that you may have received.

11.2 Returning your instrument to INFICON

Please use the Product Return Form which was included with the product at delivery.

Do not return any component of your instrument to INFICON without first speaking with a Customer Support Representative. You must obtain a Return Material Authorization (RMA) number from the Customer Support Representative.

If you deliver a package to INFICON without an RMA number, your package will be held and you will be contacted. This will result in delays in servicing your instrument.

Prior to being given an RMA number, you may be required to complete a Declaration Of Contamination (DOC) form if your instrument has been exposed to process materials. DOC forms must be approved by INFICON before an RMA number is issued. INFICON may require that the instrument be sent to a designated decontamination facility, not to the factory.

12. Declaration of Conformity

EN

INFICON

Declaration of Conformity

Manufacturer

INFICON AB
Westmansgatan 49
SE-582 16 Linköping
Sweden

Products:

Sensistor ILS500, Leak Detection System, …
Sensistor ILS500 V, Leak Detection System, high vacuum model…
Sensistor ILS500 HP, Leak Detection System, high pressure model…
Sensistor ILS500 CP, Leak Detection System, combi probe model…
Sensistor ILS500 CPV, Leak Detection System, combi probe high vacuum model…
Sensistor ILS500 CPHP, Leak Detection System, combi probe high pressure model…
Sensistor ILS500 F, Leak Detection Filler, …
Sensistor ILS500 FV, Leak Detection Filler, high vacuum model…
Sensistor ILS500 FHP, Leak Detection Filler, high pressure model…

The manufacturer declares conformity with the following directives
CE Marking Directive (93/68/EEC)
EMC Directive (98/366/EEC)*
Low Voltage Directive (73/23/EEC)
WEEE Waste electrical and electronic equipment (2002/96/EC)

Sensistor ILS500 is intended to be incorporated into machinery or to be assembled with other machinery to constitute machinery covered by Directive 98/37/EG, as amended;

and furthermore declares that is not allowed to put the equipment into service until the machinery into which it is to be incorporated or of which it is to be a component has been found and declared to be in conformity with the provisions of Directive 98/37/EG and with national implementing legislation, i.e. as a whole, including the equipment referred to in this declaration.

The delivered equipment (Sensistor ILS500) is intended to be connected to an emergency stop circuit. The enclosed plug with cable jumper is only intended for testing the equipment when not incorporated into machinery covered by Directive 98/37/EG. The jumper plug must therefore not be used when such machinery is put into service.

* The front of the HMI panel must be equipped with a conductive HF-screen to bring the radiation emissions below the limits of EN55022:1998, Class B. Without this screen emission is < 2 dB above limit at 90 MHz.

Test Institutes
Swedish National Testing and Research Institute (SP)
Accreditation number: 1002

For INFICON AB, April 10, 2012

Fredrik Enquist
R&D Manager

INFICON AB

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13. Declaration by the Manufacturer

INFICON

DECLARATION BY THE MANUFACTURER

(Directive 98/37/EG, Art. 4.2 and Annex II, sub B)

PROHIBIT TO PUT EQUIPMENT INTO SERVICE

Manufacturer

INFICON AB
Westmansgatan 49
SE-582 16 Linköping
Sweden

Hereby declares that

Sensistor ILS500, Leak Detection System, …
Sensistor ILS500 V, Leak Detection System, high vacuum model…
Sensistor ILS500 HP, Leak Detection System, high pressure model…
Sensistor ILS500 CP, Leak Detection System, combi probe model…
Sensistor ILS500 CPV, Leak Detection System, combi probe high vacuum model…
Sensistor ILS500 CPHP, Leak Detection System, combi probe high pressure model…
Sensistor ILS500 F, Leak Detection Filler, …
Sensistor ILS500 FV, Leak Detection Filler, high vacuum model…
Sensistor ILS500 FHP, Leak Detection Filler, high pressure model…

- is intended to be incorporated into machinery or to be assembled with other machinery to constitute machinery covered by Directive 98/37/EG, as amended;

and furthermore declares that is not allowed to put the equipment into service until the machinery into which it is to be incorporated or of which it is to be a component has been found and declared to be in conformity with the provisions of Directive 98/37/EG and with national implementing legislation, i.e. as a whole, including the equipment referred to in this declaration.

The delivered equipment (Sensistor ILS500) is intended to be connected to an emergency stop circuit. The enclosed plug with cable jumper is only intended for testing the equipment when not incorporated into machinery covered by Directive 98/37/EG. The jumper plug must therefore not be used when such machinery is put into service.

For INFICON AB, April 10, 2012

Fredrik Enquist, R&D Manager

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Disposal of product when taken out of service

According to EU legislation, this product must be recovered for separation of materials and may not be disposed of as unsorted municipal waste.

If you wish you can return this INFICON product to the manufacturer for recovery.

The manufacturer has the right to refuse taking back products that are inadequately packaged and thereby presents safety and/or health risks to the staff.

The manufacturer will not reimburse you for the shipping cost.

Shipping address:
INFICON AB
Westmansgatan 49
582 16 Linköping
Sweden

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