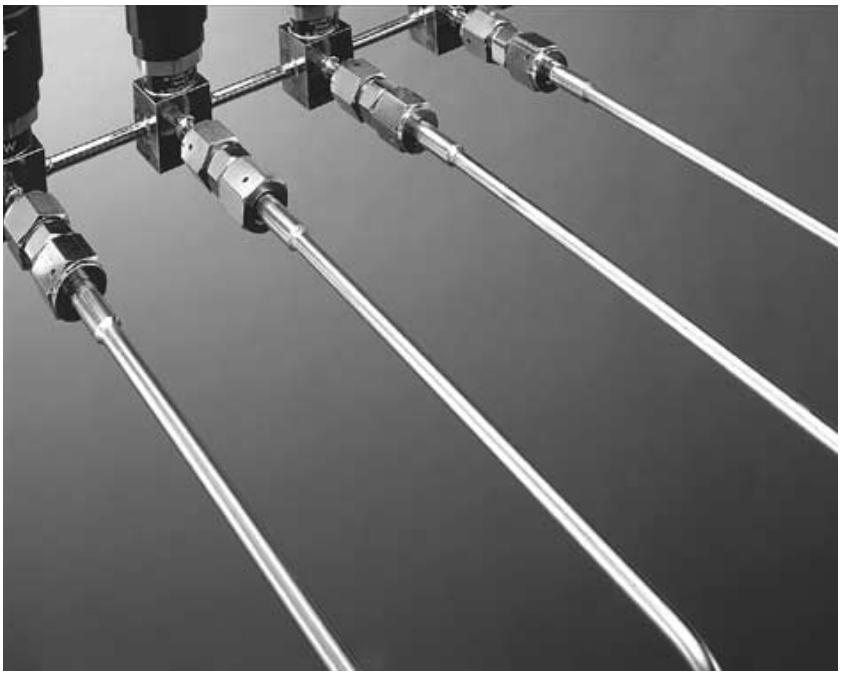
Only for the ASM 182 TD+

Gas line option



Purpose of the option

Used to perform spray testing on long lines (typical diameter: 1/4"), with a reduced response time due to the transfer of the helium by a carrier gas injected in the viscous state.

This option allows the unit to detect leaks of the order of 10^{-9} mbar.l/s in a considerably reduced time in relation to the conventional vacuum test.

The test is thus quicker and more reliable.

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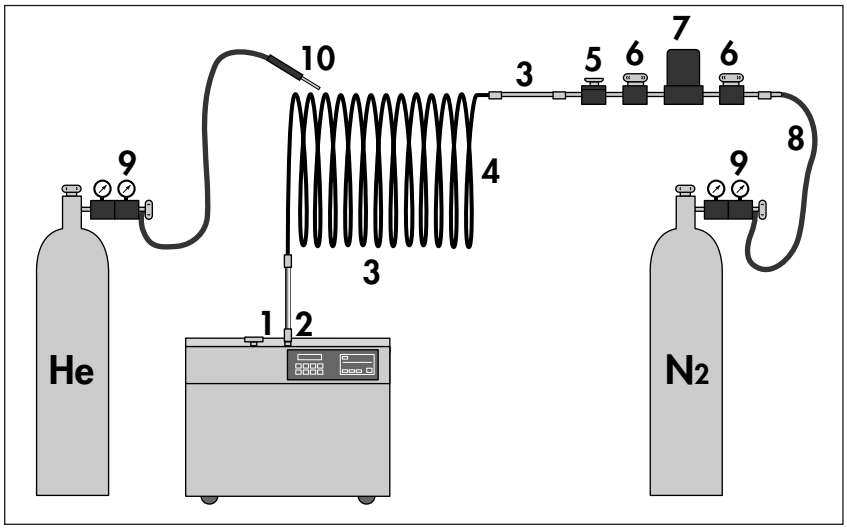
Gas line option

Operating principle



1. Detector inlet port
2. Gas line inlet port (VCR connector)
3. St. steel flexible connector
4. Rigid line under test
5. Reference leak
6. Manual valve
7. Mass flow controller (N_2)
8. Flexible connector
9. Pressure controller
10. Helium spray

Test principle

The detector is connected at the 1/4 VRC connection to one end of the line under test.
The carrier gas is injected at the other end of the line.
The line is pumped by the detector and the carrier gas is injected to obtain a laminar flow (a few mbar absolute pressure).
Helium is sprayed around the line.
In the event of a leak, the helium which enters the line is "transported" to the detector by the carrier gas.

The sensitivity of the test depends on the helium content of the carrier gas (which must be as low as possible).

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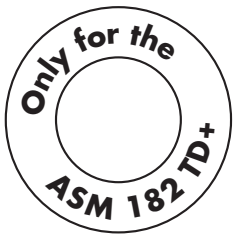
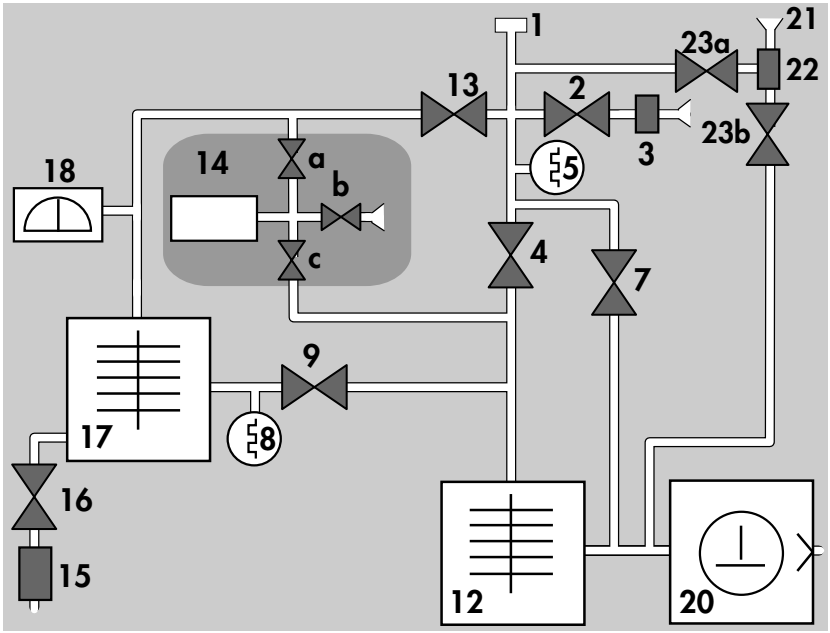


Gas line option

Detector operation

The gas line test option is an addition to the basic detector functions.
The ASM 182 TD+ is optimized for the 1/4" gas line test (in terms of response time and sensitivity).
The ASM 182 TD+ provides reduced response time for gas lines diameters higher than 1/4".



1. Detector inlet port
4. Roughing valve
13. Detection valve
12. Roughing molecular pump (MDP 5011)
17. Hybrid turbomolecular pump (TMP 5154)
18. Analyzer cell
20. Dry roughing pump (ACP 20/28)
21. Gas line inlet port
22. Gas line membrane
23. Gas line valves

Choice of carrier gas

■ The most commonly used carrier gas is **nitrogen**.

■ In order to be able to identify leaks of approximately 10^{-9} mbar.l/s, the carrier gas must have a helium content which is less than a few ppb (10^{-9}).

■ If "0.999 999 999 concentration" nitrogen is considered too expensive, nitrogen obtained from a tank or a source of liquid nitrogen can be used.

■ Any gas free of helium can be used as a carrier gas (e.g. l'Argon).
However, for safety reasons, the method is not applicable to process gases which are toxic, reactive, explosive or flammable. In addition, the detector is not designed to pump chemically reactive gases.

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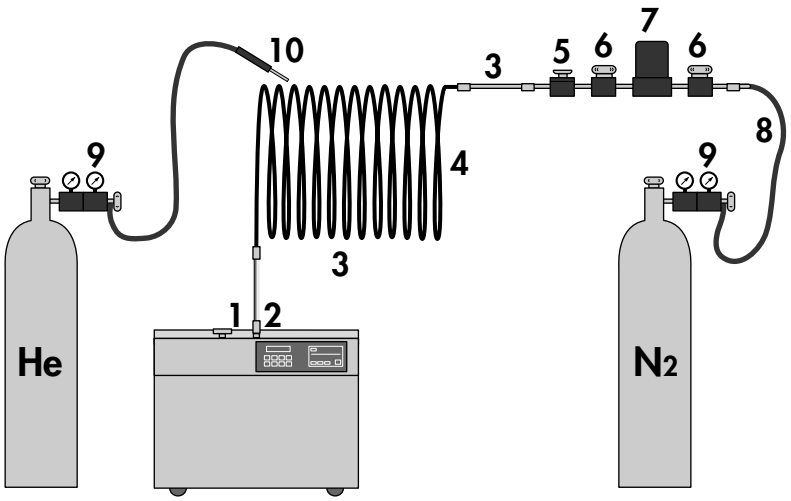
Gas line option

Only for the ASM 182 TD+

Installation preparation



Equipment required (in addition to the detector)

Flexible connection components

Flexible stainless steel tubes (**4+3**) of a diameter not greater than10 mm so as not to increase the response time and connection accessories compatible with the installation under test.

Helium spray equipment

Helium cylinder with pressure relief valve, tube and spray gun (**9+10**).

Carrier gas source

Helium-"free" nitrogen cylinder and pressure relief valve (**9+8**). This source must be compatible with the cleanliness or purity requirements within the installation at the time of the test.

A carrier gas flow adjustment device

The quickest method to adjust the gas flow is the mass flow controller (**7**) (Mass Flow Controler).
As an alternative, a manual micro-flow valve (DN 16) can be used.
According to usual connection procedures, stop valves (**6**) and filters may be inserted.

A reference leak

Reference leak (**5**) used to "calibrate" the installation (response time for the furthest point from the detector, ratio of actual leak / helium signal read on the detector). ALCATEL offers reference leaks specially designed for this application (without reservoir, with 1/4" VCR connectors).
Different values of leaks are available: **F 130**

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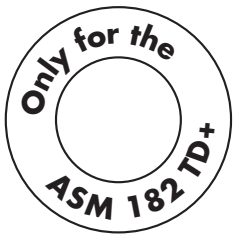

Gas line option

Installation connection

Principle

■ The detector DN 40 inlet port (**1**) must be blocked.
■ Connect the gas line under test (**4**) to the detector's 1/4" VCR connector (**2**) via flexible connection components (**3**).
■ Connect the reference leak (**5**).
■ Connect the carrier gas flow control accessories composed of a mass flow controller (**7**) or manual micro-flow rate valve and stop valves (**6**) if necessary.
■ Connect the carrier gas source via a flexible tube (**8**).

Precautions

■ A laminar flow must be maintained in the entire line under test to obtain the expected result: the response time is increased if a significant volume is between the carrier gas supply and the detector.

■ It is advisable to place the detector as close to the zone liable to leak as possible.

■ Purge the line under test with the carrier gas in order to eliminate the air.

■ It is better to stop the "gas line test" function in case of external auto-calibration.

Note: It is not necessary to connect a neutral gas purge to the detector: the carrier gas acts in the same way as the purge.

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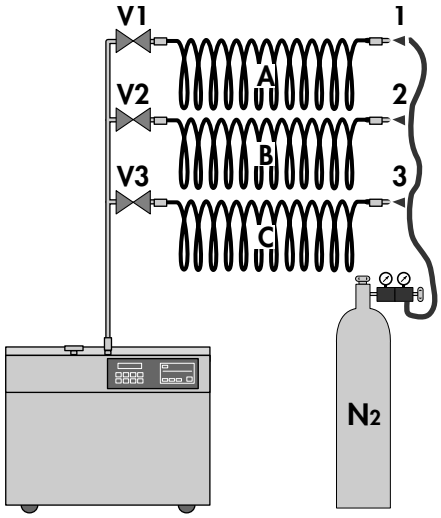
Gas line option

Multiple lines test

Shut off the line under test as much as possible with the valves and fittings available.

The zone under test is limited to the line through which the carried gas flows to the detector.
It is therefore necessary to prevent the flow of carrier gas through the lines not under test, using the valves V1, V2, and V3.



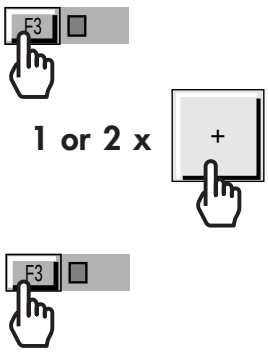
To test the line,	open,	close,	connect
A	V1	V2 and V3	1
B	V2	V1 and V3	2
C	V3	V2 and V1	3

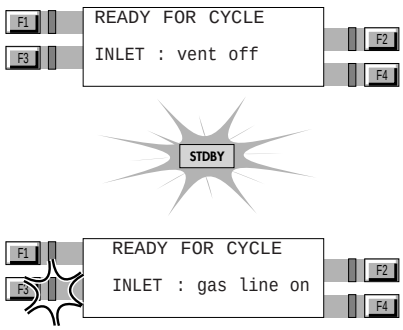
Activate the gas line option

Access authorization

Do you have access to this operation/function? C 30

Access with level 2 , 3 , 4





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Gas line option

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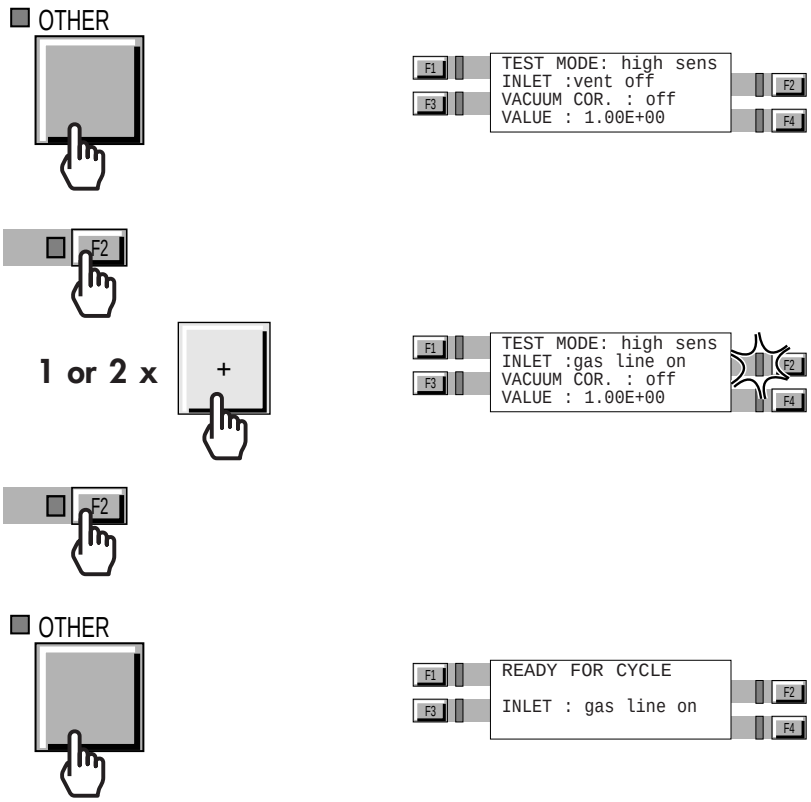
Activate the gas line (continued)

Access with level 1

Access to level 4 C 40



Deactivate the gas line option

The procedure is the same as for activating the gas line option but instead of pressing [+], press [-].

Test procedure

1	**Activate the gas line option**	See above.
2	**Connect the installation**	See "Installation connection" paragraph.
3	**Carrier gas supply**	Close the valves (**6**) and (**9**).

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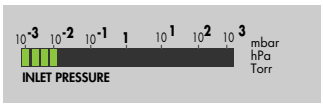
Gas line option

Only for the ASM 182 TD+

Test procedure (ctd)

④ Start up the detector

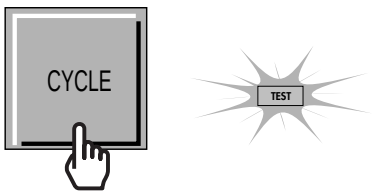
Wait until the detector enters "High sensitivity" mode.
The inlet pressure should be ≤ 1.10^{-2} mbar (4 leds max.)



The inlet pressure displayed on the control panel is not the pressure at the gas line (circuit separated by a membrane inside the detector).
It is the pressure at the level of the DN 40 inlet port.
However, this pressure varies as a function of the pressure in the gas line.

⑤ Start a cycle

Make sure that the DN 40 inlet port is blocked.



⑥ Inject the carrier gas

Gradually open the carrier gas supply (**9**) until the maximum flow allowed is obtained.
The detector must remain in High Sensitivity test mode.

The inlet pressure and the cell pressure increase as the carrier gas flow increases.
If the detector switches to Gross Leak test mode, reduce the carrier gas flow.

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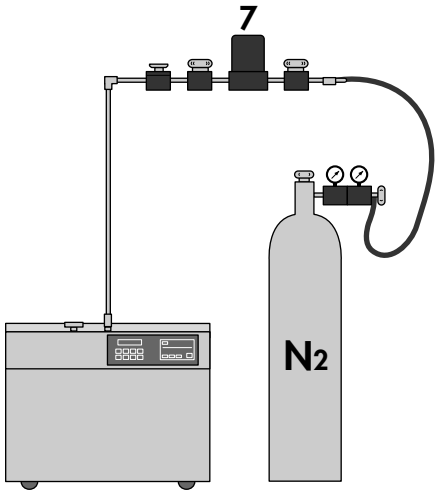
Gas line option

Test procedure (ctd)

The length of time it takes for the pressure to stabilize in the gas line depends on the length of the gas line.
If a mass flow controller (**7**) is used, the maximum carrier gas flow can be defined quickly before connection to the installation, by connecting the line under test directly to the detector.



The maximum flow is of the order of 40 to 60 SCCM or 0.6 to 1 atm.cc/s.

(7) Calibrate the installation

Spray the reference leak (**5**) for a defined period (e.g. 5 seconds).

Note:
- the time required to obtain a signal on the detector (any leak on the gas line will give a response ≤ this reference time).
- the ratio read on the detector

$$\frac{\text{Reference leak value}}{\text{Helium signal value}}$$

(this ratio depends on the detector and the carrier gas flow. Value: between 10 and 20).

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Gas line option

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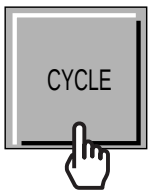
Test procedure (ctd)

⑧ Test the installation

Spray the various test points and according to the reference time defined above, wait to go to the next point. It is recommended to start on the detector side and to test progressively by moving further away (increasing response times).

⑨ Stop the test

Close the carrier gas injection (**9**).
Stop the test cycle.



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