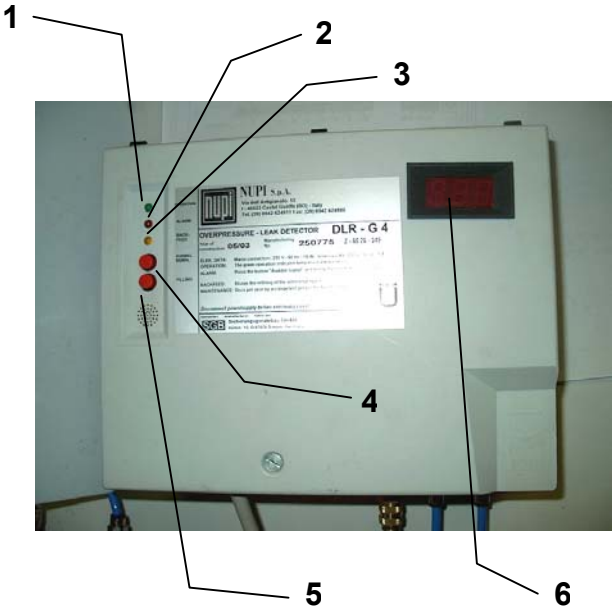
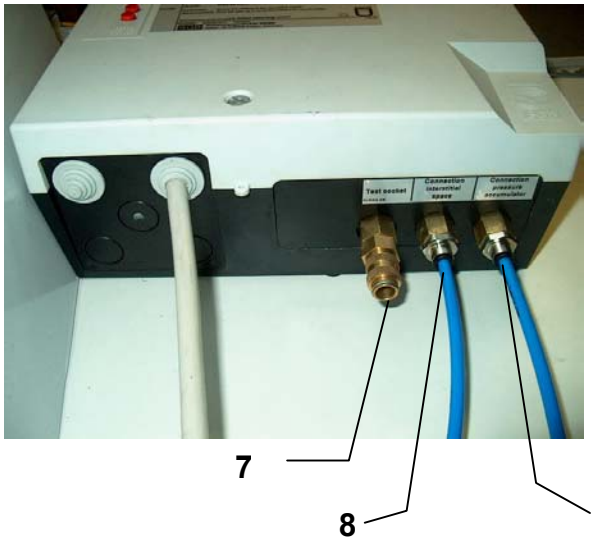
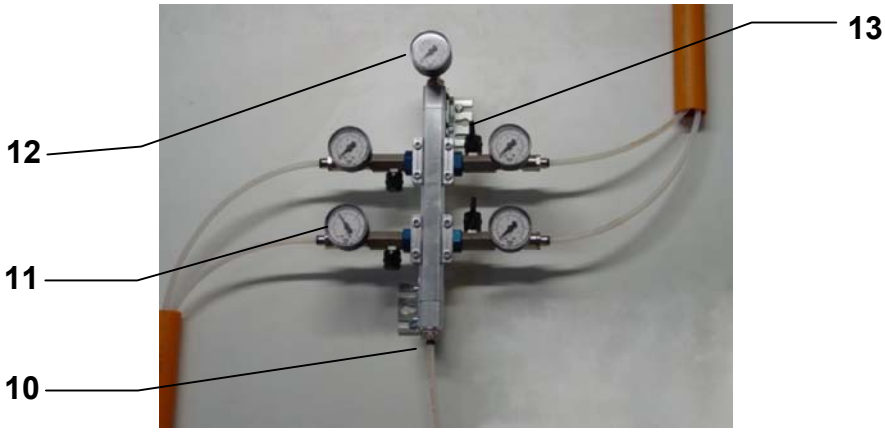
Summary

SMSD System Component Features

SMSD Unit Layout







1. System operational indicator
2. Alarm indicator
3. Refilling indicator
4. Alarm switch
5. Manual refilling button
6. Main pressure gauge
7. Test connection
8. Monitoring gas exit SMSD control panel
9. Monitoring gas entry SMSD control panel
10. Monitoring gas entry into Manifold
11. Pressure gauge for outlet
12. Pressure gauge for inlet
13. Isolating ball valve

Technical Specifications

Weight	4 kg (8.9 lb)
Dimensions	250 x 250 x 110 mm (10” x 10” x 5”)
Maximum absorbed power	25 VA
Power supply	220V / 110V and 50Hz / 60Hz
Operating temperature	-10 °C to + 45 °C (14 °F to 113 °F)
Power lead	3.0 m long (10.0 ft)
IP protection	55

System Description

The *SMARTFLEX* SMSD Leak Monitoring System is an active leak monitor that allows 24/7 real time integrity control of our double wall piping system. It allows for the early detection of pipe and fittings failures limiting potential damage to the environment. It is specifically designed to be connected to *SMARTFLEX* double wall piping system.
The system is designed to maintain a constant overpressure of nitrogen into the double wall interstitial space. The monitor incorporates a refilling capability allowing it to compensate for any “micro-leakage” that may occur. This is limited to a “low” rate.

In the likelihood of a breach in the primary or secondary pipe wall the system will not be able to compensate for the escape of nitrogen forcing the pressure in the interstice to drop below the alarm threshold set point. In this event an audible buzzer and an electronic signal alarm will be initiated.

The monitoring system SMSD is available in two models **SMSD** (220 V or 110 V) and **SMSD3** (220 V or 110 V), depending from the pressure values required:

	SMSD	**SMSD3**
Pmon (Monitoring pressure)	1,8	4
Pr (Refilling pressure)	1,45	3,75
Pa (Alarm pressure)	1,15	3
Psp* Overpressure in the interstice *	2,8	4,8

Overpressure in the interstice*: Pressure value necessary to activate the overpressure valve of the annular space.

Note: The monitoring system SMSD is equipped with an overpressure valve of the interstice that, in case of increase of the pressure in the intersticial space (for instance warming), is automatically opened.
The **SMSD** model is suggested with double wall pipe systems that work in suction (depression) while, model **SMSD3** is suggested with systems working in pression.

The *SMARTFLEX* SMSD Leak Monitoring System has two operational modes:

Normal Operating Mode

Under normal operating conditions if there are no failures, the system will experience a very slow reduction of pressure (micro-leakage) in the interstitial space.

Note: This is quite normal for any pressurised space containing fittings and connections.

If the pressure falls below the **Pr** (refilling pressure) value unit commences the refilling process restoring the over pressure to its set point **Pm** (monitoring pressure) during this process a visual yellow indicator light is illuminated on the control panel. When the over pressure set point is reached, the refilling process stops and the yellow indicator is turned off.

Alarm Mode

If the leak rate of the nitrogen from the interstitial space is greater than the set refilling rate, the pressure will continue to decrease until the alarm set point **Pa** (point of alarm) is reached. In this situation both a visual red indicator light is illuminated on the control panel and an audible buzzer alarm will be triggered. The SMSD Leak Monitoring System also has the built in capability (via a relay and an interlocked auxiliary contact) to activate other alarm actions e.g. switch off pump, external siren alarm or activate a communication channel). After acknowledging the alarm situation the audible buzzer alarm can be silenced by using the button on the control panel.

Operation Requirements

The following items are required to install the SMSD Leak Monitoring System:

1. SMSD Leak Monitoring System control panel.
2. Manifold with the required number of outlets equal to the number of lines to be monitored, (model SMANIF4 can monitor 4 lines) also available are SMANIF6, SMANIF8, SMANIF10 and SMANIF12.
3. Test tubing (model STT6) – 6 mm OD calibrated rilsan tubing to run from the manifold (model SMANIF) to the test port on double wall fittings.
4. Conduit and penetration fittings to convey the test tubing.
5. Compressed nitrogen cylinder containing a minimum volume of 50 litres @ 200 bar (2900 psi or 20000 kPa).
6. Pressure reducing set for mounting on the nitrogen cylinder to enable a pressure reduction down to 2.5 bar for the SMSD and down to 4 bar for the SMSD3.
7. Two pressure gauges to measure cylinder pressure and reduced pressure (typically these gauges are integrated with the pressure reducing set).
8. 220 V or 110 V power supply for the SMSD control panel (model SMSD) (power 50W).

Installation Guide

The installation of the SMSD Leak Monitoring System shall be undertaken in accordance with the following instructions:

1. Provide an electric power supply of the appropriate voltage to the SMSD Leak Monitoring System control panel. It is recommended that the power outlet socket be equipped with an on/off switch in order to allow the power to be shut off to the panel if necessary.
2. Locate the nitrogen cylinder as close as possible to the control panel. In the event that the nitrogen cylinder will be stored outdoors then it is recommended that it be protected form direct sunlight.

Note: As the nitrogen is stored under high pressure it is advisable to ensure that the nitrogen cylinder be appropriately protected against any accidental mechanical impact.

3. Sketch the proposed outline location of all the SMSD Leak Monitoring System components on the wall taking into consideration the potential need for any maintenance and repair ensuring that a minimum bending radius of 5 cm (2”) for the test tubing (model STT6) is not exceeded.
4. Attach all the SMSD Leak Monitoring System components to the wall utilising appropriate mounting hardware.
5. Ensure that a sufficient length of test tubing is provided between the SMSD Leak Monitoring System control panel (model SMSD) manifold (model SMANIF) and the test port of the double wall fitting.

Note: It is recommended to allow some excess tubing that can be adjusted to the final required length prior to commissioning the system.

6. Insert test tubing into the conduit. Care should be taken when pulling the test tubing through the conduit avoiding any damage such as kinking and /or cuts. It is recommended to utilise two people while undertaking this operation, one pulling the tube through the conduit and the other guiding the tube entry into the conduit.
7. Squarely trim the test tubing ends and then insert one end into the test port on the double wall fittings and the other into the manifold. Insert the test tubing firmly into the fitting and ensure it reaches the stop inside the fitting.
8. Connect the test tubing from the outlet fitting of the SMSD Leak Monitoring System control panel to the inlet fitting of the manifold.
9. Connect the test tubing from the pressure-reducing valve on the nitrogen cylinder to the inlet fitting on the SMSD Leak Monitoring System control panel.

WARNING: In order to prevent any accidental pressure shock to the SMSD Monitoring System control panel, prior to feeding any nitrogen into the system first set the pressure-reducing valve to zero.

WARNING: Do not disconnect the test tubing from the fittings when the system is still under pressure as this could damage the fittings.

The SMSD Leak Monitoring System is now completely assembled and ready to be tested in accordance with our Testing Procedure.

SMSD Leak Monitoring System Testing Procedure

The SMSD Leak Monitoring System must be tested upon completion of the installation. The SMSD Leak Monitoring System shall be deemed as operational only after the following test procedures have been undertaken and passed:

Testing must not commence prior to one (1) hour after final completion of the installation, allowing all sealants used during assembly to set.
Always record the ambient temperature immediately prior to testing as this may have an influence on the final testing results. Try to avoid any situation in which there may be temperature variations during the test period.

Note: Wherever possible it is advisable to bury or shield the double wall piping system, conduits and test tubing to be monitored from direct sunlight.

All fittings must be accessible for inspection during this process. If a leak is identified testing of all joints with the aid of soapy water or foam is required in order to locate and repair the leak.
Prior to commence all tests, ensure the power supply is connected to the SMSD Leak Monitoring System control panel.

Note: Once connected the audible buzzer alarm will sound and the red indicator light will be illuminated as at this time the pressure level in the interstice is below the alarm set point.

Ensure that the pressure in the pressure reducing valve located on the nitrogen cylinder is set to zero. Open all the valves in the manifold then open gradually the isolating valve on the supply line to the SMSD.
Set the pressure reducing valve from 0 to 2,5 bar (36 psi, 250 KpA) for SMSD and from 0 to 4 bar (58 psi,400 kPa) for the SMSD3: Nitrogen will commence flowing into the double wall piping system interstitial space. To expedite the filling process press the manual filling button (5) for 5 sec. (during filling the red light on the SMSD control panel will be illuminated).

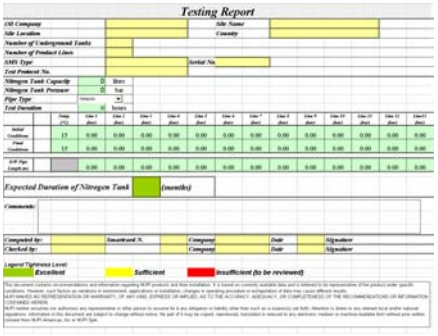
WARNING: If the set pressure of the reducer is higher the safety valve located in the SMSD will open causing a loud hiss. Check immediately the pressure reducing valve reset it to the correct value.

Note: The automatic refilling is characterized by an intermittent "swish" whereas during a manual refilling the "swish" is continuous.

As soon the pressure in the double wall piping interstitial space rises above the alarm set point of refilling pressure (**Pr)** the alarm indicators and audible buzzer alarm will cease.
When the pressure in the double wall piping interstitial space reaches operating set point (**Pm)** the refilling process will automatically cease. Now the indicator (3) should be off.
Wait one hour to allow the nitrogen temperature to stabilise with the piping interstitial space.
Close all the ball valves on the manifold and then close the isolating valve on the nitrogen cylinder.
Ensure that all gauges on the manifold are correctly numbered for identification.

Now record the following parameters: ambient temperature, pressure readings on all gauges on the manifold and the main pressure gauge on the SMSD Leak Monitoring System control panel.

Wait for 1 hour then check that all the pressure gauges in the manifolds still show the initial pressure value. Variations within 0.1 bar (1.45 psi, 10 kPa) are acceptable. If larger pressure variations are recorded, check for leaks all the components of the system with soapy water. When the leak(s) are detected repair or replace the defective component(s) and start the test again.


Testing Report

Wait 24 hours and then check and record the readings on all pressure gauges. Also record the current ambient temperature.
Complete all fields for the relevant number of monitored lines in the SMSD Leak Monitoring System analysis spreadsheet available on our website www.nupinet.com.

Note: Ensure all the following fields are completed; pipe length and size, initial and final pressure, initial and final temperature, cylinder volume and initial pressure and test duration.

Once all data is entered the spreadsheet will then automatically estimate the life expectancy of the nitrogen cylinder and will highlight the test tightness of each line to be monitored.

Maintenance Schedule

The following maintenance schedule should be regularly reviewed and all relevant time line item checks undertaken and recorded

Store this document inside the SMSD Monitoring System Control Panel	Every Shift	Daily	Weekly	Monthly	Yearly	After Nitrogen Cylinder Replacement
Test Tube Connection Visual Check			X		X	
Control Box Power On Check	X					X
Nitrogen Cylinder Check and Record Pressure			X			X
Verify Alarm Status	X					X
Sump Inspection Visual Check					X	
Test Tubes Integrity Test					X	
Undertake Pressure Test Procedure					X	
Pressure Set Point Check					X	

Troubleshooting Guide

PROBLEM DESCRIPTION	TROUBLE SHOOTING
The SMSD Leak Monitoring System is not powering up.	**Check that the power on / off switch on the power outlet is not accidentally in the off position. The power lead could be damaged, check the cable and connections for electrical continuity and replace if necessary. A power fuse in the power source feed could be damaged, verify and replace if necessary.**
Alarm indicator is on.	**There is low pressure in the double wall piping interstitial space. Check nitrogen cylinder pressure, and replace cylinder if empty. Check pressure reducing valve is set at 2.5 bar (36 psi, 250 KpA) for SMSD and 4 bar (58 psi,400 kPa) for SMSD3. Perform an SMSD Leak Monitoring System Testing Procedure. Once you identify the leaking section locate the specific fitting from which nitrogen is leaking by soaping all test tube connections and either re-tighten or check the condition of the test tube and re-inset it. If none of the above steps are successful then pressure test primary piping. If a failure in primary piping is detected, then replacement of the leaking piping section or fitting is required.**
Nitrogen cylinder is loosing pressure at an excessive rate.	**Perform an SMSD Leak Monitoring System Testing Procedure.**
During nitrogen refilling, the system never reaches the operating set point and the automatic refilling indicator remains illuminated.	**Check that the pressure reducing valve is set at 2.5 bar (36 psi, 250 KpA) and 4 bar (58 psi,400 kPa). Perform an SMSD Leak Monitoring System Testing Procedure.**

Contact our **TECHNICAL SUPPORT SERVICE** for further assistance

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Warranty Conditions

Please keep this page.

The SMSD Leak Monitoring System is warranted for a period of twelve (12) months from the date of purchase. The absence of any such proof of purchase renders the warranty null and void. The warranty covers the free replacement or repair of the SMSD Leak Monitoring System components which are deemed by the manufacturer to be manufacturing defects.

The warranty does not cover parts which are faulty due to negligence or careless use, maintenance undertaken by unauthorized personnel, damage sustained during transport or in other circumstances not deemed by the manufacturer to be manufacturing defects.

The warranty does not cover any damage to the SMSD Leak Monitoring System caused by power surges from non-stabilized power sources.
Faulty SMSD Leak Monitoring System components must be shipped freight prepaid to the manufacturer and will be returned freight forward. Prior to any shipment ensure you contact the Regional Nupi Office for authorization.