Basic functions

The *LTS 670* leakage test system can be used to check hollow objects for leaks with overpressure or vacuum.
The device comes equipped with a desk top housing and can be controlled manually or using external control signals.
The *LTS 670* leakage test system is suitable for the relative-pressure method or the differential-pressure method

All device models feature the following basic functions:

- 64 test programs
- Display of measured values in various formats on the built-in LCD display
- Textual help for setting parameters in different languages
- Password protection against unauthorized change of parameters
- Permanent self-test using monitoring of the measurement signal

- Serial interface for output of measuring values to a subsequent process data documentation system or a printer
- Test process controlled manually or by external signals
- Comprehensive testing functions and diagnosis features
- Statistical functions

Testing

Testing method
The device operates according to the relative-pressure method or the differential-pressure method.

   Relative-pressure method:
Applying this method, the test specimen is filled with a predetermined pressure. After the filling time has elapsed, the test volume is sealed off. Following a stabilization time, during which temperature equalization takes place between the test specimen, testing equipment and test medium, actual testing commences. If the test specimen is leak, the pressure in the test volume will begin to fall. The difference in pressure is measured between the beginning and end of the test period and is subjected to rating.
Applying this method, use is made of piezoresistive pressure sensors, whose range of measurement corresponds to the test-pressure range. This method is highly suitable for detecting minor to medium-sized leakages.

   Differential-pressure method:
Applying this method the test specimen and a tight reference volume are filled with equal pressure. Afterwards they are both sealed off separately. After a stabilization time has elapsed, during which temperature equalization takes place between the test specimen, testing equipment and test medium, the actual process of testing commences. If the test specimen is leak, this will result in a difference in pressure between the test specimen and the reference volume, this then being measured and subjected to rating.
Applying this method, use can be made of pressure sensors geared to a maximum accuracy regardless of the test pressure selected. This method is highly suitable for detecting minor leakages.

Test procedure
- Select existing test program or enter new time and limit values.
- Start by pressing the "Start" button on the front panel or by sending an external control signal.
- Pre-filling (if installed)
- Filling (time- or pressure controlled)
- Stabilization
- Testing
- Evaluation
   Test result "NOK" must be acknowledged by pressing the "Stop" button; if test result is "OK", the procedure is continued by
- Emptying

By pressing the "Stop" button, the test routine can be stopped at any step. In this state, the display of the remaining time switches to negative time so that the duration of the interruption can be determined at any time. Press the "Start" button to continue the test run. Press the "Stop" button twice to terminate the test.

Display during test
During each test step, various textual information will be displayed.

Before start:
Test program and the state of the integrated statistics counters in the upper rows, result and measured value of the last test in the lower rows.

In the filling step:
Test program and the state of the integrated statistics counters in the upper rows, text "Filling", display of remaining time, and measured value of the test pressure monitoring in the lower rows.

In the stabilization step:
Test program and the state of the integrated statistics counters in the upper rows, text "Damping", display of remaining time, and measured value of the test pressure monitoring in the lower rows.

In the test step:
Test program and the state of the integrated statistics counters in the upper rows, text "Damping", display of remaining time, and measured value of the flow rate in the lower rows.

In the emptying step:
Test program and the state of the integrated statistics counters in the upper row, text "Testing", test result, and measured value of the flow rate in the lower rows.

Test results

- Red LED ">" is on, output "NOK" is set. Measured value at the end of test time exceeds upper limit value.

- Red LED "<"   is on, output "NOK" is set: Measured value at the end of test time is smaller than the lower limit value.

- Green LED "=" is on, output "OK" is set: Measured value at the end of test time is within the pre-set range between limit values.

- All three result LEDs are on, output "NOK" is set: The test was terminated by pressing the "Stop" button twice, the test piece cannot be evaluated.

Interfaces

Interface to external control
The plug of the electrical part of the standard test device is assigned as follows:

Inputs:
Start
Stop/Interruption
Test program bit 0
Test program bit 1
Test program bit 2
Test program bit 3
Test program bit 4
Test program bit 5

Outputs:
Ready
Test running
Pause
Test result OK
Test result NOK
Test finished
Mark OK part
Signal end of test
Error
Pre-filling

Voltage:

+ 24 V	Power output for external opto coupler or relay with potential-free input	
0 V	Input as reference potential for the test device outputs.	

The test device outputs and the 24V voltage output can be loaded with 0.5 A each. However, the overall load in the basic device must
not exceed 2.5 A. A stronger power supply is available upon request.

Serial interface

After the completion of each test, a character string is transmitted containing the test result, the measured value, and the test program.
The output of date and time, and test pressure can be switched on and off.

Statistics

The statistics menu shows the following information:

	Number	Percent
Total	Number	Percent
NOK	Number	Percent
OK	Number	Percent
NOK total	Number	Percent
Fine leak	Number	Percent
Rough/Wrong	Number	Percent
OK results		
minimum	Value	
maximum	Value	
mean value	Value	

Technical data

Supply:

electrical: U = 230 V, 50 Hz
pneumatic: clean pressurized air, max. 7 bar

Power rating of the outputs:

individual maximum 0.5 A
total maximum 2.5 A

Stronger power supply is available upon request.

Adjustable times:

Filling time: 0.0 ... 3,000.0 sec
Stabiliz. time: 0.0 ... 3,000.0 sec
Test time: 0.0 ... 3,000.0 sec
Emptying time: 0.0 ... 3,000.0 sec

Available pressure ranges:

-1   ...   0 bar
 0   ...   1 bar
 0   ...   4 bar
 0   ...   6 bar
 0   ...   10 bar

Measuring ranges:

relative-pressure test:
like pressure range
resolution 1/20000
differential-pressure test:
±20 mbar, resolution 0.2 Pa

Designs:

Desk top housing IP40
19", 3HE
450mm x 140mm x 326mm
(W x H x D), or
½19", 6HE
235mm x 266mm x 326mm
(W x H x D)

with separate slots for electrical and pneumatic parts

Supply connections, interfaces and main switch on back panel

Serial interface

9600 bps
1 start bit
8 data bit (ASCII characters)
1 stop bit
no parity check

Available options

- two externally selectable test connections
- Test start via external switch
- Enforced voltage supply
- Test and calibration aids
- Special protocol for serial interface