

# OPERATION MANUAL

LEAK CALIBRATOR LC Series

## MODEL: LC-11/LC-12/LC-22/LC-42

No.LC-941B1-A

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# 1. FEATURES OF LEAK CALIBRATOR

This calibrator is used for calibrating the sensitivity of a differential pressure detection type air leak tester. The pressure deformation, including the work's inside measurement, and the differential pressure detection part in the circuit, cause the leak tester's indicating pressure point against the detective differential pressure to be changed. To check this by calibration, there is a way of using the throttle valve, in which the leakage is distinct, etc. But, it cannot reproduce the stable and minor leak.

On the other hand, this leak calibrator has structure that changes the capacity by a fixed quantity in the measuring circuit. If you take the testing pressure into consideration, you can regard the measure of capacity changed that have been given as the actual leak, by operating this calibrator while it is being used for measurement. And, we can check the sensitivity of the tester's differential pressure from the indicating point of the differential pressure at that time.

# 2. CALCULATING FORMULA

For the work, whose inside measurement is unknown, the exact equivalent inside measurement can be calculated using the following formula (1). And, the leakage against the alarm set pressure point and the detection indicating differential pressure can be calculated using formula (2).

$$Ve = (101.3 + P) \times 10^3 \times \Delta V / \Delta P \dots\dots\dots(1)$$

$$Q = Ve \times \frac{\Delta P}{101.3 \times 10^3} \times \frac{60}{T} \dots\dots\dots(2)$$

When the leak calibrator is used at testing pressure of 0 (atmospheric pressure), the equivalent inside measurement point in the actual testing pressure P can be found from the data at that time using the following formula (3).

$$Ve = 101.3 \times 10^3 \times \Delta V_0 / \Delta P_0 + KP \dots\dots\dots(3)$$

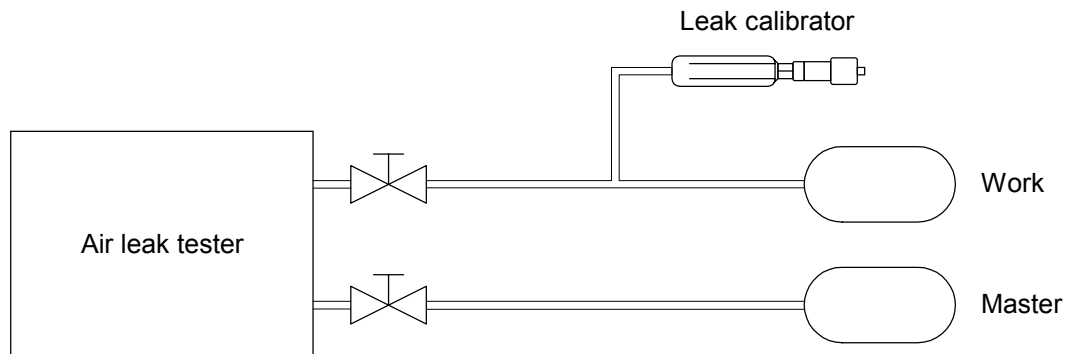
<Marks>	$\Delta V$ : Changed measure of capacity given by the leak calibrator $\Delta P$ : Differential pressure indicating point P : Testing pressure Ve : Equivalent inside measurement at the work side Q : Leakage T : Detective time K : Changing rate of the capacity of the differential sensor diagram In case of PT-110D sensor, K=0.01(mL/kPa)	[mL] [Pa] [kPa] [mL] [mL/min] [s] [mL/kPa]
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Moreover, you can easily check the sensitivity of the leak tester synthetically by using the leak calibrator regularly to test the reproducibility of  $\Delta P / \Delta P$ .

### 3. HOW TO USE

#### 3-1 Preparation

- (1) Branch off the piping at the work side in the middle of its work to install the calibrator.  
This calibrator can also be installed in the panel.



- (2) Set the work that has no leak, has been let alone for hours, and is dry.
- (3) Set the detective timer approx. five seconds before and after the time when you can fully operate the leak calibrator.
- (4) To use the leak calibrator at the ordinary testing pressure, when the leak test has been performed at such condition, the indication must be nearly zero at the time of detection, and have reproducibility. If these cannot be satisfied, pressure P must be 0 (atmospheric pressure). And, ordinarily this calibrator cannot be used at the testing pressure of high vacuum and middle or high pressure.
- (5) If you are using a test program that finishes measurement when the detecting differential pressure exceeds the alarm set differential pressure point, you must extend the set point to maximum so as not to cause it to be reset until the detection finishes.
- (6) If the leak tester has function of auto drift correction, turn it OFF.

#### 3-2 How to operate

- (1) Set the testing pressure to 0 (atmospheric pressure) or ordinary testing pressure.
- (2) Define the starting point of the dial. In case of an ordinary pressurization type air leak tester, set the division of the dial to 0.00. In case of the vacuum type or the atmospheric capsule type leak tester, set it to 10.00.  
In consideration of this calibrator having the insensible zone, once cause the division to over the starting point (0 or 10) toward the opposite direction, then return it to the starting point to be adjusted. This starting point can be made to be an adequate intermediate position according to the changed measure of capacity to be given.
- (3) Start the leak tester. When it has entered the detective stroke, turn the dial of this calibrator toward the counterclockwise direction (in case of the vacuum type and the external pressure, toward the clockwise direction) from the time starting point to give it the measure of capacity changed,  $\Delta V$ .
- (4) At this time, read the vibration  $\Delta P$  of the differential pressure meter. (First, you may decide  $\Delta P$ , and read  $\Delta V$  corresponding to it.) Keep the time constant from entering the detecting stroke to reading. Repeat the measurement three times or more to find the mean value.

- (5) Start the leak tester again. Without turning the leak calibrator at the detecting atroke, confirm there is not drift within the same time as reading given in abobe (4).  
 If there is a drift, subtract the drift volume from  $\Delta P$  formerly found so that it can be corrested.

#### 4. SPECIFICATIONS

Model	LC-11 *	LC-12	LC-22	LC-42
Variable range of capacity	0 ~ 1mL		0 ~ 2mL	0 ~ 4mL
Minimum division	0.002mL		0.004mL	0.008mL
Measure of capacity changeed per turn	0.1mL		0.2mL	0.4mL
Connecting opening of piping	Rc1/8	Rc1/4		
Measure of hole for installing in panel	$\Phi$ 17.5			$\Phi$ 25.5
Measure A	MAX.100			MAX.105
Measure B	$\Phi$ 21		$\Phi$ 24	$\Phi$ 31

\* LC-11 is made to order .

