



OPERATIONS MANUAL

MASTER CHAMBER

Model: MC- B SERIES

NO. MC SERIES-2-001-0001-E

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1. OVERVIEW

Differential pressure decay leak tester requires a non-leaking reference volume, called master. Ideally, the master should be identical to the workpiece, but it is not always possible. The master chamber can replace the master where:

- a. Fixture identical to the workpiece can not be built.
- b. Several workpieces are tested in a production line.
- c. Workpiece has possible deformation.

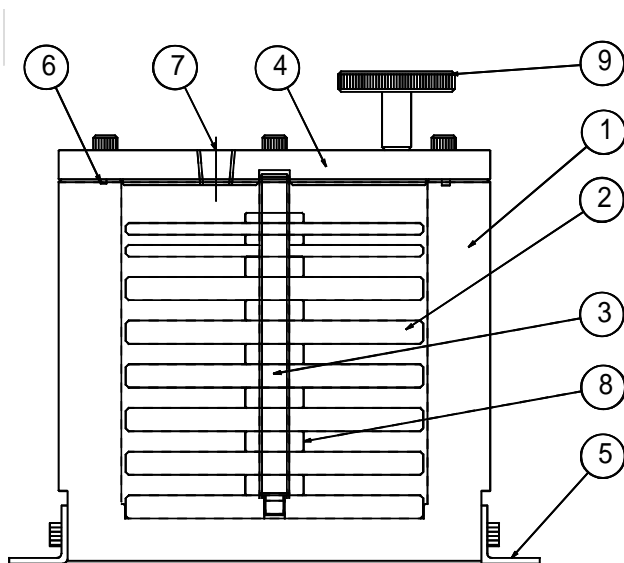
2. STRUCTURE AND FUNCTION

Fig. 1 shows the structure of the Master chamber. The internal surface area and the volume is made to be altered with fins and collars. The fins and the collars are designed not to move.

When air is pressurized, its temperature rises due to adiabatic compression. The process of stabilization of pressurized air molecules is done by a heat transfer between workpiece surface and the air, which causes the air temperature to gradually approach to that of the workpiece. If the pressurization timer is long enough, the temperature of the applied air becomes equivalent to that of the workpiece. However, if the pressurization timer is too short, those temperature won't be equalized, and it causes pressure drop, which appears to be a leak.

When workpiece and master are identical, the adiabatic effect is canceled and the test time can be shortened. However if they are not identical, diversity in shape causes difference in heat stabilization speed, which appears to be a leak.

Although the shape of the Master chamber is different from that of the workpiece, their heat effects can be adjusted with fin arrangement.



--- Fig.1 ---

Table 1: Components

NUMBER	NAME
	Capsule (Aluminum)
	Fin (Aluminum)
	Shaft (SUS303)
	Cap (Aluminum)
	Mounting bracket
	O-ring
	Connection port
	Collar (Aluminum)
	Detachable handle

3. HOW TO USE MASTER CHAMBER

- a. Although the internal volume of Master chamber should be adjusted to that of workpiece as close as possible, 20% difference is within adjustable range because shape has more effect to the heat stabilization than volume.
- b. First, set the fins in the Master chamber by equal distance, and prepare a non-leaking workpiece that is at ambient temperature. Execute a leak test with programmed timer. When air is pressurized, its temperature rises due to adiabatic compression and then it goes down due to the heat transfer between air and the internal surface of the workpiece. This fluctuation is indicated as differential pressure. Positive reading means that heat stabilization of workpiece is slower than that of master. In that case, reduce the number of the fins or the widen the distance among fins in the Master chamber.
- c. Repeat the adjustment by widening space among fins to reduce the differential pressure of the reading during DET stage.
- d. Readjustment of the fin arrangement may be required if the differential pressure data shifts due to climate change depending on seasons.

CAUTION: MC-500B to 5000B are provided with a detachable handle for the fins. The handle should be screwed complete into the shaft before you lift the fins, and be sure to lift them vertically.

Be sure to mount Master chamber vertically.

4. SPECIFICATIONS

The Master chamber specifications are the following. Each Master chamber is provided with 2 sets of half sized fins and collard not included following table.

Model	Internal Volume	Number of Fins				Number of Collars			Max Test Press. kPa (kg/cm ²)	O-ring used
		SS	S	M	L	S	M	L		
MC-50B	50	5				4			700 (7.0)	S38 (NOK)
MC-100B	100	11				10				S48 (NOK)
MC-200B	200		13			12				S115 (NOK)
MC-500B	500			3			2			
MC-1000B	1000			6			5			
MC-2000B	2000			14			13			
MC-5000B	5000				7			7	300 (3.0)	G170 (JISB2401)

5. INTERNAL VOLUME ADJUSTING RANGE

The internal volume of Master chamber can be adjusted within the following ranges:

Model	Adjustable Range
MC-50B	25 ~ 50 (mL)
MC-100B	50 ~ 100(mL)
MC-200B	100 ~ 200 (mL)
MC-500B	235 ~ 500 (mL)
MC-1000B	535 ~ 1000 (mL)
MC-2000B	1005 ~ 2000 (mL)
MC-5000B	2100 ~ 5000 (mL)

The volumes of fins, collars and shaft are followings:

Fins

L	317 (mL)
M	65 (mL)
S	6.1 (mL)
SS	3.3 (mL)

Collars

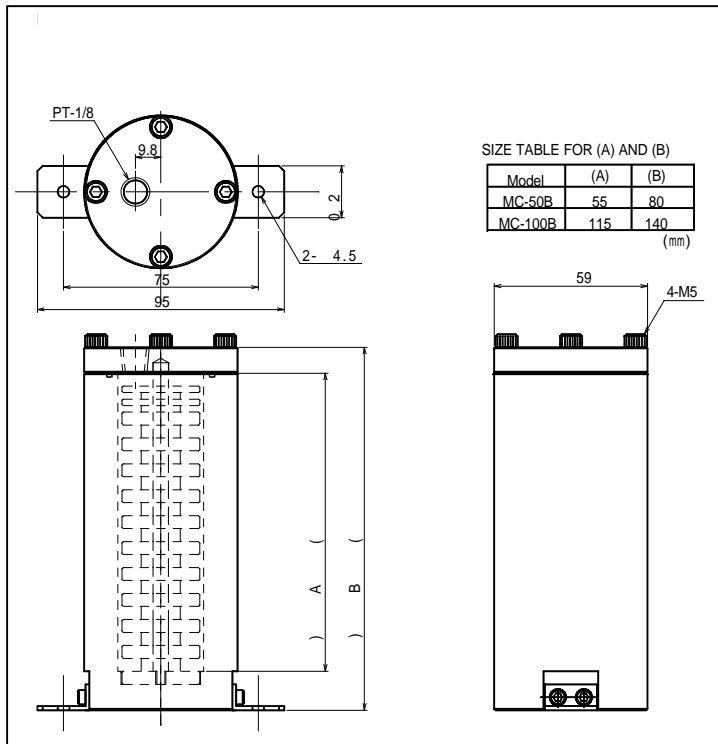
L	15 (mL)
M	1.5 (mL)
S	0.7 (mL)

Shaft

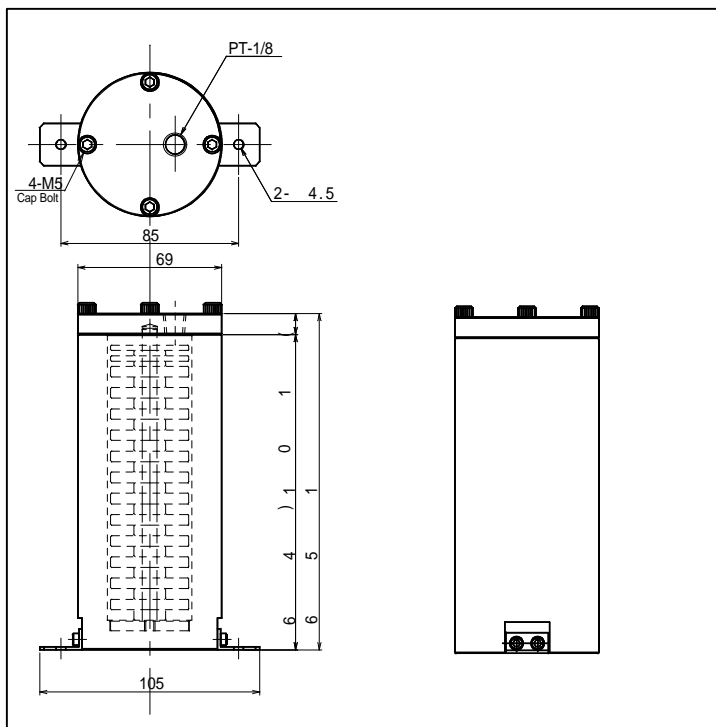
MC-50B	1.7 (mL)
MC-100B	3.4 (mL)
MC-200B	5.3 (mL)
MC-500B	4.5 (mL)
MC-1000B	8.5 (mL)
MC-2000B	17.5 (mL)
MC-5000B	26.5 (mL)

6. EXTERNAL APPEARANCE

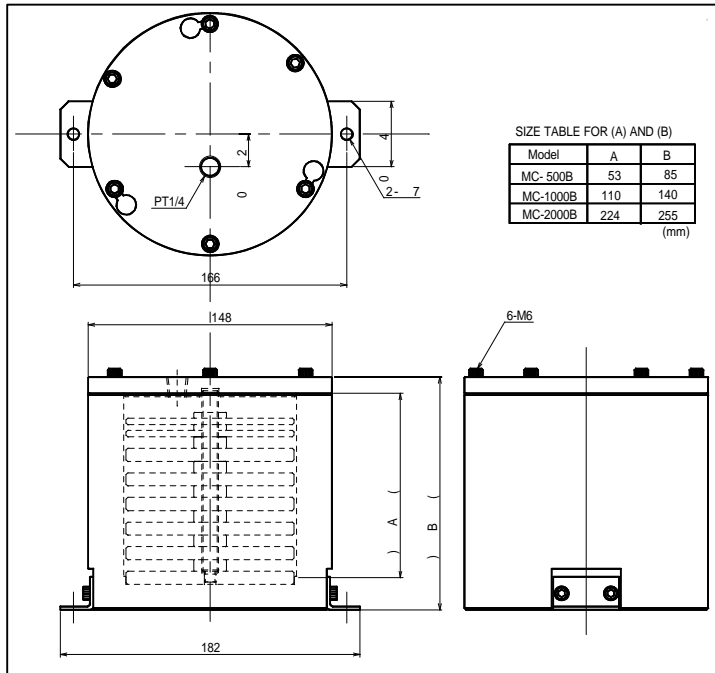
a. MC-50B, 100B



b. MC-200B



c. MC-500B, 1000B, 2000B



d. MC-5000B

