

## STANDARD OPERATING PROCEDURE FOR PORTABLE HAND PUMP CALIBRATOR



Thank you for buying Our product. Please find below the S.O.P. for Operation of Portable Hand Pump Calibrator.

1. The principle of the pump is based on the well-known gas laws whereby the gas pressure varies in inverse proportion to the gas volume. Thus, with the decrease in volume, the pressure increases in linear proportion to the decrease in volume.
2. In this Pressure pump, two pistons are made to move in a Cylindrical Honed Tube by rotating two screws (COARSE & FINE THREADS) with knobs fitted on each of them. The volume between the two pistons decreases & therefore pressure of that volume increase.
3. Keep dead volume (i.e. Tubing Connection Length) to the minimum.
4. Before connecting to any system for pressurization, bring both the piston completely outward, by moving the knobs anticlockwise.

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5. Connect 1 port of the Pressure Pump to the Master Digital Differential Pressure Gauge & the other port to the Gauge Under Calibration.
6. Since the Pump is a single cylinder honed tube, both the Ports have the same pressure & hence, the Gauge Under Calibration should readout the same as the Master Gauge.
7. Start rotating COARSE & FINE knobs clockwise till desired pressure is achieved.
8. COARSE would mean large change in pressure per rotation & FINE Knob is for varying very little pressure per rotation.
9. The principle of the pump is based on the well-known gas laws whereby the gas pressure varies in inverse proportion to the gas volume. Thus, with the decrease in volume, the pressure increases in linear proportion to the decrease in volume.
10. In this Pressure pump, two pistons are made to move in a Cylindrical Honed Tube by rotating two screws (COARSE & FINE THREADS) with knobs fitted on each of them. The volume between the two pistons decreases & therefore pressure of that volume increase.
11. Keep dead volume (i.e. Tubing Connection Length) to the minimum.
12. Before connecting to any system for pressurization, bring both the piston completely outward, by moving the knobs anticlockwise.
13. Connect 1 port of the Pressure Pump to the Master Digital Differential Pressure Gauge & the other port to the Gauge Under Calibration.
14. Since the Pump is a single cylinder honed tube, both the Ports have the same pressure & hence, the Gauge Under Calibration should readout the same as the Master Gauge.

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15. Start rotating COARSE & FINE knobs clockwise till desired pressure is achieved.
16. COARSE would mean large change in pressure per rotation & FINE Knob is for varying very little pressure per rotation.
17. For creating vacuum in any system, bring both the piston to fully inward position by moving them clockwise & then connect to the system. Now move these pistons out by rotating them anticlockwise & adjust to the desired pressure/vacuum.
18. The reading of the Master Differential Pressure Gauge & the Gauge Under Calibration should tally & any error should be noted as the error observed.
19. The Portable Hand Pump is recommended for use from up to -0.5 Kg/cm<sup>2</sup> to upto +5 Kg/cm<sup>2</sup> Maximum Pressure. To use for differential pressure gauges, it is recommended that you check the Master Differential Pressure Gauge range & use the pump to generate pressure only as per the Master Pressure Gauge maximum permitted range .
20. Periodically apply very little vacuum grease on the “O” rings of moving pistons to reduce friction. If leakage occurs, change the “O” rings (size: 44 x 50 mm.)
21. Use only recommended and calibrated differential pressure Gauges as Master Reference Gauges. Ensure that the Master Gauge has a valid calibration certificate.

**WARNING:** Use the Portable Hand Pump for generating pressure as per the Master Instrument specifications & also the maximum permitted range of the Gauge Under Calibration. Since the pump can generate much more pressure, ensure that only certified engineers trained in the usage of the pump use it with discretion. Using the pump to generate more pressure than the maximum range of the gauges under calibration can permanently damage the gauges & no warranty will be forthcoming for the same.

***Manufactured By :***

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