

PRODUCT INFORMATION**SETTING RELIEF VALVES USING A SERIES 9 DIGITAL
PRESSURE INDICATOR WITH MIN/MAX RECALL****RELIEF VALVE**

Many requests for the Heise Series 9 Digital Pressure Indicator with Min/Max Recall come from users who require a precision pressure instrument for the certification or calibration of pressure relief valves.

The Min/Max Recall option updates pressure information twelve times a second to capture values as pressure is changing. The microprocessor compares and saves pressure values that either exceed or fall below previously sensed values.

Because relief valves are important safety devices, standards have been established by the American Society of Mechanical Engineers (ASME) for setting and certifying these devices.

Many small independent companies seek to attain ASME accreditation so that they may calibrate relief valves and apply the ASME Certification Seal, per ASME Code PTC 25.3-1976.

Relief valves are very common to industries where pressure and pressurized tanks are used. The valve has two basic functions. The first is often referred to as “pop off” – the pressure at which the valve will open and relieve the excess pressure within a system. When a pressure tank with a relief valve exceeds its predetermined maximum pressure, it will “pop off.” This means the valve will open and exhaust all excess pressure until the pressure in the tank is equal to the set minimum pressure.

The decrease in pressure from the point of “pop off” until the valve resets is referred to as the “blow down.”

On some relief valves the blow down span can also be set during calibration. Once the pressure falls to the predetermined reset level, the relief valve will automatically close. The tank will then increase in pressure again until it reaches the pop-off level or stabilizes below the pop-off pressure.

RELIEF VALVE TEST

To illustrate this application, we'll set up a test for a relief valve that “pops off” at 500 psi and resets to 300 psi. The Heise 901A Pressure Indicator will have a maximum pressure range of 800 psi. (As a safety measure, always use a pressure indicator with a full-scale range higher than the pop-off pressure.)

To construct the test stand, the following is required:

- 1) Pressure source, air or nitrogen, clean and dry, with a minimum of 800 psi.
- 2) Regulator (R1), for pressure source.
- 3) One non-relieving regulator (R2).
- 4) Two quarter-turn ball valves or equivalent (V1 & V2).
- 5) 901A, 0-800 psig, Digital Indicator with Min/Max Recall option.
- 6) Miscellaneous connections and tubing.

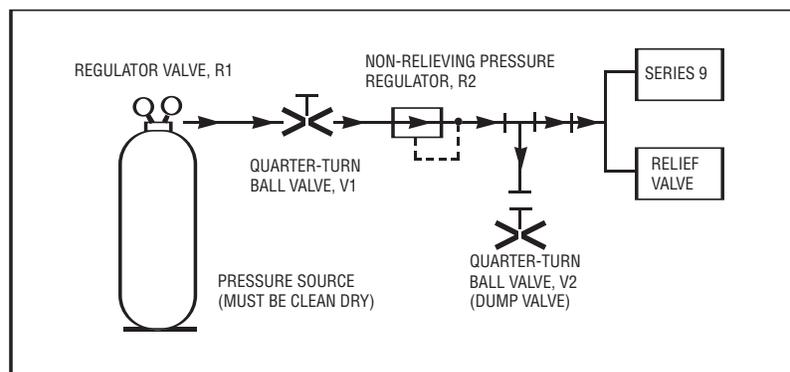
See Figure 1 for configuration of test stand.

When working with pressure in any application, safety is the first priority. Always stay within the pressure limits of the test stand. Be certain that the test stand is properly assembled and proof pressure tested. The escaping pressure from the pressure dump valve and relief valve must be directed away from the operator. Also, safety shields and safety eye protection are recommended.

The following is a quick check of the system that should be performed prior to the first test. There are four points which must be examined to assure safety. Before starting each test, confirm that the valves in the system are positioned as follows:

- 1) Close regulator R1.
- 2) Close valve V1.
- 3) Close non-relieving regulator R2.
- 4) Close valve V2 (non-dump position).

Figure 1. – Test Stand Configuration



STEP BY STEP OPERATIONAL PROCEDURE

Following the safety checklist, the first series of tests can commence.

1. With quarter-turn valves, V2 & V2, and regulator R2 in the closed position, open regulator R1 on the N2 bottle to a range above expected pop off (500 psi), yet below the full-scale capabilities of the Series 9 (800 psi).
2. Open quarter-turn valve V1 to open position.

3. Increase pressure level with regulator R2 to a pressure between the expected pop off and reset pressures.
4. Depress clear button on Series 9 (see Figure 2).
5. With regulator R2, increase pressure to the relief valve until it pops off. The valve will automatically blow down and reset itself.
6. Once the cycle is completed, close regulator R2.
7. Depress the Min/Max Recall button on the Series 9. The display will identify the pop off (max) and blow down (min) values.
8. Close valve V1. Open valve V2 (dump valve). This quarter-turn valve will exhaust all pressure from system.
9. Make the necessary adjustment to the relief valve and repeat the test to verify proper setting.
10. Before removing the relief valve, be sure that all pressure has been exhausted from the test stand. Be sure that regulator R2 and valve V1 are in the closed position and that valve V2 is in the open (dump) position.

Figure 2. – Front View of a Series 9

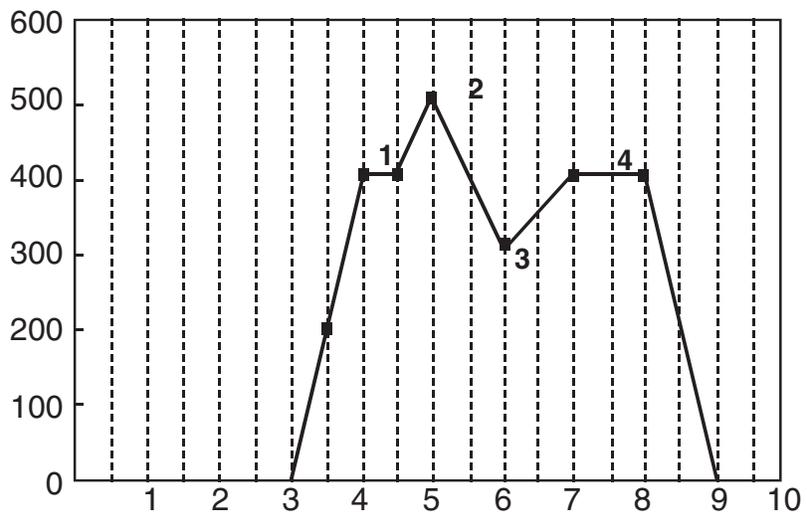


MIN/MAX

Once the Min/Max clear button is pushed, as in Step 5, the unit will automatically record both minimum and maximum pressures during the test period. To recall this information, depress the Min/Max button once. The word "MAX" will appear along with the maximum recorded value. A second touch of the button will display "MIN" along with the minimum recorded value. A third touch of the button will return the display to the normal mode, in which the current pressure in the system will be displayed. Figure 3 shows simply how the min/max values are tracked.

The Series 9 with Min/Max Recall can also be used in other test-stand applications such as tensile, compression or burst testing. The test setup and procedures will be similar to the relief valve test. However, in many cases, the Min recall need not be accessed, as the Min value is not a factor in these tests.

Figure 3. – Min/Max Calibration Cycle



— Pressure Range

Steps of Operation

- 1 Depress Clear Button
- 2 Pop Off (Maximum Pressure)
- 3 Reset (Minimum Pressure)
- 4 Depress Max/Min Recall Button and Record Value