



Fermilab

**Particle Physics Division
Mechanical Department Calibration
Standards/Procedures**

Number: MD-CALPROC-016

Date: 6/26/2009

Manufacturer: Fermi-written Procedure

Model: Operating Procedure for Relief Valve Test Panel

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This Procedure is used for:

Operation of Relief Valve test panel in the Calibration Shop.

OPERATING PROCEDURE **FOR RELIEF VALVE TEST PANEL**

There are 3 separate systems to the test panel.

1. 0-100 psig;

This is fed through the 0-100 psig regulator (RV 127) and has its own manifold with seven auxiliary valves for functions to be explained later in the procedures.

2. 0-500 psig;

The only use is to pressurize the volume chamber and is fed with the 0-500 psig regulator (RV 126).

3. 0-2000 psig.

The only use is to pressurize the volume chamber and is fed by the 0-2000 psig regulator (RV 125).

The 0-500 and the 0-2000 psig systems share the same volume chamber and are separated during tests with two ball valves. If the ball valves are not properly positioned for either 0-500 psig or 0-2000 psig, the relieving regulator for the other will start relieving, indicating an improper valve line-up. This should be corrected before proceeding.

Each system has its own vent valve and both valves are in easy reach at the left lower corner of the panel. In addition, each volume chamber has a vent valve on it, which would be used after venting with the panel vent valve. The chambers and manifold are vented outside and protected from each other by check valves. Each system has its own relief valve. Some manual valves serve dual purposes, other than off/on, and are tagged with arrows and explanations. The 0-100 psig system also can be pumped down using the small vacuum pump. The vacuum gauge is protected by a check valve near the gauge inlet port. Before any test be sure all regulators are backed off.

Use of the 0-100 psig system

Vent Valve (MV 112)

Vents 0-100 psig manifold and auxiliary test system in use.

Manifold Inlet (MV 113)

This valve has to be open to pressurize the manifold and any of the other functions. The pressure is controlled with the 0-100 psig regulator (RV 127).

0-100 psig Chamber (MV 111)

With the Manifold Inlet (MV 113) and 0-100 psig Chamber valves open, the chamber will be pressurized with the 0-100 psig regulator (RV 127). The chamber is used for testing relief and safety valves, backpressure valves, and pressure building valves. It has ports on the side and top and also has a variable bleed valve.

Dead Weight Tester (MV 110)

With the Manifold Inlet (MV 113) and Dead Weight Tester valves open, tests can be performed with the dead weight tester. The item to be tested or calibrated would be installed on the dead weight tester, close the inlet valve on the tester. Now RV 127, the 0-100 psig regulator, has to be dialed higher than the range of the instrument to be tested. When the test or calibration is done, the tester inlet valve should be closed and the tester vented with the tester vent valve, then RV 127 backed off. Now the calibrated instrument can be removed. Detailed use of the dead weight tester is covered in the owners manual.

Vacuum Manifold (MV 109)

To pump down the manifold all the other valves should be closed, including the manifold inlet so as not to pump against the 0-100 psig regulator. Vacuum then can be used for calibrations using one of the auxiliary test valves (MV 107 A or B) which has 1/4" tygon tubing for connecting to instruments to be checked.

Low Pressure/Auxiliary Test (MV 107 A/B)

Used as above for vacuum testing or with vacuum valved off and MV 113 (Manifold Inlet) open, for pressure testing with the Electro-Pneumatic Tester (60 psig maximum supply) or the Low Pressure Test Panel (5-10 psig supply). Pressure would initially be supplied with the 0-100 panel regulator to either MV 107 A or MV 107 B and then to either of the other testers with 1/4" tygon tubing. Each of the other testers has its own regulator which would then be used during calibrations.

Vacuum Dead Weight Tester (MV 108)

This valve makes calibrating absolute and compound instruments easier because they can be pumped down and pressurized with the Dead Weight Tester. CAUTION - this valve should always be closed when pressure testing anything! Before opening the Dead Weight Tester valve (MV 110) be sure MV 108 is closed, before opening MV 108 be sure MV 110 is closed - a reminder tag is mounted at the Vacuum Dead Weight Tester valve. Pressure in the Dead Weight Tester has to be vented prior to opening MV 108.

Note: The only valves that should be open are the ones you are using. The green valves are ball valves and are open when horizontal and closed when vertical - arrows on the valve tags indicate open position.

Use of the 0-500 PSIG System

All the valves used with the high pressure systems have red handles - when using the 0-500 psig system all four have to be checked. They also have multiple uses and the valve tags indicate use. Before starting any test be sure regulators RV 126 and RV 125 are backed off.

MV 106

When using the 0-500 psig system this valve in the horizontal position isolates the 0-2000 psig regulator (RV 125) and allows pressure to be built up in the test chamber. If left in the vertical position the 0-2000 psig relieving regulator (RV 125) will not allow pressure to be built up in the test chamber.

MV 105

This valve has to be in the vertical position to use the test chamber. In the horizontal position it becomes an isolation valve for the 0-500 psig system.

MV 104

This valve has to be in the vertical position to use the test chamber. In the horizontal position it becomes an isolation valve for the 0-500 psig system.

MV 103

This valve in the vertical (open) position vents the chamber through CV 102, then outside. To use the test chamber it would have to be positioned horizontally.

Close the manual vent valve on the side of the test chamber (MV 115). Pressure in the test chamber will be regulated with the 0-500 psig regulator (RV 126). The relief valve for this system is set at 450 psig.

Use of the 0-2000 psig System

All the valves used with the high pressure systems have red handles - when using the 0-2000 psig system all four have to be checked. They also have multiple functions and the valve tags indicate use. Before starting be sure regulators RV 125 and RV 126 are backed off.

MV 105

When using the 0-2000 psig system this valve in the horizontal position isolates the 0-500 psig regulator (RV 126), and allows pressure to be built up in the chamber. If left in the vertical position the 0-500 psig relieving regulator (RV 126) will not allow pressure to be built up in the test chamber.

MV 104

This valve should be positioned horizontal to use the test chamber. It and MV 105 provide double protection for the 0-500 psig gauge and regulator.

MV 103

This valve is open in the vertical position and vents the chamber through CV 102, then outside. To use the test chamber it would have to be positioned horizontally.

MV 106

This valve has to be in the vertical position to use the test chamber. In the horizontal position it becomes an isolation valve for the 0-2000 psig system.

Close the manual vent valve on the side of the test chamber (MV 115). Pressure in the test chamber will be regulated with the 0-2000 psig regulator (RV 125). The relief valve for this system is set at 1950 psig.

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May 1994