

# High Pressure Balances

The D-110 Pressure Balance is designed to record weight changes under high pressure environments.

## Balance

Thermo Scientific RECORDING BALANCE are known for their sensitivity, accuracy, ruggedness and ease of operation. The RECORDING BALANCE used in the pressure systems have a capacity of 100 grams and can record a weight change up to 10 grams. Though these balances have a sensitivity of 10 micrograms, due to the high density of the gases, the expected sensitivity is 0.1 milligram under high pressure conditions. Please refer to the Thermo Scientific RECORDING BALANCE notes for more details about the balances.

The D-110 uses the D-100 type balance with a RS-232 output to computers. Please refer to the product note about software for further information about the software.

If you presently own a D-100 balance, you can not install it into the Thermo Scientific pressure vessel. The balances used in the pressure vessel have a special high pressure base plate.

## Pressure Vessel

The pressure vessel (see Fig. 1) has the following specifications:

- Pressures up to 107 atmospheres (1575 psi)
- Vacuums to  $10^{-4}$  torr
- ASME certification
- Stainless Steel construction
- No welded joints
- Low internal volume
- Easy sample loading

The pressure vessel is machined from solid type 316 stainless steel. Black anodized spacers minimize dead volume in the balance chamber to ap-

proximately 150 cc's. Six spare connectors are available in the electrical feed through. Once installed, access to the balance chamber is not normally required. The balance chamber, including balance and fitting, weighs 120 pounds. A safety rupture disk, set at 1975 psi, is installed in the base plate. All flow fittings are 1/4 inch Swagelock. We do not supply valving, gas pressure regulators or piping.

Fabrication of the pressure vessel is performed in an ASME certified shop. Inspected and certified by an independent ASME inspector, the vessel carries the appropriate ASME stamps.

## Reactor Tube

Thermo Scientific Pressure Balances are fitted with O-ring couplings which are bolted to the balance housing (see Fig. 2). Bolted couplings allow the reactor tubes to be attached by hand and eliminates the need for heavy bolted flanges. The counterweight chamber is included with the

Pressure Balance. The standard reactor tube supplied has port on the side and bottom. The bottom port has a fitting for the included thermocouple.

Since ASME requires testing of the complete pressure system, a reactor

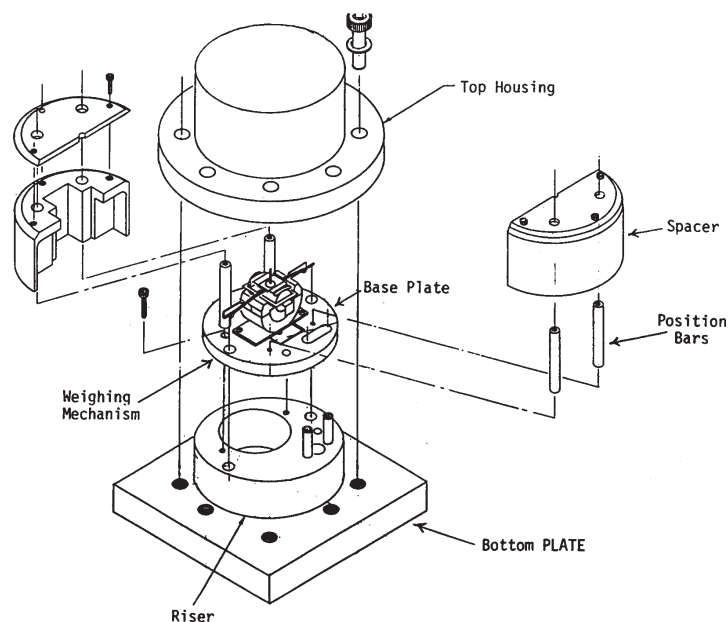
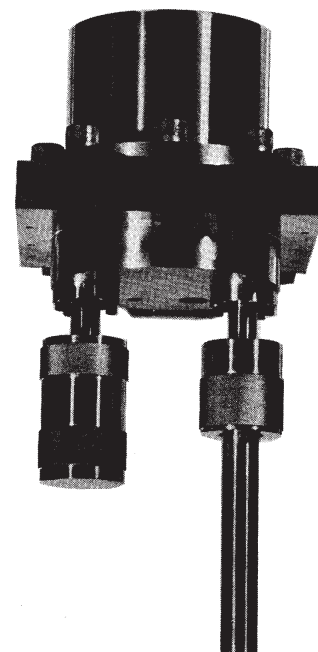


Figure 1: High Pressure Vessel

tube must be supplied with the Pressure Balance. The standard reactor tube is constructed from type 316 stainless steel.

The specifications of the reactor tube are:

Outside diameter:	38.1 mm
Inside diameter:	25.4 mm
Length:	91.4 cm
Internal volume:	390 cc
Weight:	8.3 lbs.
Maximum pressure:	107 atmospheres, 1575 PSI
Maximum temperature:	575 °C

A 316 stainless steel tube is not recommended for operation at any pressure above 575 °C or for use with certain gases. In these cases, a different tube material should be chosen, or the tube should be provided with an appropriate protective coating. It is the purchaser's responsibility to select a reactor tube design suitable for his application. However, all components must be made to ASME specifications and pass ASME code inspection to meet safety regulations in the USA. Non-standard reactor tubes should not be manufactured without prior consultation with Thermo Scientific Instruments and must be manufactured by an ASME approved shop and certified to meet ASME code. Verification by an official ASME stamp is required. Any variation from this procedure is done solely at the user's risk.

### Stand

The Pressure Balance Stand (see Fig. 3) is designed to provide a sturdy support for the Thermo Scientific Pressure Balances. Made from heavy gauge aluminum, the top plate is 5 feet above the base pads. The pressure vessel bolts to the top plate, which includes screws for accurate leveling. To absorb any vibrations from the floor, the base pads CAN be buried in sand boxes. If you have special requirements for a stand, you can buy just the top plate assembly from Thermo Scientific and design

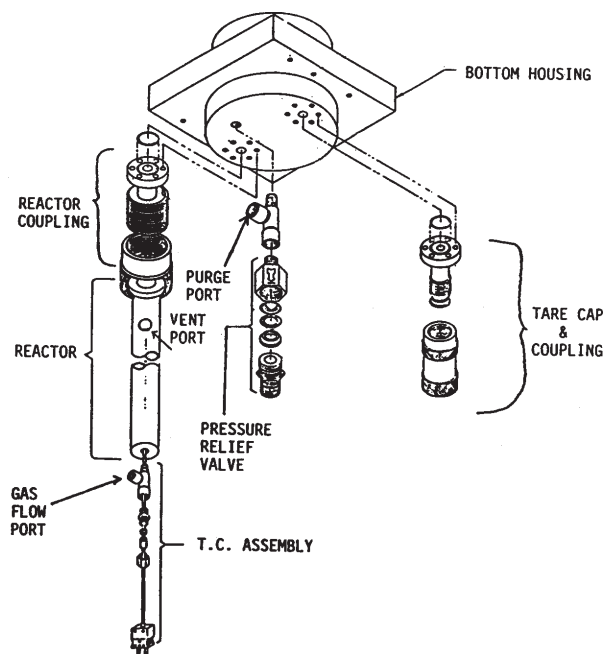


Figure 2: Bottom View of Vessel

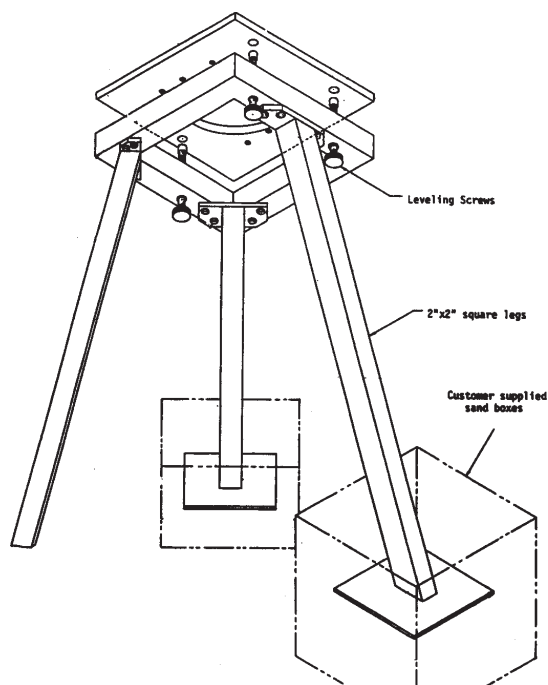


Figure 3: Pressure Balance Stand

your own stand legs.

### Ordering information

D-110 Pressure Balance (Part Number #013110-01) includes D-110 Digital Recording Balance for use with a computer. System includes balance accessory kit, software, pressure chamber, reactor tube, couplings, counterweight chamber, and instruc-

tion manual.

### Options available

Rigid Pressure Balance Stand #010872-01  
Temperature Input Module (D-110) #012986-01

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