



**HUMBOLDT**

**H-1327A & H-1327A.5F**

**Instruction Manual**

**AUTOMATIC MARSHALL  
COMPRESSION & TESTING  
MACHINE with DIGITAL DISPLAY**

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## 1. General

This equipment set consists of five main components:

- 1.1 H-1339 - Testing Machine or equivalent load frame.
- 1.2 HM-2325A - MiniLogger four channel display.
- 1.3 HM-2300.100 - Load Cell.
- 1.4 HM-2310.04 - Linear Strain Transducer.
- 1.5 H-1327B - Mounting Bracket

The equipment meets specifications for the following tests:

ASTM D1559  
ASTM D5581  
AASHTO T245  
British Standard BS 598: Part 107

A Stability Test Mold (Breaking Head), such as the H-1342, must also be available to perform the tests.

To perform the calibration an H-1326B gage block and an H-4454.100; 10,000-lbf (50.0 kN) load ring are recommended.

## 2. Unpacking

Your Marshall equipment was thoroughly inspected before it was shipped and should be ready to operate as soon as you have completed the set-up procedure. Notify Humboldt Mfg. Co. or your local agent and file a claim with any carriers involved if you find any damage to the machine. Unpack all of the equipment carefully to prevent loss of small items or manuals.

## 3. Assembly & Set-up

Place the load frame on a stable surface with space on either side to locate the display. Receptacles must be available for the correct power to be applied. Do not apply power until assembly is complete. Refer to H-1339A Test Machine Manual included. Place the display in position at the side of the frame and connect the transducer's cable to the correct channels by pushing in and locking the DIN plugs - 1 for the Stability load cell and 2 for the Flow displacement transducer, on the rear of the display. Refer to the HM - 2325A Mini Logger User Guide included. After checking for suitable power connect the power to the load frame and display.

## 4. System Configuration

Note: The equipment furnished is pre-configured and calibrated for Marshall Testing with the following units:

Models without suffix .5F are calibrated from 0 - 10,000-lbf and 0 - 0.400". Models with suffix .5F are calibrated from 0 - 50.00kN and 10mm.

If received set up is in the desired units verify calibration with suitable checking gages. If not, toggle to the other units and check as above.

To comply with governing standards and specifications after receipt of the equipment and installation in its place of use, calibration must be verified.

Calibration is accomplished by using reference gages traceable to national standards. A 10,000-lbf (50kN) load ring for force, and for flow a micrometer (or gage blocks) of known accuracy each suitable for verifying  $\pm 1\%$  accuracy of the machine readouts are required.

## 5. Operation

**CAUTION:** The term "automatic" in the product description means data is logged and peak values held, but the test machine does not turn off automatically. We have positioned the cross-head so the upper travel stop switch turns the machine off before a 4.0" breaking head is metal-to-metal, so it will stop before a destructive overload occurs. If you change to a 6.0" breaking head raise the cross-head of the test machine  $1 \frac{3}{4}$ " by adjusting the hex nuts on the vertical threaded rods upward by  $1 \frac{3}{4}$ " and re-tightening to maintain fail-safe shut off.

(Reference: A 4.0" breaking head set-up measures  $18 \frac{7}{8}$ " from the top of the case to the bottom of the cross beam. Add  $1 \frac{3}{4}$ " for the 6.0" breaking head set-up.)

Detailed operation of the test machine and display are covered in the manuals supplied with them as referred to above in these instructions.

On this unit flow is measured by measuring the actual deflection of the breaking head as it is compressed by the lower platen. (Some other models accept the compression machines loaded platen speed as an exact and constant match or ratio to their recorders paper or pen speed and infer flow values accordingly.)

## 6. Step-by-Step Marshall Test Procedure

6.1 Prepare specimens according to applicable standard, e.g., ASTM D1559 and maintain them at  $60 \pm 1^\circ\text{C}$  for 30 to 40 minutes in a water bath or 2 hours in an air oven.

6.2 Clean and lubricate the guide rods, and spray inside surfaces of the H-1342 Breaking Head(s) with release agent (e.g., WD-40) and maintain the head(s) at

21.1 to 37.8°C using heated water bath if needed.

- 6.3 Obtain a specimen and breaking head for adjustments to be made in Step 4.
- 6.4 Turn on the compression machine using the up-down toggle switch and adjust the platen height so the breaking head with specimen just fits under the load sensor. See Fig. 1A. Lift the LSCT flow sensor and turn the breaking head so its longer upright post is under the sensors plunger. See Fig. 1B.

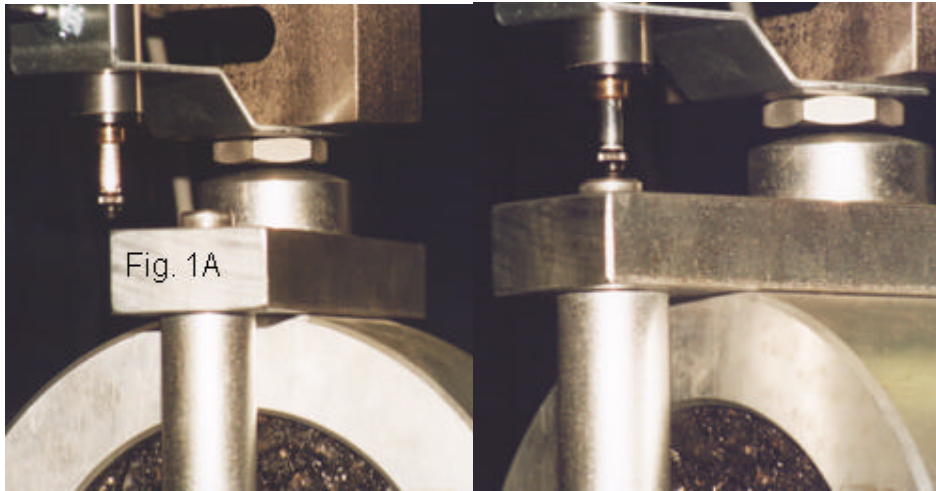


Fig. 1A

Fig. 1B

- 6.5 Turn on the HM-2325A display and Press Setup and then F2 to select Run Test.
- 6.6 You are now ready to subject a properly maintained specimen and breaking head to the Marshall compression test that is to be accomplished in 30 seconds or less after withdrawal from the temperature bath. Use of one glove for hand protection is recommended.
- 6.7 Place a conditioned specimen in the lower segment of the breaking head and place the upper segment over the guide rods so it rests on the specimen. Place the breaking head in the machine as in Fig. 1B.



Fig. 1B

- 6.8 To start the actual test move the compression machine toggle switch to UP so it compresses the specimen. Press F1 (Marshall Test) on display, which will automatically start logging data.
- 6.9 Observe the specimen and after fracture but before the breaking head halves touch.
- Turn the compression machine off.
  - Press End Test, F4-on the display.
  - Reverse the machine travel direction.
- 6.10 Note the peak values held and compare.
- 6.11 Repeat the test for two more specimens and average the three values, then prepare the report according to your standard, e.g., ASTM D1559.

## 7. Maintenance

The machine and transducers should be kept clean and the machine should not be over lubricated. Light oiling with synthetic instrument oil at most is required on exposed spindles and threads; the jack and gearbox are serviced with Berry Bearing No. 630-AA Lubriplate Grease applied thru the grease fitting no more than annually, or when an indication of power train friction appears.

## 8. Warranty

Humboldt Mfg. Co. warrants its products to be free from defects in material or workmanship. The exclusive remedy for this warranty is Humboldt Mfg. Co., factory replacement of any part or parts of such product, for the warranty of this product please refer to Humboldt Mfg. Co. catalog on Terms and Conditions of Sale. The purchaser is responsible for the transportation charges. Humboldt Mfg. Co. shall not be responsible under this warranty if the goods have been improperly maintained, installed, operated or the goods have been altered or modified so as to adversely affect the operation, use performance or durability or so as to change their intended use. The Humboldt Mfg. Co. liability under the warranty contained in this clause is limited to the repair or replacement of defective goods and making good, defective workmanship.

**CAUTION:** Keep hands, clothing and other objects away from moving parts when the machine is in operation.