Standard Operation Procedure for FR-3E Hardness Tester

Part I: Setting of test conditions

1. Select and attach an indenter and anvil to meet the materials and shape of the specimen.
2. Place the specimen on the anvil and then select the measurement mode by pressing the D/B (diamond/ball) button on the front panel according to the indenter to be used. If you use a plastic specimen, press the PLASTIC button.
3. Set the test load with the load selector knob. The selected scale will be displayed on the scale display on the front panel.
4. Select the minor load: 3kgf minor load for the Rockwell- Superficial hardness test; 10kgf minor load for the standard Rockwell hardness test. (Tell the lab assistant if you want to adjust it.)
5. Select whether or not to activate the automatic start function. To activate it, press the AUTO button. The AUTO indicator LED will be lighted. To deactivate the automatic start function, press the AUTO button again.
6. Set the dwell time.
   a. Pressing the DW TIME button displays LDT (length of Dwell Time) on the scale display and the dwell time (sec) on the measurement data display.
   b. Press the INC button to increase the dwell time 1 second (up to 99 seconds.) Pressing the DEC button decreases the dwell time 1 second (down to 0 second). Set a desired dwell time with buttons. To complete the setting, press the SET button.
7. Set the Upper Limit and Lower Limit. When OK/NG (measured data is within/out of the present hardness limits) judgment is needed, set limits with the HI, LO, DEC, and INC buttons. When OK/NG judgment is not applied, there is no need to set limits. (Factory Setting: HI=130, LO=0. In this case, when measured data is within 0 and 130, the OK LED- green remains constantly lighted.)
8. Set the Conversion Scale. To convert measured Rockwell data to the other hardness scale, press the CONV button and then select a conversion scale with the INC and DEC buttons. The converted values conform to SAE and ASTM. Converted value may not coincide depending on the specimen material and testing conditions. Please use the converted data as a reference. HV (Vickers scale) is preset as a conversion scale at the factory.
9. Now the setting is complete. These test conditions will not be lost even after the power is OFF.
Part II: Measurements

1. Rotate the elevating handle to bring the specimen close to the indenter.
2. As soon as specimen contact indenter, the minor load indicator LED will light up, one by one, from the lowest to highest.
3. The SET indicator LED will go ON, the value displayed on the data display changes and is set between 290.0 to 299.9. If the value exceeds 299.9, the OVER indicator LED goes ON. In such case, change the measuring point to retry measurement.
4. If the automatic start function is activated, in approximately 1 second, the load is automatically applied. If it is not activated, press the START button to apply the load.
5. After the dwell time has passed, the test load will be automatically released and the unit will display hardness data.
6. Turn the elevating handle counterclockwise. The specimen table goes down and 0.0 will be displayed.

**CAUTION!**

1. Make sure the specimen is clean and stable on the anvil. Otherwise accurate data cannot be obtained.
2. If the OVER indicator LED goes ON, the automatic start function will not be activated.
3. Before operating the tester, please check to see whether the value on the display is 0.0. If not, press the RESET button to obtain a 0.0 setting.