

JOHANSON **INDICIZER**

SYSTEM

Hang-Up Indicizer® Set-up

1. Unit is ready to be plugged in with the provided power cord to an 110V power source and switched on.
2. You may use your finger, a stylus or any other non-marking tool on the touch- screen.

Test Station Recommendations

The following is a list of set up requirements and support equipment we recommend for the Johanson Indicizer® System.

1. Bench space for the Indicizer® (approximately five-feet long and three-feet high to make the reading of the display easy)
2. Surge protected 110 volt strip
3. Electronic balance or scale that will read up to at least 800 grams ± 0.1 grams minimum.
4. Wide mouth containers (four inches or larger with sealable covers to contain volatiles between tests)
5. Plastic Ziploc bags to keep the sample in.
6. Tray for sample preparation (Approximately 12 by 14 inches)
7. Clean rags
8. Vacuum with brush attachment for general cleanup.

Items provided with your Indicizer® to assist in testing; metal whisk, small brush, spatula, spoon and reference material.

Material Selection Preparation

Sample Selection

Always select a fresh sample representing the material that will give you problems in your equipment. This usually means the finest material. Be aware that moisture content will affect your results. There is a moisture content that produces worst-case conditions, which will become better if the material is drier or wetter. If your moisture content varies significantly then you should measure your material over the entire range of expected moisture levels.

Never collect samples from the edge of a pile. Natural segregations will usually bias the samples on the coarse side.

Duplicating Process Conditions

You should duplicate the moisture, humidity, temperature and any special atmospheric conditions existing in your equipment.

Preparing the Material

Effective material preparation and loading can be achieved with the reference material provided with our Indicizer®.

We suggest that the reference material, or your material be placed in a re-sealable and airtight container or bowl such as a Tupperware container. This will allow the material to not only be stored during testing, but also add to the ease of fluffing, scooping and return dumping.

It is recommended that the material get “fluffed” before it is placed in the cell. This can be done by whipping the material (with the provided whisk) for five to ten seconds or until the major lumps have been broken up and the material appears to have reached a homogeneous state. The wire whisk is effective on free flowing to moderately cohesive materials. For extremely cohesive material, you will have to pull apart large lumps with your fingers. With free-flowing material segregation of fines and coarse particles must be avoided during sample preparation. In this case, you should load the cell in such a way as to distribute fine and coarse particles on the cell’s cross-section.

Loading the Cell

Once the material has been fluffed you can proceed with loading the test cell. Make sure the cell is brushed clean from previous tests and that free piston is engaged in its correct direction and secure against the inner shearing lip.

Use a spoon to load the material into cell making sure to distribute the solids, uniformly across the test cell, while filling the voids as much as possible. Do not pour into or shake the test cell during this filling process because it tends to segregate the particles. Also refrain from tamping or pressing powdered materials. This can consolidate and compact the sample prematurely.

Hang up Test procedure

If the Machine has a Test failure at any time please turn machine off and on again and start test procedures from the beginning. If this continues please contact Johanson Innovations.

To run Arching or Ratholing Test

A1. Select Run Test from main menu. Screen will read [Initiating System](#)

A2. Enter [Material ID](#) using Touch Screen and press [Enter](#)

A4. If Density Parameters are known press [Yes](#), if unknown select [No](#) and go to Density Parameter Instructions B1.

A5. Enter [Density parameters](#) including Gama0, Sigma0, and Beta

A6. Display will read [Standard, Sci Mode 1 and Sci Mode 2](#). Make Selection.

A7. Machine will ask if you would like to run Temperature Cycle? If Yes, go to C1 and press [Yes](#), if no press [No](#) and go to next step. If you are running standard tests continue with A8. If running Sci Mode 1 continue to D1. If running Sci Mode 2 continue to E1.

A8. Enter [Time of Consolidation \(TC\)](#) in minutes. Press [Continue](#) (usually for standard indices use .33.)

A9. Machine gives a brief message. Press [Continue](#).

A10. Enter [Bin Diameter](#) in Feet. Press [Continue](#). For standard Indices use 10 feet.

A11. Enter [Outlet Diameter](#) in Inches. Press [Continue](#). For standard Indices use 12 inches.

A12. Touch Screen will read [Arching, Rathole or Main Menu](#)

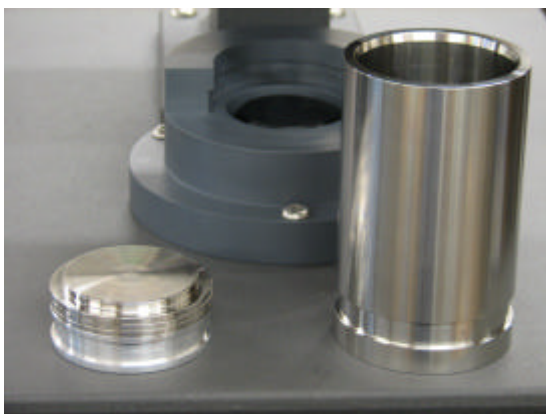
A13. Press [Arching or Rathole](#).

A14. Remove Cell from Base. Clean outer piston and shroud and then turn outer shroud to lowest position. Press [Continue](#).



Shroud in Lowest Position

A15. Prepare cell to receive material by removing material, cleaning cell and moving free piston to the up most position. Press [Continue](#).



Cell and Free Piston

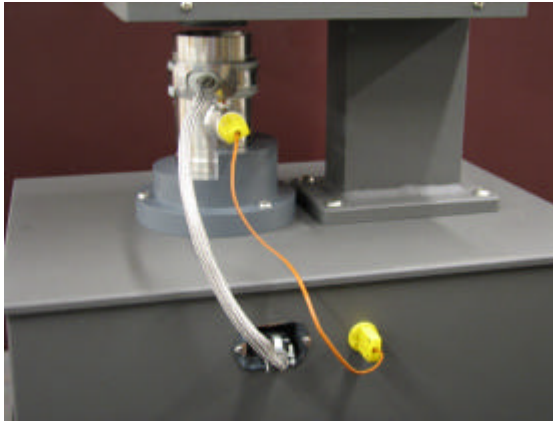


Free Piston in Up-most Position, Top view



Free Piston in Up-most position, Bottom View

A16. Fill cell with required material distributing evenly across the cell and keeping the free piston in the up most position. Return cell to base. Do not shake cell to distribute material. If more material is needed than will fit in the cell, gently consolidate the material in the cell and add more. Press [Continue](#). For Temperature Cycle Tests reconnect the heater cables and press [Continue](#).



Heater Cables Reconnected

A17. Screen reads: **Please wait and test is now running. If you forget to insert the cell and the motors begin to run, it is important that you turn the machine off and then on again to abort the test.** Screen will count down time remaining. At this point you can abort by cancel or start failure early by pressing start failure now. At the end of the countdown the upper motor will retract to pre-failure position. Turn the outer shroud to the up most position which is to the right thus exposing the inner piston. Press **Continue**.



Shroud in Up-most Position

A18. Screen will read **Please wait** as the sample is failed.

A19. Results will be displayed. Record Density parameters for future testing of this exact sample.

A20. Press **Continue** after recording results. Machine is now ready to do additional tests with the same density parameters.

To run a Rathole test Press Rathole and go to step A13

Density Parameter Instructions

B1. After pressing **No**, Meaning that you do not know the density parameters and wish to run the Density Test, Select the type of test you plan on running with these density parameters, in this example we will press **Standard**. This will allow the machine to calculate density parameters for standard indicies with known bin diameter, outlet diameter and hopper angles.

B2. Select Standard display will read: **Would you like to run Temp Cycle?** Select **No**. If **Yes** go to C1. The machine will ask you to **Enter a time of consolidation** at which you will be running the test. For instantaneous test **Enter .33** and press **Continue**.

B3. Press **Continue** again with next screen. Note that if you plan on doing overnight tests with an 8 hours consolidation time you will first need to know the density parameters for an 8 hour consolidation time. This is why the machine could be allocated for twice the time entered.

B4. Enter bin diameter in feet. For Standard test enter **10**. Press **Continue**.

B5. Enter outlet diameter in inches. For standard test enter **12**. Press **Continue**.

B6. Fill cell with material above the top with the free piston in the up most position and strike level. Remember to tare the scale with the cell on it. Weigh and record net weight of sample.

Return cell to base. Make sure the outer shroud is turned to lowest position so that it is even with inner piston. Press [Continue](#)

B7. Enter [Sample weight in grams](#)

B8. Screen reads [Please wait](#). Motors will move to test position and will run density test.

B9. Screen will read: [Arching, Rathole, or Main Menu](#)

B10. Press which test should be run and continue with A13.

Temperature Cycle Testing

C1 Enter [Tmax](#) in Deg. F. Press [Continue](#). The maximum temperature allowed is 130 deg.

C2. Enter [Tmin](#) in Deg F. Press [Continue](#). This should be no lower than the environment where the Indicizer is located.

C3. Enter [cycle time](#) in minutes. Press [Continue](#). This is the length of the cycle which has 4 phases.

C4. Enter [number of cycles](#). This is the number of times you would like the machine to repeat these test conditions before failure. Press [Continue](#).

C5. Touch Screen will display message reminding you that the sum of the fraction of time spent on each phase must equal one. If they are not equal to one each phase will be set to .25. Press [Continue](#).

C6. Enter [Fraction of Cycle for Ramp up](#). Press [Continue](#). In this phase the temperature will gradually increase and will reach Tmax at the end of this phase.

C7. Enter [Fraction of Cycle for Tmax Soak](#). Press [Continue](#). In this phase the temperature will be held at Tmax if possible. For example if Tmax is lower than ambient temperature then Tmax might be exceeded.

C8. Enter [Fraction of Cycle for Ramp down](#). Press [Continue](#). In this phase the temperature will gradually decrease and will reach Tmin if possible at the end of this phase. If Tmin is lower than ambient temperature then Tmin might not be obtainable.

C9. Enter [Fraction of Cycle for Tmin Soak](#). Press [Continue](#). In this phase the temperature will be held at Tmin if possible. If Tmin is lower than ambient temperature then Tmin might not be attainable.

C10. Enter [time of Consolidation](#) in minutes. Press [Continue](#). This should be equal to the cycle time multiplied by the number of cycles. For example: if the cycle time is 120 min and you are running 7 cycles you should have a consolidation time of 840 minutes. Otherwise, the sample will be failed during one of the phases instead of at the end of the last phase.

C11. Go to A9

Scientific Mode 1 (Multiple Compaction Pressures, One Strain Rate)

D1. Enter number of [Sigma values](#) 1-4. Press [Continue](#). This number indicates how many tests will be run before results are displayed. For example: you could select 4 sigma values and run the same pressure 4 times or 4 different pressures. You might want to do one sigma value at a time get results, and then repeat the test.

D2. Enter [compaction pressure](#) for point 1, 2, 3, and 4 pressing [Continue](#) each time.

D3. Enter [time of consolidation](#) (Tc). Press [Continue](#).

D4. Machine gives a brief message. Press [Continue](#).

D5. Enter failure [strain rate value](#). Press [Continue](#). This is the speed at which the machine fails the sample. Each 1000 is approximately equal to .001 inches per second. In Standard tests the machine uses a value of 4000. It is recommended that you also use this value unless you are trying to gain data in this area.

D6. Enter [PHI value](#). Press [Continue](#). Default value for standard tests is 22.5.

D7. Complete steps A14 to A18 and D5 to D6 for each compaction pressure.

Scientific Mode 2 (One Compaction Pressure, Multiple Strain Rate)

E1. Enter [Sigma value](#) in PSF. Press [Continue](#).

E2. Enter [Time of Consolidation](#) (Tc) in minutes. Press [Continue](#).

E3. Enter [PHI data](#). Press [Continue](#).

E4. Complete steps A14 to A18 and E3 a total of three times to complete tests and get results to display.

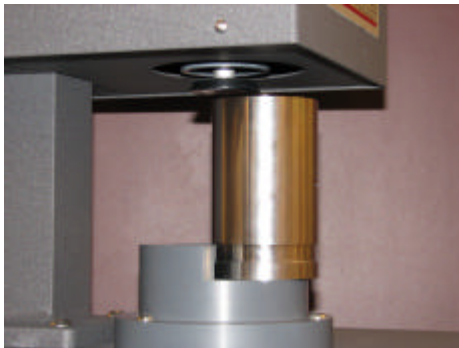
Calibration of Cell Top

F1. From main menu press Calibrate. There will be three options: [Cell Top](#), [Load Cell](#) and [Lower Limit](#). Press [Cell Top](#). Machine will initiate.

F2. Remove cell from base. Turn outer shroud to right to expose inner piston. Rest cell off center on test base. Press [Continue](#).



Shroud in Up-most Position



Cell Off Center on Test Base

F3. Upper piston will move down making contact with cell to establish cell top position. Screen will return to main menu.

Calibration of Load Cell

G1. From main menu press [Calibrate](#). There will be three options: [Cell Top](#), [Load Cell](#) and [Lower Limit](#). Press [Load Cell](#). Machine will initiate.

G2. Remove cell from base. Turn outer shroud to right to expose inner piston. Gently turn machine upside down. Press [Continue](#).



Indicizer turned upside down with Small Load

G3. Place a small load on inner piston between 75 and 200 grams. Press [Continue](#).

G4. Enter [weight](#) in grams on touch screen. Press [Continue](#).

G5. Place a large load on inner piston between 800 and 2000 grams. Press [Continue](#).

G6. Enter [weight](#) in grams on touch screen. Press [Continue](#).

G7. Load Cell is now calibrated. Turn Shroud to lowest position so that it is even with piston. Gently turn machine to upright position.

Calibration of Lower Limit

H1. From main menu press [Calibrate](#). There will be three options: [Cell Top](#), [Load Cell](#) and [Lower Limit](#). Press [Lower Limit](#). Machine will initiate.

H2. Slide free piston into bottom of cell and push to its up-most position.



Free Piston in Up-most Position, Top View



Free Piston in Up-Most Position, Bottom View

H3. Place cell on base. Press [Continue](#). Touch screen reads [Please wait](#). Lower ram in now finding Lower Limit. Touch screen will display main menu while bottom ram retracts. After about 20 seconds the bottom ram will have fully retracted and you can now remove test cell from base. Note: Free Piston is now in the bottom of the cell.