



MiniAV Series Quick Start Guide

Introduction:

Thank you for purchasing the miniAV series automated viscometer. The popular CANNON minAV family includes the miniAV, the miniAV-HT and the miniAV-X. This quick reference is intended to provide the operator with key information on setting up and operating all three of the miniAV series instruments.

- Function
- Specifications/Installation
- Calibrating
- Cable Installation
- Running a Sample



Function

miniAV-HT Function

The miniAV-HT is a fully automated, single-sample, benchtop viscometer for determining the kinematic viscosity of asphalts at 60 °C and 135 °C. The Ubbelohde-style tube covers a 100-fold viscosity range at values between 0.5 mm²/s (cSt) and 10,000 mm²/s (cSt). The miniAV-HT offers AASHTO T201, ASTM D2170, ASTM D445/D446, ISO 3104/3105, IP 71 method precision. Common applications include asphalt binders, asphalt cements and asphalt cutbacks.

miniAV Function

The miniAV is a fully automated, single-sample, benchtop viscometer for D445 testing. The Ubbelohde-style tube covers a 100-fold viscosity range at values between 0.5 mm²/s (cSt) and 10,000 mm²/s (cSt) from 15 °C to 100 °C (with available options). Meets ASTM D446/ISO 3105 requirements.

miniAV-X Function

miniAV[®]-X is a fully automated, single-bath, benchtop viscometer with a 10-position sample handler for unattended D445 processing. The Ubbelohde-style tube covers a 100-fold viscosity range between 0.5 mm²/s (cSt) and 6,000 mm²/s (cSt) from 15 °C to 100 °C (with available TE cooler).

miniAV Series Apparatus

The miniAV series test apparatus consists of the same three major units: the Bath Unit, the external Power Supply, and the Waste Receiver as shown in Figure 1.

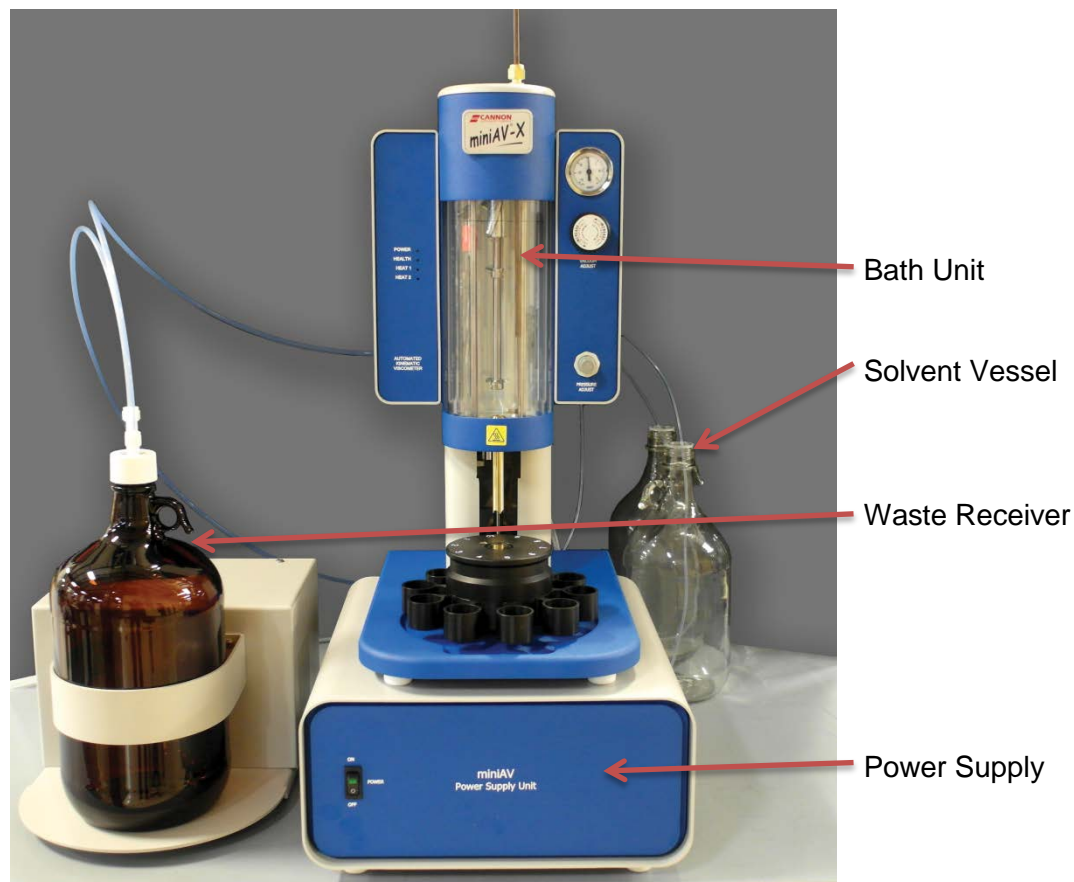


Figure 1: miniAV Series Components, assembled

miniAV Specifications:

Instrument Specifications	
Dimensions (W x D x H)	Unit: 25.4 cm x 30.5 x 59.8 cm (10 in x 12.0 in x 23.5 in) Power Supply: 33 cm x 39.6 cm x 17.2 cm (13 in x 15.6 in x 6.8 in) Waste Receiver: 33 cm x 39.6 cm x 17.2 cm (13 in x 15.6 in x 6.8 in)
Weight	Unit: 12.5 kg (27.5 lb) Power Supply: 11 kg (24 lb) Waste Receiver: 6 kg (13 lb)
Shipping Weight	64 kg (140 lb)
Data Output	RS-232 via DB-9 connector
Temperature Range and Accuracy	15 °C to 100 °C ± 0.01 °C* <i>*temperatures within 5 °C of ambient and below require bath cooling</i>
Viscosity Range	0.5 mm ² /s (cSt) to 6,000 mm ² /sec (cSt) in 100-fold increments (depending on viscometer tube selection). Fast-run tubes also available.
Maximum Throughput	12 tests per hour
Automated sample capacity	1
Minimum Sample/solvent volume	5 mL sample*/15 mL solvent per test <i>*as little as 3 mL with fast run tubes</i>
Operating Conditions	15 °C to 30 °C, 10% to 75% relative humidity (non-condensing), Installation Category II, Pollution Degree 2
Electrical Specifications	100 VAC; 50/60 Hz; 115 VAC, 50/60 Hz; 230 VAC, 50/60 Hz; 1,000 watt power consumption
Compliance	CE Mark; EMC Directive 2004/108/EC; Low voltage directive (2006/95/EC); HI-POT (1900 VDC, 60 sec.); ROHS

Installation

The miniAV series setup can be accomplished in just a few minutes by following the instructions in the installation guide provided with the instrument. Please refer to your instrument instruction manual and the diagram at the end of this document, Figure 4.



Note: Once the instrument and VISCPRO II are successfully installed, a calibration must be performed at the wash temperature and each temperature at which the user wishes to run samples.

Preparing the miniAV Series for Testing

Calibrate the miniAV Instrument

Temperature calibration is essential for the proper operation of the miniAV after installation. The calibration process consists of sending a temperature and its offset to the instrument, then waiting for the temperature to equilibrate. Equilibration is complete when the instrument stays within 0.02 °C for 150 seconds. To calibrate temperature on the miniAV series, follow the instructions below.



Note: It is necessary to log in as a manager to complete the calibration.

1. Click **Configure** from the primary display and select **Instrument Settings** from the **Configure** options for the desired instrument.
2. Click **Tray Settings: Tube and Bath** option.
3. Enter the temperature you wish to calibrate in the **Bath Temp** input box and then press **OK** to save new target temperature.
4. Click **Service** from the primary display and select your desired instrument.
5. Click **Temperature Calibration** option. The **Temperature Calibration Data** window will open.



Note: The value in the Calibration Temperature box should display the temperature the user selected in the tray settings.

6. Place your reference thermometer inside the bath.
7. Wait for the machine to equilibrate at the desired temperature.
8. Enter the current temperature reading to the nearest 0.01 °C from the reference thermometer into the **Reference Temperature** display window as shown in Figure 2.

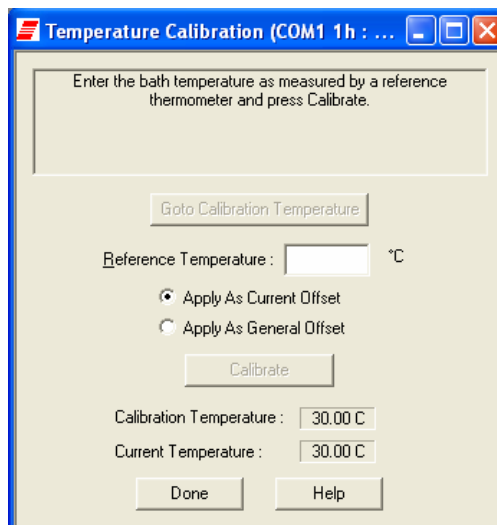


Figure 2: Reference Temperature Window

9. Click the **Apply as Current Offset** option button (always click the radio button for the **Apply as Current Offset** unless directed otherwise by a CANNON service engineer).
 10. Click the **Calibrate** button and wait for the machine equilibrate using the offset.
 11. Repeat this entire process for each temperature at which the user wishes to run samples.
- Occasionally a temperature may require several calibrations in order to get an accurate calibration. The **General Bath Offset** is a factory-preset value affecting temperature control at all temperatures and should not be changed. Once all desired running temperatures have been calibrated, the user must train the tube sensors at each of these temperatures.

Train the Tube Sensors

MiniAV series tube sensors must be trained in order for the instrument to properly perform test functions. To train the miniAV series sensors, follow the instructions below.



Note: Depending on the security level settings, it may be necessary for you to log in as a manager to complete the calibration.

1. To train tube sensors, click **Service** from the primary display and select the **Train Tube Sensors** option for the desired instrument. This opens the **Train Tube Sensors** window as shown in Figure 3.

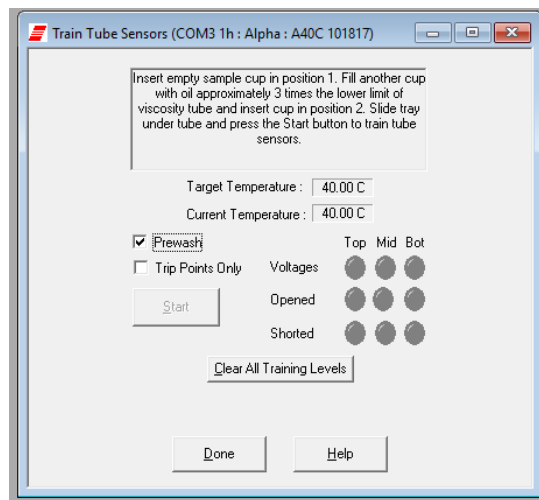


Figure 3: Train Tube Sensors Window

2. Wait for the machine to equilibrate at the desired temperature.
3. Click the **Train at Wash Temperature** checkbox if wash temperature training is desired.

Select the desired training parameters as follows:

- **Prewash:** Click the **Prewash** option if the tube is not clean and dry. VISCPRO will initiate a cleaning cycle using current wash configuration settings prior to initiating the sensor training procedure.



Note: The instruction panel will instruct you to insert an empty vial in order to perform the prewash.

4. Raise the empty vial to enable the **Start** button. Or, for the miniAV-X, place in position 2.
5. Click the **Start** button.

After the prewash is complete, the instrument will then obtain the voltages for each sensor at each of the specified temperatures.

The instruction panel will then instruct you to insert a vial containing an oil with a viscosity three times the lower limit of the tube and raise it into the ready position for determining trip points.

Once all voltages and trip points have been obtained for all desired temperatures, the tube sensors have been trained.

Cable & Tubing Installation – Back of miniAV Series

The back cable/piping installation of the miniAV series is outlined in the diagram Figure 4.

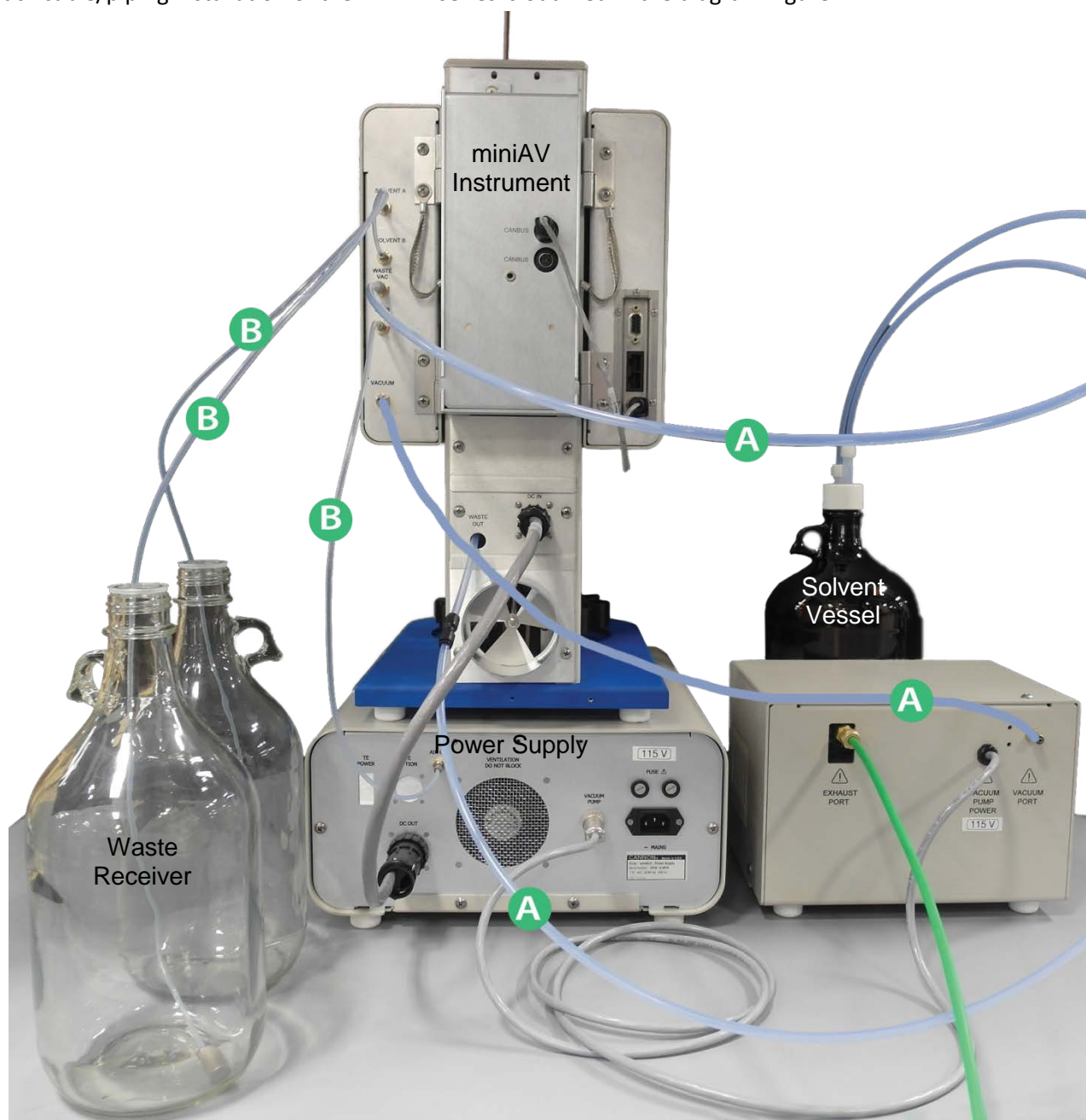


Figure 4: miniAV Cable & Tubing Installation Guide

A = 6 mm transparent tubing

B = 1/8" transparent tubing

Running a Sample

1. If the miniAV instrument is powered off, ensure MAINS power cable is plugged in and turn the instrument on by switching the power switch on the front of the power supply to the ON position.
2. Turn on the computer and load the VISCPRO software by clicking the desktop icon.
 - a. If the software is already open, click **Main** from the menu bar and click **Poll for Instruments** from the **Main Menu** bar. This establishes connection between the computer and instrument.
 - b. Permit the bath to stabilize at test temperature before testing samples.

- Pour sample material into the glass vial(s). For 20 mL vials, fill only half full, as the viscometer tube will displace sample in the vial. Approximately 10 mL of sample should be sufficient for testing in either bulb of the viscometer.



Caution: Do not overfill the sample vials as sample overflow may create problems for the tube cleaning cycle.

- Place the sample vial in the holder underneath the viscometer tube.
- Raise the holder until the magnetic coupling engages. The viscometer tube tip will be touching the bottom of the sample vial. Refer to Figure 5.



Figure 5: Raised Sample Vial

- Check the thermometer in the temperature bath to make sure the bath is holding the proper temperature. If necessary, calibrate the miniAV temperature control probe using the temperature calibration procedure in Chapter 3 of the Operator's Manual.
- Open the **View Instrument Group** window (if it is not already open) by clicking **View Instrument** from the Main menu and selecting the desired instrument group from the list box. Refer to Figure 6.

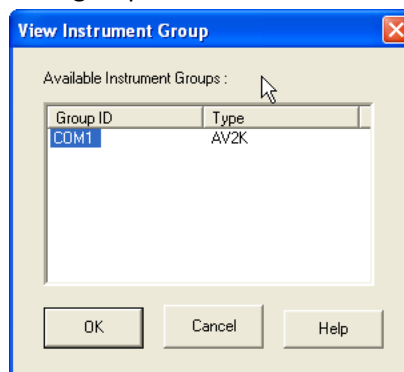


Figure 6: View Instrument Group Window

- Select the desired **Group Id** and Click **OK** to display the **Sample Input View** as shown in Figure 7. Then click the tray corresponding to the desired miniAV.

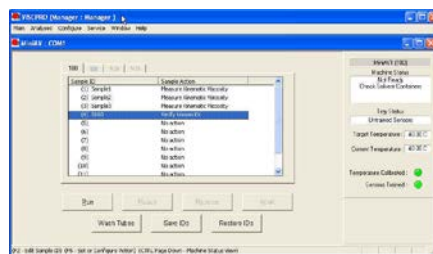


Figure 7: Sample Input Window

- Double-click on **Sample ID (1)** with the left mouse button to access the sample ID data entry field (or press **2**).

10. Enter sample ID information in the sample list box using your computer keyboard. After you have typed the sample ID, press the Tab key to complete the entry and move the cursor to the next Sample ID field. Or press Enter to complete the entry.

Once sample information is entered, the software automatically assigns a sample action, **Measure Sample Viscosity**, for the sample. If you do not enter a sample ID, the sample is automatically labeled **Unknown**.

To select or change a sample action, highlight the appropriate Sample ID(s) using the mouse or arrow keys, then click the RIGHT mouse button to access sample action options as shown in Figure 8.

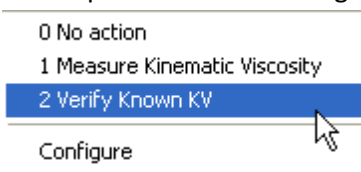


Figure 8: Sample Actions

Select the desired action by highlighting it with the mouse and clicking the left mouse button.

If **Verify Known KV** is selected as the test option for a sample, the **Viscosity Action** window will open automatically. Enter the necessary check standard data, including the **Check Standard** viscosity from the standard bottle, and click **OK** to complete data entry. To revise or confirm standard data, right-click on the desired sample ID from the list box and select **Configure** from the popup menu choices.

11. Continue entering sample information for all desired trays. When sample ID data entry is complete, check the **Tray Status** window to verify all trays are ready for testing.
12. Click on the **Run** button at the bottom of the **Sample Input** window. The **Select Trays** window will open if more than one miniAV instrument is online.
13. If necessary, click on the check box(es) to select the desired prepared “tray” (sample sequence) for automatic testing. For the miniAV, a tray corresponds to the miniAV instrument. Then click **OK** to begin the miniAV test(s).

Pause a Test

To temporarily halt testing for a given tube/sample, click the **Pause** button from the **Sample Input** window. Then select the desired tray (miniAV instrument) and pause action(s) from the **Select Trays** window (**Pause Now** will immediately pause test actions; **Pause after current sample** will pause testing after the current test is complete). Click **OK** to pause testing for the selected tray(s).



Note: If the test was paused prior to the initiation of the Wash cycle, drop time data for that sample will be discarded.

Resume a Test

To resume test actions for paused trays, click the **Resume** button from the **Sample Input** window. Then select the desired trays from the **Select Trays** window. Click **OK** to resume sample testing.

Abort a Test

To permanently halt testing for a given tube/tray, click the **Abort** button from the **Sample Input** window. Then select the desired trays from the **Select Trays** window. Click **OK** to abort testing for the selected tray.



Note: Aborting a test clears all sample test information for that tray. If test actions are aborted, it is the responsibility of the user to restore the instrument to a safe state before running tests.

Conclude a Test

After the automatic testing has completed, make certain that:

1. The sample vial carrier is in the lowered position.



Warning: Use appropriate caution when handling warm sample vials to avoid the possibility of injuries and burns.

2. The Machine Status (as indicated in the VISCPRO **Sample Input Machine Status** window), is **Ready**.
3. The **Tray Status** for the tube, as indicated in the VISCPRO **Sample Input Tray Status** window, is **Idle**. Kinematic viscosity for any tested samples will be displayed in the **Sample Action** column in the action list for the selected tube.
4. Press **Resume** to clear data and begin testing the next sample as shown in Figure 9.

Sample ID	Sample Action
(1) Sample1	KV = 0.8800 cSt
(2) Sample2	Measure Kinematic Viscosity

Figure 9: Next Sample